Annex 4
to the Procedure of the transfer of documentation
for provision an opinion on the assessment of the
environmental impact
and financing of the environmental impact
assessment

REPORT
ON THE ENVIRONMENTAL IMPACT ASSESSMENT

“Reconstruction of Maneuvering Area No. 2” of SE International Airport ‘Boryspil’”

20199134502
(registration number of the case on
environmental impact assessment
of the planned activities)

Kyiv 2020

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5. Description and assessment of the possible environmental impact of the planned activity, in particular, the size and extent of such impact (land area and population that may be affected), nature (a transfrontier impact, if any), intensity and complexity, probability, expected beginning, duration, frequency and inevitability of the impact (including direct and any indirect, incidental, cumulative, cross-border, short-term, medium-term and long-term, permanent	

and temporary, positive and negative effects) caused: performance of the preparatory and construction work and implementation of the planned activity, including (if necessary) works on dismantling after completion of such activity; use of natural resources, in particular lands, soils, water and biodiversity, in the process of implementation of the planned activity; emissions and discharges of pollutants, noise, vibration, light, heat and radiation pollution, radiation and other influencing factors, as well as operations in the field of waste management; risks to human health, cultural heritage sites and the environment, including due to the possibility of occurrence of emergencies; the cumulative impact of other existing facilities, the planned activity and facilities, in respect of which the resolution on the implementation of the planned activity was obtained, taking into account all the existing environmental problems related to areas of special environmental importance, which may be affected or on which natural resources can be used; the impact of the planned activity on the climate, including the nature and scale of greenhouse gas emissions, and the sensitivity of the activity to the climate change; technology and substances used.	
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7. Description of proposed actions aimed at prevention, avoidance, reduction, and elimination of significant adverse impact on the environment, including (if possible) the compensatory measures.	
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9. An identification of all difficulties (technical deficiencies, lack of sufficient technical means or knowledge) identified during the preparation of the environmental impact assessment report.	
10. All comments and suggestions of the public regarding the proposed operations, scope of research and the level of detail of information to be included in the environmental impact assessment report (a table with information on full consideration, partial consideration or reasonable rejection by the business entity of comments and suggestions provided in the process of public discussion of the scope of research and the level of detail of information is attached).	
11. Summary of programs for monitoring and control of the environmental impact during the implementation of the planned activity, as well as (if necessary) post-project monitoring plans.	
12. The summary of non-technical nature of information specified in subparagraphs 1–11 of this paragraph is intended for the general public.	
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1. Description of the planned activity

1.1. Description of the place of the planned activity (attachments: copies of the detailed plan of the territory and situational diagram indicating the sources of the environmental impact, information signed by the business entity on the availability of own or leased production areas (premises) required for conducting business activities, together with copies of documents confirming the right of ownership or lease of production areas (premises))

The Boryspil airport is the only airport in Ukraine that successfully competes with major European hub airports. According to the International Airport Council (ACI EUROPE), in 2018, the Boryspil airport topped the rating of growth among major European airports (ranked first in the group of European airports serving from 10 to 25 million passengers).

The airport is a full member of relevant international and national associations: Airports Council International (ACI Europe), Ukrainian Air Transport Association (UATA), Chamber of Commerce and Industry of Ukraine, Ukrainian Association of Quality, Organization of Employers of Enterprises providing Transport Services, Association of Taxpayers of Ukraine, etc. and is guided in its activity by standards and practices of the International Air Transport Association (IATA), International Civil Aviation Organization (ICAO).

Demand for airport services is supported by a favourable location at the intersection of a number of interstate transport routes (connecting Asia with Europe and America), proximity to the capital, availability of the modern infrastructure and implementation of a hub development strategy.

The airport infrastructure includes two runways (4 km and 3.5 km long) that allow receiving aircraft of any type, without restrictions on weather and light conditions, as well as 2 permanently operated terminals (D and F).

The Boryspil airport is the only one in Ukraine, from which scheduled transcontinental flights are performed.

The Boryspil airport strives for perfection by developing the infrastructure, attracting new airlines and improving the quality of service. In 2019, the Cabinet of Ministers of Ukraine approved the Concept of Development of the Boryspil International airport until 2045, the main priorities of which are the development of the infrastructure and introduction of modern services (ref. to Annex No. 1).

The importance of the airport development can be determined by three main provisions:

– Creation of new jobs – the increase in air traffic will increase the number of new jobs not only in the airport, but also in other related business projects in the area of the Boryspil airport and the city of Boryspil;

– Further development of tourism – as the airport is the main air gate of Ukraine, Kyiv and its main airport “Boryspil” are the most known brands; the increase in the number of tourists will positively influence the growth of the GDP of the country and this region;

– investments – accessibility and openness are an important factor for foreign companies in deciding on placement of their offices.

State Enterprise “International Airport ‘Boryspil’” is located in the South-West of the city of Boryspil in the Kyiv region. Administratively, it is located at the following address: Kyiv region, Boryspilsky district, the village of Hora.

The airport territory is in operation since 1959.

The airfield territory is about 1000 ha (of which about 220 ha with hard pavement), where the following objects are located and function: Military Base A2215; SE “International Airport ‘Boryspil’”; Ukrainian State Air Traffic Services Enterprise; SAE “Ukraine”, SE “ODH”; SBU division in airport “Boryspil”; IICP “Kyiv” of the State Border Guard Service of Ukraine; Kyiv customs office of the State Fiscal Service; transit police in airport “Boryspil” of the central administration of the Ministry of Internal Affairs in Kyiv region; flight catering

companies LIMITED LIABILITY COMPANY DO AND CO KYIV and Foreign-Owned Affiliated Company “AeroCatering Services Ukraine”; Ukrainian State Postal Service Company “Ukrposhta” – airmail exchange division No. 5; Legal entities – commercial entities (CE) – representative offices of air companies, LLC “Aerohandling”, LLC “Interavia”, handling company “Transaerohandling”, etc.

The airport is located about 1 km to the West of the boundary of the city of Boryspil and 6 km to the West of the Boryspil city center, 29 km to the East of the Kyiv city center. Routes of approaches for landing and leaving the airfield go over the residential areas of the following settlements:

– villages of Trebukhiv, Dudarkiv, Velyka Oleksandrivka – to the North of the airport;
– multistory development area and suburbs of the city of Boryspil to the East;
– majority of the villages of Voronkivka, Martusivky, Zatyshne to the South;
– the village of Hora to the West.

At the Boryspil airport, there are:

– two parallel independent artificial runways (ARW): ARW-1 with dimensions of 4,000 × 60 m and ARW-2 with dimensions of 3,500 × 63 m;

– a system of taxi ways (major, connecting, high-speed exit taxiways), ways of taxiing on the apron and parking place, holding bays and bays for application of deicing fluid, etc.;

– passenger and cargo aprons, parking places for aircraft, including those for transit ACs.

Planning decisions

Planned location of buildings and facilities is determined by their functionality, technological relationship, the minimum length of utilities, requirements of sanitary and fire regulations.

The area of the Boryspil airport land plotted out for reconstruction of Maneuvering Area No. 2 of the airfield of the SE "International airport ‘Boryspil’" is 387.06 hectares.

To provide the necessary requirements concerning working zones of localizers, additional land acquisition in the amount of 22.68 ha is required.

To accommodate a ground for training of the airport’s rescuing service, dog training center, engineering support facilities, etc., additional land acquisition in the amount of 27.52 ha is required.

Total area of the plot for reconstruction of Maneuvering Area No. 2 of the airfield of SE "International airport ‘Boryspil’" is 437.26 hectares.

Total development footprint is 1,970,310 m^2, including:
– the existing buildings and structures – 6,200 m^2;
– buildings and structures that are under design – 24,227 m^2;
– aerodrome pavement area –1,064,105 m^2;
– area of road asphalt pavement – 70,435 m^2;
– area of agrotechnical operations of the airfield – 776,093^2;
landscaping area is 2,402,290 m^2.
The ratio of area built up with building and structures to total area is 0.0136.
Aerodrome pavement ration is 0,2434.
Road pavement ration is 0.0161.
Green coverage ratio is 0.7269.

Vertical planning

Vertical positioning of buildings, structures, the patrol road, technological roads and access ways to isolated areas are designed on the basis of vertical planning of the airfield and the existing geological conditions and the need to ensure reliable wastewater disposal.

The design project provides a complete vertical planning of the airport airfield with the creation of standard descending grades.

The master plan and planimetric map with plotted sources of environmental impact are presented in Annex No. 2 and No. 22.

Data signed by the business entity about the availability of own production areas (premises) required for conducting of economic activities are listed in Annex No. 3.

1.2. Purposes of the planned activity

The objectives of the planned activity is the reconstruction of maneuvering area No. 2 of SE “IA ‘Boryspil’". According the law, the decision on the conducting of the planned activity related to "Reconstruction of Maneuvering Area No. 2 of SE IA ‘Boryspil’” shall be an opinion on environmental impact assessment published by the Ministry of Environment and Natural Resources of Ukraine.

In 2019, the Cabinet of Ministers of Ukraine approved the Concept of Development of the Boryspil International airport until 2045, the main priorities of which are the development of the infrastructure and introduction of modern services.

The planned activities are aimed at developing the infrastructure of the Boryspil airport, attracting new airlines, and improving service quality.

The purpose of an environmental impact assessment is to identify and estimate levels of the environmental impact of the State Enterprise "International airport ‘Boryspil’"(SE “IA ‘Boryspil’") after the implementation of complex of works on reconstruction of Maneuvering Area No. 2 of SE “IA ‘Boryspil’", determine the feasibility and acceptability of the planned activity and justify technical, organizational, health, public-legal and other measures on ensuring environmental safety. Assessment is done takin into account the current environmental impact of economic activity of SE “IA ‘Boryspil’” and existing constraints (emissions permit, permit for the special use, etc., existing settlements).

1.3. Description of characteristics of the activity during the preparatory and construction work and implementation of the planned activity, including (if necessary) work on dismantling and needs (limitations) for the use of land during the preparatory and construction work and implementation of the planned activity (if available, the following documents shall be submitted: documents confirming the right of use (ownership) of land and/or documents proving the compliance of the planned activity with the approved planning documentation in accordance with the law)

Scheme of the general plan of object "Reconstruction of Maneuvering Area No. 2" It is developed by SE "International Airport 'Boryspil'" in accordance with applicable regulations of Ukraine, standards and recommended practices of ICAO in the sphere of design and operation of airports, as well as requirements of SNiP 2.05.08-85 "Aerodromes"; DBN B.2.2-12: 2018 "Planning and Development of the Territory", SNiP 2.05.07-91 "Industrial Transport" and DBN V.2.3-4: 2015 "Transport Facilities. Motor Roads".

The construction of Maneuvering Area No. 2 is divided into stages and start-up facilities.

Construction stage 1, start-up facility 1

– Reconstruction of the existing apron "S" with assignment of parking places (hereinafter referred to as the PP) for treatment of aircraft with the deicing fluid and arrangement of a Centralized Aircraft Refuelling System (CARS).

– Reconstruction of connecting taxiways TW-9 and TW-18.

– Two underground reservoirs of used deicing liquid with a capacity of 75 m^3.

– Distribution point (DP).

– Transformer substation (TS) of apron "S".

Construction stage 1, start-up facility 2

– A new runway with artificial pavement (ARW-2) with a length of 3,800 m.

– Major taxiway (MTW-2).

– The MTW as a connecting taxiway.

– Connecting taxiways between TW-2 and MTW as a connecting taxiway.

– Reconstruction of connecting taxi ways TW-16 and TW-17.

– A section of apron "G" and TW-10.

– Ground landing of the VHF band instrument landing (ILS) of a new runway ARW as per category "III-B" with a magnetic bearing to landing of 18° and a magnetic bearing to landing of 36° (LOC and GS + DME).

– Lighting equipment as per landing category "III-B" with a magnetic bearing to landing of 36° and category "III-B" with a magnetic bearing to landing of 18°.

– An emergency rescue stations (ERS) with as fire fighting pump station and two reservoirs for firefighting water reserve with a capacity of 150 m^3.

– A TS for light signalling equipment (LSE)-1023N, TS LSE-1024N, a TS near the ERS and reconstruction of the existing TS-1023.

– Installation of automatic direction finder (ADF) and transmitting radio center (TRC).

– SPS No. 3/No. 4.

– Meteorological equipment.

– A system for collection and drainage of surface runoff water from the airfield to sewage treatment plants.

Construction stage 1, start-up facility 3

– Patrol motor road.

– Fences of the airport equipped with security alarm and video surveillance systems and lighting.

Construction stage 2, start-up facility 1
– Parking spots for aircraft (ACs) with TS.
Construction stage 2, start-up facility 2
– Parking space for testing of AC engines.

Construction stage 2, start-up facility 3
– Isolation parking place (PP).

Construction stage 3
– De-icing liquid filling station with an underground container for used de-icing liquid with a capacity of 75 m^3 and parking spot for 6 motor vehicles.
– Civil defence shelter for fire equipment and duty guards.
– Fuel filling station (FFS).

Description of characteristics of the activity during preparatory works of the planned activity

It is provided for a complex of preparatory works on dismantling of the existing airport pavements of ARW-2, taxiways and a part of aprons "S" and "G"; the existing pavements of roads and sites; the existing elements of the wastewater removal network; the demolition of the existing buildings, objects, lighting and radio equipment, lighting towers of Maneuvering Area No. 2, aerodrome fence and clearance of vegetation that fall in the area of planning works to be performed at the airport.

The existing airport utilities that fall under the area of planning of Maneuvering Area No. 2 are subject to relocation in accordance with the ToR provided by the Customer.

Utilities that belong to third party users and pass through Maneuvering Area No. 2 in transit are subject to protection.

Description of characteristics of the activity during execution of construction works and implementation of the planned activity

In accordance with Fig. 1 of SNiP 2.05.08-85 "Aerodromes", the construction objective is located in road-climatic zone II with hydrogeological conditions of type I.

In terms of physical-geographic conditions, the area belongs to the Dnieper lowlands and is located on the edge of the second-third terrace above the floodplain of the left bank part of the Dnieper River valley.

The climate of the region of work execution is moderately continental.

The average temperature of the coldest month – January – is minus 4,7 °C; of the warmest month – July – is plus 19.8 °C.

The average duration of a period with a stable snow cover is from 22 December to 14 March.

The snow depth varies from 10 cm (in December) to 75 cm (in February).

Average annual rainfall is 640 mm.

In winter, westward winds prevail, and in summer, northward wind prevail. The average annual speed of wind is 2.7 m/s, the highest speed 4.3 m/s is observed in February, and the lowest speed 1.6 m/s is observed in August.

In hydrogeological terms, the study area is located within the northwestern part of the Dnipro artesian basin, for which the development of aquifers, which are separated from each other by impervious layers, is typical. The surface of the area where it planned to perform works is quite flat-lying, has absolute elevations from 122 m to 131 m.

The geological structure of the area to be surveyed to an exploration depth of 6–7 m comprises quaternary eolian diluvial deposits and alluvial-diluvial deposits that are covered with topsoil (e H).

Thickness of topsoil (EGE-1) is from 0.2 m to 0.6 m, the relative content of organic matters is from 2.2% to 2.7%.

Wells No. 26, 26a encounter, met with lacustrine-boggy sediments (EGE-1b) to a depth of 2.8–4.5 m that are covered with fill soil – sandy loam.

Based on the results of office processing of field and laboratory work materials, 8 engineering and geological elements (EGE) were identified in the geological section of the surveyed area.

Topsoil (e).

EGE-1 – humus sandy loam with plant roots of firm consistency, dark brown, layer thickness – from 0.2 to 0.6 m.

Industrial deposits (t).

EGE-1a – fill soil – solid sandy loam, from dark grey to brown colour, with interlayers of sand, in some places – with an admixture of rubble and construction waste, 5–10%. The layer thickness is from 0.4 m to 3.2 m.

Lacustrine-boggy sediments (lb RIV).

EGE-1b – plastic sandy loam, silty, with a small amount of peat and an admixture of organic matter, dark grey. Met wells number 26, 26a, capacity 0.6 m – 2.0 m.

Eolian-diluvial deposits (vd RIII).

EGE-2 – hard sandy loam, silty, loess subsiding, from yellow-brown to yellow-grey, sometimes with interlayers and lenses of fine and dusty sand, 10–25%.

EGE-2a – plastic sandy loam, silty, loess subsiding, from yellow-brown to yellow-grey, sometimes with interlayers and lenses of fine and dusty sand, 10–25%.

IGE-3 – fine sand, yellow-gray, sometimes with lenses and layers of loamy sand and sandy silt 5–25%, with a low level of water saturation, of a medium density.

Alluvial-diluvial deposits (ad PIII).

EGE-4 – plastic loamy sand, sometimes hard sand, sandy silt, from greenish-brown to yellow-grey, sometime with layers and lenses of sand 5–15%.

EGE-5 – fine sand, grey, sometimes with interlayers of sandy silt, 5–15%, with a low level of water saturation, of a medium density.

Porosity ratio (e) of all the detected elements, except EGE-1b is less than 0.80.

For the period of research, groundwater was not found to the explored depth.

The standard depth of season soil freezing is 100 cm.

In terms of subsidence, soil conditions are classified as type I.

based on seismological properties, soil belongs to category II.

Motor roads and sites

For the transport connections between separate buildings of Maneuvering Area No. 2, airport facilities and execution of manufacturing operations project envisages construction of detached entrances to facilities, road construction technology and building patrol roads with asphalt pavement arrangement.

The roads are designed with standard slopes of the bank that provides a reliable drainage of water at existing geological conditions.

The width of the road is adopted in accordance with SNiP 2.05.07-91 and DBN V.2.3-4: 2015.

The length of the new patrol motor road under design without taking into account access ways to facilities of landing aids is 11,165 running meters.

The length of technological motor road with a width of 6 m is 1,325 m.

The length of technological motor road with a width of 8.50 m is 189 m.

Area of road pavement – construction stage 1

Start-up facility 1 (single-layer asphalt concrete) – 1,440 m^2.
Start-up facility 2 (single-layer asphalt concrete) – 7620 m^2;
(two-layer asphalt concrete) – 16,020 m^2.
Start-up facility 3, patrol road (single-layer asphalt concrete) – 37,995 m^2.
Area of pavements – construction stage II
Start-up facility 1 (single-layer asphalt concrete) – 650 m^2.
Start-up facility 2 (two-layer asphalt concrete) – 1,770 m^2.
Start-up facility 3 (two-layer asphalt concrete) – 580 m^2.
Area of pavement – construction stage III (two-layer asphalt concrete) – 4,360 m^2.
The total area of road pavement is 70,435 m^2.

Utilities

Before the construction of all utilities that fall under the development footprint should be demolished.

All utilities are designed taking into account their extension to consumers are shown on the plans of the relevant sections. Routes are selected, where possible, outside the development area and outside artificial pavements with a minimum number of crossings and compliance with all regulatory requirements.

General improvement and landscaping

On the territory free of development, near the ERS and facilities that are under design, it is provided for planting grass and arranging lawns.

Fire prevention

The master plan provides for fire prevention by way of:

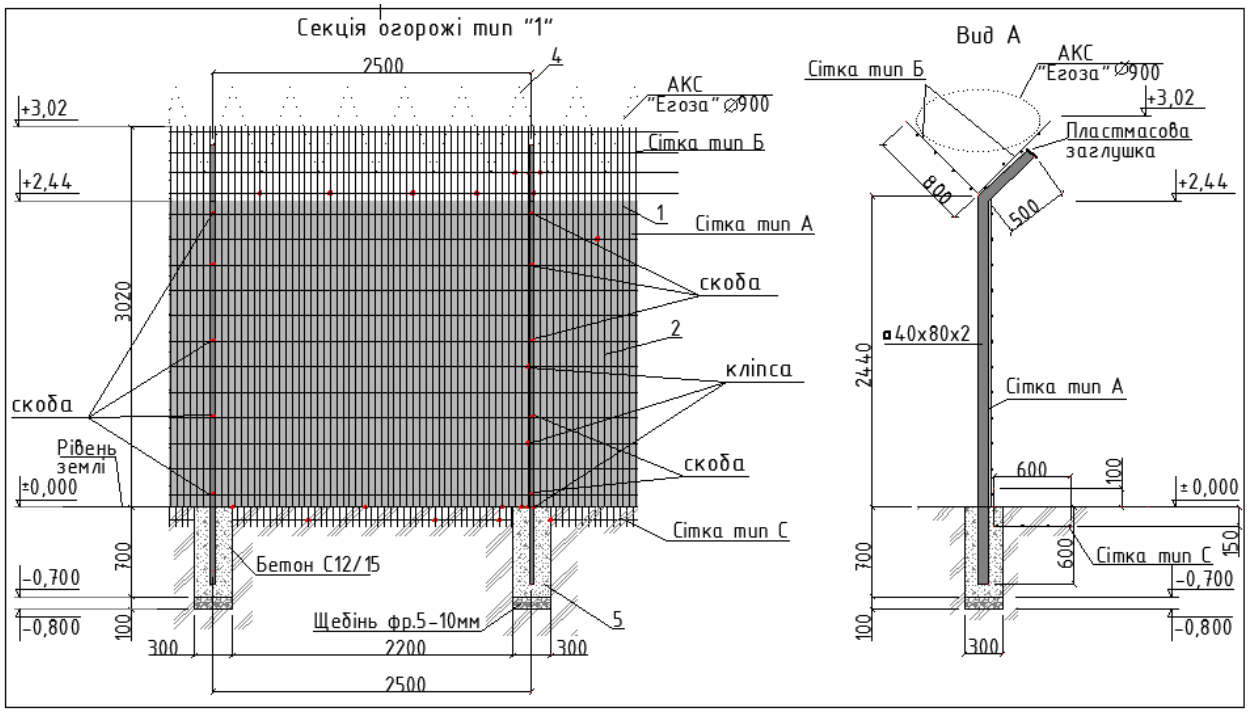
– installation of buildings and structures in compliance with regulatory requirements for firebreaks between them;

– arrangement of roads (driveways, sites) and approaches for fire fighting vehicles ability along the freely-planned area to the objects under design;

– construction of a new emergency rescue station to ensure the standard time of arrival of fire and rescue units to the thresholds of the artificial driveway-2.

Protection regime actions

To ensure the internal object regime of the territory and to prevent outsiders from entering the airport, the project provides for the installation of a perimeter fence with burglar alarms and video surveillance system. The fence is designed from mesh panels 2.44 m high and a Y-shaped nozzle with a sharp tape of Egoza type. To ensure a higher degree of protection of the monitored area from unauthorized penetration, the fence shall be equipped with an antiundermining barrier. The length of the fence is 11,565 m.



Reconstruction of the existing networks of fuel supply

SE "International Airport 'Boryspil'" provides for:

– relocation of a section of the route of the existing blocking (interdepot) fuel pipeline that connects the CARS depot and the basic depot of fuel and lubrication materials (FLM) beyond the pavement of a part of apron "S" that is subject to expansion;

– dismantling and laying on the new route of a section of the fuel line of the existing centralized aircraft refueling station (CARS) of the existing apron "S";

– laying of pipelines and construction of process chambers of the centralized aircraft refueling system on the parking places of aircraft of the new part of apron "S" is subject to extension;

– laying of cased under solid pavement of taxi ways (TW) and the runway (RW) for prospective laying of a new road of the blocking fuel supply line, construction of which is envisaged by the concept of the airport development;

– dismantling of the existing fuel filling station and construction of a new one, the location of which is supposed to be at a standard distance from aircraft parking places.

Existing situation

The aviation fuel provision system of SE "IA 'Boryspil'" includes the following:

– two depots of fuel and lubrication materials (hereinafter referred to as the FLM), one of which is the base (railroad) depot with a capacity of 16,000 m^3, the second depot is the CARS depot with a capacity of 12,000 m^3;

– a blocking (interdepot) fuel pipeline that consists of two pipelines with diameters of 219 and 159 mm;

– pipeline system of the centralized aircraft refueling system (CARS) under the pavement of apron "M", aprons "S" (small and large), apron "F", apron "G1" and apron "D".

The basic depot of FLM is located away from the airport territory near the railway station. The depot is intended for receiving railway tanks, storage, preparation and issue of aviation fuel in fuel refilling tankers and blocking (interdepot) fuel pipelines. The composition belongs to a category III as required in building code VBN V.2.2-58.1-94.

A warehouse of the CARS is located on the service and technical areas (STT) airport and for receiving, storing and issuing fuel to air refueling aircraft. Issue is performed in fuel refilling tankers and pipelines of the CARS system to aprons.

The composition belongs to a category III as required in building code VBN V.2.2-58.1-94.

The current set of buildings and structures of depots ensure performance of all these technological operations.

Blocking (interdepot) fuel pipelines are intended for transporting aviation fuel from the basic depot of FLM to the CARS depot. The length of the route of blocking pipelines is 6.9 km.

The existing centralized aircraft refueling system (CARS) is a complex of structures and equipment including a CARS depot and extensions of fuel lines of the CARS system under apron pavements. The existing aprons M, S, F, G1, and D are equipped with the system.

Design technology solutions

To meet needs of the FLM service, it is provided:

– to relocate the existing blocking pipelines with DN150 mm and DN200 mm beyond the boundary of construction for expansion of apron "S";

– construction of a network of the CARS system at new places of aircraft parking of apron "S" to be expanded;

– for the future laying of a new route of 2 blocking fuel pipelines with DN350 mm beyond the planned runway of Maneuvering Area No. 2 and crossing (in the future) of artificial pavements of Maneuvering Area, it is provided to lay 2 cases with DN630 mm under each of the objects – the artificial pavement, taxiways and main taxiways;

– dismantling of the existing fuel filling station, buildings which fall in the area that does not meet the regulatory fire-fighting distance from aircraft parking places;

– construction of a new FFS.

The existing blocking (interdepot) fuel pipeline

A section of the route of the existing blocking (interdepot) fuel line, two branches of pipes with DN150 mm and DN200 mm that connected the CARS depot and the base depot of FLM are subject to relocation.

It is provided for laying beyond the boundary of the construction objective on expansion of a section of the route of blocking (interdepot) fuel pipeline with two branches with diameters DN150 mm and DN200 mm. Connection of pipelines planned to be relocated, is done by means of tie into the existing process chambers located in front of the new apron and connection in an existing process chamber.

The diameters of pipelines to be relaid are adopted as similar to those of the existing pipelines made of seamless steel pipes. It is envisaged to lay pipelines underground with external anticorrosion coating of "reinforced" type.

Fuel lines of the CARS system of the existing apron "S"

A section of the route of pipelines of the existing CARS system of large apron "S", two branches with DN 250 mm belonging to the fueling company are subject to relocation. LLC "Krebo-Boryspil".

A section of pipelines that is planned to be relocated, relaid along the route of fuel lines of the CARS system of new apron "S".

Pipelines with DN 250 mm are laid under the pavement of apron in cases with DN 530 mm.

Cases with working pipes are introduced into process chambers of the CARS system of new apron "S". Cases in chambers are sealed. It is also provided to monitor leakages and discharge of cases, if necessary. Connection to the existing fuel pipeline network of the CARS system of large apron "S" in the process chamber PCh-3 of the CARS.

System of centralized refueling of aircraft of apron "S"

This project provides for construction of a new CARS under new apron “S” with laying of the route of 2 pipelines with DN 250 mm in cases with DN 530 mm.

Into-plane refueling is performed at AC parking places through the aircraft refueling unit (dispenser) that is an intermediate chain between the hydrant column and the aircraft filler connector. Pipelines of the centralized fueling system are laid under concrete pavements of aprons and have a system of hydrant columns (HC).

Storage of fuel, its technological preparation, quality control and supply of fuel to refuel is performed on the existing CARS depot and is the only complex of the entire system of the airport CARS.

It is provided to make connection of process fuel pipelines of the CARS system under design to the existing network of pipelines by meas of means of pipeline tie-in.

The expected performance of refueling on the apron part to be reconstructed is 280 m^3/h.

At a given performance of aircraft refueling on the apron, the velocity of fuel movement in pipelines do not exceed the standard one (1.7 m/s).

Based on a given refueling performance and layout of the aircraft on the apron, the network of fuel pipelines of the centralized refueling of aircraft is composed of two pipelines with a diameter of 273 × 10 mm. The pipelines are interlooped in the process chamber PCh-3.

In the places of connection of the pipelines under design to the existing pipelines, process chamber PCh-1 is installed.

Pipelines under the pavement are laid in the cases made of steel welded pipes in accordance with GOST 10704-87 with a diameter of 530 × 10 mm. Cases are entered in the process chambers and sealed. Units for monitoring leakages of fuel pipelines and their emptying, when necessary, are envisaged on the cases.

It is adopted that the standard slope of pipelines is at least 0,002 towards the draining of fuel from pipelines (the lowest point of fuel pipelines by the profile).

The system of centralized refueling of aircraft on the apron under design functions in automatic mode like the entire system of the CARS, to which it has to be connected.

For emergency situations (rapture of filling hose or other emergences) on aircraft parking spaces, it is provided to installation of buttons for emergency stop of the CARS pumps that are located in the pumping station on the territory of the existing CARS depot. It is provided to install buttons on lighting poles of the apron. A distance between the hydrant column and emergency shutdown button is not more than 80 m. They are clearly identified and easily accessible.

Parking places of aircraft are equipped with hydrants (two hydrants per each aircraft) for connecting a mobile refueling unit (dispenser) of the CARS system.

Connection of hydrant columns to supplying pipelines of the system is done though pipeline with a diameter of 159 × 6 mm.

At the locations of process chambers and hydrant columns, it is provided for a vertical planning of the apron to prevent the ingress of rainwater.



Pipelines of the CARS system are provided with external and internal anticorrosion coating. It is adopted that the external corrosion-resistant coating of both working pipes and casings is an epoxy-bitumen coating that meets the requirement to the heavier-duty coating.

The inner surface of the working pipelines and pipeline components are covered in the factory anticorrosion enamel-type coating that has conductive characteristics and is intended for operation in the environment of aviation fuels.

Pipelines of the CARS system are grounded. Grounding of pipelines that pass under the pavement is arranged near process chambers and hydrant columns.

It is provided to place process chambers in places where routes of taxiing aircraft and service vehicles do not pass.

The surface and casings of process chambers are designed for the maximum load of the aircraft, lids are seal the chamber space and exclude the ingress of precipitation into the chamber. Covers for chamber hatches have locking devices. For ease of assembly and disassembly of gates with electric actuators, it is provided for mounting manholes in the coating of chambers.

In the lower points of the route of underground pipelines, stripping devices for pumping out of fuel from the pipes are installed taking into account the slope of the pipelines, and in the higher points, the air intake (output) valves (a minimum slope of 0.002%) are installed.

To protect the envisaged by the design fuel pipelines of the CARS system from water hammer, on each of them, 1 hydraulic shock-absorber with a capacity of 50 l is installed.

Hydraulic shock-absorbers are installed in all process chambers.

For fuel sampling, special devices – pit boxes allowing to carry out this operation without going down into the chamber – are built in the coating of process chambers.

The requires check valves, devices for monitoring temperature and fuel pressure in the pipelines, devices for gas hazard monitoring of chambers, sensors of liquid level in the pits, equipment for lighting of chambers and equipment of process telephone communications.

Process chamber PCh-1–PCh-3 that are located on the platform "S" with dimensions 8,0 × 7,0 h = 4 m, in-depth premises are made of reinforced concrete of class C20/25, fittings of class A400.

The bottom, walls and cover of the structure is 500 mm thick.

In the chamber coating, it is provided for three manholes and hatches for easy installation and dismantling of equipment.

For fuel sampling, special devices – pit boxes allowing to carry out this operation without going down into the chamber – are built in the coating of process chambers.

Construction of process chambers are designed for maximum loading of the aircraft.

According to the ToR, load class is F900 (90 tf).

DN250 dampers with the electric actuator on the pipelines are adopted as explosion-proof ones.

To ensurer convenience during maintenance of process chambers, it is provided for maintenance platforms in them.

Process chambers of the CARS system are served in accordance with “Regulations for Maintenance of Structures and Process Equipment of Aviation Fuel Supply Facilities” (russ.).

Gas hazard monitoring of process chambers is performed by gas detectors installed in the chambers. For ventilation of chambers, standalone portable explosion-proof fan is used.

The expansion of the CARS system on the apron under design does not require any additional fire-prevention measures.

The number of service personnel is determined by the company’s staffing schedule based on local conditions. Change in the number of staff is taken into account in the project of reconstruction of the CARS depot.

Works with aviation fuels of the CARS system are carried out in a sealed system of pipelines, therefore no negative environmental impact is expected.

Laying of cases for blocking (interdepot) fuel pipeline for the future

For the future laying of a new route of 2 blocking fuel pipelines with DN 350 mm beyond the planned runway of Maneuvering Area No. 2 and crossing (in the future) of artificial pavements of Maneuvering Area, it is provided to lay 2 cases with DN 630 mm under each of the objects – the artificial pavement, taxiways and main taxiways.

Laying of cases is performed by cut-and-cover method until the construction of aerodrome pavement of the ARW and TW.

It is provided that cases are made of electric welding steel pipes with external anticorrosion “heavier-duty” coating. The ends of the cases are sealed.

Fuel filling station (FFS)

It is provided to dismantle the existing fuel filling station, buildings which fall in the area that does not meet the regulatory fire-fighting distance from aircraft parking places.

The construction of a new fuel filling station provides for installation of:

– horizontal double-walled steel tanks with a capacity of 60 m^3 located underground – 6 pcs.;

– horizontal double-walled steel tanks with a capacity of 14 m^3 located underground – 2– pcs.;

– block posts for two types of fuel – 2 pcs.;

– a building of the control room.



Architectural and planning decisions

Architectural and planning decisions of the emergency rescue station (ERS) are performed in accordance with the technological ToR and determination of its functionality, as well as with consideration of the provision of employees with domestic working conditions.

The ERS building consists of a central one-story garage part in axes 3–10, “B”–”G” Gd and two-story units adjoined on the edges of the garage part in axes 1–3, “A”–”D” and 10–12, “A”–”D”.

The garage part of the building is rectangular in plan with dimensions in the axes of 18.0 × 32.82 m, a height to the roof beam of 6.0 m is intended for installation of four boxes for estimated fire trucks in each six-meter span of the building and one box for rescue equipment and an ambulance.

It is provided for two-way entry of vehicles through the lifting sectional doors with dimensions 4,2 × 4,5 (h) m.

The garage box in axes 4–5 is equipped with an inspection pit with dimensions of 13.5 × 1,2 m with a depth of 1.6 m.

Two-storey face blocks look like symmetrical extension of rectangular shape in plan with dimensions in axes of 12.3 × 27.0 m with projecting stairwells, the dimensions of which in plan are 6,0 × 6,0 m.

To maximize the view of the runway in the axes 11–12, "A"–"B" over the block of the stairwell, it is provided for observation fire tower. The height of the observation tower premises is 3.0 m. Along the tower perimeter, it is provided for panoramic windows with a glass slope of 15°.

Architectural expression of the building is achieved by symmetric blocking of spaces of various height, the use of stained glass for lighting of stairwells.

Glazed lifting gates used in the project meet all the requirements for the design of the ERS building in the airport. They are equipped with a motorized drive to open a tower control unit, gates can be also opened and closed manually. Gates are equipped with doors for evacuation. They ensure a safe and comfortable working environment and have aesthetic appearance.

Entrance canopies, coatings of the observation tower, wall decoration and colour solutions emphasize the expressive appearance of facades.

In administrative and living rooms and corridors, it is provided for lowered ceilings.

Walls of bathrooms, room for meals, living room are finished with glazed tiles.

Floors and decoration of premises are done according to the requirements of sanitary and fire regulations that are in force in Ukraine.

Administrative, technical and sanitary premises are equipped with comfortable modern furniture and equipment.

Location of premises

The main administrative and technical premises are located in two-storey extension in axes 1–3, "A"–"D" and 10–12, "A"–"D", namely: in axes 1–3, "A"–"D" on the first floor, production facilities are located and on the second floor, sanitary and utility room are located; in axes 10–12, "A"–"D", on the first floor, technical premise, premises for the shift in duty and administrative offices are located, and on the second floor, training rooms, rooms for psychological and physical relief are located.

Sanitary rooms are provided on all floor of the extension, group of production processed "2G". Areas and equipment of sanitary premises are adopted in accordance with DBN V.2.2-28:2010 "Buildings for Administrative and Household Purposes".

Restrictions of the use of land during the preparatory and construction work and implementation of the planned activity

Lands of airports (aerodromes) are land plots, on which buildings, structures, equipment are located and land plots that are required for ensuring operation of the airport (aerodrome) and are defined by the master plan.

Definition of terms of building (of construction) and land use in the aerodrome environs is performed during planning of the area by means of the development and approval of planning documentation in accordance with Law of Ukraine "On Regulation of Urban Development" taking into account restrictions on the use aerodrome environs (surfaces for preventing obstacles, zones for limiting development in terms of aircraft noise, zones for protecting aeronautical equipment and restrictions related to landing approach and departure at the airport, use of areas for carrying out training and other flights).

Restriction of use of the aerodrome environs are developed by entities operating the aerodrome for each aerodrome separately.

Lands of airports (aerodromes) are of social importance and are transport in accordance with their purpose.

Aerodrome lands may be used only for the purpose of ensuring aerodrome activities. Aerodrome lands may be used for temporary activities in agreement with the aerodrome owner and an authorized civil aviation authority.

Restrictions on the aerodrome environs

The aerodrome environs (ares adjacent to the aerodrome for monitoring and accounting objects and obstacles) – a limited area around the aerodrome, above which the maneuvering of aircraft is performed.

In accordance with Article 41 of the Air Code of Ukraine, a special regime for obtaining a permit for construction (reconstruction) and other activities that is carried out only in coordination with the aerodrome owner and the state aviation regulator and the Boryspil City Council has been introduced on the aerodrome environs of SE “International Airport ‘Boryspil’”.

Aerodrome environs is defined within the radius of 50 km from the ARP (aerodrome reference point).

Size of the aerodrome environs and restrictions on the height of buildings that are applicable within such areas

Ser. No.	Surface name	Dimensions (km)	height restrictions (H abs.) of the building (m)	Approval of the Airport administration
1	Aerodrome environs	Radius of 50 km from the ARP	Depending on the location and type of the structure	mandatory
2	Internal horizontal	Radius of 4 km for each ARW threshold	Not >180 m	mandatory
3	External horizontal	Radius of 15 km from the ARP	Not >280 m	mandatory

The location and construction of the facilities, the truth height of which is 50 meters or more should be agreed regardless of their location.

Enterprises, institutions and organizations and individuals who have committed violations of the rules of construction and other actions in the aerodrome environs shall be obliged, at the request of the owner of the aerodrome (airport) or his/her authorized representative, to stop construction or other activities on the aerodrome environs and eliminate the committed violations withing the established period using their money and resources.

The buildings and natural objects that are located in the aerodrome environs should not pose a threat to aircraft flights.

In the aerodrome environs, a special procedure for conducting activities that may affect safety of flights is introduced. Such activities include:

1) construction, blasting operations;

2) activity that promotes accumulation of birds;

3) placing of radio-emitting devices;

4) work associated with the use of laser devices that can emit into the air space;

5) work associated with the launch of missiles, meteorological radiosonde and balloons-pilots;

6) activities related to the flight of aircraft, emissions of smoke and gases that can impair visibility in aerodrome area;

7) construction of high-voltage overhead lines, planting and growing of trees or greenery.

Determination of conditions of development, use of land and structures in the aerodrome environs is carried out by local authorities under the law in coordination with the entity operating the aerodrome and the competent authority for civil aviation.

The procedure for approving the location and height of objects in the aerodrome environs is determined by Resolution of the Cabinet of Ministers of Ukraine dated 06.12.2017 “On approval of the Use of Airspace of Ukraine” and Order of the Ministry of Infrastructure of Ukraine, dated 30.11.2012, No. 721 “On Approval of the Procedure of Approval of the Location and Height of Objects in the Aerodrome Environs and Objects, activities of which may affect flight safety and operation of radio equipment of civil aviation”.

Approval of the location and height of objects in the aerodrome environs and objects, activities of which may affect the flight safety and operation of radio equipment of civil aviation is performed by the State Aviation Service of Ukraine taking into account conclusions of the entity operating the aerodrome and provider of air navigation service.

The design, construction, reconstruction and technical improvement of the following objects are subject to approval:

objects that cross the surfaces for restriction of obstacles of aerodromes, helicopter aerodrome, permanent landing grounds;

objects with a height of 45 m or more in respect of aerodrome reference point within a radius of 50 km;

overhead lines for telecommunications and electricity, explosives, radio, lighting and other facilities (railways, roads, facilities releasing an open flame, smoke and gas, activities of which may lead to poor visibility in the areas of aerodromes, etc.) that may endanger the safety of air traffic or interfere with operation of the aerodrome or means of communication, navigation and surveillance (radio-technical support), regardless of their location;

objects regardless of their location at a height of 100 m or more above the earth's surface;

objects located within the landing space.

The approval loses its force, if companies, organizations and institutions failed to begin its implementation within 3 years.

Persons who own or use permanent and temporary high-rise buildings are obliged, for the purpose of ensuring safety of aircraft, to place night and day markings on such objects at their own expense in accordance with aviation regulations of Ukraine and to ensure the maintaining of these markings in a state that allows to use them.

Limitations of development around the airport

Cartographic materials indicating the zones of restrictions related to development in accordance with Order of the Ministry of Health of Ukraine, dated 19 June 1996, No. 173 “On Approval of the State Sanitary Rules of Planning and Development of Settlements” is given in Appendix No. 4.

Restrictions around the radio facilities

A Sanitary Protection Zone (SPZ) and Restricted Development Zone (RDZ) are established to protect people from EMP exposure.

Sanitary Protection Zone is the area adjacent to the radio-facility service site where maximum permissible EMP level is exceeded at 2 m above ground level.

The SPZ external boundary is defined at 2 m above ground level beyond maximum permissible levels (MPL) of EMP.

The restricted development zone is an area, where MPL is exceeded at 2 m above ground level. The zone’s external boundary is defined based on maximum height of houses in the development area, at the third floor were EMP is within MPL.

According to DSP 173-96, for the facilities with antennas emitting electromagnetic radiation at defined horizontal angle and EMP is variable depending on its position above ground level, restricted development zones are subject to vertical differentiation by height (metres): 3, 6, 9, 12, 15 etc.

Project landing radio facilities are located at airfield territory. According to current regulatory documents airport runways shouldn’t have any facilities excluding facilities whose

functionality requires such location (radio navigation and landing facilities) and vegetation (bushes, trees, etc.) Height of facilities located within airfield is limited by Ukraine Airside Certification Requirements. Due to the above Development Restriction Zone is not required.

See DSNiP 239 Table 1.2 for maximum permissible values of electromagnetic field generated by radio facilities in compliance with paragraph 1.3.3 of DSNiP 239.

According to DSNiP 239, Maximum Permissible Strength (MPV) for VHF transmitters (bandwidth 8) is 6 V/m; Maximum Permissible Power Flow Density (MPPFD) for UHF transmitters (bandwidth 9) is 10 $\mu W/cm^2$.

Sanitary zone calculation results.

Calculation of electromagnetic field generated by RTO feeder antenna devices is made with the use of Antenna Impact Calculation software.

Sanitary zone calculations are made with the regard to the adjacent technical terrain.

For the purpose of calculation the reference point (±0.00) above ground level is the RTO antenna foundation above sea level.

Total expected EMP levels generated by KRM/GS transmitters at 2.0 m above ground are above Maximum Permissible Level (MPL). Base on this, the Sanitary Protected Zones (SPZ) are defined for those radio-technical support means.

SPZ border line.

1. KRM-36L: 26 m long from KRM antenna along the ShZPS rwy axis in the 18R ShZPS threshold direction; 32 m wide (16 m at each side of rwy axis).

2. For GS-36L: 16 m long from the GS antenna along the axis that is parallel to the ARW axis in the 36L ARW threshold direction; 10 m wide.

3. LOC-18P: with a length of 26 m from LOC antenna along the ARW axis in the 36L ARW threshold direction; 32 m wide (16 m at each side of ARW axis).

4. For GS-18R: 16 m long from the GS antenna along the axis that is parallel to the ARW axis in the 18R ARW threshold direction; 10 m wide.

Facility	**Emission bearing, degrees**	**Maximum EMP level at 2.0 m**	**SPZ border line**
KRM-36L	182° 36`	4.569	26.00 × 32.00
LOC-18P	2° 36`	4.569	26.00 × 32.00
GSM-36L	182° 36`	32.184	16.00 × 10.00
GS-18R	2° 36`	32.184	16.00 × 10.00

In general location and operation conditions of Boryspil airport's ARW-2 navigation and landing equipment as an EMS source meet "EMS Exposure Sanitary Regulations" approved by the Order of the Ministry of Health of Ukraine, dated 01.08.1996, No. 239.

Documents confirming the right of use (ownership) of land

The following land allotments are in constant use of SE Boryspil International Airport:

- with an area of 163.3212 hectares intended "for placing engineering and other buildings" (a state certificate of the right of the permanent use of land, series "YAYA" No. 140084 registered in the Register of State Acts on the Ownership and the Right of Permanent Use of Land, Lease Agreements under No. 322080003000048);
- with a total area of 624.8682 ha under the existing development/technical engineering and social and domestic objects/(a state certificate of the right of constant land use "II-KV" No. 001459 registered in the Register of State Acts on the Right of Permanent Use of Land under No. 438).

Copies of documents confirming the right of permanent use of land plots listed in Appendix No. 5.

During the implementation of the planned activity, it is planned to purchase plots of land for the reconstruction of runway strip No. 2.

Information on the owners/users of land plots of the Martusivska Village Council and Hirska Village Council that are planned to be purchased for the reconstruction of Maneuvering Area No. 2 is provided in Annex 6.

Documents proving the compliance of the planned activity with the approved planning documentation in accordance with the law

The Law of Ukraine "On Regulation of Urban Development Activities" determines that the General Scheme of Planning of the Territory of Ukraine is urban development documentation determining concept solutions of planning and use of the territory of Ukraine; detailed territory plan is urban development documentation determining the planning organization and development of the territory.

The General Scheme of Planning of the Territory of Ukraine (hereinafter referred to as the General Scheme) approved by the Law of Ukraine "On the General Scheme of Planning of the Territory of Ukraine".

The General Scheme determines the priorities and concept solutions for planning and use of the country's territory, improvement of the system for resettlement and provision of constant development of settlements, development of production, social, and engineering and transport infrastructure, shaping of national ecological network.

The General Scheme was developed according to the laws of Ukraine and other regulatory and legal acts concerning the issues of use of territories considering the economical, geographical, historical, environmental, demographical features of regions.

The provisions of the General Scheme conform to the principles of conclusive documents of the Conference of United Nations Organization on settlement development (HABITAT-II) and corresponding recommendations of the European Economic Commission of the UN and European Council.

Clause 7 "Development of engineering and transport infrastructure" of Section III "Main courses of the use of territory of Ukraine" of the General Scheme determines that in order to satisfy the needs of population and economy in passenger and cargo transportation, continuation of reconstruction and extension works of SE "International Airport 'Boryspil'" is provided.

Additionally, following the requirements of Law of Ukraine "On Regulation of Urban Development Activities", we developed a Detailed Plan of Land Territory Located in the Premises of Hirska village council of Boryspil district of Kyiv region, considering development of surrounding territory, which, in particular, determines the location of runway No. 2 (extract from the Detailed Plan of the Territory can be found in Annex No. 7).

So, it may be stated that the planned activity of SE "International airport 'Boryspil'" on the reconstruction of runway strip No. 2 corresponds to the current planning documentation – General Scheme for Planning of the Territory of Ukraine Approved Law of Ukraine "On the General Scheme of Planning of the Territory in Ukraine."

1.4. Description of the main characteristics of the planned activity (including production processes), for example, the type and quantity of materials and natural resources (water, land, soil, biodiversity) that are planned to be used (if available, information on utilities of the facility, including water supply and wastewater disposal, is attached)

SE “IA ‘Boryspil’" received a expert report on the review of project documentation for feasibility study "Reconstruction of the Maneuvering Area No. 2 of SE “IA ‘Boryspil’" (adjustments) that is approved by SE "Ukrderzhbudekspertiza", dated 15 June 2020, No. 00-1144-19/PB. Based on the results of reviewing design documentation and consideration of remarks, it is found that the said documents are developed according to the source data for the design in compliance with requirements for endurance, reliability and durability of the construction and its operational safety and engineering support, including requirements on conditions for unhindered access for persons with disabilities and other people with limited mobility, sanitary and epidemiological welfare of population, environment, energy, the estimation part of design documentation and can be approved in accordance with the established procedure with technical and economic indicators that are shown in Appendix No. 8.

Characteristics of soils on the territory of the planned activity that are planned to be used

Based on the results of office processing of field and laboratory work materials, 8 engineering and geological elements (EGE) were identified in the geological section of the survey area:

Topsoil (e).

EGE-1 – humus sandy loam with plant roots of firm consistency, dark brown, layer thickness – from 0.2 to 0.6 m.

Industrial deposits (t).

EGE-1a – fill soil – solid sandy loam, from dark grey to brown colour, with interlayers of sand, in some places – with an admixture of rubble and construction waste, 5–10%. The layer thickness is from 0.4 m to 3.2 m.

Lacustrine-boggy sediments (lb RIV).

EGE-1b – plastic sandy loam, silty, with a small amount of peat and an admixture of organic matter, dark grey. Met by wells No. 26 and 26a, with a thickness from 0.6 m to 2.0 m.

Eolian-diluvial deposits (vd RIII).

EGE-2 – hard sandy loam, silty, loess subsiding, from yellow-brown to yellow-grey, sometimes with interlayers and lenses of fine and dusty sand, 10–25%.

EGE-2a – plastic sandy loam, silty, loess subsiding, from yellow-brown to yellow-grey, sometimes with interlayers and lenses of fine and dusty sand, 10–25%.

IGE-3 – fine sand, yellow-gray, sometimes with lenses and layers of loamy sand and sandy silt 5–25%, with a low level of water saturation, of a medium density.

Alluvial-diluvial deposits (ad PIII).

EGE-4 – plastic loamy sand, sometimes hard sand, sandy silt, from greenish-brown to yellow-grey, sometime with layers and lenses of sand 5–15%.

EGE-5 – fine sand, grey, sometimes with interlayers of sandy silt, 5–15%, with a low level of water saturation, of a medium density.

During the preparatory work, it is planned to remove the vegetable mould.

On the Maneuvering Area No. 2, the following earthworks are envisaged:

- in the trough of new aerodrome pavements, complete removal of the vegetable mould;
- on unpaved areas of the runway and taxiway shoulders, complete stripping of the vegetable mould followed by restoration with a 20 cm layer to form a sod cover;
- on unpaved areas outside the runway and on design slopes, complete stripping of the vegetable mould followed by restoration with a 20 cm layer to form a sod cover.

The total volume of earthworks for creating the embankment (in a compacted state) is 3,805,061 m^3, including those:

- in the trough of aerodrome pavements – 1,106,522 m^3;
- on the unpaved area of the runway – 2,357,737 m^3;
- on unpaved ares outside the runway – 340,802 m^3.

The missing mineral soil for creating the embankment is imported from the quarry in the volume of 3,640,567 m^3.

Upon the completion of all types of excavation and planning work within convenient agronomic terms, agrotechnical works consisting of pre-sowing treatment of areas and work on introducing mineral fertilizers and sowing seeds of grass mixture are carried out on the unpaved areas of the runway and beyond them.

The total area of execution is 261.3 ha. Including an area within the runway – 81.3 ha, outside the runway – 180 ha.

Artificial aerodrome pavements

The design of new aerodrome pavements for the operation of the design load (at a standard load of 900 kN on the conditional resistance of the aircraft and a tire pressure of 1.5 MPa) is adopted as a multilayer pavement of rigid type that consists of:

– soil base with bed ratio Ks = 40 MN/m^3;

– artificial base – sand-and-cement mix from ready mix M75 with a thickness of 30 cm;

– the lower layer of the pavement – "lean" concreate "V 10/150" with a thickness of 30 cm;

– the top layer of the pavement – monolithic cement concrete Btb 4,4/55 with a thickness of 45 cm.

It is provided for reinforced shoulders made of cement concrete with a thickness of 30 cm on a base of a ready-to-use sand-and-cement mix with a thickness of 15 cm.

Total area of aerodrome pavements is 1,064,105 m^2, including:

– ARW – 171,000 m^2, and shoulders and thresholds – 100,195 m^2;

– MTW-2 – 87,400 m^2 and shoulder – 50,360 m^2;

– MTW as a connecting taxiway – 87,400 m2, shoulder – 49,590 m^2;

– rapid exit TW – 105,600 m^2, shoulder – 49,265 m^2;

– connecting TWs – 41,900 m^2, shoulder – 21,870 m^2;

– TW-9 – 17,540 m2, shoulder – 10,980 m^2;

– TW-10 and site of apron G – 11,160 m^2, shoulder – 1900 m^2;

– TW-16 – 2,830 m^2, shoulder – 1,935 m^2;

– TW-17 – 2,730 m^2, shoulder – 1,895 m^2;

– TW-18 – 2,285 m^2, shoulder – 1,090 m^2;

– bay for testing aircraft engines – 19,620 m^2, shoulder – 330 m^2;

– IMC – 13,070 m^2, shoulder – 3,060 m^2;

– apron "S" with places for treatment of ACs with deicing fluid – 121,430 m^2; shoulder – 3,890 m^2;

– MC – 83,300 m^2, shoulder – 480 m^2.

Wastewater disposal

The Section on wastewater disposal provides for:

– dismantling of elements of a part of the existing drainage network;

– installation of a wastewater disposal network;

– installation of a system for automatic collection of the used deicing fluid at the bay of anti-icing treatment of aircraft for its further disposal.

Wastewater disposal network of Maneuvering Area No. 2

The wastewater disposal system provides for construction of a closed gravity wastewater disposal network that includes a linear system made of polymer and concrete gutter inlet elements, water outlet manifolds, inspection wells and drainage ditches.

From artificial pavements, rainwater enters a linear system made of polymer concrete elements. Its construction is provided at the edge of the ARW pavement, on the apron "S", on the parking places for aircraft, on the isolation place for aircraft and a place of parking for testing engines. Though the sand catcher along the bypass water enters the manhole, and from there it is transported through the manifold to the sewage pumping station.

In surface depressions of the unpaved part outside the runway, concrete drainage ditches with input heads, through which rain water enters by gravity the manifold and is transported to a sewage pumping station are arranged.

In places, where the arrangement of the drainage ditch is not possible, reinforced concrete thalweg well of reinforced type with three grates are installed.

For the installation of rainwater mains, polyethylene pipes with ring stiffness not lower than SN8 an diameters that meet the calculation are provided.

Total estimated flow of rainwater is about 3100 l/s.

Diameter of the pipeline supplying wastewater to the sewage pumping station (SPS), according to the calculations, is 1,500 mm.

The depth of the outlet manifold near the SPS No. 3/No. 4 is approximately 8 m. Such depth does not allow to treat wastewater in gravity mode, so a pump station intended for a full flow of rainwater is designed.

Sewage pumping station No. 3/No. 4 is provided as a station of round shape with a diameter of the underground of 12 m and a depth of 12 m. In he underground part, it is provided to install two groups (including backup ones) of submersible pumps designed for the maximum-medium and medium-minimum estimated costs. Both groups of pumps are installed at the bottom of the sewage station and are separated by a partition with discharge openings. Each group of pumps is equipped with pressure pipelines (1 operating pump, 1 reserve pump). The first group of pumps transports rainwater to wastewater treatment facilities.

Pumping of polluted runoff lasts for one hour. The second group of pumps pump relatively clean rainwater to the collecting pond. They are turned on/off based on the level of water.

The building of the pumping station is of square shape, 12 × 12 m in axes, with a height to the truss bottom of 6 m.

The above-ground part of the building is made of steel structures. Columns – I beam No. 35 "KZ", trusses – made of rectangular steel pipes, connections are made of angles 125 × 125 × 12, walls and coating – sandwich panels.

It is provided in the design that, during construction of the underground part, the method of sunk well in the thixotropic jacket will be used that allow reducing forces of lateral friction. It is adopted that wall thickness is 120 mm, thickness of the bottom is 120 mm, thickness of the drainage layer is 150 mm. The floor structure at an elevation of – 0,050 with a thickness of 200 mm on metal beams. Concrete of all structures is adopted as concrete of Class C25/30, fittings of class A400.

According to the design ToR, rainwater treatment facilities are designed as an individual project that also includes pressure pipelines from the sewage pumping station.

Installation of a system for collecting used deicing fluid at the site of deicing treatment of aircraft

To ensure the removal of snow and ice deposits from the critical surfaces of the aircraft and prevent their reproduction until the moment of takeoff, the aircraft are treated with polypropylene-based deicing fluid using specialized vehicles.

The ground for treatment of aircraft with deicing fluid is located on the apron“S” that allows the aircraft to quickly get to the ARW-2 after treatment, and the ground is intended for simultaneous treatment of two planes.

After each hour cycle of treatment of aircraft, the fluid is collected from the surface of the ground with the use of a vacuum installation. The residual liquid is washed off with water.

A separate sewer system includes two surface inlets located on the parking site, but without the possibility of collision with the aircraft landing gear, and are connected by bypasses with the outlet manifold that transport the remains of liquid in two steel underground tanks, each of which has a capacity of 75 m^3. Reservoirs are located outside the apron boundary, in”green zone” and have an access way for motor vehicles used for their discharge and transport fluid remains to a place of disposal. Reservoirs are also equipped with automatic gates to prevent the ingress of rainwater into reservoirs after treatment of aircraft and rinsing of fluid residues from the pavement surface.

In the warm season, rainwater enters directly into the storm sewer system.

Construction order of priority

Construction of the aerodrome’s wastewater disposal system will be performed in the following construction stages.

Stage 1, start-up facility 1

– Manifold D. Total length is 294 m.

– Two temporary sites of the manifold with connection to the existing wastewater disposal network. Total length is 318 m.

– Manifold L. Total length is 219 m.

The total length of the bypass from the rainwater inlets is 120 m.

Stage 1, start-up facility 2

– Manifold A. Total length is 4,157 m.

– Manifold V. Total length is 3,878 m.

– Manifold C. Total length is 4,220 m.

– Manifold E. Total length is 269 m.

– Manifold N. Total length is 827 m.

– Manifold J. Total length is 1,139 m.

– Manifold M. Total length is 387 m.

– Manifold N. Total length is 386 m.

– Manifold P. Total length is 283 m.

– Drainage ditches. Total length is 1,584 m.

– Construction of the SPS No. 3/No. 4.

The total length of the bypass from rainwater inlets is 2,642 m.

Stage 2, start-up facility 1

– Manifold F. Total length is 656 m.

The total length of the bypass from rainwater inlets is 90 m.

Stage 2, start-up facility 2

– Manifold G. Total length is 230 m.

The total length of the bypass from rainwater inlets is 11 m.

Stage 2, start-up facility 3

– Manifold K. Total length is 240 m.

The total length of the bypass from rainwater inlets is 9 m.

Characteristics of planted vegetation to be deleted in the process of conducting the planned activities

The commission consisting of: Head of the Production Department of State Enterprise “International Airport ‘Boryspil’” (hereinafter referred to as SE “International Airport

‘Boryspil’”) S. O. Rora, Project Manager of the Department of Project Works of SE “International Airport ‘Boryspil’” M. I. Tsilyk, Chief Forest Pathologist of State Specialized Forest Protection Enterprise “Kyivlisozakhyst” V. V. Holyk, conducted this special forest pathological and sanitary examination of green plantations TS-23 of SE “International Airport ‘Boryspil’” with accounting by technical validity categories and distribution by the quality state of plantations within the administrative boundaries of Hirska Village Council of the Boryspilsky district of e Kyiv region, confirmed by this act.

The need of this examination is caused by the fact that a need of modernization of infrastructure facilities appeared in connection of the planned activity of SE “International Airport ‘Boryspil’”.

This survey determined that green plantations of TS-23. SE “International Airport ‘Boryspil’” is located in the land allotments with cadastral numbers 3220883200:02:004:0140; 3220883200:02:004:0142, state property, purpose: 12.08 For placement and operation of buildings and structures of additional transport services and auxiliary operations for placement and operation of buildings and structures of additional transport services and auxiliary operations, estimated area is 7.0 ha.

Plantations are represented by tree breeds of cherry, willow, sorbus, maple, walnut, apple tree, plum tree, apricot tree, oak, birch, poplar, chestnut, pear tree, and pine tree. The quality state of trees in the majority of plantations is good and satisfactory – the trees are healthy but with slow growth, unevenly developed crown, insufficiently dense leaves, with minor mechanical damages and small hollows.

Tree age is from 30 to 50 years. There are overmature trees of willow and poplar in the plantations. Overmature trees are severely weakened, such tree categories are potentially dangerous trees, and belong to Category III according to biological condition categories. In case of squall wind gusts and galling of wet snow in winter, the branches of different orders can fall, creating potential hazard for traffic, life and health of airport workers.

No.	Tree species	Unit of measurement	Quantity	Diameter, cm	State of quality
1.	Pine	pcs.	10	8–44	Satisfactory
2.	Birch	pcs.	5	16–60	Good
3.	Willow	pcs.	12	20–68	Satisfactory
4.	Rowan	pcs.	1	24	Satisfactory
5.	Oak	pcs.	2	32	Satisfactory
6.	Maple	pcs.	23	8–80	Satisfactory
7.	Chestnut	pcs.	1	20	Satisfactory
8.	Poplar	pcs.	1	88	Satisfactory
9.	Apricot	pcs.	6	16–36	Satisfactory
10.	Cherry	pcs.	85	8–52	Satisfactory
11.	Walnut	pcs.	5	8–32	Good
			6	8-56	Satisfactory
12.	Pear	pcs.	2	12	Satisfactory
13.	Plum	pcs.	5	16–40	Satisfactory
14.	Apple	pcs.	7	8–40	Good
			20	8–36	Satisfactory
Total			191		

The Commission considers it possible to remove all trees that fall under the zone of modernization of the infrastructure of TS-23 of SE “MI ‘Boryspil’”. “Measures not related to

forestry" – by another felling, solid method, on an approximate area of 7.0 ha, a total number of 191 (one hundred and ninety-one) trees.

Together with felling of trees, bush and tree species scrubs are subject to cutting as part of infrastructure modernization.

The height of tree stubs according to the current regulations shall be 10 cm at the tree diameter up to 30 cm, and 1/3 of the stub diameter at the tree diameter over 30 cm.

Cogs shall be subject to mandatory cleaning from wood cutting dirtiness as part of cutting.

A copy of the certificate of special forest pathological and sanitary inspection of the planted land of TS-23 of SE "International Airport "Boryspil" within the administrative boundaries of the Hora Village Council of the Boryspilsky district of the Kyiv region dated 14.08.2020 is provided in Annex No. 9.

Characteristics of lands that are planned to be used during the implementation of the planned activities

In the course of implementation of the planned activity it is supposed to use the land plots that are in constant use of SE "International Airport 'Boryspil'":

- with an area of 163.3212 hectares intended "for placing engineering and other buildings" (a state certificate of the right of the permanent use of land, series "YAYA" No. 140084 registered in the Register of State Acts on the Ownership and the Right of Permanent Use of Land, Lease Agreements under No. 322080003000048);
- with a total area of 624.8682 ha under the existing development/technical engineering and social and domestic objects/(a state certificate of the right of constant land use "II-KV" No. 001459 registered in the Register of State Acts on the Right of Permanent Use of Land under No. 438).

Copies of documents confirming the right of permanent use of land plots listed in Appendix No. 5.

In addition, it is planned to purchase plots of land for the reconstruction of runway strip No. 2.

Information on the owners/users of land plots of the Martusivska Village Council and Hirska Village Council that are planned to be purchased for the reconstruction of Maneuvering Area No. 2 is provided in Annex 6.

Engineering support of the facility (energy, water supply, wastewater disposal)

Power supply. SE "IA 'Boryspil'" is powered by 2 independent sources from TS "Boryspil" and TS "Strila" through 110/10 kV substation "Airport", DP No. 21, 22, 39, TS-1005 with 7 feeders.

In case of partial or complete power outage, the company has 36 diesel power plants (3 of them are mobile ones), with a total capacity of 7,182 kW, that ensures flight safety and livelihood of employees and passengers at the time of the accident.

Heat supply. SE "IA 'Boryspil'" is provided with two own boiler houses with a total capacity of 55.3 Gcal/h. Boiler house No. 1 (can use diesel fuel as fuel in emergency mode). The length of one-pipe heating systems is more than 42 km.

Water supply. SE "International Airport 'Boryspil'" is provided with the following sources: 7 (existing) and 3 (new, not commissioned) own artesian wells, via purification and deferrization pump station with maximum total capacity of 190 m^3/h and two second stage pump stations with total capacity of 400 m^3/h; municipal water supply ME "VKG BORYSPILVODOKANAL", water supply network of CFI Amic Ukraine.

Needs for domestic and potable water supply are 3.68 m^3/h.

Water supply system in the premises of the facility is sealed, from the connection point to the inlet complex. Water supply systems are laid underground.

Wastewater disposal is ensured by systems of sewage networks laid underground and a storm sewer system with a storm sewage pump station (SPS) No. 1 located on the north of ARW No. 1 – near the outdoor reservoir for collecting surface waters.

Reverse water receiver: sewage networks of ME “VKG BORYSPILVODOKANAL” (domestic waste waters); the Ikva river beyond the boundary of the village of Zatyshne, Boryspilsky district, channel pond within the boundary of the city of Boryspil (rain and thaw waters) (ref. to Annex No. 14).

1.5. Estimation by types and quantities of expected wastes, emissions (discharges), pollution of water, air, soil and subsoil, noise, vibration, light, heat and radiation pollution, as well as radiation resulting from the preparatory and construction works and implementation of the planned activity

During execution of preparatory and construction works on the territory of the planned activity on the reconstruction of Maneuvering Area No. 2 of SE "International Airport 'Boryspil'", there will be the following impacts on the environment. The set of preparatory works will include the following:

- dismantling of the existing aerodrome pavements of Maneuvering Area No. 2: runway, taxiways (RD), aerodrome pavement shoulders and the existing passages at the aerodrome;
- dismantling of utilities that fall into the reconstruction zone (networks of fuel pipelines, water supply, wastewater disposal, communication cables, airfield lighting systems, etc.);
- removal of tree and shrub vegetation;
- stripping.

The complex of construction works provides for a new construction of buildings and structures:

– artificial runway (ARW-2), main taxiway, connecting taxiways and rapid exit ways;
–an isolation parking space for aircraft (AC), parking place for testing aircraft engines; parking places for cargo aircraft;
–radio navigation and light signalling equipment systems;
–emergency rescue stations (ARS);
–systems for collection of rainwater, wastewater and their disposal from aerodrome sites and treatment facilities;
–transformer substations;
–a fuel filling station (FFS);
–a patrol motor road, access roads and sites;
–fences of the airport equipped with security alarm and video surveillance systems;
–an operational base for deicing (preparation of deicing liquid) and places for parking of motor vehicles;
–civil defence shelter for fire equipment and duty guards;
it is provided for the reconstruction of the existing buildings and structures;
–transformer substations;
–networks of fuel lines;
–ramp "S" with arrangement of a platform for handling aircraft with anti-icing agent.

Construction works are expected to be performed in the conditions of the operating airport, with the cessation of operation of Maneuvering Area No. 2.

The following impact on the environment is expected during the planned activities:

- air environment: emissions of pollutants into the atmosphere by stationary and mobile sources of emissions of pollutants, determination of compliance with the restrictions established by the Permit for Emissions of Pollutants;
- aquatic environment: discharge of pollutants into the Ikva river, assessment of compliance with the requirements of the existing Permit for Special Water Use;
- soil: during operation of the facility, there is no soil contamination of the adjacent territories, preventive measures are considered;
- flora and fauna: the impact on the existence of birds during the implementation of measures for ensuring safety of the movement of aircraft within the airport during the accounting, tracking and prevention of entry of wild animals and birds into the airport;
- social environment (population): the impact on the development of adjacent territories; impact of acoustic conditions on settlements, the impact of the spread of electromagnetic

radiation during the operation of radio navigation equipment; assessment of compliance with the requirements of State Sanitary Norms and Rules;

- technogenic environment: waste generation during preparatory works and operation of the facility; hazard identification, identification of possible danger zones.

Assessment according to the types and quantities of expected emissions and water pollution that are generated as a result of preparatory and construction works as well as the implementation of the planned activity

During the implementation of the complex of preparatory works, works on dismantling of the existing aerodrome pavements of the runway (RW-2), taxi ways (TW), sections of aprons "S" and "G", pavements of the patrol road, driveways and platforms, existing utilities, elements of the wastewater disposal system, dismantling of the existing buildings, lighting and radio equipment facilities, lighting towers and fencing of Maneuvering Area No. 2 are carried out.

Construction waste generated during the dismantling of the existing buildings is not stored on construction sites. It is provided for the organized removal.

Dismantling of the existing artificial aerodrome pavements of Maneuvering Area No. 2 – ARW-2, MTW-2, TW-9, TW-10, TW-11, TW-12, TW-13, TW-14, TW-15, TW-16, TW-18, TW-19, TW UTR

Table

Facility Name	**Construction Material**	**Units of Measurement**	**Quantity**
1	*2*	*3*	*4*
ARW-2	Ferro-concrete (26 cm)	m^2	219,445
	Soil-bitumen (13 cm)	m^2	223,010
	Cutting of ferro-concrete joints	rm	75,600
MTW-2	Ferro-concrete (26 cm)	m^2	74,035
	Soil-bitumen (13 cm)	m^2	77,590
	Cutting of ferro-concrete joints	rm	25,200
TW-9	Ferro-concrete (26 cm)	m^2	15,929
	Soil-bitumen (13 cm)	m^2	16,675
	Cutting of ferro-concrete joints	rm	5,415
TW-10	Cement concrete (45 cm)	m^2	6,300
	Lean concrete (20 cm)	m^2	6,615
	Sand-and-cement mix (15 cm)	m^2	6,615
TW-11	Ferro-concrete (26 cm)	m^2	7,660
	Soil-bitumen (13 cm)	m^2	7,965
	Cutting of ferro-concrete joints	rm	2,605
TW-12	Ferro-concrete (26 cm)	m^2	8,840
	Soil-bitumen (13 cm)	m^2	9,205
	Cutting of ferro-concrete joints	rm	3,005
TW-13	Ferro-concrete (26 cm)	m^2	5,860
	Soil-bitumen (13 cm)	m^2	6,185
	Cutting of ferro-concrete joints	rm	1,995
TW-14	Ferro-concrete (26 cm)	m^2	6,260
	Soil-bitumen (13 cm)	m^2	6,615
	Cutting of ferro-concrete joints	rm	2,130
TW-15	Ferro-concrete (26 cm)	m^2	7,015
	Soil-bitumen (13 cm)	m^2	7,295
	Cutting of ferro-concrete joints	rm	2,385

TW-16	Ferro-concrete (26 cm)	m^2	965
	Soil-bitumen (13 cm)	m^2	1,020
	Cutting of ferro-concrete joints	rm	330
TW-18	Ferro-concrete (26 cm)	m^2	1,280
	Soil-bitumen (13 cm)	m^2	1,345
	Cutting of ferro-concrete joints	rm	435
TW-19	Cement concrete (45 cm)	m^2	6,360
	Lean concrete (20 cm)	m^2	6,675
	Sand-and-cement mix (15 cm)	m^2	6,675
TW UTR	Ferro-concrete (26 cm)	m^2	3,045
	Soil-bitumen (13 cm)	m^2	3,235
	Cutting of ferro-concrete joints	rm	1,035
Apron “S”	Cement concrete (45 cm)	m^2	40,000
	Cement concrete (30 cm)	m^2	23,795
	Sand-and-cement mix (15 cm)	m^2	40,620
	Lean concrete (20 cm)	m^2	19,175
	Broken stone (20 cm)	m^2	24,190
	Sand (20 cm)	m^2	24,190

Dismantling of removable concrete slabs over the existing fuel pipeline

Table

Facility Name	**Construction Material**	**Units of Measurement**	**Quantity**
1	*2*	*3*	*4*
Apron “S”	Reinforced-concrete slabs	pcs.	182
	Sandy substrates under slabs (32)	m^2	2,560

Dismantling of the existing roadsides of aerodrome pavements of Maneuvering Area No. 2 and driveways

Table

Facility Name	**Construction Material**	**Units of Measurement**	**Quantity**
1	*2*	*3*	*4*
ARW-2	Asphalt concrete (6 cm)	m^2	12,430
	Broken stone (12 cm)	m^2	19,250
	Sand (15 cm)	m^2	19,250
MTW-2	Asphalt concrete (6 cm)	m^2	52,800
	Broken stone (12 cm)	m^2	59,040
	Sand (15 cm)	m^2	59,040
TW-9	Asphalt concrete (6 cm)	m^2	8,290
	Broken stone (12 cm)	m^2	9,260
	Sand (15 cm)	m^2	9,260
TW-10	Cement concrete (24 cm)	m^2	565
	Sand-and-cement mix (21 cm)	m^2	665
TW-11	Asphalt concrete (6 cm)	m^2	2,850
	Broken stone (12 cm)	m^2	3,175
	Sand (15 cm)	m^2	3,175
TW-12	Asphalt concrete (6 cm)	m^2	1,080
	Broken stone (12 cm)	m^2	2,470
	Sand (15 cm)	m^2	2,470

TW-13	Asphalt concrete (6 cm)	m^2	3,735
	Broken stone (12 cm)	m^2	4,205
	Sand (15 cm)	m^2	4,205
TW-14	Asphalt concrete (6 cm)	m^2	3,820
	Broken stone (12 cm)	m^2	4,425
	Sand (15 cm)	m^2	4,425
TW-15	Asphalt concrete (6 cm)	m^2	2,700
	Broken stone (12 cm)	m^2	3,125
	Sand (15 cm)	m^2	3,125
TW-18	Asphalt concrete (6 cm)	m^2	465
	Broken stone (12 cm)	m^2	555
	Sand (15 cm)	m^2	555
TW-19	Cement concrete (24 cm)	m^2	480
	Sand-and-cement mix (21 cm)	m^2	565
TW UTR	Asphalt concrete (4 cm)	m^2	685
	Broken stone (10 cm)	m^2	565
	Cement concrete (24 cm)	m^2	3,435
	Sand-and-cement mix (21 cm)	m^2	3,740
Apron “S”	Asphalt concrete (4 cm)	m^2	255
	Broken stone (10 cm)	m^2	330
	Cement concrete (24 cm)	m^2	2,770
	Sand-and-cement mix (21 cm)	m^2	3,340
Airfield	Asphalt concrete (4 cm)	m^2	21,570
	Broken stone (10 cm)	m^2	29,250
	Cement concrete (24 cm)	m^2	1,615
	Sand-and-cement mix (21 cm)	m^2	2,235

Dismantling of the existing pavements of vehicular accesses to separated sites

Table

Facility Name	**Construction Material**	**Unit of Meas.**	**Quantity**
1	*2*	*3*	*4*
Airfield	Crushed stone treated with bitumen (6 cm)	m^2	29,300

Dismantling of the existing metal shelters

Table

Item	**Construction Material**	**Unit of Meas.**	**Quantity**
1	*2*	*3*	*4*
Territory of the airfield	Metal shelters	pc.	4

Demolition of the existing buildings

Table

Item	**Construction Material**	**Units of Measurement**	**Quantity**
1	*2*	*3*	*4*
Territory of the airfield	Existing buildings	pc.	5

Dismantling of the existing wooden fence

Table

Item	Construction Material	Units of Measurement	Quantity
1	*2*	*3*	*4*
Territory of the airfield	Wooden fence	m^3	38.47

Dismantling of the existing concrete fence

Table

Item	Construction Material	Units of Measurement	Quantity
1	*2*	*3*	*4*
Territory of the airfield	Cement concrete	m^3	72,15

Dismantling of the existing airfield fence made of mesh panels

Table

Item	Construction Material	Units of Measurement	Quantity
1	*2*	*3*	*4*
Territory of the airfield	Mesh panels	rm	10,470

Dismantling of equipment

Table

Item	Construction Material	Units of Measurement	Quantity
1	*2*	*3*	*4*
Territory ARW 2	TW edge lights	pc.	96
	Aerodrome signs	pc.	9
	Insulating transformer, 45 V	pc.	96
	Pole piece for installation of elevated-type lights	pc.	105
	Cable with rubber insulation 2×2.5 mm^2	m	945
	Special aviation cable 1×6 mm^2	m	2,775
	Armored aluminum cable, 3-core, 10 kV	m	4,470
	Armored cable, 5-core, 0.4 kV	m	4,260
Apron	Lighting towers	pc.	8
	Lighting control cabinets	set	8
Subsystem of approach lights	Crossbar approach lights	pc.	328
	Side row approach lights	pc.	54
	Insulating transformer, 150 W	pc.	328
	Insulating transformer, 100 W	pc.	54
	Pole pieces for installation of elevated-type lights	pc.	382
	Base for installation of the elevated-type light	pc.	382
	Cable with rubber insulation 2×4 mm^2	m	1,800

	Special aviation cable 1 × 6 mm^2	m	13,660
	Brightness regulator, 15 kVA	pc.	4
	Brightness regulator, 10 kVA	pc.	2
Lighting system ARW	Threshold flood lights	pc.	46
	Restriction flood lights	pc.	24
	Side row universal lens lights of the RW	pc.	130
	Insulating transformer, 150 W	pc.	176
	Insulating transformer, 65 W	pc.	24
	Pole piece for installation of elevated-type lights	pc.	300
	Base for installation of the elevated-type light	pc.	600
	Cable with rubber insulation 2 × 2.5 mm^2	m	1,000
	Special aviation cable 1 × 6 mm^2	m	19,510
	Brightness regulator, 3 kVA	pc.	4
	Brightness regulator, 10 kVA	pc.	2
	Touchdown zone lights	pc.	180
	Insulating transformer, 48 W	pc.	180
	Base for installation of the flush light	pc.	180
	Cable with rubber insulation 2 × 4 mm^2	m	12,960
	Brightness regulator, 5 kVA	pc.	2
	Runway centerline lights	pc.	276
	Insulating transformer, 100 W	pc.	276
	Base for installation of the flush light	pc.	276
	Cable with rubber insulation 2 × 4 mm^2	m	11,040
	Special aviation cable 1 × 6 mm^2	m	16,700
	Brightness regulator, 17.5 kVA	pc.	2
	Angle-of-approach lights (PAPI)	pc.	46
	Insulating transformer, 200 W	pc.	16
	Pole piece for installation of the elevated-type light	pc.	4
	Base for installation of the elevated-type light	pc.	4
	Cable with rubber insulation 2 × 2.5 mm^2	m	48
	Special aviation cable 1 × 6 mm^2	m	7,920
	Brightness regulator, 5 kVA	pc.	4
	Wing bar lights	pc.	20
	Insulating transformer, 48 W	pc.	20
	Pole piece for installation of elevated-type lights	pc.	20
	Base for installation of the elevated-type light	pc.	20
	Cable with rubber insulation 2 × 4 mm^2	m	45
	Special aviation cable 1 × 6 mm^2	m	4,010
	Brightness regulator, 5 kVA	pc.	4
TW lighting system	TW edge lights	pc.	227
	ARW protection lights	pc.	227

Lighting system TW	Aerodrome signs	pc.	30
	Insulating transformer, 45 W	pc.	227
	Pole piece for installation of elevated-type lights	pc.	227
	Base for installation of the elevated-type light	pc.	227
	Cable with rubber insulation 2×2.5 mm^2	m	1,345
	Special aviation cable 1×6 mm^2	m	14,735
	Brightness regulator, 12.5 kVA	pc.	2
Equipment Lightning TSs	Dismantling of power supply boards "RU"-04 kV	set	2
	Dismantling of high-voltage contactor cabinets "SHVK"	set	2
	Condenser units	set	2
	Remote control equipment	set	2
	Diesel generator "ASDA-200"	pc.	2
	Oil transformers TM-250 kVA	pc.	4
Dismantling of the existing CL	Armored aluminum cable, 3-core, 10 kV	m	11,175
	Armored cable, 5-core, 0.4 kV	m	3,110

Characteristics of waste generated during the implementation of the planned activity ST "International Airport 'Boryspil'"

Table

Ser. No.	**Nomenclature name of waste according to DSTU 3910-99 or packaging according to the documentation of the enterprise**	**Physical state of care or type of packaging**	**Waste code according to DK 005-96 or packaging code according to DK 016-97**	**Designation of the waste type according to DK 005-96 or designation of packaging according to DK 016-97**	**Unit of measurement of the waste amount**	**Hazard class**
1	*2*	*3*	*4*	*5*	*6*	*7*
1	Wastes from dismantling of buildings, concrete constructions, reinforced concrete, dismantling of existing artificial coverings, and wooden products	Solid	4510.3.1.01	Concrete wall products, columns, concrete tiles spoiled, contaminated or unidentified that cannot be used for their intended purpose	t	IV
2		Solid	4510.1.3.02	Scrap bricks, stone wall materials	t	IV
3		Solid	4510.1.3.06	Wood products that are damaged, soiled or unidentified, wood residues and wood chips, including those from wooden floor or parquet boards that cannot be used for the intended purpose	t	IV
4	Wastes from dismantling of buildings, concrete constructions, reinforced concrete, dismantling of existing artificial coverings	Solid	4510.2.9.02	Mixture of soil and stones	t	IV
5		Solid	4510.2.9.04	Remains of bitumen-concrete mix without tar	t	IV
6		Solid	4510.2.9.06	Reinforced concrete constructions and metal parts made of iron and steel that are corrupted	t	IV

				(damaged) or unidentified		
7		Solid	4510.2.9.09	Mixed waste from construction and demolition of buildings and structures	t	IV
8		Solid	4510.1.1.01	Gravel, crushed stone, sand, dolomite flour, fillers, gypsum cement, hydraulic insulating mastic, bonding agents	t	IV
9	Sand contaminated with oil products	slurry- or paste-like	7730.3.1.04	Absorbents that are spoiled, used or contaminated	t	III
10	Rags contaminated with oil products	Mix	7730.3.1.06	Wiping materials that are damaged, used or contaminated	t	III
11	Power equipment	Solid	7740.3.1.03	Equipment in power production, communications, construction and other activities (except for general-purpose electronic equipment) that is damaged, used	t	IV
12	Electronic equipment	Solid	7740.3.1.03	General-purpose electronic equipment that is broken, used or is not repaired	t	IV
13	Electronic equipment	Solid	3210.3.1.02	Scrap electronic components	t	IV
14	Insulated wires and cables	Solid	2910.2.5.03	Trimmings of cables	t	IV
15		Solid	3110.1.0.10	High-resistance alloys (manganin) that are spoiled, contaminated or unidentified that cannot be used for their intended purpose	t	IV
16		Solid	3110.1.0.12	Armored tape, armored wire that are damaged, contaminated or unidentified that cannot be used for its intended purpose	t	IV
17	Metal structures	Solid	7710.3.1.08	Other small scrap of ferrous metals	t	IV

Dismantling of the existing structures, equipment, buildings, structures will be performed in one turn. Warehousing is not provided. It is provided for the organized removal.

Characteristics of sediments formed in the process of LWTP treatment of surface water of SE “IA “Boryspil” are given in the table below.

table

Waste designation	**Waste hazard class, content of chemical elements (compounds) in waste, %**	**Physico-chemical characteristics of waste (fire and explosion hazard, physical state, solubility, moisture)**	**Generated waste, t/year**	**Transferred to enterprises, organizations**

1. Mechanically dehydrated on sand separators sludge after oil and sand traps	Hazard class IV. Composition: sand, clay, soil – 60%, water – 40%	Solid, non-flammable substance, non-explosive, non-flammable, practically insoluble, humidity – 40%, density – 1.6 t/m^3	18.16	Removal as solid waste to the landfill for solid waste
2. Mechanically dehydrated on screw dehydrators sludge from clarifiers after aerobic stabilization	Hazard class IV. Composition: organic parts – 10%, clay, iron hydroxide, mech. parts – 25% water – 65%	Solid, non-flammable substance, explosion-proof, non-flammable, practically insoluble, humidity – 65%, density – 1.18 t/m^3	63,62	Use for improving the fertilizing properties of soils
3. Biohumus from biosorption bonds	Hazard class IV. Composition: bio-humus biomass – 60%, water – 40%	Solid, non-combustible substance, humidity – 40%, density – 1.18 t/m^3	0.084	Use for improving the fertilizing properties of soils
4. Dehydrated excess sludge from the station TOPAS AUTOMATIC	Hazard class IV. Composition: bio-humus biomass – 40%, water – 60%	Solid, non-combustible substance, humidity – 60%, density – 1.18 t/m^3	0.069	Use for improving the fertilizing properties of soils
Total:			81.873	

According to the estimated composition, results of analyzes and conclusions of examination on similar objects VOC sediment belongs to the IV class of danger, is subject to utilization for improvement of fertilizing and structural-mechanical properties of soils (danger class according to results of sanitary and hygienic assessment of sludge clarified and provided recommendations for its disposal).

After the commissioning of the facility, during the economic activity, the increase of generated waste and generation of new types of hazardous waste is not expected. The generated waste, including that generated during the preparatory work, belongs to the waste with known methods of reuse, processing, destruction, and disposal.

Assessment according to the types and quantities of expected emissions of pollutants in atmospheric air that arise as a result of preparatory and construction works as well as the implementation of the planned activity

The main air pollution in the airport area during its operation is created by emissions from aircraft engines and special vehicles, as well as during the operation of other related facilities that are on the balance of SE "IA ‘Boryspil’".

Data of SE “IA ‘Boryspil’" on the intensity of departures/arrivals, composition of the fleet of accepted aircraft, data of the Report on Inventory of Pollutant Emissions at SE “IA ‘Boryspil’" developed by LLC “Ecotekhservis” in 2018 and duly registered were used as initial data to perform calculations.

Additionally, as the initial data, information on the operation of the runways in the future (after the completion of runway No. 2 reconstruction) was provided.

The predicted total number of operations is 350 takeoffs/landings.

Distribution by RW (since 2030): RW 1 – 50%; RW 2 – 50%.

Newly created sources of pollutant emissions into the atmosphere were identified. It is envisaged to dismantle the existing one and build a new fuel filling station, the location of which is supposed to be at a standard distance from aircraft parking places. In connection with this reconstruction, the existing sources of long-distance emissions of ES No. 68–73 and 176–180 are to be liquidated, and new sources of pollutant emissions into the atmospheric air of ES No. 201–212 are to be created at the construction site of the fuel filling station.

The construction of a new fuel filling station provides for installation of:

- horizontal double-walled steel tanks with a capacity of 60 m^3 located underground;

- 6 pcs. for storage of special de-icing fluids necessary for the treatment of aircraft and the hard runway surfaces.

The company plans to use propylene glycol produced by Safewing MP II Fligth to prevent aircraft icing (please refer to Appendix No. 10 – Conclusion of the State Sanitary and Epidemiological Expertise No. 602-123-20-3/37153 dated 28 August 2018).

At the consumer level, propylene glycol is used in automotive windshield products to ensure safe driving.

Propylene glycol does not pose a threat to the environment. Therefore, the calculation of emissions during storage and when processing aircraft with this substance is not performed.

- Horizontal double-walled steel tanks with a capacity of 14 m^3 located underground.

- 2 pcs. for storage of special de-icing fluids necessary for the treatment of hard runway surfaces.

For the processing of airport runways, taxiways, and aprons in the autumn and winter period, it is planned to use potassium formate produced by Runway Guard KF (please refer to Appendix No. 11 – Conclusion of the State Sanitary and Epidemiological Expertise No. 602-123-20-1/4974 dated 16 December 2016).

Potassium formate does not pose a threat to the environment. Therefore, the calculation of emissions during storage and when processing hard surfaces with this substance is not performed.

2 block points. Each block point consists of two filling stations (FS) and two tanks (20 m^3 and 10 m^3) for storing diesel fuel (DF) and Jet-A1 fuel (aviation kerosene), for simultaneous refuelling for 4 cars.

For continuous operation of radio and lighting equipment necessary for aircraft landing, diesel generators are installed on airport premises. It is planned to dismantle the existing diesel generator sets of the existing emission sources ES No. 117-119, 133-135, 146-149, and the construction of new transformer substations for lighting equipment (1023H) with the installation of new diesel generator sets creating new sources of pollutants emissions into the air ES No. 213-218.

It is planned to arrange a parking area for testing aircraft engines, that is, a newly formed source of pollutants emissions into the air ES No. 219.

It is planned to build an emergency rescue station (ERS). The garage part of the building is rectangular in plan with dimensions in the axes of 18.0 × 33.54 m, with a height of 6.5 m, designed to accommodate four boxes for estimated fire trucks in each six-meter span of the building and one box for rescue equipment and ambulance – the emission of pollutants into the air is carried out through a deflector installed on the roof of the building, a newly formed source ES 220.

When calculating pollutants emissions into the air, an increase in the number of aircraft (AC) during landing and takeoff (LTO) cycles (from 156 to 350) with a distribution of 50% (AR-1) and 50% (AR-2) was taken into account. The existing ES No. 190 – AR-1 and the reconstructed one (repair of the track and increase in length: from 3,500 m to 3,800 m) ES No. 200 – AR-2.

When calculating pollutants emissions into the air, the redistribution of emissions from internal combustion engines of special vehicles, when driving along the apron of terminals B and D, as well as when driving along the reconstructed apron of terminal F (taking into account the redistribution of the number of cars due to an increase in the LTO cycle), were taken into account. Existing ES No. 191–193.

It is envisaged to build an S apron with a platform for processing aircraft with the de-icing fluid – newly formed ES No. 221.

Determination of the impact of pollutant emissions from stationary sources

Technological equipment for storage and delivery of diesel fuel

It is envisaged to dismantle the existing one and build a new filling station (FS), the location of which is supposed to be at a standard distance from aircraft parking areas.

The following technological operations are carried out at the FS site:

- fuel receiving;
- fuel storage in stationary tanks;
- refuelling;

Diesel fuel and Jet-A1 fuel (aviation kerosene) are delivered to FS by fuel trucks and stored in ground tanks painted with heat-reflecting enamel.

FS parameters

Table

	Fuel grade	**Tank volume, m^3**	**Received fuel volume, m^3/year**	**Number of tank trucks**	**Rundown time**	**FS productive capacity**	**Fuel dispensed, m^3/year**
FS 4-1	Diesel fuel	20	287.5	43	9 hours	90 l/min	289.6
FS 4-1	JET-A1	10	41.6	13	3 hours	50 l/min	37.4
FS 4-2	Diesel fuel	20	308.8	37	11 hours	50 l/min	304.7
FS 4-2	Diesel fuel	10	134.7	30	9 hours	50 l/min	130.2

From the tank trucks, the fuel is supplied to the fuel inlet filter through a flexible hose. The inlet filter removes scale and dirt from the fuel. The hose is connected to the filter using a quick-disconnect coupling, which provides immediate disconnection if necessary.

When fuel is discharged into the tank, fuel vapours are intensively displaced from the tank into the atmosphere. To prevent this, they use a fuel vapour recirculation system, which ensures the return of fuel vapour from the tank through a pipeline, a quick-disconnect coupling, and a flexible special hose into the airtight neck of the tank truck.

To prevent significant pressure fluctuations that can lead to deformation of the tank or to the failure of the filling station, breathing valve, which is connected to the tank by a deaeration pipeline, is used.

The storage time for petroleum products is 8,760 h/year.

Gases generated during the discharge of oil products into the tank and storage due to evaporation are released into the atmosphere through a breathing valve with a diameter of 0.05 m and a height of 5.0 m – ES No. 213-218.

Expected pollutants: C_{12}-C_{19} saturated hydrocarbons in terms of total organic carbon, aromatic hydrocarbons, and hydrogen sulphide.

Diesel generators

General data in accordance with the passport: manufacturer – SDMO (France), model J275K, 275 kW, which is intended for backup power supply of electrical equipment in case of unregulated power outages from the main power supply:

- frequency – 50 Hz;
- rated power – 275 kW/220 kW; basic – 200 kW/160 kW;
- rotation frequency – 1,500 rpm;
- fuel type – diesel fuel (taken with a specific gravity – 0.85);
- fuel consumption (100% load) – 53.5 l/h, at 75% load – 40.1 l/h.

We assume that the DG standby time is no more than 100 hours per year.

Emission sources:

– ES No. 213, 216, the height of which is 7.0 m and the diameter is 0.15 m.

Expected pollutants: nitrogen dioxide, sulphurous anhydride, carbon oxide, formaldehyde, benzo[a]pyrene, C_{12}-C_{19} saturated hydrocarbons, suspended particles undifferentiated by composition.

Diesel generators equipped with a DF storage tank

So the following operations are carried out on the site:

- diesel fuel receiving;
- diesel fuel storage in stationary tanks;

– ES No. 214, 215, the height of which is 7.0 m and the diameter is 0.05 m;

– ES No. 217, 218, the height of which is 4.0 m and the diameter is 0.5 m.

Expected pollutants: C_{12}-C_{19} saturated hydrocarbons in terms of total organic carbon, aromatic hydrocarbons, and hydrogen sulphide.

Emergency rescue stations (ERS)

The garage part of the building is designed to accommodate four boxes for estimated fire trucks in each six-meter span of the building and one box for rescue equipment and ambulance.

- a newly formed ES No. 220 – the emission is carried out through a deflector installed on the roof of the building, H = 8 m, ∅= 0.5.

Expected pollutants: nitrogen dioxide, sulphurous anhydride, carbon oxide, methane, benzo[a]pyrene, C_{12}-C_{19} saturated hydrocarbons, suspended particles undifferentiated by composition, nitrogen (1) oxide [N_2O], and carbon dioxide (CO_2).

Determination of the impact of pollutant emissions from unorganized sources

– A newly formed emission source: ES No. 219 – parking areas intended for aircraft engines testing. The operation of testing engines in stationary ground conditions is a mandatory technical procedure after completion of repair work or work according to routine maintenance forms and is carried out in accordance with the schedule (test program).

Number of LTO cycles per year – 104 (according to the customer's data).

Schedule (test program)

LTO cycle stage	**Relative engine thrust, %**	**LTO cycle stage duration, min.**
Takeoff	100	0.7
900 m height gain	85	2.2
Descent and landing approach from a height, 900 m	30	4.0
Taxiing (ground idle mode)	7	26.0

Expected pollutants: nitrogen dioxide, carbon oxide, C_{12}-C_{19} saturated hydrocarbons, suspended particles undifferentiated by composition.

Determination of the impact of pollutant emissions from mobile sources

– Existing ES No. 190 and reconstructed ES No. 200 – aircraft engines during landing and takeoff (LTO) cycles.

Sources of air pollution are aircraft during landing and takeoff (LTO) cycles.

Expected pollutants: nitrogen dioxide, carbon oxide, C_{12}-C_{19} saturated hydrocarbons, suspended particles undifferentiated by composition.

Aprons of terminals B, D, F and apron S:

– existing ES No. 191–193 – siding of specialized vehicles on the apron of terminals B, D and on the reconstructed apron of terminal F (taking into account the redistribution of the

number of cars in connection with the increase in LTO cycles), and the newly formed ES No. 221, that is, apron S.

Expected pollutants: nitrogen dioxide, ammonia, sulphurous anhydride, carbon oxide, methane, benzo[a]pyrene, C_{12}-C_{19} saturated hydrocarbons, suspended particles undifferentiated by composition, nitrogen (1) oxide [N_2O], and carbon dioxide (CO_2).

Characteristics of the object as a source of air pollution (prospective state)

The total number of newly formed and reconstructed emission sources is 26; 9 of them are organized, 17 – unorganized sources, at the same time, 4 of them are flat platforms of mobile sources (special vehicles and aircraft (AC)). 14 types of pollutants enter the air in the amount of 36.744 tons/year.

The list of types and volumes of pollutants that are planned to be emitted into the air by newly formed and reconstructed emission sources is provided in the table below.

table

No.	2-TP code	San. code	Item	TLV (SRLI)	Hazard class	Gross emissions	
						g/sec	tons/year
1	3000	2902	Suspended particles undifferentiated by composition	0.5	3	0.018263	0.555798
2	3004	328	Soot	0.15	3		
3	4001	301	Nitrogen dioxide	0.2	3	0.257350	35.702886
4	4002	304	Nitrogen oxide	0.4	3	0.000056	0.000001
5	5001	330	Sulphurous anhydride	0.5	3	0.127021	0.034112
6	5002	333	Hydrogen sulphide	0.08	2	0.000303	0.000069
7	4003	303	Ammonia	0.2	4	0.348438	0.088958
8	6000	337	Carbon oxide	5	4	1.474860	0.019471
9	7000	11812	Carbon dioxide			0.225382	0.048246
10	11000	2754	C_{12}-C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	1	4	0.000167	0.000037
11	11000	10312	Aromatic hydrocarbons	–	–	0.003571	0.000974
12	11049	1325	Formaldehyde	0.035	2	0.000165	0.293608
13	12000	410	Methane	(50)	–	0.000014	0.0000003
14	1301	703	Benzo[a]pyrene	1E-05	1	0.257350	35.702886
TOTAL						2.45559	36.74416

The list of types and volumes of pollutants that are planned to be emitted into the air by stationary newly formed and reconstructed emission sources of the company after reconstruction is provided in the table.

table

No.	Pollutant			Actual emissions (tons/year)	Potential emissions (tons/year)	Threshold values of potential emissions for state registration, (tons/year)
	code		Item			
1	3000	2902	Suspended particles undifferentiated by composition		0.55774	3.0
2	3004	328	Soot		0.55580	0.3
3	4001	301	Nitrogen dioxide		35.70289	1.0
4	4002	304	Nitrogen oxide		0.000001	0.1
5	5001	330	Sulphurous anhydride		0.03411	1.50

No.	Pollutant			Actual emissions (tons/year)	Potential emissions (tons/year)	Threshold values of potential emissions for state registration, (tons/year)
	code		Item			
6	5002	333	Hydrogen sulphide		0.00007	0.03
7	6000	337	Carbon oxide		0.08896	1.5
8	7000	11812	Carbon dioxide		0.01947	500.0
9	11000	2754	C_{12}-C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)		0.04825	1.5
10	11000	10312	Aromatic hydrocarbons		0.00004	1.5
11	11049	1325	Formaldehyde		0.00097	0.1
12	12000	410	Methane		0.29361	10
13	13101	703	Benzo[a]pyrene		0.0000003	0.0000005
				TOTAL	36.744	
The most common pollutants						
1	3000	2902	Suspended particles undifferentiated by composition		0.556	3.0
2	3004	328	Soot		0.556	0.3
3	4001	301	Nitrogen dioxide		35.703	1.0
4	4002	304	Nitrogen oxide		0.000001	0.1
5	5001	333	Sulphurous anhydride		0.03411	0.1
6	5002	333	Hydrogen sulphide		0.00007	0.03
7	6000	337	Carbon oxide		0.08896	1.5
8	11049	1325	Formaldehyde		0.00097	0.1
9	13101	703	Benzo[a]pyrene		0.0000003	0.0000005
				TOTAL	36.383	
Other pollutants present in facility emissions						
1	11000	2754	C_{12}-C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)		0.04825	1.5
2	11000	10312	Aromatic hydrocarbons		0.00003692	1.50
3	12000	410	Methane		0.29361	10
				TOTAL	0.34189	
Pollutants for which no TLV (SRLI) is set						
1	7000	11812	Carbon dioxide		0.01947	500.0
				TOTAL	0.01947129	

In accordance with the List of the most common and hazardous pollutants, which emissions into the air are subject to regulation, approved by the Resolution of the Cabinet of Ministers of Ukraine dated 29 November 2001 No. 1598 (1598-2001-p), and the List of pollutants and threshold limit values of potential emissions, according to which state registration is carried out (Appendix 1 to the Instruction on the procedure and criteria for state registration of facilities that have or may have a harmful effect on human health and the state of air, types and volumes of pollutants emitted into the air approved by order of the Ministry of Natural Resources of Ukraine dated 10 May 2002 No. 177), the designed facility belongs to the 2nd group, that is, facilities that are subject to state registration.

The total number of emission sources is 202; 129 of them are organized, 63 – unorganized sources (at the same time, 15 of them are flat platforms of mobile sources (special

vehicles and aircraft (AC))). 48 types of pollutants enter the air in the amount of 17.073 tons/year.

List of types and volumes of pollutants that are planned to be released into the air (prospective state)

table

No.	2-TP code	San. code	Item	TLV (SRLI)	Hazard class	Gross emissions	
						g/sec	tons/year
1		150	Sodium hydroxide (lye, caustic soda)	(0.01)	–	0.000884	0.010568
2		10226	Titanium dioxide	(0.5)	–	0.000786	0.000253
3	1002	110	Vanadium pentoxide	0.002	1	0.000144	0.000003
4	1003	123	Iron oxide** (in terms of iron)	0.04	3	0.019573	0.058297
5	1104	143	Manganese and its compounds (in terms of manganese dioxide)	0.01	2	0.003187	0.002823
6	1007	183	Metallic mercury	0.0003	1	0.000000	0.000029
7	1009	184	Lead and its compounds, except for tetraethyllead (in terms of lead)	0.001	1	0.000006	0.000001
8	1010	203	Hexavalent chromium (in terms of chromium trioxide)	0.02	1	0.000620	0.000029
9	3000	2902	Suspended particles undifferentiated by composition	0.5	3	0.767906	1.637247
10	3000	323	Amorphous silicon dioxide (Aerosil 175)	(0.02)	–	0.002832	0.001080
11	3000	10442	Potassium hydroxide	–	–	0.000010	0.000036
12	3000	10368	Dust containing asbestos	0.06	1	0.050734	0.024112
13	3004	328	Soot	0.15	3	0.044918	0.769725
14	4001	301	Nitrogen dioxide	0.2	3	2.582216	674.926682
15	4002	304	Nitrogen oxide	0.4	3	0.000557	0.000446
16	4002	11815	Nitrogen (I) oxide (N_20)	–	–	0.00	0.0317440
	4003	303	Ammonia	0.2	4	0.00000032	0.00000426
17	5001	330	Sulphurous anhydride	0.5	3	1.112396	0.229170
18	5002	333	Hydrogen sulphide	0.08	2	0.000303	0.000069
19	5004	322	Sulfuric acid, H_2SO_4	0.3	2	0.009781	0.108078
20	6000	337	Carbon oxide	5	4	3.610907	495.123965
21	7000	11812	Carbon dioxide			13.524780	15882.004679
22	11000	514	2-Methylpropene (isobutylene)	(0.1)	–	0.000007	0.000010
23	11000	1042	Butanol	0.1	3	0.101576	0.017084
24	11000	1061	Ethanol	5	4	0.145536	0.006281
25	11000	1319	Dimethoxymethane (methylal, dimethylformal)	0.05	4	0.000956	0.001376
26	11000	2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	5	4	0.072403	0.895941
27	11000	2732	Kerosene	(1.2)	–	0.179895	0.124691
28	11000	2735	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	(0.05)	–	0.000522	0.000394
29	11000	2750	Solvent oil	(0.2)	–	0.028685	0.038261
30	11000	2752	White spirit	(1)	–	0.219824	0.026463
31	11000	2754	C_{12}-C_{19} saturated hydrocarbons (in terms of total organic carbon)	1	4	3.683903	11.962828
32	11000	10312	Aromatic hydrocarbons	–	–	0.000167	0.000037
33	11000	10411	Aliphatic hydrocarbons	–	–	0.051143	0.002092

No.	2-TP code	San. code	Item	TLV (SRLI)	Hazard class	Gross emissions	
						g/sec	tons/year
34	11001	2001	Acrylonitrile	0.03	2	0.000002	0.000003
35	11007	1401	Acetone	0.35	4	0.047533	0.001178
36	11009	1210	Butyl acetate	0.1	4	0.093247	0.050784
37	11020	1246	2-Ethoxyethanol (ethyl cellosolve, ethylene glycol ethyl ether)	(0.7)	–	0.085946	0.010937
38	11021	1240	Ethyl acetate	0.1	4	0.070070	0.013590
39	11030	616	Xylene	0.2	3	0.138479	0.058344
40	11036	1052	Methanol	1	3	0.000917	0.001430
41	11037	620	Styrene	0.04	2	0.019300	0.011250
42	11041	621	Toluene	0.6	3	0.018800	0.006525
43	11049	1325	Formaldehyde	0.035	2	0.003571	0.000974
44	12000	410	Methane	(50)	–	0.001397	0.295802
45	1301	703	Benzo[a]pyrene	1E-05	1	0.000113	0.000009
46	16000	343	Highly soluble inorganic fluorides (fluoride and sodium fluorosilicate)	0.03	2	0.003840	0.000769
47	16000	344	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	0.2	2	0.002160	0.000480
48	16001	342	Fluorides, gaseous compounds (hydrogen fluoride, silicon tetrafluoride)	0.02	2	0.001171	0.000225
TOTAL						26.6052	17067.6618

Characteristics of newly formed and reconstructed sources of pollutant emissions into the air and their parameters, as well as calculations of pollutant emissions by newly formed and reconstructed sources of the SE Boryspil International Airport are provided in the Appendix No. 12.

The degree of pollutant emissions influence on the air

Calculations of pollutants dispersion in the surface layer of the atmosphere were made in accordance with the OND-86 “Methodology for calculating atmospheric concentrations of harmful substances contained in enterprise emissions” according to the EOL+ program, version 5.3.8. The software complex was developed by the TOPAZ system programming design bureau, Kyiv

Based on the results of the calculation, an analysis of the influence of design solutions on the state of air at the border of residential development in the surface layer is presented taking into account all of the enterprise emission sources and the existing background pollution.

In accordance with the requirement of clause 2.19 of the OND-86, the calculated rectangle size is 10000×10000 m with a step of 250 m. The calculation was carried out for 49 pollutants and 14 summation groups.

When calculating air pollution on the maps of pollutant dispersion in the air, the values of surface concentrations at the border of the nearest residential development at a given point were determined:

c.p. No. 1 (x = 3,282; y = 9,306) –at a distance of about 600 m – the territory of the Epicentr K shopping centre located at 2 Horbatiuk str., Boryspil (northern direction);

c.p. No. 2 (x = 4,592; y = 4,606) – at a distance of about 1600 m – residential and public buildings at the intersection of Volodymyr Momot and Yevhen Konovalets streets, Boryspil (eastern direction);

c.p. No. 3 (x = 4,830; y = 3,813) – at a distance of about 2,000 m – private residential building area, Gardens district, Boryspil (eastern direction);

c.p. No. 4 (x = 293; y = 2,579) – at a distance of about 950 m – residential area of the private sector on Boryspilska str., village of Martusivka, Boryspil district (north-western direction);

c.p. No. 5 (x = 2,042; y = 4,447) – at a distance of about 2,700 m – residential area of the private sector on Polova str., village of Petropavlivske, Boryspil district (western direction);

c.p. No. 6 (x = 910; y = 8,272) – at a distance of about 1,700 m – residential area of the private sector on Tsentralna str., village of Hora, Boryspil district (western direction);

c.p. No. 7 (x = 815; y = 8,887) – at a distance of about 650 m – residential area of the private sector on Aeroportivska str., village of Hora, Boryspil district (north-western direction).

The nearest distance from emission sources to the residential development area is 600 m (north direction), that is, the territory of the Epicentr K shopping centre located at 2 Horbatiuk str., Boryspil.

The hygienic criterion for determining the maximum permissible pollutant emissions into the atmosphere is the compliance of their calculated concentrations at the border of the sanitary protection zone of residential buildings with hygienic standards. Determination of the expediency of pollutants dispersion calculation using a computer is carried out in accordance with the requirements of paragraph 5.21 of the OND-86.

Conducting a dispersion calculation for a given pollutant is considered appropriate if the following condition is met:

$F = 0.01 \times Hg$ if $H > 10$ m

$M\ TLV \geq F$

$F = 0.1$ if $H < 10$ m

where M is the total value of the pollutant emission from all sources of the designed facility (g/sec);

TLV is the maximum threshold limit value of a pollutant (mg/m^3);

H is the average height of the emission source at the facility (m).

Coefficient F, which takes into account the sedimentation rate of harmful substances in the atmosphere, is adopted according to the OND-86:

1 – for gaseous substances;

2 – for solids emitted after purification, the efficiency of which is higher than 90%;

3 – for solids emitted without purification.

Expediency of calculating dispersion for newly formed and reconstructed sources of pollutant emissions into the air

No.	**Pollutant name**	**M, g/sec**	**TLV, mg/m^3**	**M/TLV**	**Average height of emission sources, m**	**Parameter F**	**Calculation expediency**
2902	Suspended particles undifferentiated by composition	0.01826	0.50	0.04	< 10 m	0.1	NO
328	Soot	0.01826	0.15	0.12	< 10 m	0.1	YES
301	Nitrogen dioxide	0.25735	0.20	1.29	< 10 m	0.1	YES
304	Nitrogen oxide	0.00006	0.40	0.0001	< 10 m	0.1	NO
330	Sulphurous anhydride	0.12702	0.50	0.25	< 10 m	0.1	YES
333	Hydrogen sulphide	0.00030	0.08	0.004	< 10 m	0.1	NO
2754	C_{12}-C_{19} saturated hydrocarbons (in terms of total organic carbon)	0.34844	1	0.35	< 10 m	0.1	YES
1325	Formaldehyde	1.47486	0.035	42.14	< 10 m	0.1	YES
410	Methane	0.22538	50	0.0045	< 10 m	0.1	NO
703	Benzo[a]pyrene	0.00017	0.000 01	16.74	< 10 m	0.1	YES

Expediency of calculating dispersion of pollutant emissions into the air (prospective state)

No.	Pollutant name	M, g/sec	TLV, mg/m^3	M/TLV	Average height of emission sources, m	Parameter F	Calculation expediency
150	Sodium hydroxide (lye, caustic soda)	0.00088	0.01	0.088	< 10 m	0.1	NO
10226	Titanium dioxide	0.00079	0.5	0.0016	< 10 m	0.1	NO
110	Vanadium pentoxide	0.00014	0.5	0.0003	< 10 m	0.1	NO
123	Iron oxide** (in terms of iron)	0.02	0.04	0.489	< 10 m	0.1	YES
143	Manganese and its compounds (in terms of manganese dioxide)	0.0032	0.01	0.319	< 10 m	0.1	YES
184	Lead and its compounds, except for tetraethyllead (in terms of lead)	0.000006	0.001	0.006000	< 10 m	0.1	NO
203	Hexavalent chromium (in terms of chromium trioxide)	0.0006	0.02	0.031	< 10 m	0.1	NO
2902	Suspended particles undifferentiated by composition	0.77	0.50	1.54	< 10 m	0.1	YES
323	Amorphous silicon dioxide (Aerosil 175)	0.0028	0.02	0.14	< 10 m	0.1	YES
10368	Dust containing asbestos	0.05	0.06	0.85	< 10 m	0.1	YES
328	Soot	0.04	0.15	0.30	< 10 m	0.1	YES
301	Nitrogen dioxide	2.58	0.20	12.91	< 10 m	0.1	YES
304	Nitrogen oxide	0.00	0.40	0.0014	< 10 m	0.1	NO
330	Sulphurous anhydride	1.11	0.50	2.22	< 10 m	0.1	YES
333	Hydrogen sulphide	0.00030	0.08	0.004	< 10 m	0.1	NO
322	Sulfuric acid, H_2SO_4	0.01	0.30	0.03	< 10 m	0.1	NO
337	Carbon oxide	3.61	5.00	0.72	< 10 m	0.1	YES
514	2-Methylpropene (isobutylene)	0.000007	0.1	0.0001	< 10 m	0.1	NO
1042	Butanol	0.10	0.1	1.02	< 10 m	0.1	YES
1061	Ethanol	0.15	5	0.03	< 10 m	0.1	NO
1319	Dimethoxymethane (methylal, dimethylformal)	0.00096	0.05	0.02	< 10 m	0.1	NO
2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	0.07	5	0.01448	< 10 m	0.1	NO
2732	Kerosene	0.18	1.2	0.15	< 10 m	0.1	YES
2735	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	0.001	0.05	0.01	< 10 m	0.1	NO
2750	Solvent oil	0.03	0.2	0.14	< 10 m	0.1	YES
2752	White spirit	0.22	1	0.22	< 10 m	0.1	YES
2754	C_{12}-C_{19} saturated hydrocarbons (in terms of total organic carbon)	3.68	1	3.68	< 10 m	0.1	YES
2001	Acrylonitrile	0.000002	0.03	0.0001	< 10 m	0.1	NO
1401	Acetone	0.048	0.35	0.14	< 10 m	0.1	YES
1210	Butyl acetate	0.093	0.1	0.93	< 10 m	0.1	YES
1246	2-Ethoxyethanol (ethyl cellosolve, ethylene glycol ethyl ether)	0.086	0.7	0.12	< 10 m	0.1	YES
1240	Ethyl acetate	0.070	0.1	0.70	< 10 m	0.1	YES
616	Xylene	0.138	0.2	0.69	< 10 m	0.1	YES
1052	Methanol	0.001	1	0.001	< 10 m	0.1	NO
620	Styrene	0.019	0.04	0.48	< 10 m	0.1	YES
621	Toluene	0.019	0.6	0.03	< 10 m	0.1	NO

No.	Pollutant name	M, g/sec	TLV, mg/m^3	M/TLV	Average height of emission sources, m	Parameter F	Calculation expediency
1325	Formaldehyde	0.0036	0.035	0.10	< 10 m	0.1	YES
410	Methane	0.00140	50	0.00003	< 10 m	0.1	NO
703	Benzo[a]pyrene	0.00011	0.00	11.33	< 10 m	0.1	YES
343	Highly soluble inorganic fluorides (fluoride and sodium fluorosilicate)	0.004	0.03	0.13	< 10 m	0.1	YES
344	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	0.0022	0.20	0.01	< 10 m	0.1	NO
342	Fluorides, gaseous compounds (hydrogen fluoride, silicon tetrafluoride)	0.0012	0.02	0.06	< 10 m	0.1	NO

Analysis of the results of the inventory and calculations of the dispersion of existing stationary sources, as well as newly formed and reconstructed sources of airport emissions, has established that there are no violations of standards at the calculated points of residential development.

The results of calculating the dispersion of pollutants in the air taking into account the background pollution (prospective state)

No.	2-TP air code	TLV code	Pollutant	Surface concentration (TLV fraction)						
				C.P. No. 1 2885 9352	C.P. No. 2 4333 6544	C.P. No. 3 4540 3970	C.P. No. 4 -82 2587	C.P. No. 5 -2580 4538	C.P. No. 6 256 8930	C.P. No. 7 815 8887
1		150	Sodium hydroxide (lye, caustic soda)	0.5012	0.5010	0.5015	0.5012	0.5010	0.5012	0.5013
2		10226	Titanium dioxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3	1002	110	Vanadium pentoxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4	1003	123	Iron oxide** (in terms of iron)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
5	1104	143	Manganese and its compounds (in terms of manganese dioxide)	0.5031	0.5031	0.5028	0.5023	0.5021	0.5034	0.5053
6	1007	183	Metallic mercury	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7	1009	184	Lead and its compounds, except for tetraethyllead (in terms of lead)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8	1010	203	Hexavalent chromium (in terms of chromium trioxide)	0.3788	0.3809	0.3798	0.3790	0.3784	0.3787	0.3793
9	3000	2902	Suspended particles undifferentiated by composition	0.1423	0.1352	0.1339	0.1330	0.1336	0.1402	0.1508
10	3000	323	Amorphous silicon dioxide (Aerosil 175)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
11	3000	10442	Potassium hydroxide	–	–	–	–	–	–	–
12	3000	10368	Dust containing asbestos	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
13	3004	328	Soot	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
14	4001	301	Nitrogen dioxide	0.3203	0.2357	0.1983	0.1807	0.1661	0.2408	0.3424
15	4002	304	Nitrogen oxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
16	4002	11815	Nitrogen (I) oxide (N_20)	–	–	–	–	–	–	–
17	4003	303	Ammonia	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	5001	330	Sulphurous anhydride	0.5017	0.5012	0.5011	0.5012	0.5009	0.5012	0.5021

No.	2-TP air code	TLV code	Pollutant	Surface concentration (TLV fraction)						
				C.P. No. 1 2885 9352	C.P. No. 2 4333 6544	C.P. No. 3 4540 3970	C.P. No. 4 -82 2587	C.P. No. 5 -2580 4538	C.P. No. 6 256 8930	C.P. No. 7 815 8887
19	5002	333	Hydrogen sulphide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
20	5004	322	Sulfuric acid, H_2SO_4	0.1051	0.1037	0.1037	0.1043	0.1029	0.1038	0.1091
21	6000	337	Carbon oxide	–	–	–	–	–	–	–
22	7000	11812	Carbon dioxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
23	11000	514	2-Methylpropene (isobutylene)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
24	11000	1042	Butanol	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
25	11000	1061	Ethanol	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
26	11000	1319	Dimethoxymethane (methylal, dimethylformal)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
27	11000	2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
28	11000	2732	Kerosene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
29	11000	2735	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
30	11000	2750	Solvent oil	0.5021	0.5012	0.5010	0.5009	0.5011	0.5022	0.5040
31	11000	2752	White spirit	0.5005	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
32	11000	2754	C_{12}-C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	–	–	–	–	–	–
33	11000	10312	Aromatic hydrocarbons	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
34	11000	10411	Aliphatic hydrocarbons	0.1382	0.1379	0.1387	0.1378	0.1379	0.1383	0.1389
35	11001	2001	Acrylonitrile	0.5046	0.5026	0.5021	0.5020	05023	0.5048	0.5086
36	11007	1401	Acetone	0.5006	0.5003	0.5003	0.5003	0.5003	0.5006	0.5011
37	11009	1210	Butyl acetate	0.5035	0.5019	0.5016	0.5015	0.5018	0.5036	0.5065
38	11020	1246	2-Ethoxyethanol (ethyl cellosolve, ethylene glycol ethyl ether)	0.5034	0.5019	0.5016	0.5015	0.5017	0.5034	0.5065
39	11021	1240	Ethyl acetate							
40	11030	616	Xylene	0.5024	0.5013	0.5011	0.5010	0.5012	0.5021	0.5046
41	11036	1052	Methanol	0.5007	0.5007	0.5003	0.5003	0.5004	0.5007	0.5014
42	11037	620	Styrene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
43	11041	621	Toluene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
44	11049	1325	Formaldehyde	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
45	12000	410	Methane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
46	13101	703	Benzo[a]pyrene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
47	16000	343	Highly soluble inorganic fluorides (fluoride and sodium fluorosilicate)	0.5032	0.5031	0.5028	0.5023	0.5021	0.5034	0.5023
48	16000	344	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	0.5017	0.5013	0.5011	0.5012	0.5009	0.5012	0.5022
49	16001	342	Fluorides, gaseous compounds (hydrogen fluoride, silicon tetrafluoride)	0.3788	0.3810	0.3798	0.3790	0.3784	0.3787	0.3793
			Summation group No. 3	0.693	0.642	0.619	0.609	0.600	0.645	0.707

No.	2-TP air code	TLV code	Pollutant	Surface concentration (TLV fraction)						
				C.P. No. 1 2885 9352	C.P. No. 2 4333 6544	C.P. No. 3 4540 3970	C.P. No. 4 -82 2587	C.P. No. 5 -2580 4538	C.P. No. 6 256 8930	C.P. No. 7 815 8887
				7	3	7	3	2	4	3
			Summation group No. 4	0.5024	0.5023	0.5020	0.5019	0.5016	0.5019	0.5032
			Summation group No. 5	0.6938	0.6423	0.6197	0.6093	0.6002	0.6454	0.7032
			Summation group No. 19	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Based on pollutant dispersion in lower surface: pollutant concentration in lower surface bordering closest residence area is within permissible level.

Analysis of compliance of potential pollutant emissions into the air from stationary sources with established emission standards

Emission source number	Pollutant code	Pollutant name	Potential emission		Maximum permissible emission standard	
			mass concentration in the gas and dust flow, mg/m³	value of mass flow in exhaust gases, g/h	mass concentration in the gas and dust flow, mg/m³	value of mass flow in exhaust gases, g/h
1	*2*	*3*	*4*	*5*	*6*	*7*
310503. service stations (including car refuelling)						
201	5002 333	Hydrogen sulphide	–	0.0000071	5	50 or >
	11000 2754	Non-methane volatile organic compounds	–	0.00026	–	–
	11000 10312	Aromatic hydrocarbons	–	0.0000039	–	–
202	5002 333	Hydrogen sulphide	–	0.000001	5	50 or >
	11000 2754	Non-methane volatile organic compounds	–	0.0015	–	–
	11000 10312	Aromatic hydrocarbons	–	0.0000018	–	–
203	5002 333	Hydrogen sulphide	–	0.0000079	5	50 or >
	11000 2754	Non-methane volatile organic compounds	–	0.0028	–	–
	11000 10312	Aromatic hydrocarbons	–	0.0000043	–	–
204	5002 333	Hydrogen sulphide	–	0.0000034	5	50 or >
	11000 2754	Non-methane volatile organic compounds	–	0.0012	–	–
	11000 10312	Aromatic hydrocarbons	–	0.0000018	–	–
120105. stationary engines						
213	03000 2902	Substances in the form of suspended solid particles (microparticles, fibres)			150	≤ 500
	04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	185	720	500	> 5,000
	05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	56	216	500	> 5,000
	06000 337	Carbon monoxide	145	581	250	> 5,000

Emission source number	Pollutant code	Pollutant name	Potential emission		Maximum permissible emission standard	
			mass concentration in the gas and dust flow, mg/m^3	value of mass flow in exhaust gases, g/h	mass concentration in the gas and dust flow, mg/m^3	value of mass flow in exhaust gases, g/h
1	*2*	*3*	*4*	*5*	*6*	*7*
	11000 2754	Non-methane volatile organic compounds	40	155.4	–	–
	11049 1325	Formaldehyde	1.7	6.4	20	Up to 100
	13101 703	Benzo[a]pyrene	0.0002	0.0007	0.1	0.5 or >
120105. stationary engines						
216	03000 2902	Substances in the form of suspended solid particles (microparticles, fibres)			150	≤ 500
	04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	185	720	500	> 5,000
	05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	56	216	500	> 5,000
	06000 337	Carbon monoxide	145	581	250	> 5,000
	11000 2754	Non-methane volatile organic compounds	40	155.4	–	–
	11049 1325	Formaldehyde	1.7	6.4	20	Up to 100
	13101 703	Benzo[a]pyrene	0.0002	0.0007	0.1	0.5 or >
310402. other types of transportation and storage (including pipelines)						
214	5002 333	Hydrogen sulphide	–	0.0000001	5	50 or >
	11000 2754	Non-methane volatile organic compounds	–	0.000036	–	–
	11000 10312	Aromatic hydrocarbons	–	0.0000000054	–	–
217	5002 333	Hydrogen sulphide	–	0.0000001	5	50 or >
	11000 2754	Non-methane volatile organic compounds	–	0.000036	–	–
	11000 10312	Aromatic hydrocarbons	–	0.0000000054	–	–

Comparison of existing gross emissions with gross emissions of pollutants after reconstruction

No.	2-TP code	San. code	Item	perspective	current position	difference
				tons/year	tons/year	tons/year
1		150	Sodium hydroxide (lye, caustic soda)	0.010568	0.010568	0.000
2		10226	Titanium dioxide	0.000253	0.000253	0.000
3	1002	110	Vanadium pentoxide	0.000003	0.000003	0.000
4	1003	123	Iron oxide** (in terms of iron)	0.058297	0.058297	0.000
5	1104	143	Manganese and its compounds (in terms of manganese dioxide)	0.002823	0.0028233	0.000
6	1007	183	Metallic mercury	0.000029	0.000029	0.000
7	1009	184	Lead and its compounds, except for tetraethyllead (in terms of lead)	0.000001	0.0000008	0.000
8	1010	203	Hexavalent chromium (in terms of chromium trioxide)	0.000029	0.000029	0.000
9	3000	2902	Suspended particles undifferentiated by	1.644953	1.092758182	0.552

No.	2-TP	San.	Item	perspective	current position	difference
			composition			
10	3000	323	Amorphous silicon dioxide (Aerosil 175)	0.001080	0.00108	0.000
11	3000	10442	Potassium hydroxide	0.000036	0.000036	0.000
12	3000	10368	Dust containing asbestos	0.024112	0.024112	0.000
13	3004	328	Soot	0.777431	0.225146782	0.552
14	4001	301	Nitrogen dioxide	674.969619	102.5066917	572.463
15	4002	304	Nitrogen oxide	0.000624	0.000440741	0.000
16	4002	11815	Nitrogen (I) oxide (N_20)	0.031744	0.031744	0.000
17	5001	330	Sulphurous anhydride	0.234481	0.199451902	0.035
18	5002	333	Hydrogen sulphide	0.000069	0	0.000069
19	5004	322	Sulfuric acid, H_2SO_4	0.108078	0.108078	0.000
20	6000	337	Carbon oxide	495.345717	115.8376548	379.508
21	7000	11812	Carbon dioxide	15887.155179	15882.00469	5.150
22	11000	514	2-Methylpropene (isobutylene)	0.000010	0.00001	0.000
23	11000	1042	Butanol	0.017084	0.017084	0.000
24	11000	1061	Ethanol	0.006281	0.006281	0.000
25	11000	1319	Dimethoxymethane (methylal, dimethylformal)	0.001376	0.001376	0.000
26	11000	2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	0.895941	0.8959405	0.000
27	11000	2732	Kerosene	0.124691	0.125369937	–0.001
28	11000	2735	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	0.000394	0.000394	0.000
29	11000	2750	Solvent oil	0.038261	0.038261	0.000
30	11000	2752	White spirit	0.026463	0.026463	0.000
31	11000	2754	C_{12}-C_{19} saturated hydrocarbons (in terms of total organic carbon)	11.996261	13.04012873	–1.044
32	11000	10312	Aromatic hydrocarbons	0.000037	0	0.000
33	11000	10411	Aliphatic hydrocarbons	0.002092	0.002092	0.000
34	11001	2001	Acrylonitrile	0.000003	0.000003	0.000
35	11007	1401	Acetone	0.001178	0.001178	0.000
36	11009	1210	Butyl acetate	0.050784	0.050784	0.000
37	11020	1246	2-Ethoxyethanol (ethyl cellosolve, ethylene glycol ethyl ether)	0.010937	0.010937	0.000
38	11021	1240	Ethyl acetate	0.013590	0.01359	0.000
39	11030	616	Xylene	0.058344	0.058344	0.000
40	11036	1052	Methanol	0.001430	0.00143	0.000
41	11037	620	Styrene	0.011250	0.01125	0.000
42	11041	621	Toluene	0.006525	0.006525	0.000
43	11049	1325	Formaldehyde	0.000974	0	0.001
44	12000	410	Methane	0.296770	0.29590673	0.001
45	1301	703	Benzo[a]pyrene	0.000013	8.43371E-06	0.0000041
46	16000	343	Highly soluble inorganic fluorides (fluoride and sodium fluorosilicate)	0.000769	0.0007689	0.000
47	16000	344	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	0.000480	0.00048	0.000
48	16001	342	Fluorides, gaseous compounds (hydrogen fluoride, silicon tetrafluoride)	0.000225	0.000225	0.000
			TOTAL	17073.124628	16116.458343	956.666

Considering the above, the enterprise is increasing the number of sources of pollutant emission and the level of the total capacity of pollutant emissions into the air. Currently, the enterprise has 178 sources of pollutant emissions into the air, 120 of which are organized and 56 are unorganized sources (11 of them are flat platforms of mobile sources (taking into account emissions of pollutants from the movement of special vehicles and aircraft)) with a total emission capacity of 16116.458 tons/year, 46 types of pollutants. After commissioning of the

facility, the total number of emission sources will be 202; 129 of them will be organized, 63 – unorganized sources (at the same time, 15 of them will be flat platforms of mobile sources (special vehicles and aircraft (AC))). 48 types of pollutants will be emitted into the air. The total emission capacity is 17,067, 6,618 tones/year (taking into account the emissions of pollutants during the movement of special vehicles and aircraft).

At control design points located on the border of residential buildings, the amount of pollutants in the air is within the maximum permissible concentration.

Assessment according to the types and quantities of expected emissions and water pollution that arise as a result of preparatory and construction works as well as the implementation of the planned activity

According to the calculation of the flow rate of wastewater (rain, irrigation, and melt) generated on the territory of the airport and calculated for the maximum capacity during the rain period, the calculated intensity is 7,800 m^3/day, 96,807 m^3/year. Calculations of the return surface water expenditures are presented in the table.

Total estimated expenditures of wastewater generated on the territory of BORYSPIL International Airport

Indicator, unit of measurement	**Total expenditures in the airport**	
	current	**future**
F area, ha	626.15	780.3
Second maximum consumption of rainwater q, l/sec,	10476.2	11877.5
including polluted rainwater	1934.0	2197.74
including conditionally clean rainwater	8542.17	9684.73
Daily maximum consumption of rainwater, Q, m^3/day	43846.5	55169.7
including polluted rainwater	7369.76	7799.56
including conditionally clean rainwater	36476.7	47369.44
Daily maximum consumption of melt water, Q, m^3/day	5171.55	5251.4
Annual maximum consumption of surface water, Q, m^3/year	633638.2	806721.1
including polluted rainwater and melt water	76036.3	96806.6
including conditionally clean rainwater	557602.0	709914.6

To ensure the purification of rain and melt water from the SE Boryspil International Airport, construction of modern highly efficient local waste treatment plants (LWTP) is envisaged.

Based on calculations of the airport surface wastewater consumption by technological solutions, they are divided into the following flows.

– From the territory of the landing area No. 1:

contaminated surface wastewater flows through distribution wells on the storm drainage networks of the airport to the sewage pumping station of pumping No. 2, No. 5; by pressure pipelines, it is fed into the chamber for reducing the pressure in the LWTP building, where it is evenly cleaned during the first day for use for technical needs, and the excess of treated water from the service water reservoir is discharged through overflow for additional treatment in a sealed underground synergistic bioplateau next to the LWTP building, after which additional treated surface wastewater flows into the connecting well, where, together with conditionally clean surface water, it is discharged to the Ikva River through quality control and consumption chambers located on the territory of the airport by the drainage manifold (existing) through the biopond (existing) and the outlet (existing);

from the catchment area 1-1 of the flight zone No. 1, conditionally clean surface (storm) water comes from the distribution wells to the existing storage tank equipped on its territory, from which, through the existing sewage pumping station No. 1, uniformly during the second day of accumulation, it is fed through the well to reduce the pressure in the connecting well, into which conditionally clean storm water is also supplied through a distribution well from the catchment area 1-2 of the landing area No. 1, from the existing accumulating tank 2-3 and storage tank 2-2 from sewage pumping station of pumping No. 6 on a rain collecting collector equipped in the LWTP area, evenly during the first day, it enters and, together with the additional purified surface water of LWTP, it is discharged into the Ikva River through quality and consumption chambers located on the territory of the airport by the drainage manifold (existing) through the biopond (existing) and the outlet (existing).

– From the territory of the landing area No. 2:

from the catchment area of the flight zone No. 2, conditionally clean surface (storm) water comes from distribution wells to the sewage pumping station No. 4 and is fed by pressure pipelines to a new storage tank located at the LWTP site, which is being designed, from which, evenly within two days, it is discharged into the Ikva River through quality and consumption chambers located on the territory of the airport by the drainage manifold (existing) through the biopond (existing) and the outlet (existing);

from the territory of the landing area No. 2, contaminated surface water is supplied by pressure pipelines to the LWTP chamber for reducing the pressure through the sewage pumping station No. 3 located on the site of the landing area No. 2; after additional treatment in the biopond, it enters the connecting well, where, together with the additional purified surface water of LWTP, it is discharged into the existing biopond and released into the Ikva River through quality and consumption chambers located on the territory of the airport. The average indicators of the surface wastewater quality of the SE Boryspil International Airport, which entered the Ikva River in 2018 and the 1st half of 2019, are presented in the table below.

Taking into account all the peculiarities of the surface wastewater quality formation at different times of the year, as well as the regime of its flow to treatment facilities, they adopted a multi-stage scheme for the purification of contaminated surface water, which includes the following stages.

Mechanical purification:

– elimination of coarse contamination from the crusher grates installed in the sewage pumping station No. 2 (on the site of the landing area No. 1), in the sewage pumping station No. 3 (on the site of the landing area No. 2), and in the sewage pumping station No. 5, the receiving chamber of which is located in the LWTP building from which contaminated surface water is supplied by pressure pipelines to the chamber to reduce the pressure in the LWTP building;

– removal of film from oil products as well as sand from oil and sand traps in the LWTP building.

Accumulation, averaging, and physicochemical purification:

– accumulation and averaging of contaminated surface water (all small, medium, the first contaminated portion of heavy rainfall, all irrigation, washing and melt water) in an accumulator-homogenizer-bioreactor equipped with an electric mixer and submersible pumps for uniform round-the-clock supply of averaged water for physicochemical purification, and into which the BIOSAN biological product is dosed during the purification of melt water containing reagents from aircraft icing;

– physicochemical purification of averaged wastewater in block modules, which include flocculation agents, into which solutions of coagulant and flocculant are sequentially dosed, illuminators for phase separation, equipped with airlifts to drain sediments into an aerobic stabilizer, microfilters before draining treated surface water into a technical tank water, equipped with a pumping station with a membrane tank and a UV-0 unit for disinfection of industrial

water before its reuse, and an overflow pipeline to drain excess treated surface water to the bioplateau.

Additional purification of surface wastewater at a synergistic bioplateau:

– after its physicochemical purification with closed-type LWTPs, by overflow from the tank of industrial water, the surface water is discharged to a sealed underground synergistic closed-type bioplateau located next to the LWTP building, loaded with rubble with microorganisms of the BIOSAN biological product immobilized on its surface (please refer to the Appendix No. 13) and a system of distribution and collection drains, which ensures deep biodegradation of residual pollution, utilization of dissolved nutrients, and the main metabolic processes by fouling biocenosis on crushed stone loading, which ensures the restoration of the wastewater quality and compliance with the requirements for their discharge into a fishery water body.

Treatment of sludge generated during wastewater purification process includes:

mechanical dewatering of sand removed using aerated sand traps, sand separators, and collection of dewatered sludge in containers;

periodic removal of sludge from biosorption booms installed in aerated sand traps and loaded with the Econadin biological product, products of biodegradation of petroleum products into vermicompost, and loading biosorption booms with new portions of a biological product (2 times a year);

treatment of sludge in aerobic sludge stabilizers from illuminators after physicochemical purification of averaged waste water (sludge mineralization) followed by mechanical dewatering of sludge on auger dehydrators and collection of dewatered sludge in containers.

The average indicators of the surface wastewater quality of the SE Boryspil International Airport, which entered the Ikva River in 2018 and the 1st half of 2019, are presented in the table below.

Data (average indicators) on wastewater quality as of 2018 and the 1st half of 2019

table

Indicators	**2018**	**The 1st half of 2019**	**Maximum limit allowed, mg/dm^3**	**Maximum concentration of a pollutant during 2018, mg/dm^3**	**Maximum concentration of a pollutant recorded during the 1st half of 2019, mg/dm^3**
Control point: wastewater inlet to the wastewater treatment facilities					
N-NH_4, mg/dm^3	0.72	3.57	0.66	0.98	6.70
BOD_5, mg/dm^3	7.89	18.56	5.67	12.40	29.90
Suspended substances, mg/dm^3	24.40	23.15	12.00	48.40	23.90
Petrochemicals, mg/dm^3	0.33	0.51	0.12	0.92	0.90
Nitrates (NO_3), mg/dm^3	0.94	2.08	0.63	1.37	3.50
Nitrites (NO_2), mg/dm^3	0.23	0.07	0.07	0.44	0.10
Sulphates (SO_4), mg/dm^3	22.48	12.10	27.10	41.90	19.20
Phosphates (PO_4), mg/dm^3	0.33	0.81	0.16	0.65	1.47
Chlorides, mg/dm^3	35.60	36.25	33.50	54.80	38.80
Total iron ($Fe_{tot.}$), mg/dm^3	0.44	0.60	0.22	0.68	0.75
COD, mg/dm^3	35.45	64.00	25.25	40.0	92.00
Mineralization, mg/dm^3	230.80	430.00	290.00	385.0	483.00
pH, units	7.28	7.64	6.5–8.5	7.83	7.72
Dissolved oxygen, mg/dm^3	11.79	8.52	At least 6.0	15.10	11.10
Control point: discharge of wastewater from the treatment facilities into the Ikva River (the 1st release)					
N-NH_4, mg/dm^3	0.52	0.49	0.66	0.61	0.49
BOD_5, mg/dm^3	5.11	5.44	5.67	5.43	5.53
Suspended substances, mg/dm^3	9.48	11.55	12.00	11.60	11.80
Petrochemicals, mg/dm^3	0.10	0.11	0.12	0.10	0.11

Nitrates (NO_3), mg/dm^3	0.45	0.50	0.63	0.61	0.62
Nitrites (NO_2), mg/dm^3	0.06	0.05	0.07	0.07	0.07
Sulphates (SO_4), mg/dm^3	18.90	17.70	27.10	25.30	24.40
Phosphates (PO_4), mg/dm^3	0.14	0.14	0.16	0.15	0.15
Chlorides, mg/dm^3	25.18	31.20	33.50	32.90	31.20
Total iron ($Fe_{tot.}$), mg/dm^3	0.20	0.21	0.22	0.21	0.21
COD, mg/dm^3	23.08	23.70	25.20	25.00	24.90
Mineralization, mg/dm^3	218.50	285.00	290.00	282.00	285.00
pH, units	7.17	6.81	6.5–8.5	7.65	6.85
Dissolved oxygen, mg/dm^3	10.99	10.64	At least 6.0	15.90	11.30

Material balance for water consumption and water disposal

No.	**Receipts**	**Quantity**			**Expenditures**	**Quantity**		
		m^3/day	**thous. m^3**	**%**		**m^3/day**	**thous. m^3**	**%**
1	Surface wastewater	7,800	96.806	95.183	Additional treated surface water – discharge into the main outlet collector through control chambers	7796.38	96.766	9,515
2	Return water for preparation of reagents, equipment cleaning and other technical needs	19.7	4.840	4.759	Treated domestic water – discharge to a two-stage synergistic bioplateau	0.59	0.053	0.05
					Water removed with sediment	3.621	0.0396	0.04
3	Drinking water for household needs	0.59	0.053	0.057	Treated surface water for technical needs	19.7	4.840	4.76
4	Total	7820.29	101.699	100	Total	7820.29	101.699	100

Prediction of the quality of LWTP-treated surface water

Design indicators of wastewater composition and properties SE BORYSPIL International Airport as well as the design composition and properties of surface water purified with the help of local LWTPs and wastewater purified on bioplateau

No.	**Indicator**	**Accepted values**		
		Averaged, in surface wastewater at the entrance to a closed-type LWTP	**In surface water treated with LWTPs for technical needs**	**In return water further purified with the help of bioplateau (for discharge through the outlet main collector through the biopond into the Ikva River)***
1	*2*	*3*	*4*	*5*
1	pH, units	7.1	6.5–8.5	6.5–8.5
2	Suspended substances, mg/dm^3	325.0	15.0	12.0
3	Dry residue, mg/dm^3	1130.0	1000.0	790.0
4	Sulphates, mg/dm^3	96.4	110.0	100.0
5	Chlorides, mg/dm^3	325	320	300.0

No.	Indicator	Accepted values		
6	BOD_5, mg O_2/dm^3	109.0	15.0	6.0
7	COD, mg O_2/dm^3	1560.0	80.0	30.0
8	Ammonia nitrogen, mg/dm^3	2.21	2.0	0.5
9	Petrochemicals, mg/dm^3	0.5	0.3	0.05
10	Nitrates, mg/dm^3	9.5	5.0	3.0
11	Nitrites, mg/dm^3	0.9	0.3	0.1
12	Phosphates, mg/dm^3	0.5	0.3	0.1
13	Total iron, mg/dm^3	4.96	0.3	0.2
14	Toxicity	Mildly toxic, the 3rd class	Non toxic	Non toxic
15	Number of lactose-positive Bacillus coli, units/dm^3	ND	300	Not more than 5,000
16	Coli index	ND	Not more than 3	Not standardized

Assessment according to the types and quantities of expected emissions and water pollution that arise as a result of preparatory and construction works as well as the implementation of the planned activity is positive. The establishment of LWTP reduces the concentration of pollutants during the discharge of water into the Ikva River. Requirements established in the Permit for special water use are met (please refer to the Appendix No. 14). The threshold limit values of pollutants in water bodies are observed.

Assessment by type and amount of expected soil and relief contamination

To implement the planned activities, it is necessary to attract additional land acquisition with a total area of 47 ha for permanent use.

During the preparatory work, it is planned to remove the vegetable mould.

On the landing area No. 2, the following earthworks are envisaged:

- in the trough of new aerodrome coverings, removal of vegetable mould in full;
- on unpaved areas of the runway and taxiway safety strips, removal of the vegetable mould in full followed by restoration with a 20 cm layer to form a sod cover;
- on unpaved areas outside the runway and on design slopes, removal of the vegetable mould in full followed by restoration with a 20 cm layer to form a sod cover.

The total volume of earthworks to create the embankment (in a compacted state) is 3,805,061 m^3, including:

- in the trough of aerodrome coverings – 1,106,522 m^3;
- on the unpaved part of the runway – 2,357,737 m^3;
- on unpaved areas outside the runway – 340,802 m^3.

Measures for the conservation of vegetable mould with its subsequent use when performing landscape gardening on the territory of the airport are provided.

The missing mineral soil to create the embankment is imported from the quarry in the volume of 3,640,567 m^3.

After the completion of all types of excavation and planning work in convenient agronomic terms, agrotechnical work (consisting of pre-sowing treatment of areas and work on the introduction of mineral fertilizers and sowing of grass mixture seeds) are carried out on the unpaved areas of the runway and beyond.

The total area of execution is 261.3 ha. Including 180 ha within the runway and 81.3 ha outside the runway.

Assessment of the planned activity impact on the geological environment (subsoil)

Geomorphologically, the site is located within the 2nd above-floodplain terrace of the Dnipro River.

Quaternary deposits take part in the geological structure of the exploration area up to explored reserves of 6.0–7.0 m depth. The quaternary system is represented by aeolian and deluvial (vd PIII) as well as alluvial (a PIII) deposits. Lithologically, they are represented by sandy loam and sand covered by topsoil (e). The thickness of the topsoil is 0.2–0.6 m.

In hydrogeological terms, the study area is located within the northwestern part of the Dnipro artesian basin, for which the development of aquifers, which are separated from each other by impervious layers, is typical.

For the period of research to the explored depth, groundwater was not found.

In terms of geological and hydrological conditions, the territory does not belong to the category characterized by flooding.

Locally, near wells No. 26 and 26a, there were encountered lacustrine-boggy (lb PIII) deposits with a thickness of 0.6–2.0 m covered with fill soil. Fill soil is represented by sandy loam.

Based on the results of office processing of field and laboratory work materials, 8 engineering and geological elements (EGE) were identified in the geological section of the survey area.

Topsoil (e).

EGE-1 – humus sandy loam with plant roots of firm consistency, dark brown, layer thickness – from 0.2 to 0.6 m.

Industrial deposits (t).

EGE-1a – fill soil – solid sandy loam, from dark grey to brown colour, with interlayers of sand, in some places – with an admixture of rubble and construction waste, 5–10%. The layer thickness is 0.4–3.2 m.

Lacustrine-boggy sediments (lb RIV).

EGE-1b – plastic sandy loam, silty, with a small amount of peat and an admixture of organic matter, dark grey. Met by wells No. 26 and 26a, the layer thickness is 0.6–2.0 m.

Aeolian and deluvial deposits (vd RIII).

EGE-2 – hard sandy loam, silty, loess subsiding, from yellow-brown to yellow-grey, sometimes with interlayers and lenses of fine and dusty sand, 10–25%.

EGE-2a – plastic sandy loam, silty, loess subsiding, from yellow-brown to yellow-grey, sometimes with interlayers and lenses of fine and dusty sand, 10–25%.

EGE-3 – fine sand, yellow-grey, sometimes with lenses and interlayers of sandy loam and sandy silt, 5–25%, with a low level of water saturation, of a medium density.

Alluvial and deluvial deposits (ad PIII)

EGE-4 – plastic sandy loam, sometimes hard, silty, from greenish-brown to yellow-grey, sometimes with interlayers and lenses of sand, 5–15%.

EGE-5 – fine sand, grey, sometimes with interlayers of sandy silt, 5–15%, with a low level of water saturation, of a medium density.

Considering the description of the airport area geological structure, it can be concluded that the planned activity will not affect the geological environment.

Noise impact assessment

Today the problem of aircraft noise (AN) is relevant for Ukrainian airports in the field of environmental protection from the aircraft impact. The effect of noise generated by aircraft arriving at or departing from an airport depends on a number of factors, namely:

– types of aircraft operated at the airport aerodrome;

– the total number of takeoffs and landings of aircraft in the busiest week of the design year (determined by the airport data);

– distribution of aircraft by routes (determined by the airport data);

– operating conditions;

– distribution of aircraft by periods of the day (determined by the airport data);

– the number of runways and their use;

– weather conditions and airport-specific flight rules;

– projected runway volumes and the aircraft fleet structure in the long term.

The process of investigating noise effects around airports involves noise contours modelling.

Noise contour is a line of constant sound level of aircraft noise, averaged over a period of time, which is generated during the flights of aircraft of various types under normal operating conditions.

SE Boryspil International Airport has “A” class airfield. Working hours: round the clock.

Local time: UTC +2/+3 hours.

Currently, the airport has two runways with artificial turf with the following dimensions: runway No. 1 – 4000 × 60; runway No. 2 – 3500 × 63.

According to the Aeronautical Information Manual (AIM), runways have flight directions corresponding to the following RWY designations: runway No. 1 – 18L, 36R; runway No. 2 – 18R, 36L.

Additionally, as the initial data, the Customer provided information on the operation of the runways in the current period and for the future (after the completion of the runway No. 2 reconstruction). According to it, takeoffs from runway No. 2 are not performed in the current period due to the low PCN value.

The terrain is flat. The terrain coefficient is 1.

For the aerodrome control point, the elevation above sea level is 130 m (ACP: 502041N, 0305336E).

The airport is located about 1 km to the West of the boundary of the city of Boryspil and 6 km to the West of the Boryspil city centre, 29 km to the East of the Kyiv city centre. The following settlements are located in the area of the Boryspil airport airfield: Boryspil, Hora, Martusivka, Zatyshne, Hlyboke, Voronkiv, Zherebiatyn, Revne, Petropavlivske, Velyka Oleksandrivka, Mala Oleksandrivka, Dudarkiv, Trebukhiv, Krasylivka, Velyka Dymerka, Kiiliv, etc.

Meteorological conditions

Meteorological conditions in the airport area directly affect the conditions for the generation and propagation of aircraft noise. Such meteorological factors as wind speed and direction, as well as air temperature, almost completely determine the possibility and acoustic efficiency of operational measures to reduce aircraft noise (AN).

According to the Aeronautical Information Manual, the design temperature for the summer period is 22 °C. The norm for atmospheric pressure is 760 mm Hg (as for International Standard Atmosphere).

The wind speed is 4 m/s.

The INM program uses a geographic coordinate system for the ACP to plot airport runways. The local coordinate system (X and Y axes) is formed automatically, while the origin point of the local coordinate system coincides with the ACP.

Operated aircraft fleet. A characteristic feature of the aircraft fleet of the SE Boryspil International Airport (unlike other Ukrainian airports) is the presence in its structure of a significant number of wide-body types of aircraft.



Fig. The share of narrow- and wide-body aircraft in the structure of the SE Boryspil International Airport fleet, 2018

The main types of aircraft that are currently in service:

– narrow-body: B738 E190, A320, E145, A321, B739, B733, B734, DH8D, B735, A319, CRJ7, MD83;

– wide-body: B763, B772, A332.

In addition, the following obsolete types of aircraft are noted in the structure of the aircraft fleet: MD82, MD83, IL76, An12, Yk40, etc. Their noise characteristics, which comply with the requirements of Chapter 2 (Volume 1 "Aircraft Noise", Appendix 16 to the Convention of the International Civil Aviation Organization. ICAO – the 4th edition – 2005), create the main acoustic load and determine the maximum noise levels at the aerodrome area.

In the process of reconstruction, they will build a new runway No. 2, the axis of which will be offset parallel to the axis of the old runway No. 2 by 80 meters to the west.

The dimensions of the landing area No. 2 elements were accepted according to standards and recommended ICAO practice for 4F originator code airfields.

The construction of development restriction zones from the AN influence conditions was developed in accordance with the Appendix No. 18 and Appendix No. 19 of the State Sanitary Rules for Planning and Development of Settlements No. 173 (hereinafter referred to as the "State Sanitary Rules"). According to these requirements, the zones that determine the territory suitability in the vicinity of the airport for development are divided into A, B, C, and D (the value is given for the equivalent sound level LAeq and the maximum sound level LAmax in dBA for day (from 7 a.m. to 11 p.m.) and night (from 11 p.m. to 7 a.m.) periods).

Zones that determine the territory suitability in the vicinity of the airport for development

Period	**A**	**B**	**C**	**D**
Day	$L_{Aeq} \leq 60$ $L_{Amax} \leq 80$	$61 \leq L_{Aeq} \leq 65$ $81 \leq L_{Amax} \leq 85$	$61 \leq L_{Aeq} \leq 65$ $81 \leq L_{Amax} \leq 85$	$L_{Aeq} > 65$ $L_{Amax} > 85$
Night	$L_{Aeq} \leq 50$ $L_{Amax} \leq 70$	$51 \leq L_{Aeq} \leq 55$ $71 \leq L_{Amax} \leq 75$	$56 \leq L_{Aeq} \leq 60$ $76 \leq L_{Amax} \leq 8$	$L_{Aeq} > 60$ $L_{Amax} > 80$

Possibility, subject to the construction of facilities in areas of restricted development around the airport

Zone D defines an area that is unsuitable for residential development.

Zones B and C define areas with restrictions and separate requirements for the application of measures to reduce noise exposure.

Zone A is a territory without restrictions for the construction of structures of any purpose.

The boundaries of the zones of protection against the AN adverse effects and the suitability of the territories around airports and aerodromes for residential and public buildings are determined using the calculation method for assessing *LAeqv* and *LAmax* sound levels (RECOMMENDED METHOD FOR COMPUTING NOISE CONTOURS AROUND AIRPORTS (DOC 9911), 2nd edition, 2018) and the corresponding computer program (INM

Pre-approved List of Aircraft Substitutions) for constructing noise contours for standard values of sound levels and plotting contours on a map with reference to runways.

Determination of equal noise impact contours around the airport taking into account the time and routes, types of aircraft, as well as traffic intensity using computer programs for calculating noise levels at the nodes of the computational grid, which is defined within the vicinity of the airport. In particular, the basic requirements for the means for determining the AN contours in the vicinity of the airport are set out in ICAO DOC 9911. Noise contours that meet regulatory targets define the boundaries of noise zones around airports.

Призначення будівель	Будівництво будівель а зонах			
	А	Б	В	Г
Житлові будинки, дитячі дошкільні заклади	дозволяється	дозволяється з підвищеною звукоізоляцією зовнішніх огороджень, які забезпечують зниження шуму, ΔL_A дБА 25	30	забороняється
Поліклініки	дозволяється в частині зони з рівнями у денний час $L_{Аекв} \leq 55$ дБА без обмеження, $L_{Аекв} \leq 56\text{-}60$ дБА з підвищеною звукоізоляцією (ΔL_A=25 дБА)	дозволяється з підвищеною звукоізоляцією, яка забезпечує ΔL_A=30 дБА		забороняється
Школи та інші навчальні заклади	дозволяється	дозволяється з підвищеною звукоізоляцією, яка забезпечує ΔL_A=25 дБА		забороняється
Готелі, гуртожитки	дозволяється	дозволяється з підвищеною звукоізоляцією, яка забезпечує ΔL_A дБА 25	30	
Адміністративні будівлі, проектні та науково-дослідні організації	дозволяється	дозволяється	дозволяється	дозволяється при забезпеченні необхідної звукоізоляції

The forward-looking calculation scenario for 2030 takes into account the predicted increase in flight intensity for the next ten years. After the commissioning of the new runway No. 2, the use of runway No. 1 and runway No. 2 is forecasted in the proportion of 50 × 50%, and the volume of runways for the year will reach 225,000.

For the forward-looking design scenario in the daytime, aircraft with noise characteristics are excluded from the calculation in accordance with the standards of the Chapter 2 of the Appendix 16 of the ICAO, which complies with the requirements of EU Regulation No. 598/2014 and ICAO documents. For night-time operation, it is proposed to keep only those aircraft that comply with the Chapter 4 (ICAO noise certification requirements) and above.

Taking into account the above, the output data and information on the airport development provided by the SE Boryspil International Airport and, guided by the current international recommendations (EU, ICAO) in the field of environmental protection in civil aviation, such a calculated operating scenario was formed for the perspective loading of the airport (please refer to the table below).

The distribution of aircraft types along the routes and their intensity were determined as a percentage in accordance with the data provided by the customer. The prospective route

distribution and the possible introduction of new routes in the vicinity were not taken into account.
SE Boryspil International Airport.

Estimated operating scenario – perspective loading, 2030

Category /aircraft type	**Period/operation type**				**Total**
A+B	*Day*		*Night*		*Total*
	Takeoff	*Landing*	*Takeoff*	*Landing*	
GLEX	2	2	1	1	6
G280	2	2			4
R44	1	1			2
GLF6	2	2	1	1	6
LJ85	1	1			2
Be45	1	1			2
C680	2	2	1	1	6
FA7X	1	1			2
Pa46	2	2			4
Total	14	14	3	3	34
Total	28		6		5%
C	*Day*		*Night*		Total
	Takeoff	*Landing*	*Takeoff*	*Landing*	
B738/B738MAX8	76	76	14	14	180
E190E2	16	16	4	4	40
A320neo	14	14	4	4	36
An148	14	14	2	2	32
B739/B738MAX9	10	10	2	2	24
A321neo	8	8	2	2	20
B738	6	6	1	1	14
An148	4	4	1	1	10
B738/B738MAX8	4	4	1	1	10
B738	2	2	1	1	6
A319neo	4	4	1	1	10
CRJ9/1000	2	2	1	1	6
An158	4	4	1	1	10
An140	4	4			8
Cl30	4	4			8
E175E2	4	4			8
Total	176	176	35	35	422
Total	352		70		60%
D+E	*Day*		*Night*		Total
	Takeoff	*Landing*	*Takeoff*	*Landing*	
787-9	18	18	6	6	48
787-8	16	16	6	6	44
B772	14	14	2	2	32

Category /aircraft type	**Period/operation type**				**Total**
A333	10	10	2	2	24
A332	6	6	1	1	14
A350XWB	8	8			16
B757-200	4	4			8
B747	4	4			8
B777-300ER	8	8			16
Total	88	88	17	17	210
Total	176		34		30%
F	*Day*		*Night*		*Total*
	Takeoff	*Landing*	*Takeoff*	*Landing*	
A380-800	17	17			34
Total	34		0		5%

Calculations of the prospective scenario noise contours taking into account the design solutions for the aerodrome reconstruction (2030).

For the perspective scenario of operation, the noise pollution contours were calculated and constructed, and the contour areas of equivalent and maximum sound levels for day and night time were determined.

Areas of the contours of the standard equivalent sound levels for the aircraft prospective traffic intensity (prospective calculation option)

LA_{eq}, dBA	**S, km^2**	
	day	**night**
50	–	127.8
55	–	51.54
60	56.98	18.85
65	20.7	–

Areas of the contours of the standard maximum sound levels for the aircraft prospective traffic intensity (prospective calculation option)

LA_{max}, dBA	**S, km^2**	
	day	**night**
70	–	119.46
75	–	62.52
80	47.69	30.75
85	21.6	–

Building restriction zones – promising operating scenario.

For a promising scenario of the intensity of flights for the design stage of reconstruction and construction of a new runway No. 2 at the SE Boryspil International Airport, the contours of the maximum sound levels (night):

– 71 ≤ LAmax ≤ 75 dBA partially affect the following settlements:

– Trebukhiv, Dudarkiv, Velyka Oleksandrivka – to the north of the airport;

– multistory development area and suburbs of the city of Boryspil – to the east;

– most of the settlements of Voronkiv and Martusivka, individual buildings of Zatyshne – to the south;

– Hora – to the west.

71 ≤ LAmax ≤ 75 dBA sound levels correspond to zone B according to the SSR 173. In zone B, it is allowed to build residential buildings and preschool institutions with increased sound insulation of external fences, which ensure noise reduction by ΔLA = 25 dBA; construction of polyclinics with increased sound insulation, which provides ΔLA = 30 dBA; construction of schools and other educational institutions with increased sound insulation, which provides ΔLA = 25 dBA; construction of hotels and hostels with increased sound insulation, which provides ΔLA = 20 dBA; construction of office buildings, design and research organizations.

– 76 ≤ LAmax ≤ 80 dBA partially affect the following settlements:

– Trebukhiv, Dudarkiv, Velyka Oleksandrivka – to the north of the airport;

– multistory development area and suburbs of the city of Boryspil – to the east;

– Voronkiv, Zatyshne, Martusivka – to the south;

– Hora – to the west.

76 ≤ LAmax ≤ 80 dBA sound levels correspond to zone B according to the state sanitary regulations. In zone B, it is allowed to build residential buildings and preschool institutions with increased sound insulation of external fences, which ensure noise reduction by ΔLA = 30 dBA; construction of polyclinics with increased sound insulation, which provides ΔLA = 30 dBA; construction of schools and other educational institutions with increased sound insulation, which provides ΔLA = 25 dBA; construction of hotels and hostels with increased sound insulation, which provides ΔLA = 25 dBA; construction of office buildings, design and research organizations.

- LAmax > 80 dBA (partially cover the following settlements: to the north of the airport – Velyka Oleksandrivka; to the east – separate residential areas of the city of Boryspil; to the south – Martusivka (partially), most of the village of Zatyshne; to the west – individual houses of the village of Hora). LAmax > 80 dBA sound levels correspond to zone D according to the state sanitary regulations. In zone D, the construction of residential buildings, preschool institutions, clinics, schools and other educational institutions, hotels and hostels is prohibited. Subject to the provision of the necessary sound insulation, construction of administrative buildings as well as design and survey organizations is permitted there.

According to the results obtained for the current and prospective calculation scenarios and in accordance with the requirements of the State Sanitary Rules for Planning and Development of Settlements (SSR No. 173), the acoustic state in the vicinity of SE Boryspil International Airport after the reconstruction and construction of a new runway No. 2 (considering the possibility of complying with the requirements of EU Regulation No. 598/2014) is improved – compared to the current state (a description of the current state of noise exposure is provided in the Section 3 of the Report), the areas of the corresponding noise contours are reduced by 35%.

In accordance with the requirements of the Aviation Regulations of Ukraine "Requirements for the aerodrome operator for spatial zoning of the area around the airport from the conditions of aircraft noise exposure" approved by the order of the State Aviation Service dated 26 March 2019 No. 381, until 31 December 2020, by the contractor organization, SE Boryspil International Airport, carries out work on spatial zoning near the aerodrome territory taking into account the conditions of aircraft noise (assessment of the aircraft noise level, construction of a noise map and an explanatory note). The performance of the work involves carrying out full-scale instrumental measurements of aircraft noise at the airport and in the area near it (11 settlements) during takeoff, flight, aircraft landing, starting and testing of aircraft engines followed by the construction of noise maps and an explanatory note to them.

Currently, the SE Boryspil International Airport uses the runway No. 1 for takeoff and landing operations. According to information from the aerodrome service, the runway No. 2 will not be used until the end of 2020. Therefore, measurements of aircraft noise during takeoff and landing operations conducted on the runway No. 2 are not expected.

Considering the above, it is not possible to provide any materials regarding the acoustic regime assessment of the flight zone No. 2 of the Kyiv/ Boryspil aerodrome.

At the same time, we would like to inform you that the SE Boryspil International Airport has materials of evidentiary documentation and zoning maps of the Kyiv/Boryspil aerodrome environs ("Determination (monitoring) of the level of aircraft noise and the level of air pollution around the aerodrome") performed in 2007 within the framework of the aerodrome certification, as well as the "Environmental impact assessment" relating to the "Feasibility study for the reconstruction of the flight zone No. 2 of the Boryspil airport" containing the "Acoustic impact" section (please refer to the Appendix No. 38).

Assessment of the vibration pollution impact

Vibration sources are engines of construction machines and mechanisms.

Vibration levels of equipment used in construction and installation work do not exceed the permissible standard values in accordance with the requirements of SSS 3.3.6.039-99 "State sanitary standards for industrial general and local vibration".

Assessment of light, thermal pollution and radiation

Thermal pollution

The source of power supply for the structures being designed is a 110/10 kV substation of the SE Boryspil International Airport.

The distribution of electricity to consumers is carried out from the existing and new transformer substations of the airport.

To power the new TS in the southern part of the AR, a new 10 kV distribution point (DP-10 kV), which is being built primarily for the first start-up complex to supply power to the new facilities of the FZ No. 2, has been designed.

Power supply of the new 10 kV DP is carried out from the 1st and 2nd busbar section (BS) of the 10 kV DP of the Airport substation and is backed up by two 10 kV lines from the DP No. 22. Remote control and monitoring of the equipment condition at the DP and TS is carried out using the existing ABB MicroSCADA Pro 9.3 control system.

To provide electricity for lighting, radio, and meteorological equipment, it is planned to build two new transformer substations with the followings aggregates: TS-1023N and TS-1024N.

To provide electricity to the emergency rescue station (ERS), it is planned to build a new TS-ERS, waterworks – a new TS and CTS, to provide power to the consumers of the apron S (lighting masts, power supply of aircraft at parking areas, video surveillance and technological cameras of the CFS). TS for apron S is provided. To supply parking places, isolation place, and engine race, TS of parking places is provided.

10 kV networks are planned to be made with AAB_{2l} cable in trenches at a depth of 0.7 m covered with a signal tape, 0.4 kV networks – with VBbShv and VVGng cables similarly.

Cable lines are laid as follows: in a trench at a depth of 0.7 m from the planned ground level, they are covered with a signal tape (for the 1st category and the specific group of the 1st category, an additional tape is provided at a height of 0.25 m from the main one); in a cable duct made of polyethylene pipes D = 110 mm (TU U 22.2 -31032472-003: 2012) – with the implementation of prefabricated reinforced concrete wells (the standard sizes of the wells are chosen by the project); at the intersection with highways and engineering networks – in HDPE pipes D = 110 mm. The crossing of roads is supposed to be done both by digging and without digging, that is, by pushing.

The following cable networks are provided: in cable ducts – VVGng cables; in trenches – AAB2l, VBbShv.

Mutual reserve cables supplying consumers of the first and specific group of the first category are intended to be laid in different trenches, while the distance between the trenches is 1 m.

According to the power supply reliability, electrical consumers of the air transport infrastructure of the reconstructed flight zone No. 2 belong to the 1st, 1st special, and 2nd category. The source of power supply for the structures being designed is a 110/10 kV substation of the SE Boryspil International Airport. The distribution of electricity is carried out from the existing and new transformer substations (hereinafter referred to as the "TS") – 10/0.4 kV.

Plan: 1st stage.

1st subcategory:

– construction in the AR southern part of a new distribution point (hereinafter referred to as the "DP") – 10 kV, from which it is supposed to supply the projected TS-10/0.4 kV;

– construction of the TS-10/0.4 kV with transformers with a capacity of 2 × 630 kVA to power the consumers of the apron S (lighting masts, power supply of aircraft at parking areas, video surveillance, CFS technological cameras);

– installation of lighting masts on the apron S.

2nd subcategory:

– reconstruction of the existing TS-1012 with the installation of additional 10 kV cells for connecting TS-1023N;

– reconstruction of the existing TS-1023 with the dismantling of a number of electrical equipment and the use of a number of premises for maintenance and control over the operation of light signalling equipment (hereinafter referred to as the "LSE") of the runway No. 1 and runway No. 2, accommodation of the personnel of the operation department of radio navigation possession of runway No. 2, storage of SPTA as well as materials for radio navigation and lighting equipment;

– dismantling of TS-1024, which is not used for the needs of the runway No. 2, TS-1029, TS-1030, TS-1031 as high-altitude obstacles for the runway No. 2;

– construction of TS-1023N, TS-1024N with transformers with a capacity of 2 × 400 kVA to provide electricity to the LSE, radio and meteorological equipment;

– construction of TS-10/0.4 kV ERS with transformers with a capacity of 2 × 630 kVA to provide the emergency rescue station with electricity.

3rd subcategory:

– construction of CTS-10/0.4 kV with 2 × 400 kVA transformers for perimeter lighting and video surveillance; – installation of a 65 kVA diesel generator to ensure guaranteed power supply to consumers and a special category of power supply reliability.

2nd stage.

1st subcategory:

– construction of TS-10/0.4 kV with 2 × 630 kVA transformers for powering parking lots, an isolation area, and an engine runup;

– installation of masts for lighting aircraft parking areas.

2nd subcategory:

– installation of lighting masts on the engine test site.

3rd subcategory:

– installation of lighting masts for an insulated parking space.

3rd stage:

– provision of power supply to a filling station, de-icing fluid filling station, a civil protection store, fire fighting equipment and a guard on duty from TS-10/0.4 kV, apron S and TS-10/0.4 kV ERS, installation of a 65 kVA diesel generator for civil protection repositories.

10 kV networks are carried out with AAB2l cables, 0.4 kV networks – with VBbShv and VVGng cables, which are laid in the ground and in cable ducts.

Total annual consumption – 12,396 thousand kW· h; 1st stage – 11,802 thousand kW· h.

1st subcategory – 2,144 thousand kW· h.

2nd subcategory – 9,608 thousand kW· h.
3rd subcategory – 50 thousand kW· h.
2nd stage – 372 thousand kW· h.
1st subcategory – 322 thousand kW· h.
2nd subcategory – 25 thousand kW· h.
3rd subcategory – 25 thousand kW· h.
3rd stage – 222 thousand kW· h.

A detailed description of the transformer substations is described in the feasibility study (correction) "Reconstruction of the flight zone No. 2 of the SE Boryspil International Airport" (Volume No. 3 UA- KBP-02-TEO-CCO Lighting equipment. Power supply. Transformer substations. Platform illumination. Architectural and construction solutions) and is presented in the Appendix No. 15.

Earthing

To protect personnel from electric shock, all metal non-conductive parts of electrical equipment shall be connected to the PE (PEN) of the power cable conductor.

A common 10 kV and 0.4 kV earthing device is provided. It shall consist of electrodes made of angle steel 50 × 50 × 5 mm, and connections made of stripped steel 40 × 4 mm. The earthing circuit resistance must not exceed 4 Ohms.

At ERS, searchlight masts, TS 1023n, and TS 1024n, the potential equalization system is provided: PE (PEN) conductors of a power supply network, metal structures, and a lightning protection circuit shall be connected to the main grounding bus.

For showers, an additional potential equalization system shall be provided by connecting pipes and metal pallets to the PE bus installed in the box with a PV1 4 mm^2 wire in a 16 mm PVC pipe.

Lightning protection

The lightning protection of buildings is made in accordance with DSTU B.V.2.5-38-2008.

TS and ERS are classified as level II, while searchlight masts – to level III in terms of reliability of protection against direct lightning strikes.

The lightning protection of TS and ERS is performed by means of a lightning receiving grid laid in the roofs of the buildings. The grid is connected to the lightning protection circuit laid in a trench at a depth of 0.5 m around the building perimeter with lightning rods.

The mast connected to the angle steel and stripped steel grounding conductors is used as a lightning rod for searchlight masts.

To protect the breathing valve of the diesel generator and the 5 m^3 fuel tank, a lightning rod connected to the grounding circuit with a 40 × 4 mm steel bar shall be used.

Electrical equipment (with the exception of diesel generators operating in emergency situations) is environmentally friendly and does not pose a threat to the environment.

Light pollution

Lighting equipment is installed from both landing directions:
– at a minimum of III-B category with landing course MKland.-18R;
– at a minimum of III-B category with landing course MKland.-36L.



Мал.1 Точний заход на посадку по мінімуму III-а категорії

The system of lighting equipment includes the following subsystems of lights:

– approach lights of the central row and side approach lights with two light horizons according to ICAO III-B category with MKland-18R and MKland-36L;

– flashing approach lights with MKland-18R and MKland-36L;

– entrance and limit lights from both landing directions;

– AR edge lights;

– AR centerline lights;

– landing zone lights with MKland-18R and MKland-36L;

– lights of the glide path visual indication with MKland-18R and MKland-36L;

– lights of the high-speed exit taxiway indicator;

– runway protection lights;

– axial taxiing lights;

– stop line lights;

– aerodrome signs.

Reflective poles with flexible bases are installed on all overhead lights of the AR and taxiways. All the recessed lights shall have a projection height of not more than 6.35 mm above the covering.

With MKland-18R and MKland-36L, an approach lighting system is installed for precision approach in accordance with ICAO III-B category.

The approach lighting system consists of centre row line lights, which are installed on the extension of the runway axis within 900 meters from the AR threshold with longitudinal

intervals of 30 meters, and is complemented by linear approach side lights and two light horizons located at a distance of 150 and 300 meters from the AR threshold.

Each line fire consists of four fittings; the distance between the fittings in a line fire is 1.5 meters.

Linear side approach lights consist of three single lights in one line light and are placed in two rows on either side of the AR extension axis within 270 meters from the runway threshold with a longitudinal interval of 30 meters.

The distance between the interior lights of the line lights is 18 meters.

At a distance of 300 meters from the AR threshold, a row of lights form a light horizon 30 meters wide.

At a distance of 150 meters from the AR threshold, the light horizon is formed by lights placed between the rows of centre and side approach lights.

LED lights with a minimum average luminous intensity of 20,000 cd are used as approach lights for the centre row and light horizons, while LED lights with a minimum average intensity of 5,000 cd are used as side approach lights.

The emitting colour of the approach lights of the centre row and light horizons is white, while the side approach lights are red.

At a distance of 300 to 900 meters from the AR threshold, the approach lights of the centre row are complemented by LED approach lights.

A detailed description of the lights subsystem is described in the feasibility study (correction) “Reconstruction of the flight zone No. 2 of the SE Boryspil International Airport” (Volume No. 3 UA- KBP-02-TEO-CCO Lighting equipment. Power supply. Transformer substations. Platform illumination. Architectural and construction solutions) and is presented in the Appendix No. 15.

Power supply of lighting facilities system

The power supply for the LFS lights is carried out through high-voltage and low-voltage cable lines laid in cable duct pipes, in pipes installed in the artificial surface of the AR and taxiways.

To power the lights of the aerodrome lighting system, they use a series connection circuit through isolation transformers.

The primary windings of the insulating transformers of the lights are connected by segments of a single-core shielded cable in a series circuit, the leads of which are connected to a dimmer. The serial connection ensures a constant current in all lights of the cable ring, which gives a constant luminous intensity of all lights and allows the use of a single-core cable.

The need to change the light intensity of the lights depending on meteorological conditions, as well as to ensure a constant current in the cable ring when the voltage in the network changes, lead to the use of special current stabilizers (dimmers). Dimmers based on pulse width modulation.

The rated output current of the dimmers does not exceed 10 A. Therefore, the cable cross-section in series connection of the lights is chosen not by current but taking into account the mechanical strength conditions. In practice, lighting facilities system use a special cable with a copper conductor with a cross-section of 1 × 6 mm² and a voltage of 5 kV.

Direct connection of lights and airfield signs is made through isolation transformers.

Cable ducts are made of low-pressure polyethylene pipes (type C) with a diameter of 110 mm. When installing cable ducts outside the airfield pavements, pipes laid in trenches are poured with concrete to ensure the safety of this duct in the event of an aircraft rolling out of the AR and taxiways.

To accommodate insulating transformers, cable wells of three standard sizes are provided: type A – 1,190 × 1,190 × 1,150 mm; type B –1,800 × 1,190 × 1,150 mm; type D – 2,500 × 2,000 × 2,500 mm.

In addition, the type D well is used for cable crossings over the AR and taxiways.

Type A and B wells are prefabricated, while type D wells are built on site using formwork.

The design of the wells and their covers are designed for collision with the aircraft when rolling out of the AR and taxiways. The design of the wells cover is designed for maintenance with the equipment available in the STZP department (lifting mechanism).

Earthing

For the earthing of the lighting facilities that are installed, it is assumed that the earthing bus is made of galvanized steel with a size of 30 × 3.5 mm, which should be included in the set of lighting facilities. All metal cable structures in the wells and fire bodies must be connected to the earthing bus, for which a copper conductor is used.

The lighting facilities are environmentally friendly and do not pose a threat to the environment.

Electromagnetic radiation

Landing system radio-transmitters are the EMS source that generate EMS field in bandwidth classified in SNiP No. 239:

• course beacon LLZ 421 – bandwidth 8 (108–112 MHz);

• glide slope beacon GP 422 with distance measurement DME 415 – bandwidth No. 9 (329–335 MHz) and (900–1,200 MHz) respectively.

Special operation conditions – none.

Electromagnetic field for bandwidth No. 8 is estimated by the field strength. The standard unit of electric field strength is the volt per meter (V/m).

Electromagnetic field for bandwidth No. 9 is estimated by surface flow density (SFD). SFD is measured in Watt per square metre (W/m^2), microwatt pet square centimetre ($\mu W/cm^2$).

Electromagnetic field for bandwidth No. 9 is estimated by surface flow density (SFD). SFD is measured in Watt per square metre (W/m^2), microwatt pet square centimetre ($\mu W/cm^2$).

Operation – 24 h, autonomous, at a high safety/dependability level, not requiring service personnel involvement. No permanent/interim operators. All diagnostics and control operations are made with the use of remote controls.

This facility excludes any emergency that can affect environment or equipment.

Landing system equipment is located in containers and meets current health regulation standards.

A sanitary protection zone (SPZ) and restricted development zone (RDZ) are established to protect people from EMP exposure created by the landing system equipment.

Sanitary protection zone is the area adjacent to the radio-facility service site where maximum permissible EMP level is exceeded at 2 m above ground level.

SPZ external boundary is defined at 2 m above ground level beyond maximum permissible levels (MPL) of EMP.

Restricted development zone includes area where MPL is exceeded at 2 m above ground level. The zone's external boundary is defined based on maximum height of houses in the development area, at the third floor were EMP is within MPL.

According to DSP 173-96, for the facilities with antennas emitting electromagnetic radiation at defined horizontal angle and EMP is variable depending on its position above ground level, restricted development zones are subject to vertical differentiation by height (metres): 3, 6, 9, 12, 15, etc.

Project landing radio facilities are located at airfield. According to the current regulatory documents, there should be no buildings and structures on the airfield runway, except for those which, according to their functional purpose, should be there (radio

navigation and landing objects), as well as green spaces (shrubs, trees, etc.). Height of facilities located within airfield is limited by Ukraine Airside Certification Requirements. In this regard, there is no need to establish a development restriction zone.

See DSNiP 239 Table 1.2 for maximum permissible values of electromagnetic field generated by radio facilities in compliance with paragraph 1.3.3 of DSNiP 239.

According to DSNiP 239, Maximum Permissible Strength (MPV) for VHF transmitters (bandwidth 8) is 6 V/m; Maximum Permissible Power Flow Density (MPPFD) for UHF transmitters (bandwidth 9) is 10 μW/cm^2.

Sanitary zone calculation results

Calculation of electromagnetic field generated by RTO feeder antenna devices is made with the use of Antenna Impact Calculation software.

Sanitary zone calculations are made with the regard to the adjacent technical terrain.

For the purpose of calculation, the reference point (±0.00) above ground level is the RTO antenna foundation above sea level.

Total expected EMP levels generated by KRM/GRM transmitters at 2.0 m above ground are above Maximum Permissible Level (MPL). In view of the above, the Sanitary Protected Zones (SPZ) for the above RTOs shall be defined.

SPZ border line.

1. KRM-36L: 26 m long from KRM antenna along the ShZPS rwy axis in the 18R ShZPS threshold direction; 32 m wide (16 m at each side of rwy axis).

2. For GRM-36L: 16 m long from the GRM antenna along the axis that is parallel to the AR axis in the 36L AR threshold direction; 10 m wide.

3. For KRM-18R: 26 m long from KRM antenna along the AR axis in the 36L AR threshold direction; 32 m wide (16 m at each side of AR axis).

4. For GRM-18R: 16 m long from GRM antenna along the axis parallel to the AR axis in the 18R AR threshold direction; 10 m wide.

Table

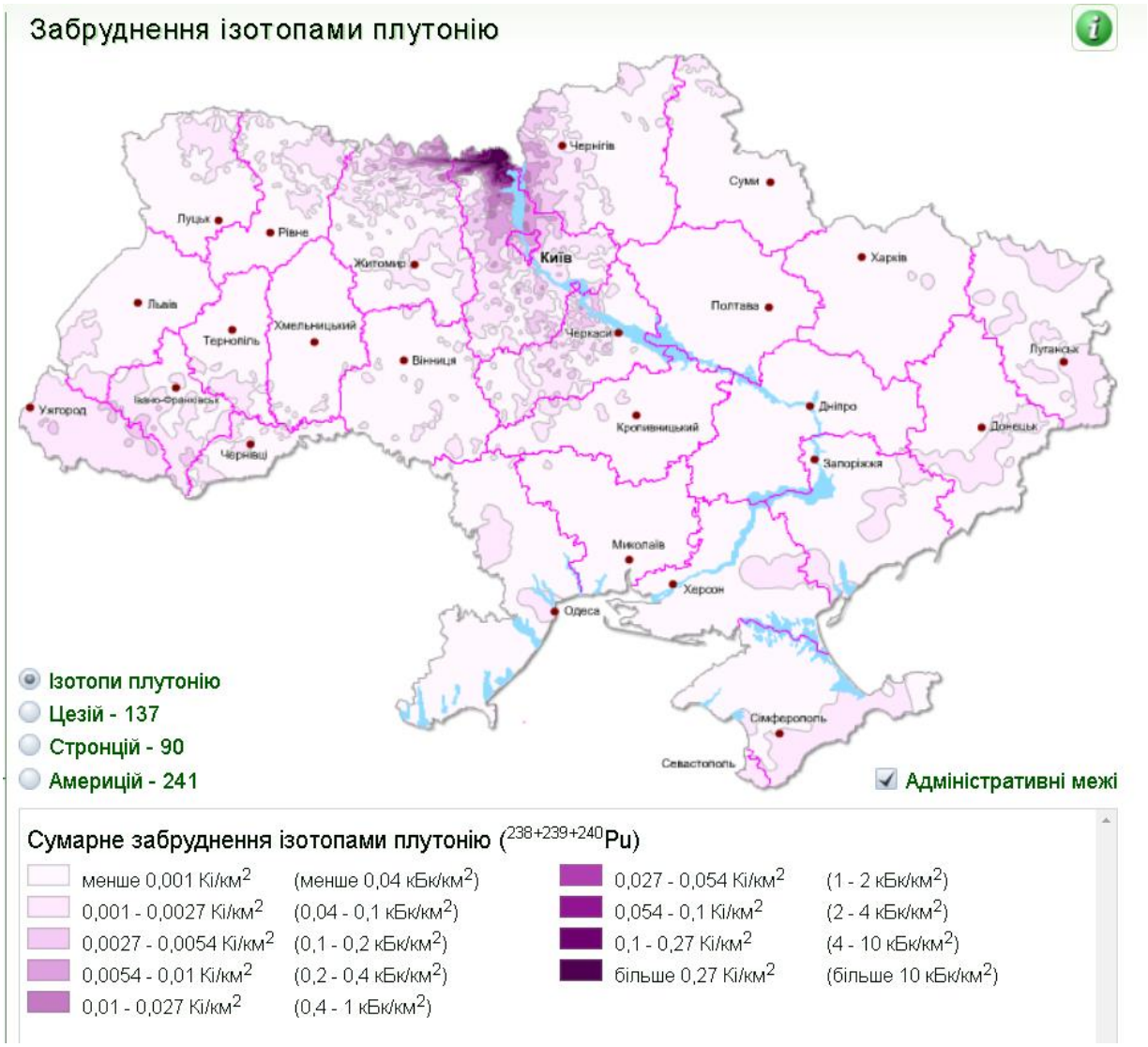
Facility	**Emission bearing, degrees**	**Maximum EMP level at 2.0 m high**	**SPZ border line**
KRM-36L	182° 36`	4.569	26.00 × 32.00
KRM-18P	2° 36`	4.569	26.00 × 32.00
GRM-36L	182° 36`	32.184	16.00 × 10.00
GRM-18P	2° 36`	32.184	16.00 × 10.00

In general, the location and operation conditions of SE Boryspil International Airport's AR-2 navigation and landing equipment as an EMS source meet "EMS Exposure Sanitary Regulations" approved by the Order of the Ministry of Health of Ukraine No. 239 dated 1 August 1996.

Radiation contamination assessment

According to the requirements of the Aviation Regulations of Ukraine "Instructions for the Organization and Implementation of Security Control at the Airports of Ukraine" approved by the Order of the State Aviation Service of Ukraine on 15 March 2019 No. 322 (Section IV. Inspection of passengers) of the SE Boryspil International Airport during the inspection of passengers, it is assumed to use scanners that are not based on ionizing radiation.

Subject to the provisions of the State Program of Civil Aviation Safety approved by the Law of Ukraine dated 21 March 2017 No. 1965-VIII, X-ray equipment for safety control will be used in the territory of the SE Boryspil International Airport in accordance with radiation safety standards. The executive authorities implementing the state customs policy through their territorial bodies in the area of the SE Boryspil International Airport (at checkpoints) will take measures to prevent the illegal movement of radioactive and other dangerous substances and items across the customs border of Ukraine.


Забруднення ізотопами плутонію
Чернігів
Суми
Луцьк
Рівне
Житомир
Київ
Харків
Львів
Полтава
Тернопіль
Хмельницький
Черкаси
Вінниця
Луганськ
Ужгород
Івано-Франківськ
Дніпро
Кропивницький
Донецьк
Чернівці
Запоріжжя
Миколаїв
Херсон
Одеса
Сімферополь
Севастополь
Ізотопи плутонію
Цезій - 137
Стронцій - 90
Америцій - 241
Адміністративні межі
Сумарне забруднення ізотопами плутонію ($^{238+239+240}$Pu)
менше 0,001 Кі/км^2 (менше 0,04 кБк/км^2)
0,001 - 0,0027 Кі/км^2 (0,04 - 0,1 кБк/км^2)
0,0027 - 0,0054 Кі/км^2 (0,1 - 0,2 кБк/км^2)
0,0054 - 0,01 Кі/км^2 (0,2 - 0,4 кБк/км^2)
0,01 - 0,027 Кі/км^2 (0,4 - 1 кБк/км^2)
0,027 - 0,054 Кі/км^2 (1 - 2 кБк/км^2)
0,054 - 0,1 Кі/км^2 (2 - 4 кБк/км^2)
0,1 - 0,27 Кі/км^2 (4 - 10 кБк/км^2)
більше 0,27 Кі/км^2 (більше 10 кБк/км^2)

2. List of justified alternatives (e.g. of a geographical and/or technological nature) of planned activities, main reasons for selection of the suggested option considering environmental consequences (situational base map with marked alternative options is added in case of availability)

Two technical alternatives for implementation of the planned activities (two options for reconstruction of landing area No. 2) are considered in design.

- Technical alternative 1: placement of a new runway with a shift (maximum possible) to the West. Main indicators based on alternative 1 selection criteria: airfield paved area – 1,064,105 m^2; length of new additional fencing – 1,400 rm; area of additional land allocation – 42 ha.
- Technical alternative 2: creation of a new runway. Main indicators based on 2 alternative selection criteria: airfield pavement area – 1,040,060 m^2; length of new additional fencing – 3,100 rm; area of additional land allocation – 51 ha.

A comparative analysis for design solution selection determined that technical alternative No. 1 is the most economically and technically rational. The decision is approved by the Minutes of Meeting of ST "'Boryspil' International Airport" Construction and Development Council dated 21.12.2018 No. 01-27/5-13 (an extract from the minutes can be found in Annex No. 16).

Following a comparison of both options, preference is given to option No. 1 with an axis shift of the new runway, based on the main indicators.

The planned location of the new runway with artificial pavement (AR-2) will be determined based on standard distances between airfield elements; airfield elements and stationary and mobile objects; placement of lighting facilities and radio equipment considering critical and sensitive zones, as well as aviation safety requirements for the airfield premises.

The axis of the new AR-2 is shifted 80 metres to the western direction in parallel to the axis of the old AR-2, which ensures placement of the runway and radio navigation and landing facilities within the existing land allotment of the airport.

ILS radio navigation and landing systems are placed considering standard requirements for critical and sensitive zones, which are determined for radio signal structure protection from distortion against the land surface, stationary and mobile so-called "radio-opaque" facilities – technical buildings and structures, wheeled transport on the patrol road, enclosures, airplanes on taxi strips and parking ramps, etc. (even facilities outside of airport premises can influence ILS operation).

The project provides for an additional land allotment for placement of KRM, GRM and lighting facilities, which shall protect their critical and sensitive zones.

The northern end of the new AR-2 runway (18R) will be shifted considering the heights of the existing enclosure, which should not be an obstacle for airplanes performing airfield operations.

The dimensions of the landing area No. 2 elements were accepted according to standards and recommended ICAO practice for 4F originator code airfields.

The length of the new AR-2 runway, according to the Design Assignment, is 3,800 metres. The width of the runway is accepted at 45 metres according to the requirements of cl. 3.1.10 of "Annex 14".

The placement of aircraft parking places defined by the project only allows aircraft to manoeuver using engine thrust.

Alternative No. 1 involves the option of reconstruction of runway No. 2 located at the territory of the existing airport of SE "'Boryspil' International Airport".

Alternative No. 2 is not being considered, as planned activities are foreseen on the premises of the existing airport and determined by the General Scheme of Planning of the

Territory of Ukraine approved by the Law of Ukraine “On the General Scheme of Planning in the Territory of Ukraine”.

3. Description of the current state of the environment (basic scenario) and description of its potential change without planned activities in terms of how natural changes from the basic scenario can be evaluated based on available environmental information and scientific knowledge

Description of the current state of the environment (basic scenario) and description of its potential change without planned activities in terms of how natural changes from the basic scenario can be evaluated based on available environmental information and scientific knowledge. The following is added in this section: a statement on the values of background concentration of contaminants, a statement from the meteorological office on meteorological characteristics and coefficients defining the conditions for distribution of contaminants in the atmosphere for a particular region.

The "'Boryspil' International Airport" is a state commercial enterprise of civil aviation founded on state property and belonging to the management sphere of the Ministry of Infrastructure of Ukraine.

The state enterprise of "'Boryspil' International Airport" is located to the South-West of the city of Boryspil, Kyiv region. Administratively, it is located at the following address: Kyiv region, Boryspil district, village of Hora.

The airport has operated since 1959.

The airfield has an area of about 1,000 ha (of which about 220 ha is paved) and the following facilities: Military Base A2215; SE "'Boryspil' International Airport"; Ukrainian State Air Traffic Services Enterprise; SAE "Ukraina", SE "ODH"; SBU division in "Boryspil" airport; IICP "Kyiv" of the State Border Guard Service of Ukraine; Kyiv customs office of the State Fiscal Service; transit police in "Boryspil" airport of the central administration of the Ministry of Internal Affairs in Kyiv region; flight catering companies LIMITED LIABILITY COMPANY DO AND CO KYIV and Foreign-Owned Affiliated Company "AeroCatering Services Ukraine"; Ukrainian State Postal Service Company "Ukrposhta" – airmail exchange division No. 5; Legal entities – commercial entities (CE) – representative offices of air companies, LLC "Aerohandling", LLC "Interavia", handling company "Transaerohandling", etc.

The airport is located about 1 km to the West from the edge of the city of Boryspil and 6 km to the West of Boryspil city centre, 29 km to the East of Kyiv city centre. Airfield approach and takeoff routes pass over the residential areas of the following settlements:

– villages of Trebukhiv, Dudarkiv, Velyka Oleksandrivka to the North from the airport;

– multistory development area and suburbs of the city of Boryspil to the East;

– most of the villages of Voronkivka, Martusivky, Zatyshne to the South;

– village of Hora to the West.

Total area of the plot for comprehensive reconstruction of the airfield of SE "'Boryspil' International Airport" is 429.41 hectares.

The State Enterprise of "'Boryspil' International Airport" is the largest and most powerful in Ukraine. It ensures 62 % of aviation passenger transport of Ukraine, as well as, based on the results of 2018, rendered services to 12.6 million passengers.

Over 60 national and foreign airline companies visit the airport via over 120 routes all over the world.

To ensure airplane takeoff and landing, the following facilities were constructed at "Boryspil" airport:

– two parallel independent artificial runways (AR): AR-1 measuring 4,000 × 60 m and AR-2 measuring 3,500 × 60 m;

– a taxi strip system (major, connecting, high speed exit taxiways), taxiways at the ramp and PP, holding bays for takeoff and application of de-icing liquids, etc.;

– passenger and cargo aprons, aircraft parking space, including those for transit ACs.

Currently, the main types of aircraft taking off from and landing at the airport includes:

– narrow-body – Airbus, Boeing, Bombardier, Embraer E-Jet, McDonnell Douglas of the following types: B738 E190, A320, E145, A321, B739, B733, B734, DH8D, B735, A319, CRJ7, MD83;

– wide-body – Airbus, Boeing: B763, B772, A332.

Additionally, the following older aircraft are still part of the fleet structure: MD82, MD83, IL76, An12, Yk 40, etc.

Number of operations at night time: 152-1,455 takeoffs and 151-155 landings.

Number of operations in night time: 30 takeoffs and 17 landings.

Runway load distribution: AR No. 1 – 85 % and AR No. 2 – 15 % (landing only, takeoffs do not take place from AR-2 due to the low PCN value).

In order to ensure the functioning of passenger transportation, acceptance and departure, the airport constructed the required infrastructure and organised maintenance and repair services with auxiliary productions and production sites, including maintenance and repair of aviation equipment, wheel transport, and wheel transport parking places.

Auxiliary productions of the enterprise consist of:

– a repair and construction division (RCD) that provides ongoing repairs for upkeep of buildings, production facilities, offices. It enjoys a carpentry shop, welding shop, warehouses for inert material storage (ballast ground warehouse fr. 5–20 mm, fr.; 20–40 mm, ballast screening 0–5 mm, ravine sand screening);

– a special transport service (STS) that provides special machines and auxiliary mechanisms for the following processes: ground handling of aircraft, transportation of aviation and technical possessions, business cargo, elimination of consequences of emergencies, etc., according to the intended use of special machines in the service's operation. Service production departments: assembly shop for sharpening and repair of tools; fuel shop for carburettor repair; repair shop for maintenance and running repair of wheel transport; turning shop; motor shop for cold trial of engines; welding workshop; copper smithy shop; curing shop; battery shop; bus maintenance shop; internal combustion engine trial shop; carpentry shop; washing and painting complex; stationary heating of special wheeled transport engines; UMP-350 heat machines; containers for diesel fuel storage; vehicle maintenance station at the ramp; repair shop for airfield equipment and special equipment; mechanical division;

– fuel and oil material service (FOMS): Filling Station 1; Filling Station 2; Filling Station 3; Laboratories Nos. 1, 2; aviation fuel provision system. Centralised airplane filling system includes two warehouses for fuel and oil materials and a system of inter-warehouse pipelines and centralised filling pipeline branching under ramp covers. Aviation fuel is the main petroleum product. Wheel transport is filled with petrol, diesel fuel, and reactive engine fuel (kerosene). These fuels are stored in underground warehouses;

– chief power engineer service (CPES): responsible for heating and technical upkeep of airport facilities, water supply and water drainage, electrical engineering. To provide all buildings and structures of the airport with heat and hot water, the following facilities operate on the airport premises: heating and production boiler house No. 1 (HPB No. 1), heating and production boiler house No. 2 (HPB No. 2). Boiler houses are equipped with boiler units operating on natural gas. HPB No. 2 is additionally equipped with diesel generators with underground diesel fuel storage containers;

– the airport chief mechanic service (ACMS) is responsible for operational upkeep and continuous operation of ramp mechanisation facilities, equipment for servicing passengers, luggage, cargo, hoisting, commercial and process, as well as domestic equipment, air ventilation and conditioning systems of airport facilities, process mechanisation and automation equipment. ACMS production subdivisions: ramp mechanisation building – AKZS No. 1, AKZS No. 2 with battery rooms and rooms for running repair of batteries (alkali and acid), a welding shop with stations and working benches for metal cutting and welding;

– MAU technic LLC performs aircraft maintenance. It operates battery rooms, including rooms for maintenance and running repairs of batteries;

– the flight radio and lighting equipment service (FRLES) is responsible for continuous operation of radio navigation equipment, landing systems and aircraft flight lighting facilities. It has the following production sections: repair and operation shops (ROS) – welding section, battery section with battery charging stations, diesel electric generators to ensure continuous operation of radio and lighting facilities for aircraft landing, as well as fuel storage containers;

– the information technology service (ITS) provides means of communication for airport activities. A diesel generator is installed to ensure continuous operation of communication equipment;

– the following parking sites are located on airport premises: vehicle parking site near Boryspil hotel, terminal B, terminal D, terminal F, service parking near the office block.

Physical, geographical and climate characteristics of the facility

Physically and geographically, the territory is part of the Dnipro Lowland. The plot is located at the edge of the second-third fluvial terrace of the left-bank of the Dnipro river.

Flight zone No. 2, which is under reconstruction, is located on the premises of Boryspil airport in U-II road and climate zone with type I hydrological and geological conditions with weak surface runoff. The plot surface is relatively flat, planned artificially under airfield and asphalt-concrete pavements of different types. Absolute relief elevations of the territory considered for construction of the facilities vary from 124.25 to 126.75 m.

The climate of the region is moderately continental. According to the map of architecture and construction climate zoning of the territory of Ukraine, it is located within the North-Western climate region (I).

According to data from the Boryspil meteorological station presented by the Central Geophysical Observatory of the State Emergency Service of Ukraine, the average annual air temperature is 9.6 °C.

The average annual temperature of the warmest month, July, is 27.4 °C; the coldest month, January, is –6.8 °C.

The dominant wind is western in January (14.0 %), and northern and north-western in July (18.6–22.4 %). The highest number of days without wind is in October (25.4 %).

Average annual wind speed is 2.3 m/s.

Average annual rainfall is 640 mm.

Standard depth of season soil freezing is 112 cm (as per cl. 7.5.3 of DBN V.2.1-10-2009).

Climate and meteorological characteristics for calculations can be seen in the table.

table

Names of characteristics	Value
Coefficient depending on atmosphere stratification, A	200
Terrain coefficient	1
Average maximum ambient air temperature of the hottest month of the year, T °C	+27.4
Average ambient air temperature of the coldest month T °C	–6.8
Frequency of wind directions, %	
N	15.3
NE	11.6
E	8.0
SE	10.4
SW	11.1
S	12.7
W	15.1
NW	15.9
No wind	16.0

Wind speed (according to average multi-year data), with frequency of 5% – 12.0 m/s.

Relief and geological environment

The plot surfaces are flat, planned artificially in places, and partially covered with concrete airfield pavement and asphalt-concrete pavement. The region surface is gentle, with absolute elevations from 122.0 to 131.0 m.

Geomorphologically, the site is located within the 2nd above-floodplain terrace of the Dnipro River.

Quaternary deposits feature in the geological structure of the exploration area up to explored reserves of 6.0–7.0 m in depth. The quaternary system is represented by aeolian and deluvial (vd PIII) as well as alluvial (a PIII) deposits. Lithologically, they are represented by sandy loam and sand covered by topsoil (e). The thickness of the topsoil is 0.2–0.6 m.

In hydrogeological terms, the study area is located within the northwestern part of the Dnipro artesian basin, for which the development of aquifers, which are separated from each other by impervious layers, is typical.

During the period of research and to the explored depth, no groundwater was found.

In terms of geological and hydrological conditions, the territory does not belong to the category characterised by flooding. Locally, near wells No. 26 and 26a, there were lacustrine-boggy (lb PIII) deposits with a thickness of 0.6–2.0 m covered with fill soil. Fill soil is represented by sandy loam.

Based on the results of office processing of field and laboratory work materials, 8 engineering and geological elements (EGE) were identified in the geological section of the survey area:

Topsoil (e).

EGE-1 – humus sandy loam with plant roots of firm consistency, dark brown, layer thickness – from 0.2 to 0.6 m.

Industrial deposits (t).

EGE-1a – fill soil – solid sandy loam, from dark grey to brown in colour, with interlayers of sand, in some places – with an admixture of rubble and construction waste, 5–10 %. The layer thickness is 0.4–3.2 m.

Lacustrine-boggy sediments (lb RIV).

EGE-1b – plastic sandy loam, silty, with a small amount of peat and an admixture of organic matter, dark grey. Met by wells No. 26 and 26a, the layer thickness is 0.6–2.0 m.

Aeolian and deluvial deposits (vd RIII).

EGE-2 – hard sandy loam, silty, loess subsiding, from yellow-brown to yellow-grey, sometimes with interlayers and lenses of fine and dusty sand, 10–25%.

EGE-2a – plastic sandy loam, silty, loess subsiding, from yellow-brown to yellow-grey, sometimes with interlayers and lenses of fine and dusty sand 10–25%.

EGE-3 – fine sand, yellow-grey, sometimes with lenses and interlayers of sandy loam and sandy silt, 5–25%, with a low level of water saturation, of a medium density.

Alluvial and diluvial deposits (ad PIII).

EGE-4 – plastic sandy loam, sometimes hard, silty, from greenish-brown to yellow-grey, sometimes with interlayers and lenses of sand, 5–15%.

EGE-5 – fine sand, grey, sometimes with interlayers of sandy silt, 5–15%, with a low level of water saturation, of a medium density.

Flora and fauna, nature reserve fund

The airport is located within intermediate northern forest-steppes with significant intrusion of Polissia landscapes.

There are no objects of the nature reserve fund on or near the plot.

The closest nature reserve fund object is the scenic reserve “Khutir Chubynskoho” located more than 5 km away from the planned site of these activities. Figure 3.1 shows the distance from the planned activities of SE “‘Boryspil’ International Airport” to the nature reserve fund object.

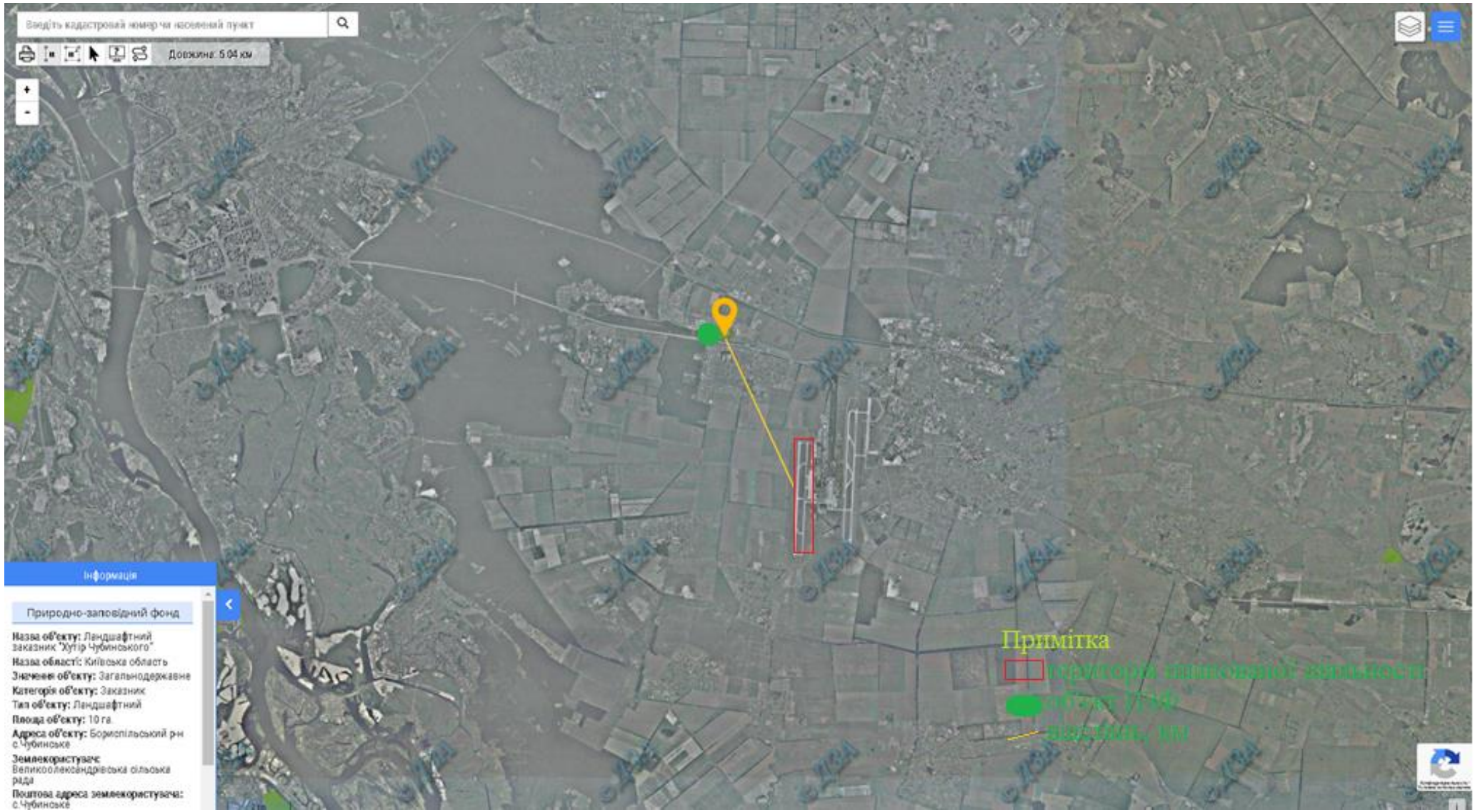


Fig. 3.1. Extract from public cadastral map

Flora

Currently, there are no green plantings within the existing land allotment.

The flora near the airport is characterised by scattered groups of trees, although the territory around it mostly consists of fields, including different types of grass.

The airport region belongs to intensive agriculture and animal farming area, which is why agricultural grounds (fields, pastures, meadows) constitute the majority of the territory.

The main forest ranges of this region are concentrated in the western part and scattered along the Dnipro valley. This section of Dnipro valley occupies southern, south-western and western part of the territory.

Fauna

According to the materials of "Plan of management of hazards created by representatives of wild nature in the airfield area" in the airport area and neighbouring territories, constant monitoring, control and accounting of birds and wild animals is performed.

Based on the results of observations and accounting of the ornithological division of SE "International Airport 'Boryspil'", the following species of birds/wild animals were seen in the last five years.

White stork (Ciconia ciconia)

Weight 2.7–4.4 kg. Body length 100–115 cm. Wing spread 195–215 cm. Nest in settlements or nearby. Collect food in green meadows, on the banks of fresh water bodies. The birds are migrating – come flying in March. Autumn flyoff begins at the end of August. Gather in large flocks in this time.

*Northern goshawk (Accipiter gentilis***)**

Weight 0.8–1.5 kg. Wing spread 98–117 cm. Resident birds in Polissia and Forest-Steppe regions. Places of living are sections of old leafy or mixed forest. In the area of the airport, may appear in the period of October-November during autumn and winter travels.

Mallard (Anas platyrhynchos)

Weight 0.8–1.7 kg. Body length 51–62 cm. Wing spread 81–98 cm. Migrating. Settle on the banks of overgrown fresh water bodies. Appear in the first days of March in nesting places. Fly off in October–November. Eat not only seeds and vegetative parts of water plants, but also fly to fields where they eat grains.

Common buzzard (Buteo buteo)

Weight 0.7–1.3 kg. Body length 51–57 cm. Wing spread 113–128 cm. Migrating birds. Settle in sections of old leafy and mixed forest or forest belts. Come flying in spring, at the end of March. Fly off at the end of October. Appear near the airport in the period of rodent growth.

European herring gull (Larus argentatus)

Weight 0.6–1.3 kg. Body length 55–67 cm. Wing spread 130–158 cm. Can appear within the airport premises constantly. Partially resident, partially passage (migratory) or migrating birds. Pass all big rivers and water reservoirs.

Rough-legged buzzard (Buteo lagopus)

Weight 0.9–1.3 kg. Body length 50–60 cm. Wing spread 120–150 cm. Migrating. Come to the territory of Ukraine only for wintering, from the end of October to mid-March. Hold to open areas, where they hunt rodents. Often land on ground, bushes.

Hooded crow (Corvus cornix L)

Weight 0.7–0.8 kg. Body length 47–50 cm. Wing spread 120–130 cm. Resident, migratory. Fairly numerous. Hold near and within settlements. Appear constantly in the airport premises.

Hen harrier (Circus cyaneus)

Weight 0.4–0.6 kg. Body length 47–50 cm. Wing spread 120–130 cm. Migrating. Come flying mid March, fly off in October–November. Places of stay – fields, inundated dry meadows, forest glades. Appear near the airport in the period of rodent number growth. *Rare species with special protection status. Listed in the Red Book of Ukraine.*

Rook (Corvus frugilegus)

Weight 0.32–0.5 kg. Body length 45–46 cm. Wing spread 110–120 cm. Partially migrating, migratory. Stay in colonies of hundreds of birds in settlements, near-road and field protection plantings. Migrating flocks appear in the second half of March. Substitution of wintering birds with local ones takes place in early March. Local birds fly off for wintering in October–November. Feed in fields, waste disposal sites and waste lands in settlements.

Black-headed gull (Larus ridibundus)

Weight 0.26–0.35 kg. Body length 38–44 cm. Wing spread 94–105 cm. Nesting and migrating. Live in colonies. Stay near ponds, on green meadows. Come to nesting places in late March. Autumn flyoff is in late August to November. Some birds stay in winter. A large number is recorded in the area of Boryspil waste disposal site.

Pigeon (Columba livia)

Weight 0.26–0.3 kg. Body length 31–34 cm. Wing spread 63–70 cm. Resident birds. Settlement pigeons gather in large flocks. Constantly appear within the airport and neighbouring territories.

Northern lapwing (Vanellus vanellus)

Weight 0.18–0.26 kg. Body length 28–31 cm. Wing spread 70–76 cm. Migrating. Come flying in the first decade of March. The autumn flyoff is in March–October. Nesting on the ground. In the premises of the airfield, nesting on the eastern side of the runways. Feed by insects and other small invertebrates.

Common kestrel (Falco tinnunculus)

Weight 0.16–0.23 kg. Body length 33–39 cm. Wing spread 65–80 cm. Migrating. Come flying in spring in March. Autumn flyoff is in September–October. Typical places of stay are forest outliers, forest belts. Feed by insects, rodents. In the airport premises, appear in flocks in the autumn migration period.

Western jackdow (Corvus monedula)

Weight 0.14–0.23 kg. Body length 32–33 cm. Wing spread 95–100 cm. Resident, partially migratory. Usually settle in buildings of settlements. In the airport premises, gather in flocks in early August. Feed mainly by insects, but gladly eat different seeds, leftovers.

Eurasian magpie (Pica pica)

Weight 0.23–0.25 kg. Body length 45–46 cm. Wing spread 95–100 cm. Resident, nesting. Common in the whole territory, appear in woodsides, near-road and field protection belts. Feed by insects, rodents. Can appear in the airport premises constantly.

Red-footed falcon (Falco vespertinus)

Weight 0.15–0.18 kg. Body length 28–31 cm. Wing spread 65–75 cm. Migrating, nesting. Fairly numerous in places. Come flying in April. Autumn flyoff is late August-September. Places of stay – small woods interchanging with open field sections, field protection belts. Feed by insects, myomorphic rodents. Large number in the airport premises in the period of autumn migrations (September).

Common starling (Sturnus vulgaris)

Weight 0.06–0.08 kg. Body length 20–21 cm. Wing spread 25–46 cm. Migratory in the territory of living. Tend to gather in flocks. Settle in city and suburb areas and grassy lands, forest belts, parks, gardens. Feed by insects and other invertebrates, berries, seeds, leftovers. Can appear in the airport premises constantly from mid March to November.

Common swift (Apus apus)

Weight 0.06–0.08 kg. Body length 20–28 cm. Wing spread 45–46 cm. Migratory in all regions. Places of stay – large settlements, parks, public gardens, road wood afforestations. Feed mainly by flying insects. Helpless on the ground. Come flying in spring in late May. Fly off in late August. Large number appears in the airport premises in the period of flying off of young birds to autumn season migrations, during insect increase. Tend to gather in flocks.

Old World sparrow (Passeridae)

Weight 0.06–0.08 kg. Body length 20–30 cm. Wing spread 42–43 cm. Resident, partially migratory. Feed by insects, food waste, seeds, berries. Appear constantly in the airport premises.

Swallow (Hirundo)

Weight 0.16–0.18 kg. Body length 20–25 cm. Wing spread 43–45 cm. Migrating. Come flying mid April, fly off for wintering in September. Nest in colonies. Stay in buildings of settlements. Feed mainly by flying insects. Can appear in the airport premises in the period of flyoff of young birds up to the end of autumn migration.

Water supply and water drainage

Water supply of SE "International Airport 'Boryspil'" is ensured by the following sources: 7 (existing) and 3 (new, not commissioned) own artesian wells, via purification and deferrization pump station with maximum total capacity of 190 m^3/h and two second stage pump stations with total capacity of 400 m^3/h; municipal water supply ME "VKG BORYSPILVODOKANAL", water supply network of CFI Amic Ukraine.

Needs in domestic and potable water supply are 3.68 m^3/h.

Water supply system in the premises of the facility is sealed, from the connection point to the inlet complex. Water supply systems are laid underground.

Wastewater disposal is ensured by networks of sewage systems laid underground and a storm sewer system with a storm sewage pump station (SPS) No. 1 located on the north of ARW No. 1 – near the outdoor reservoir for collecting drainage water.

Reverse water receiver: sewage networks of ME "VKG BORYSPILVODOKANAL" (domestic waste waters); river Ikva beyond the village of Zatyshne, Boryspil district, channel pond within the city of Boryspil (rain and thaw waters). (see Annex No. 14).

Pollutant emissions into the air

Boryspil International Airport State Enterprise has "A" class airfield. Working hours: round the clock. Local time: UTC +2/+3 hours.

At the Boryspil airport, there are:

- two parallel independent artificial runways (ARW): AR-1 measuring 4,000 × 60 m and AR-2 measuring 3,500 × 60 m;
- a system of taxi ways (major, connecting, high-speed exit taxiways), ways of taxiing on the apron and parking place, holding bays and bays for application of deicing fluid, etc.;
- passenger and cargo aprons, aircraft parking space, including those for transit ACs.

The operation scenario for the most "typical" day of operation of the airfield complex of SE "International Airport 'Boryspil'" according to the load for the year 2018.

Total number of operations – 156 takeoffs/landings.

Runway load distribution: AR 1 – 85%; AR 2 – 15%.

Sources of pollution of the air are mobile emission sources – aircraft during takeoff and landing cycles (TLC), vehicles during movement in the premises of the airport and ground stationary emission sources (ventilation systems of production rooms, airport FOM warehouses, wheel transport, boiler units, etc.).

SE Boryspil International Airport emits pollutants from its stationary sources in accordance with Emission Permit No. 3220883201-14, issued by the Department of Ecology and Natural Resources of the Kyiv Regional State Administration on 27 August 2018. Effective period of the Permit is 10 years from 27.08.2018 to 27.08.2028 (see Annex No. 17).

Information on the type and volumes of pollutant emissions into the air by stationary sources are submitted according to the Report on pollutant emission control registered by the Department of Ecology and Natural Resources of Kyiv Regional State Administration, see Annex No. 18 and Annex No. 19.

Based on the results of the materials of pollutant emission control by stationary sources and completed calculations of the volumes of pollutant emissions formed during movement of mobile sources, it was established that the enterprise has 178 sources of pollutant emissions into

the air, 120 of which are organized and 58 are unorganized sources (11 of them are flat platforms of mobile sources (taking into account emissions of pollutants from the movement of special vehicles and aircraft).

46 titles of pollutants emitted from organized and unorganized pollutant sources are emitted into the air. Emission rate of stationary sources and mobile sources of the enterprise as total is: 16,116.4583 t/year (including pollutant emissions during movement of special wheel transport and aircraft).

The table below presents a list of types and volumes of current pollutants emitted into the air by stationary and mobile emission sources at SE Boryspil International Airport.

List of types and volumes of pollutants emitted into the air by stationary and mobile emission sources

Table

No.	2-TP code	San. code	Item	TLV (SRLI)	Hazard class	Emission rate	
						g/sec	tons/year
1	2	3	4	5	6	7	8
1		150	Sodium hydroxide (lye, caustic soda)	(0.01)	–	0.000884	0.010568
2		10226	Titanium dioxide	(0.5)		0.000786	0.000253
3	1002	110	Vanadium pentoxide	0.002	1	0.000144	0.000003
4	1003	123	Iron oxide** (in terms of iron)	0.04	3	0.019573	0.058297
5	1104	143	Manganese and its compounds (in terms of manganese dioxide)	0.01	2	0.003187	0.002823
6	1007	183	Metallic mercury	0.0003	1	0.000000	0.000029
7	1009	184	Lead and its compounds, except for tetraethyllead (in terms of lead)	0.001	1	0.000006	0.000001
8	1010	203	Hexavalent chromium (in terms of chromium trioxide)	0.02	1	0.000620	0.000029
9	3000	2902	Suspended particles undifferentiated by composition	0.5	3	0.746487	1.092758
10	3000	323	Amorphous silicon dioxide (Aerosil 175)	(0.02)	–	0.002832	0.001080
11	3000	10442	Potassium hydroxide	–	–	0.000010	0.000036
12	3000	10368	Dust containing asbestos	0.06	1	0.050734	0.024112
13	3004	328	Soot	0.15	3	0.020066	0.2251468
14	4001	301	Nitrogen dioxide	0.2	3	2.444600	102.506692
15	4002	304	Nitrogen oxide	0.4	3	0.0003638	0.000440741

16	4002	11815	Nitrogen (I) oxide (N_20)	–	–	0.00	0.0317440
17	4003	303	Ammonia	0.2	4	0.00000032	0.00000482
18	5001	330	Sulphur anhydrite	0.5	3	0.988847	0.199452
19	5004	322	Sulfuric acid, H_2SO_4	0.3	2	0.009781	0.108078
20	6000	337	Carbon oxide	5	4	3.505174	115.837655
21	7000	11812	Carbon dioxide			8.805228	15882.004691
22	11000	514	2-Methylpropene (isobutylene)	(0.1)	–	0.000007	0.000010
23	11000	1042	Butanol	0.1	3	0.101576	0.017084
24	11000	1061	Ethanol	5	4	0.145536	0.006281
25	11000	1319	Dimethoxymethane (methylal, dimethylformal)	0.05	4	0.000956	0.001376
26	11000	2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	5	4	0.072403	0.895941
27	11000	2732	Kerosene	(1.2)	–	0.180033	0.125370
28	11000	2735	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	(0.05)	–	0.000522	0.000394
29	11000	2750	Solvent oil	(0.2)	–	0.028685	0.038261
30	11000	2752	White spirit	(1)	–	0.219824	0.026463
31	11000	2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	1	4	3.644555	13.040129
32	11000	10411	Aliphatic hydrocarbons	–	–	0.051143	0.002092
33	11001	2001	Acrylonitrile	0.03	2	0.000002	0.000003
34	11007	1401	Acetone	0.35	4	0.047533	0.001178
35	11009	1210	Butyl acetate	0.1	4	0.093247	0.050784
36	11020	1246	2-Ethoxyethanol (ethyl cellosolve, ethylene glycol ethyl ether)	(0.7)	–	0.085946	0.010937
37	11021	1240	Ethyl acetate	0.1	4	0.070070	0.013590
38	11030	616	Xylene	0.2	3	0.138479	0.058344
39	11036	1052	Methanol	1	3	0.000917	0.001430
40	11037	620	Styrene	0.04	2	0.019300	0.011250
41	11041	621	Toluene	0.6	3	0.018800	0.006525
42	12000	410	Methane	(50)	–	0.000922	0.295907
43	13101	703	Benzo[a]pyrene	1E-05	1	0.00006768	8.43371E-06
44	16000	343	Highly soluble inorganic fluorides (fluoride and	0.03	2	0.003840	0.000769

			sodium fluorosilicate)				
45	16000	344	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	0.2	2	0.002160	0.000480
46	16001	342	Fluorides, gaseous compounds (hydrogen fluoride, silicon tetrafluoride)	0.02	2	0.001171	0.000225
TOTAL						21.453375	16116.458348

Calculations of pollutants dispersion in the surface layer of the atmosphere were made in accordance with the OND-86 “Methodology for calculating atmospheric concentrations of harmful substances contained in enterprise emissions” according to the EOL+ program, version 5.3.8. The software complex was developed by the TOPAZ system programming design bureau, Kyiv, and approved by GGO named after Voiekov, ref. No. 11-5-68 dated 07.05.98.

Based on the results of the calculation, an analysis of the influence of design solutions on the state of air at the border of residential development in the surface layer is presented taking into account all of the enterprise emission sources and the existing background pollution.

In accordance with the requirement of clause 2.19 of the OND-86, the calculated rectangle size is 10000×10000 m with a step of 250 m. The calculation was carried out for 46 pollutants and 9 summation groups.

When calculating air pollution on the maps of pollutant dispersion in the air, the values of surface concentrations at the border of the nearest residential development at a given point were determined:

c.p. No. 1 (x = 3,282; y = 9,306) – at a distance of about 600 m – the territory of the Epicentr K shopping centre located at 2 Horbatiuk Str., Boryspil (northern direction);

c.p. No. 2 (x = 4,592; y = 4,606) – at a distance of about 1,600 m – residential and public buildings at the intersection of Volodymyr Momot and Yevhen Konovalets streets, Boryspil (eastern direction);

c.p. No. 3 (x = 4,830; y = 3,813) – at a distance of about 2,000 m – private residential building area, Gardens district, Boryspil (eastern direction);

c.p. No. 4 (x = 293; y = 2,579) – at a distance of about 950 m – residential area of the private sector on Boryspilska str., village of Martusivka, Boryspil district (north-western direction);

c.p. No. 5 (x = 2,042; y = 4,447) – at a distance of about 2,700 m – residential area of the private sector on Polova str., village of Petropavlivske, Boryspil district (western direction);

c.p. No. 6 (x = 910; y = 8,272) – at a distance of about 1,700 m – residential area of the private sector on Tsentralna Str., village of Hora, Boryspil district (western direction);

c.p. No. 7 (x = 815; y = 8,887) – at a distance of about 650 m – residential area of the private sector on Aeroportivska str., village of Hora, Boryspil district (north-western direction).

The nearest distance from emission sources to the residential development area is 600 m (north direction), that is, the territory of the Epicentr K shopping centre located at 2 Horbatiuk str., Boryspil.

Analysis of the results of the inventory and calculations of the dispersion of existing stationary sources, with addition of mobile sources of airport emissions, has established that there are no violations of standards at the calculated points of residential development, the information can be seen in tables below.

Information on background concentration of pollutants in surface layer of atmosphere air

Table

Code	Pollutant	TLV, mg/m³	SRLI, mg/m³	Concentration	
				mg/m³	TLV portion
143	Mangan and its compounds (in terms of mangan)	0.01		0.004	0.4
150	Sodium hydroxide (lye, caustic soda)		0.01	0.004	0.4
203	Chromium and its compounds (in terms of chromium trioxide)	0.002		0.0006	0.3
301	Nitrogen oxides (in terms of nitrogen dioxide ($NO + NO_2$))	0.2		0.008	0.04
330	Sulphur dioxide	0.5		0.2	0.4
337	Carbon monoxide	5		0.4	0.08
343	Fluor and its compounds (in terms of fluor)	0.03		0.012	0.4
616	Xylene	0.2		0.08	0.4
620	Styrene	0.04		0.016	0.4
621	Toluene	0.6		0.24	0.4
1042	Butanol	0.1		0.04	0.4
1210	Butyl acetate	0.1		0.04	0.4
1240	Ethyl acetate	0.1		0.04	0.4
1246	Ethyl cellosolve, ethylene glycol ethyl ether		0.7	0.28	0.4
1401	Acetone	0.35		0.14	0.11
2732	Kerosene		1.2	0.48	0.4
2752	White spirit		1	0.4	0.4
2754	Saturated hydrocarbons C_{12}–C_{19} (RPK-265 P solvent, etc.)	1		0.4	0.4
2902	Suspended particles undifferentiated by composition	0.5		0.05	0.1

The results of calculating the dispersion of pollutants in the air taking into account the background pollution (existing/current state)

Table

No.	Code Air 2-TP	Code TLV	Pollutant	Surface concentration (TLV fraction)						
				C.P. No. 1 3282 9306	C.P. No. 2 4592 4606	C.P. No. 3 4830 3813	C.P. No. 4 –293 2579	C.P. No. 5 –2042 4447	C.P. No. 2 –910 8272	C.P. No. 3 815 8887
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*
1		150	Sodium hydroxide (lye, caustic soda)	0.5012	0.5010	0.5015	0.5012	0.5010	0.5012	0.5013
2		10226	Titanium dioxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3	1002	110	Vanadium pentoxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4	1003	123	Iron oxide** (in terms of iron)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
5	1104	143	Manganese and its compounds (in terms of manganese dioxide)	0.5031	0.5031	0.5028	0.5023	0.5021	0.5034	0.5053

6	1007	183	Metallic mercury	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7	1009	184	Lead and its compounds, except for tetraethyllead (in terms of lead)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8	1010	203	Hexavalent chromium (in terms of chromium trioxide)	0.3788	0.3809	0.3798	0.3790	0.3784	0.3787	0.3793
9	3000	2902	Suspended particles undifferentiated by composition	0.1423	0.1352	0.1339	0.1330	0.1336	0.1402	0.1508
10	3000	323	Amorphous silicon dioxide (Aerosil 175)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
11	3000	10442	Potassium hydroxide	–	–	–	–	–	–	–
12	3000	10368	Dust containing asbestos	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
13	3004	328	Soot	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
14	4001	301	Nitrogen dioxide	0.3203	0.2357	0.1983	0.1807	0.1661	0.2408	0.3424
15	4002	304	Nitrogen oxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
16	4002	11815	Nitrogen (I) oxide (N_20)	–	–	–	–	–	–	–
17	4003	303	Ammonia	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	5001	330	Sulphur anhydrite	0.5017	0.5012	0.5011	0.5012	0.5009	0.5012	0.5021
19	5004	322	Sulfuric acid, H_2SO_4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
20	6000	337	Carbon oxide	0.1051	0.1037	0.1037	0.1043	0.1029	0.1038	0.1091
21	7000	11812	Carbon dioxide	–	–	–	–	–	–	–
22	11000	514	2-Methylpropene (isobutylene)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
23	11000	1042	Butanol	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
24	11000	1061	Ethanol	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
25	11000	1319	Dimethoxymethane (methylal, dimethylformal)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
26	11000	2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
27	11000	2732	Kerosene	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
28	11000	2735	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
29	11000	2750	Solvent oil	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
30	11000	2752	White spirit	0.5021	0.5012	0.5010	0.5009	0.5011	0.5022	0.5040
31	11000	2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	0.5005	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
32	11000	10411	Aliphatic hydrocarbons	–	–	–	–	–	–	–
33	11001	2001	Acrylonitrile	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
34	11007	1401	Acetone	0.1382	0.1379	0.1387	0.1378	0.1379	0.1383	0.1389
35	11009	1210	Butyl acetate	0.5046	0.5026	0.5021	0.5020	05023	0.5048	0.5086
36	11020	1246	2-Ethoxyethanol (ethyl cellosolve, ethylene glycol ethyl ether)	0.5006	0.5003	0.5003	0.5003	0.5003	0.5006	0.5011
37	11021	1240	Ethyl acetate	0.5035	0.5019	0.5016	0.5015	0.5018	0.5036	0.5065
38	11030	616	Xylene	0.5034	0.5019	0.5016	0.5015	0.5017	0.5034	0.5065
39	11036	1052	Methanol							
40	11037	620	Styrene	0.5024	0.5013	0.5011	0.5010	0.5012	0.5021	0.5046
41	11041	621	Toluene	0.5007	0.5007	0.5003	0.5003	0.5004	0.5007	0.5014
42	12000	410	Methane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
43	13101	703	Benzo[a]pyrene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
44	16000	343	Highly soluble inorganic fluorides (fluoride and sodium fluorosilicate)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
45	16000	344	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
46	16001	342	Fluorides, gaseous compounds (hydrogen fluoride, silicon tetrafluoride)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 10	0.5032	0.5031	0.5028	0.5023	0.5021	0.5034	0.5023
			Summation group No. 11	0.5017	0.5013	0.5011	0.5012	0.5009	0.5012	0.5022
			Summation group No. 12	0.3788	0.3810	0.3798	0.3790	0.3784	0.3787	0.3793
			Summation group No. 27	0.5017	0.5012	0.5011	0.5012	0.5009	0.5012	0.5023
			Summation group No. 28	0.5022	0.5019	0.5017	0.5018	0.5014	0.5017	0.5029
			Summation group No. 31	0.6937	0.6423	0.6197	0.6093	0.6002	0.6454	0.7073
			Summation group No. 35	0.5024	0.5023	0.5020	0.5019	0.5016	0.5019	0.5032
			Summation group No. 37	0.6938	0.6423	0.6197	0.6093	0.6002	0.6454	0.7032
			Summation group No. 11002	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Based on pollutant dispersion in lower surface: pollutant concentration in lower surface bordering closest residence area is within permissible level.

General report on the results of calculation of atmosphere pollution dispersal from pollution sources of SE Boryspil International Airport (existing state) can be seen in Annex No. 12.

Certificate of Central Geophysical Observatory named after Borys Sreznevskyi on meteorological characteristics is enclosed (see Annex No. 20).

Certificate of the Department of Ecology and Natural Resources of Kyiv Region State Administration on values of background concentrations of pollutants is enclosed (see Annex No. 21).

Noise impact

To perform calculations, we used the indicators of current schedule and aircraft fleet as of 2018, based on flight plan data.

The structure of aircraft fleet operated in the airport in 2018 has the following form and is shown in Figure 4.

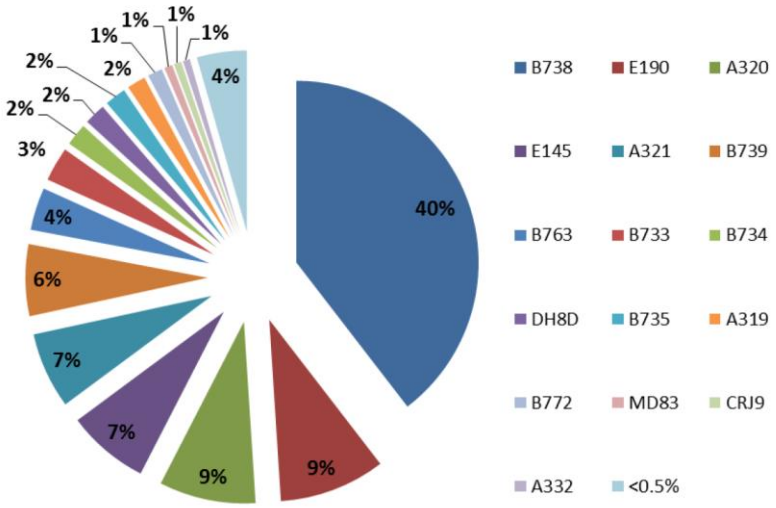


Рис. 4. Структура парку ПС, аеропорт КВР, 2018

Modern aircraft fleet operated in the airport includes the following narrow-body types of airplanes: B738 E190, A320, E145, A321, B739, B733, B734, DH8D, B735, A319, CRJ7, MD83, and wide-body: B763, B772, A332.

In addition, the following obsolete types of aircraft are noted in the structure of the aircraft fleet: MD82, MD83, IL76, An12, Yk40, etc. certified according to the requirements of chapter 2 (ANNEX 16 – ENVIRONMENTAL PROTECTION – VOLUME 1 – AIRCRAFT NOISE, 8th edition, July 2017), which create the main acoustic load and determine maximum noise levels in the airfield environs.

Total calculated number of takeoffs and landings per day can be seen in the table below.

Estimated operating scenario – current loading, 2018

Aircraft type	Day		Night	
	Takeoff	Landing	Takeoff	Landing
A319	2	2	1	1
A320	10	11	3	2
A321	5	7	6	3
A332	1	1	0	0
A333	2	2	0	0
B733	4	5	1	0

B734	2	2	1	1
B735	3	3	0	0
B738	54	57	6	4
B739	7	7	3	2
B763	4	4	2	1
B772	2	2	0	0
CRJ9	1	1	0	0
DH8D	2	3	1	0
E145	10	11	1	1
E190	12	14	2	1
MD83	0	1	1	0
IL76	0	1	0	1
< 0.5%	5	4	2	1
Total	126	138	30	17

For the current scenario of operation (current aircraft traffic intensity), the noise pollution contours were calculated and constructed, and the contour areas of equivalent and maximum sound levels for day and night time were determined (see table below).

Areas of the contours of the standard equivalent sound levels for the aircraft existing traffic intensity (current calculation option)

LA_{eq}, dBA	**S, km^2**	
	day	**night**
50	–	83.12
55	–	29.74
60	23.82	11.58
65	9.16	–

Areas of the contours of the standard maximum sound levels for the aircraft existing traffic intensity (current calculation option)

LA_{max}, dBA	**S, km^2**	
	day	**night**
70	–	183.9
75	–	103.3
80	50.09	50.1
85	23.93	–

Description of possible change of current state of environment without execution of planned activities

Waiver of planned activities will result in dismissal of qualified employees able to work and decrease the activity of Boryspil airport, the only airport of Ukraine competing successfully with big European hub airports. It will have a negative impact on the social area of the enterprise location region, and, considering the fact that the enterprise is one of the biggest taxpayers in the district, it will also have an adverse effect on local budgets.

Planned activities in terms of reconstruction of the flight area No. 2 of SE Boryspil International Airport have a positive impact. Continuing works on reconstruction and expansion of the State International Airport Boryspil conforms to the provisions of the Law of Ukraine “On the General Scheme of Planning of the Territory of Ukraine”. Effective use of the transit potential of the country with integration of its transport complex to European and world transport and communication system will stimulate the development of engineering and transport

infrastructure of Ukraine, development of territories near transport corridors and of the country as a whole.

Without planned activities of the enterprise, the quality indicators of the environment state will most likely remain at the current level.

Additionally, we shall mention the fact that the situation will have consequences for social and economical activities of the enterprise and the region as a whole:

will lead to decrease of the number of jobs at the enterprise;

will decrease the size of revenue (taxes, rent payment) for the region;

will slightly decrease the level of physical pollution for the environment.

4. Description of environmental factors that are likely to be affected by the planned activity and its alternatives, including public health, state of fauna, flora, biodiversity, land (including land acquisition), soils, water, air, climatic factors (including climate change and greenhouse gas emissions), tangible objects, including architectural, archaeological and cultural heritage, landscape, socio-economic conditions and the relationship between these factors.

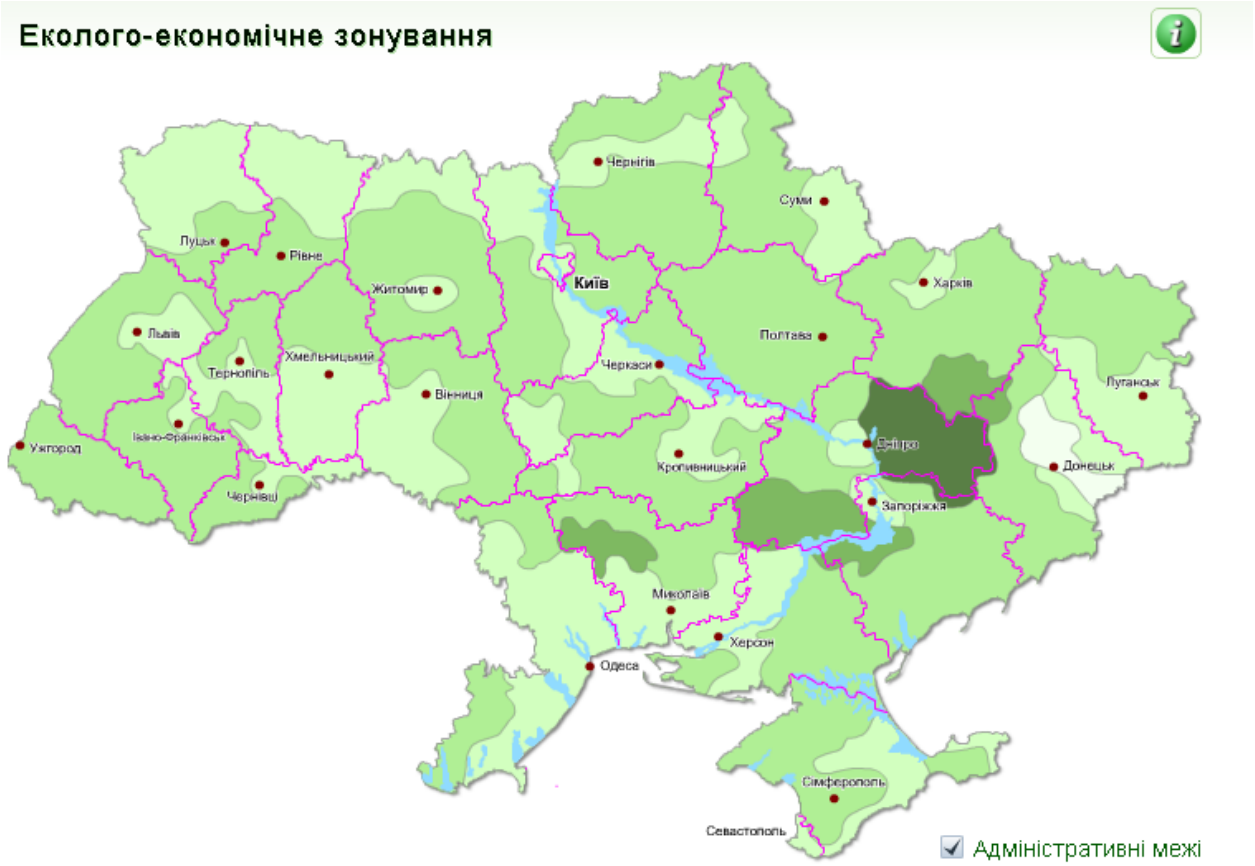
On technical alternative No. 1

When implementing the accepted option of planned activities in terms of reconstruction of the flight area No. 2 of SE Boryspil International Airport, the following impacts on environment factors are possible:

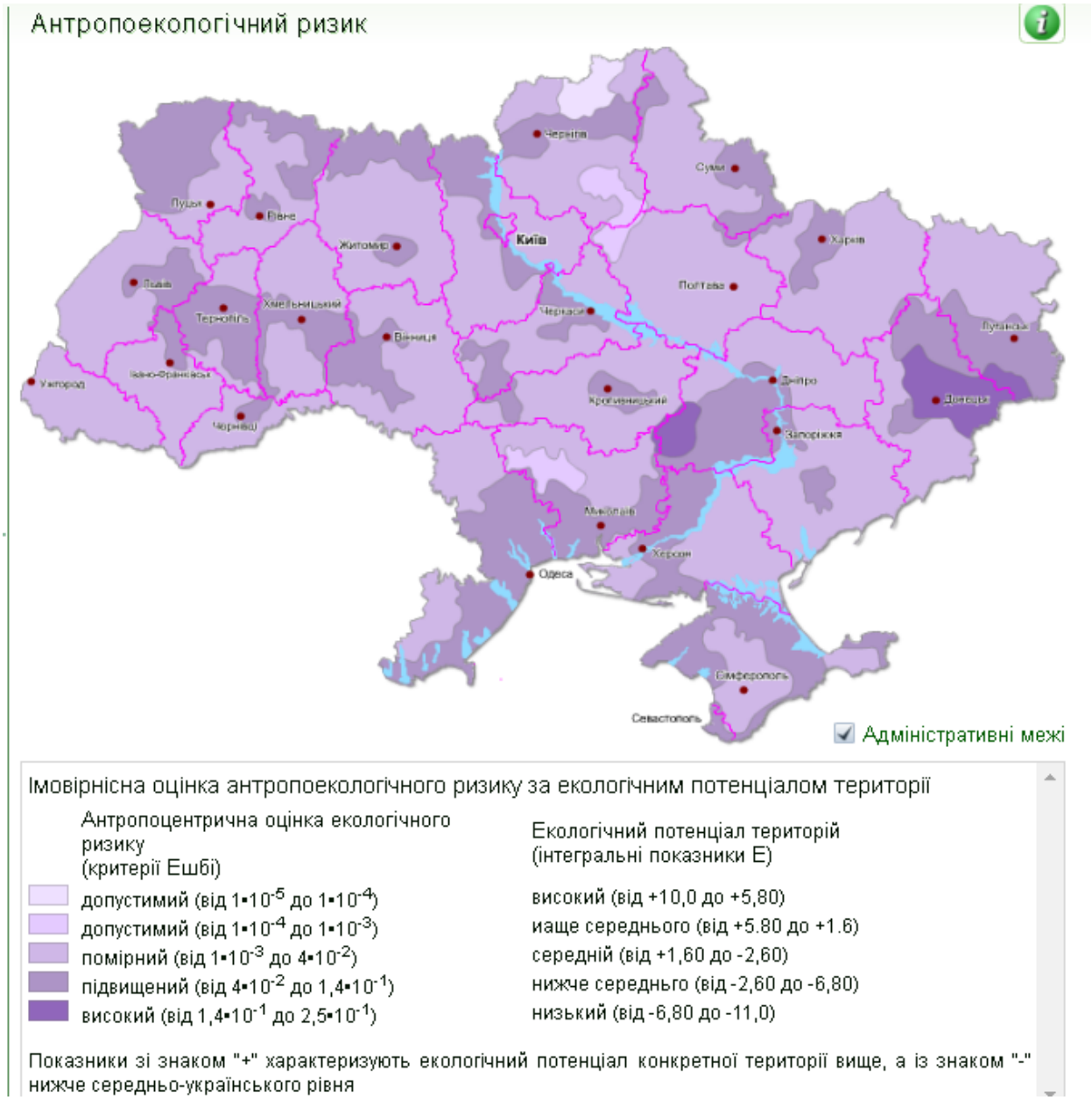
Impact on public health

There are no residential buildings within the sanitary protection area (100 m) of reconstruction of the flight area No. 2 of SE Boryspil International Airport. Additionally, engineering and technical workers and workers performing their functional responsibilities will be present in the planned activity area.

Atmosphere contamination with man-made substances, their accumulation in soil, plants, water sources, food products has a negative impact on the workers. Ingress of toxic substances to human organism is possible in case of inhalation of technogenesis products, contact of skin with them, impact on mucous membranes, with water and food products.



Еколого-економічний потенціал територій (синтетичні показники Кп)		Екологічні обмеження виробництва, шкідливого для навколишнього середовища і населення
менше -4,9	низький	максимальне (лімітує в цілому розвиток такого виробництва)
від -4,9 до -1,2	нижче середнього	часткове (доцільність розміщення окремих виробництв)
від -1,2 до +2,5	середній	помірне (вибіркові вимоги до поліпшення виробничих технологій)
від +2,5 до +6,15	вище середнього	практично без обмежень (в межах потенціалу стійкості природних ландшафтів)
більше +6,15	високий	



Depending on ways of ingress, peculiarities of man-made contaminants, their concentrations and form of impact on human organism, they can impact particular human organs, which is manifested in increase of morbidity of cardiovascular and endocrine, nervous, respiratory system, etc.

Impact of planned activities on biodiversity

According to theConvention on Protection of Biodiversity dated 1992 “Biodiversity” is the diversity of living organisms from all sources, including, among others, ground, marine and other water ecosystems and ecological complexes, which they belong to; this term includes diversity within species, between species and diversity of ecosystems.

Impact on territories and objects of ecological network

The planned activity territory is not included in territories, objects and lists of territories and objects of the ecological network, according to the provisions of the Law of Ukraine “On Ecological Network of Ukraine” and Procedure for Inclusion of Territories and Objects to Lists of Territories and Objects of Ecological Network approved by the decree of the Cabinet of Ministers of Ukraine dated 16 December 2015, No. 1196.

Impact on Emerald Network objects

The planned activity territory does not belong to the territory and objects of the Emerald Network of Ukraine. The closest object of the Emerald Network of Ukraine (Kanivske Reservoir – UA0000111 area: 672.34 km²) is located about 13 km away from the proposed operation site.

Impact on territories and objects of nature reserve fund

In the Nature of Ukraine website, in particular, in the Guide "Nature Reserve Fund of Kyiv Region" (http://pryroda.in.ua/kyiv-region/rayon/), and according to the Order of Kyiv Regional State Administration No. 209 dated 21 April 2017 "On Approval of the Project of Regional Program of Development of the Natural Reserve Fund of Kyiv Region 'Kyivshchyna Zapovidna' for the years 2017–2020" (hereinafter – the Program), approved by the decision of Kyiv Regional Council of the seventh calling dated 19.05.2017 No. 300-14-VII, it is stated that the nature reserve fund (NRF) of Kyiv region, particularly Boryspil district, has valuable nature protection territories and objects prospective for nature reserve creation. Their list can be seen in the table.

List of objects of the nature reserve fund of Boryspil district of Kyiv region

Table

Name of territory or object of nature reserve fund	**Category**	**Type**	**Area, ha**	**Year of creation**	**Location**
"Chubynskyi Hamlet"	Wildlife reserve	Landscape	10	1994	Boryspil district
"Sulymivskyi"	Garden art park		17.4	1972	Boryspil district
"Viazove" natural landmark	Wildlife reserve	Ornithologic	336	1988	Boryspil district
"Kilov-Rudiakiv"	Wildlife reserve	Landscape	800.15	2011	Boryspil district
"Protsivskyi"	Wildlife reserve	Ichthyological	563	1999	Boryspil district
"Boloto Bile"	Wildlife reserve	Hydrological	392.6	1999	Boryspil district

"Boryspilski ostrovy"	Wildlife reserve	Landscape	6900.26	2011	Boryspil district
"Nechaivshchyna"	Wildlife reserve	Landscape	17.6	2010	Boryspil district
"Katerynyn dub"	Natural monument	Botanical	0.02	2014	Boryspil district

There are no objects of nature reserve fund in the land plot of planned activities or near it. There is no impact objects of nature reserve fund.

Impact of planned activities on state of fauna

According to the materials of "Plan of management of hazards created by representatives of wild nature in the airfield area" in the airport area and neighbouring territories, constant monitoring, control and accounting of birds and wild animals is performed.

Based on the results of observations and accounting of the ornithological division of SE "International Airport 'Boryspil'", the following species of birds/wild animals were seen in the last five years.

White stork (Ciconia ciconia). Weight 2.7–4.4 kg. Body length 100–115 cm. Wing spread 195–215 cm. Nest in settlements or nearby. Collect food in green meadows, on the banks of fresh water bodies. The birds are migrating – come flying in March. Autumn flyoff begins at the end of August. Gather in large flocks in this time.

Northern goshawk (Accipiter gentilis). Weight 0.8–1.5 kg. Wing spread 98–117 cm. Resident birds in Polissia and Forest-Steppe regions. Places of living are sections of old leafy or mixed forest. In the area of the airport, may appear in the period of October-November during autumn and winter travels.

Mallard (Anas platyrhynchos). Weight 0.8–1.7 kg. Body length 51–62 cm. Wing spread 81–98 cm. Migrating. Settle on the banks of overgrown fresh water bodies. Appear in the first days of March in nesting places. Fly off in October–November. Eat not only seeds and vegetative parts of water plants, but also fly to fields where they eat grains.

Common buzzard (Buteo buteo). Weight 0.7–1.3 kg. Body length 51–57 cm. Wing spread 113–128 cm. Migrating birds. Settle in sections of old leafy and mixed forest or forest belts. Come flying in spring, at the end of March. Fly off at the end of October. Appear near the airport in the period of rodent growth.

European herring gull (Larus argentatus). Weight 0.6–1.3 kg. Body length 55–67 cm. Wing spread 130–158 cm. Can appear within the airport premises constantly. Partially resident, partially passage (migratory) or migrating birds. Pass all big rivers and water reservoirs.

Rough-legged buzzard (Buteo lagopus). Weight 0.9–1.3 kg. Body length 50–60 cm. Wing spread 120–150 cm. Migrating. Come to the territory of Ukraine only for wintering, from the end of October to mid-March. Hold to open areas, where they hunt rodents. Often land on ground, bushes.

Hooded crow (Corvus cornix L) Weight 0.7–0.8 kg. Body length 47–50 cm. Wing spread 120–130 cm. Resident, migratory. Fairly numerous. Hold near and within settlements. Appear constantly in the airport premises.

Hen harrier (Circus cyaneus). Weight 0.4–0.6 kg. Body length 47–50 cm. Wing spread 120–130 cm. Migrating. Come flying mid March, fly off in October–November. Places of stay –

fields, inundated dry meadows, forest glades. Appear near the airport in the period of rodent number growth. *Rare species with special protection status. Listed in the Red Book of Ukraine.*

Rook (Corvus frugilegus). Weight 0.32–0.5 kg. Body length 45–46 cm. Wing spread 110–120 cm. Partially migrating, migratory. Stay in colonies of hundreds of birds in settlements, near-road and field protection plantings. Migrating flocks appear in the second half of March. Substitution of wintering birds with local ones takes place in early March. Local birds fly off for wintering in October–November. Feed in fields, waste disposal sites and waste lands in settlements.

Black-headed gull (Larus ridibundus). Weight 0.26–0.35 kg. Body length 38–44 cm. Wing spread 94–105 cm. Nesting and migrating. Live in colonies. Stay near ponds, on green meadows. Come to nesting places in late March. Autumn flyoff is in late August to November. Some birds stay in winter. A large number is recorded in the area of Boryspil waste disposal site.

Pigeon (Columba livia). Weight 0.26–0.3 kg. Body length 31–34 cm. Wing spread 63–70 cm. Resident birds. Settlement pigeons gather in large flocks. Constantly appear within the airport and neighbouring territories.

Northern lapwing (Vanellus vanellus). Weight 0.18–0.26 kg. Body length 28–31 cm. Wing spread 70–76 cm. Migrating. Come flying in the first decade of March. The autumn flyoff is in March–October. Nesting on the ground. In the premises of the airfield, nesting on the eastern side of the runways. Feed by insects and other small invertebrates.

Common kestrel (Falco tinnunculus). Weight 0.16–0.23 kg. Body length 33–39 cm. Wing spread 65–80 cm. Migrating. Come flying in spring in March. Autumn flyoff is in September–October. Typical places of stay are forest outliers, forest belts. Feed by insects, rodents. In the airport premises, appear in flocks in the autumn migration period.

Western jackdow (Corvus monedula). Weight 0.14–0.23 kg. Body length 32–33 cm. Wing spread 95–100 cm. Resident, partially migratory. Usually settle in buildings of settlements. In the airport premises, gather in flocks in early August. Feed mainly by insects, but gladly eat different seeds, leftovers.

Eurasian magpie (Pica pica). Weight 0.23–0.25 kg. Body length 45–46 cm. Wing spread 95–100 cm. Resident, nesting. Common in the whole territory, appear in woodsides, near-road and field protection belts. Feed by insects, rodents. Can appear in the airport premises constantly.

Red-footed falcon (Falco vespertinus). Weight 0.15–0.18 kg. Body length 28–31 cm. Wing spread 65–75 cm. Migrating, nesting. Fairly numerous in places. Come flying in April. Autumn flyoff is late August-September. Places of stay – small woods interchanging with open field sections, field protection belts. Feed by insects, myomorphic rodents. Large number in the airport premises in the period of autumn migrations (September).

Common starling (Sturnus vulgaris). Weight 0.06–0.08 kg. Body length 20–21 cm. Wing spread 25–46 cm. Migratory in the territory of living. Tend to gather in flocks. Settle in city and suburb areas and grassy lands, forest belts, parks, gardens. Feed by insects and other invertebrates, berries, seeds, leftovers. Can appear in the airport premises constantly from mid March to November.

Common swift (Apus apus). Weight 0.06–0.08 kg. Body length 20–28 cm. Wing spread 45–46 cm. Migratory in all regions. Places of stay – large settlements, parks, public gardens, road wood afforestations. Feed mainly by flying insects. Helpless on the ground. Come flying in spring in late May. Fly off in late August. Large number appears in the airport premises in the period of flying off of young birds to autumn season migrations, during insect increase. Tend to gather in flocks.

Old World sparrow (Passeridae). Weight 0.06–0.08 kg. Body length 20–30 cm. Wing spread 42–43 cm. Resident, partially migratory. Feed by insects, food waste, seeds, berries. Appear constantly in the airport premises.

Swallow (Hirundo). Weight 0.16–0.18 kg. Body length 20–25 cm. Wing spread 43–45 cm. Migrating. Come flying mid April, fly off for wintering in September. Nest in colonies.

Stay in buildings of settlements. Feed mainly by flying insects. Can appear in the airport premises in the period of flyoff of young birds up to the end of autumn migration.

The following equipment is used to haze birds from the airfield:

– stationary bio-acoustic birdscarer Bird Guard Super Pro AMP made in the USA, 3 pieces. The operation principle is based on the reproduction of recorded danger signals for different species of birds.

Technical specifications:

– number of records – 8;

– protection area up to 12 ha;

– signal power up to 125 db;

– day/night operation mode, round the clock;

– duration of pause between broadcasts from 1 to 30 min.

Gas birdscarers (thunderbolt) Guardian-2 made in Spain, 6 pieces. The operation principle of this birdscarer is based on periodic reproduction of snaps (claps) with a power of up to 110 dB.

Technical specifications:

– weight 8 kg;

– acoustic power from 70 to 110 Db. Regulated using a telescopic tube;

– operates on gas (propane);

– regulation of shot playback time in the range from 1 to 30 minutes using the gas feed valve.

Laser birdscarers LEM-50 made in France, 2 pieces.

The birds are hazed away with a green laser beam.

Technical specifications:

– equipment weight – 820 g;

– length – 35 cm;

– diameter – 6.4 cm;

– range up to 1.5 km;

– mobile bio-acoustic birdscarers Scarecrow made in UK, 2 pieces, mounted on response vehicles. The operation principle is based on the reproduction of recorded danger signals for different species of birds.

Technical specifications:

– number of hazard records – 8;

– signal power up to 110 Db;

– device operation control in manual mode.

In particular, in order to ensure the safety of takeoffs and landings of aircraft, the airport developed measures for monitoring, tracking, accounting, and hazing of birds and wild animals. The airport ornithological service monitors the prevention of conditions that may attract birds.

Actions to manage the hazards posed by hazard agents:

- identification of possible nesting zones, monitoring according to the survey schedule
- preventing birds and wild animals from entering the airfield area by installing an appropriate fence
- hazing birds and wild animals
- imposing restrictions to ensure that actions would not attract birds and wild animals
- maintaining drainage systems and grass in good condition
- exclusion of the presence of standing water on the coatings of artificial runways and taxiways
- maintaining the proper grass height. Grass at the airport is maintained 50 mm to 300 mm high, including the grass trimming before it produces seeds, selection of seeds of appropriate grasses that cannot serve as food for birds, combating the vegetation erosion
- removal of dead birds and animals, destruction of rodents

- removal of nesting sites before nesting
- switching off landing lights between flights
- identifying and taking actions to eliminate potential places that attract birds and wild animals outside the airport (within 15 km), namely tourist recreation areas, landfills, slaughterhouses, orchards, animal feed warehouses, greenhouses with plants, farms, garbage pits, waste recycling centres, and settling ponds.
- bird chasing – the use of car headlights, sirens; bio-acoustic means are used at the airport in different areas by reproducing the cries of "danger" produced by different species of birds, laser and mechanical means to haze birds by directing a green laser beam, pyrotechnic charges, shots

Extermination policy, applied during serious activity of birds by setting traps for certain species of birds. The decision on extermination shall be made if the other actions failed only.

Aircraft collisions with birds poses a threat to air transportation safety.

Actions aimed at preventing the penetration of birds and wild animals protect both the airport and wild animals from danger.

SE Boryspil International Airport has an “Ecological and ornithological expertise conducted in the period from 1 October 2019 to 31 December 2019” conducted by ornithologist O. P. Shkabarliuk and presented in Annex No. 24.

Additionally, an inspection check for bird flocks was conducted on 27.05.2020 at the following facilities, namely:

– waste disposal site operated by Eco-Service LLC located about 2 km from the 36R/18L runway;

– Boryspil sewage treatment plants located 700 m from the 36R/18L runway;

– agricultural lands around these facilities.

The following was checked during inspection.

Flights and flocks of birds were recorded at the waste disposal site operated by Eco-Service LLC, namely:

– black-headed gull in the number of around 400-500 specimen;

– white stork in the number of around 20-30 specimen.

Consequently, the commission believes that the waste disposal site continues creating potential hazard for flight safety in the premises of Kyiv/Boryspil airfield, as the birds concentrated in it cross the airfield area and have constant food reserve.

An inspection check for bird flocks was also conducted on 16.07.2020 at the following facilities, namely:

– waste disposal site operated by Eco-Service LLC located about 2 km from the 36R/18L runway;

– Boryspil sewage treatment plants located 700 m from the 36R/18L runway;

– agricultural lands around these facilities.

The following was checked during inspection.

Flights and flocks of birds were recorded at the waste disposal site operated by Eco-Service LLC, namely:

– common starling in the number of around 40–60 specimen;

– white stork in the number of around 100–120 specimen.

Consequently, the commission believes that the waste disposal site continues creating potential hazard for flight safety in the premises of Kyiv/Boryspil airfield, as the birds concentrated in it cross the airfield area and have constant food reserve.

On the same day, an inspection of the waste disposal site operated by Eco-Service LLC was conducted located about 2 km from the 18L/36R runway for birds/wild animals.

The following was detected and recorded during inspection:

– concentration of birds (seagulls) in the number up to 120 specimen;

– concentration of storks in the number up to 20 specimen;

– presence of homeless dogs;

– there are conditions for attraction and accumulation of birds.

These representatives of wild nature come to the waste disposal site for feeding.

Respectively, conditions for attraction and accumulation of birds are created and exist at the waste disposal site, which contradicts the regulatory requirements of the Air Code of Ukraine. From the point of view of attraction and accumulation of birds, the waste disposal site is a potential hazard for flight security at Kyiv/Boryspil airfield. Accumulation and long-term storage of different types of waste (food, domestic) in this section has a negative impact on the environment of Boryspil district.

SE Boryspil International Airport has certificates of examination of the airfield environs enclosed in Annex No. 25.

Impact of planned activities on state of flora

The territory region belongs to intermediate northern forest-steppes with significant intrusion of Polissia landscapes.

The flora near the airport is characterised by scattered groups of trees, although the territory around it mostly consists of fields, including different types of grass.

The airport region belongs to intensive agriculture and animal farming area, which is why agricultural grounds (fields, pastures, meadows) constitute the majority of the territory.

The main forest ranges of this region are concentrated in the western part and scattered along the Dnipro valley. This section of Dnipro valley occupies southern, south-western and western part of the territory.

Commission comprised of: director of the production department of the state enterprise of Boryspil International Airport (hereinafter – SE Boryspil International Airport) S. O. Ror, project manager of project department of SE Boryspil International Airport M. I. Tsilyk, chief forest pathologist of the state specialized forest protection enterprise “Kyivlisozakhyst” V. V. Holyk conducted this special forest pathological and sanitary inspection of green plantations TP-23 of SE Boryspil International Airport with accounting by technical validity categories and distribution by the quality state of plantations in the administrative boundaries of Hirska village council of Boryspil district, Kyiv region, confirmed by this act.

The need of this survey is caused by the fact that there is a need of modernization of infrastructure facilities as a result of planned activities of SE Boryspil International Airport.

This survey determined that green plantations TP-23 of SE Boryspil International Airports in the land allotments with cadastral numbers 3220883200:02:004:0140; 3220883200:02:004:0142, state property, purpose: 12.08 For placement and operation of buildings and structures of additional transport services and auxiliary operations for placement and operation of buildings and structures of additional transport services and auxiliary operations, estimated area – 7.0 ha.

Plantations are represented by tree breeds of cherry, willow, sorbus, maple, walnut, apple tree, plum tree, apricot tree, oak, birch, poplar, chestnut, pear tree, pine tree. The quality state of trees in the majority of plantations is good and satisfactory – the trees are healthy but with slow growth, unevenly developed crown, insufficiently dense leaves, with minor mechanical damages and small hollows.

Tree age is over 30 to 50 years. There are overmature trees of willow and poplar in the plantations. Overmature trees are severely weakened, such tree categories are potentially dangerous trees, and belong to category III according to biological condition categories. In case of squall wind gusts and galling of wet snow in winter, the branches of different orders can fall, creating potential hazard for traffic, life and health of airport workers.

No.	Tree species	Unit of measurement	Quantity	Diameter cm	State of quality
1.	Pine	pcs.	10	8–44	Satisfactory

2.	Birch	pcs.	5	16–60	Good
3.	Willow	pcs.	12	20–68	Satisfactory
4.	Rowan	pcs.	1	24	Satisfactory
5.	Oak	pcs.	2	32	Satisfactory
6.	Maple	pcs.	23	8–80	Satisfactory
7.	Chestnut	pcs.	1	20	Satisfactory
8.	Poplar	pcs.	1	88	Satisfactory
9.	Apricot	pcs.	6	16–36	Satisfactory
10.	Cherry	pcs.	85	8–52	Satisfactory
11.	Walnut	pcs.	5	8–32	Good
			6	8-56	Satisfactory
12.	Pear	pcs.	2	12	Satisfactory
13.	Plum	pcs.	5	16–40	Satisfactory
14.	Apple	pcs.	7	8–40	Good
			20	8-36	Satisfactory
Total			191		

The commission considers it possible to remove all trees in the area of infrastructure modernization of TP-23 of SE Boryspil International Airport. “Measures not related to forestry” – by another felling, solid method, on an approximate area of 7.0 ha, a total number of 191 (one hundred and ninety-one) trees.

Together with tree cutting, bush and tree species scrubs are subject to cutting as part of infrastructure modernization.

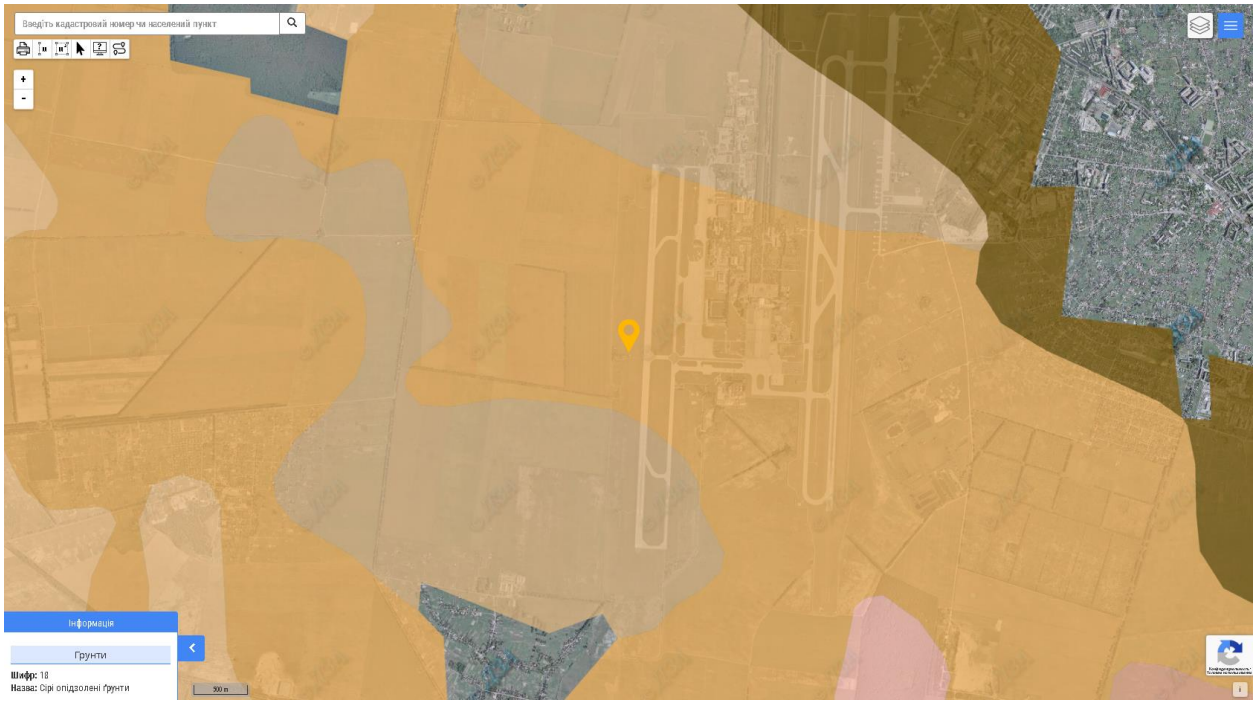
The height of tree stubs according to the current regulations shall be 10 cm at the tree diameter up to 30 cm, and 1/3 of the stub diameter at the tree diameter over 30 cm.

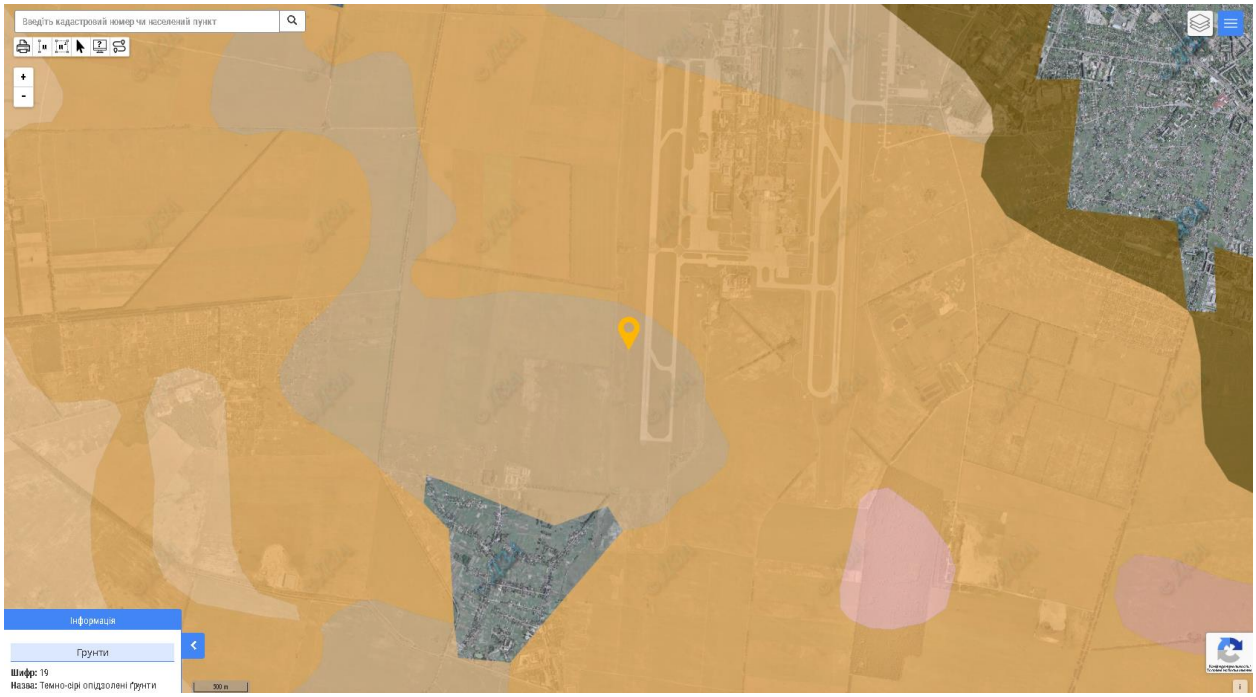
Cogs shall be subject to mandatory cleaning from wood cutting dirtiness as part of cutting.

Copy of the certificate of special forest pathological and sanitary inspection of green plantations TP-23 for SE Boryspil International Airport within the administrative boundaries of Hora Village Council, Boryspil district, Kyiv region dated 14 August 2020 is enclosed in Annex No. 9.

Impact of planned activities on soils

According to the data of the official website of the State Service of Ukraine for Geodesy, Cartography and Cadastre “Public Cadastre Map”, dark-grey podsolic soils (code 19) and grey podsolic soils (code 18) are common in the territory of planned activities of SE Boryspil International Airport.



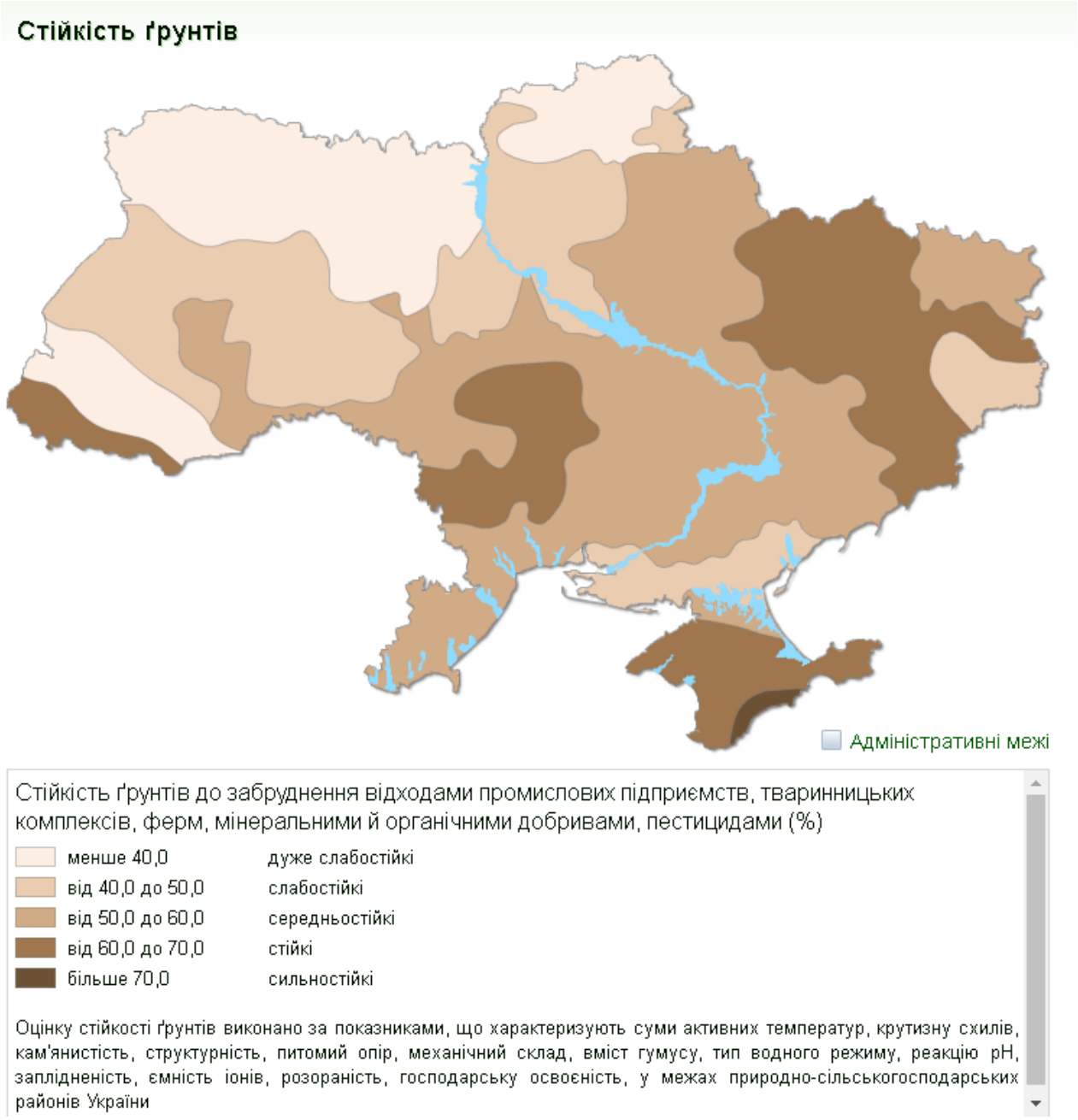


The mentioned groups of soils do not belong to highly valuable lands determined in Article 150 of the Land Code of Ukraine and are not listed in the List of Highly Valuable Groups of Soils approved by the order of StateGeoCadastre of Ukraine dated 06.10.2003 No. 245 registered in the Ministry of Justice of Ukraine dated 28 October 2003, No. 979/8300.



Антропоекологічна оцінка сумарного пестицидного навантаження на грунти (в умовних одиницях Кс)

менше 1,0	допустима
від 1,0 до 2,30	умовно допустима
від 2,30 до 3,60	несприятлива
від 3,60 до 4,90	дуже несприятлива
більше 4,90	надзвичайно несприятлива



During implementation of planned activities, SE Boryspil International Airport:

– will carry out economic activity on land plots in ways that will not have a detrimental effect on the land condition;

– will promote the systematic conduct of surveying, examination and exploration of the land condition;

– will timely inform the relevant executive authorities and local self-administration bodies on the condition, degradation, and pollution of land plots;

– will ensure compliance with the regime of using the lands subject to special protection established by the laws of Ukraine;

– will ensure the use of land plots for their intended purpose and compliance with the restrictions (encumbrances) imposed on the land plot;

– will protect lands from erosion, depletion, pollution, littering, salinization, sodification, acidification, waterlogging, flooding, overgrowing with weeds, shrubs, and small forests;

– will take steps to prevent adverse and environmentally hazardous impacts on land plots and eliminate the consequences of these impacts;

– soil monitoring will be conducted in order to timely identify changes in the condition of lands, their assessment, prevention and elimination of the consequences of adverse processes.

Impact of planned activities on water environment

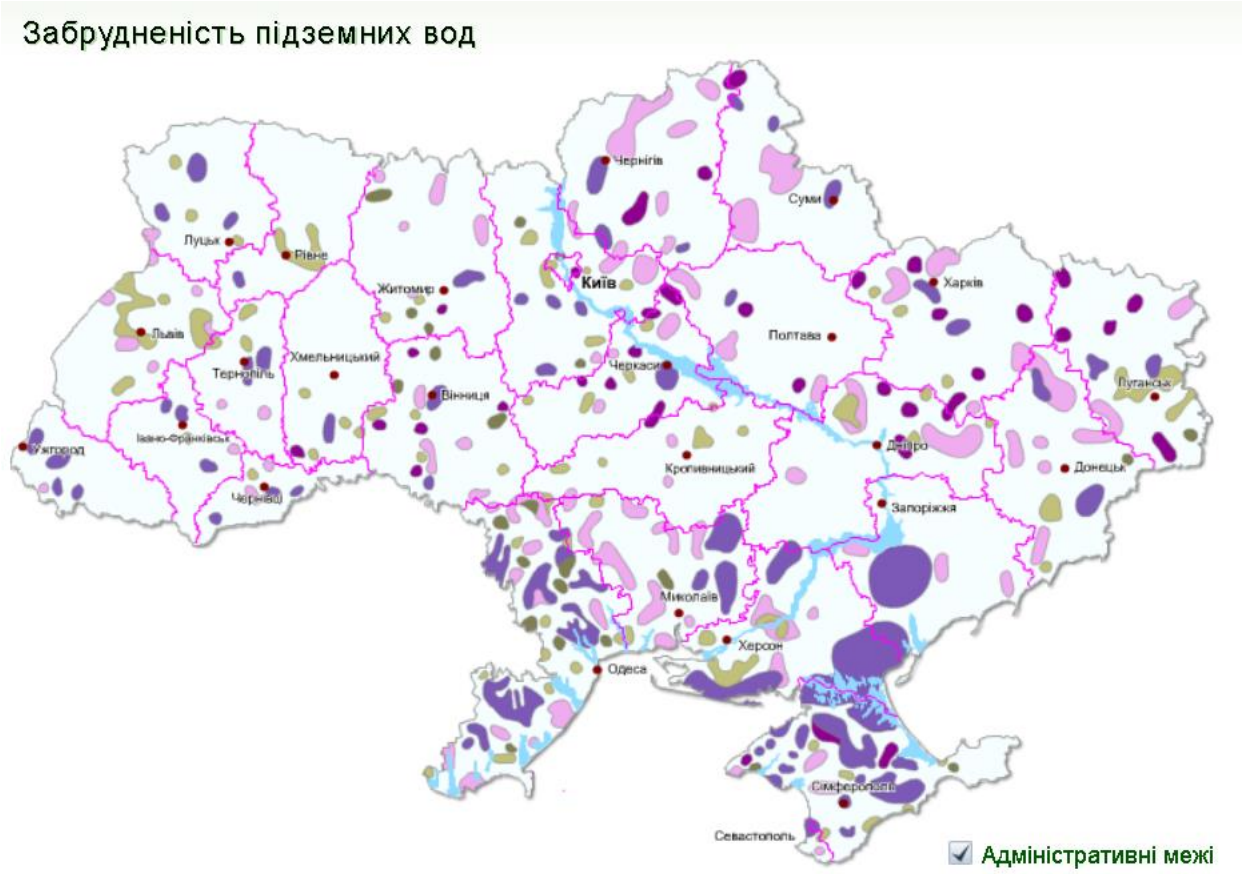
Assessment of impacts of the designed facility on water environment can be found in the project "Technical and economical justification (correction) "Reconstruction of the flight area No. 2 of SE Boryspil International Airport", volume 2, Airfield planning works. Water sewage (see Annex No. 26).

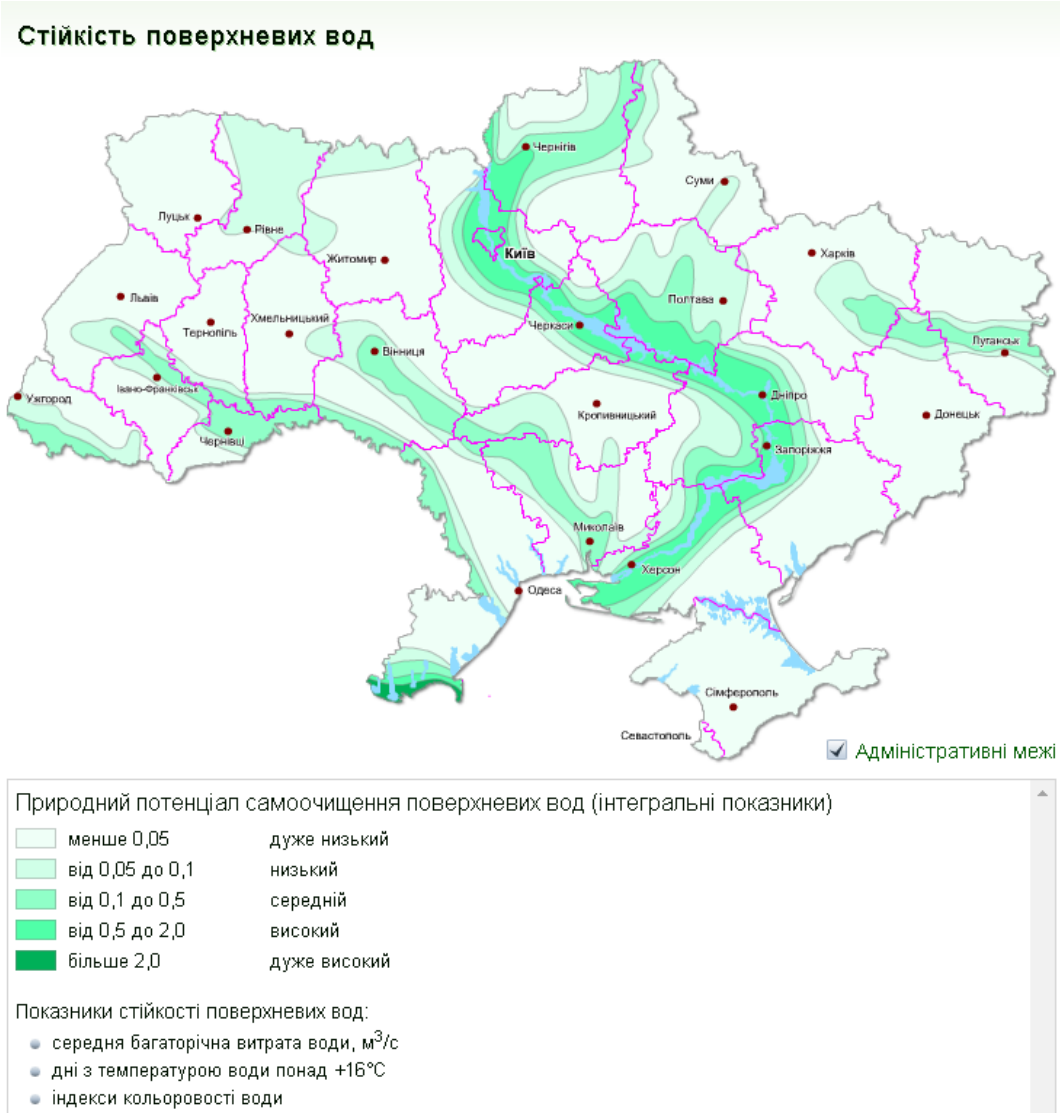


Territory zoning according to the level of contamination of surface waters (hygiene classification of water objects)

Surface water contamination level (total indexes)			**Ecological assessment of water quality**
	Less than 5.0	Admissible	Clean
	From 5.0 to 10.0	Moderate	Conditionally clean
	From 10.0 to 15.0	Increased	Contaminated (harmful for potable use)
	From 15.0 to 20.0	High	Contaminated (harmful for potable use)
	More than 20.0	Very high	Contaminated (harmful for potable use)

Total surface water contamination indices are calculated based on organoleptic and toxicological properties, sanitary conditions and bacteriological indicators.


Забрудненість підземних вод
Чернігів
Суми
Луцьк
Рівне
Житомир
Київ
Харків
Львів
Полтава
Хмельницький
Тернопіль
Черкаси
Вінниця
Луганськ
Ужгород
Івано-Франківськ
Дніпро
Кропивницький
Донецьк
Чернівці
Запоріжжя
Миколаїв
Херсон
Одеса
Сімферополь
Севастополь
Адміністративні межі
Забруднені ділянки (розрахунки відносно гранично-допустимих концентрацій)
пестицидами (нижче ГДК)
пестицидами (рівно або вище ГДК)
нітратами (нижче ГДК)
нітратами (рівно або вище ГДК)
основні осередки сумарної забрудненості підземних вод



Considering the abovementioned, in order to decrease the negative impact on water environment, implementation of planned activities will be done following the requirements of current nature protection laws.

Impact of planned activities on atmosphere air and impact of planned activities on climate factors (including climate change and greenhouse gas emissions)

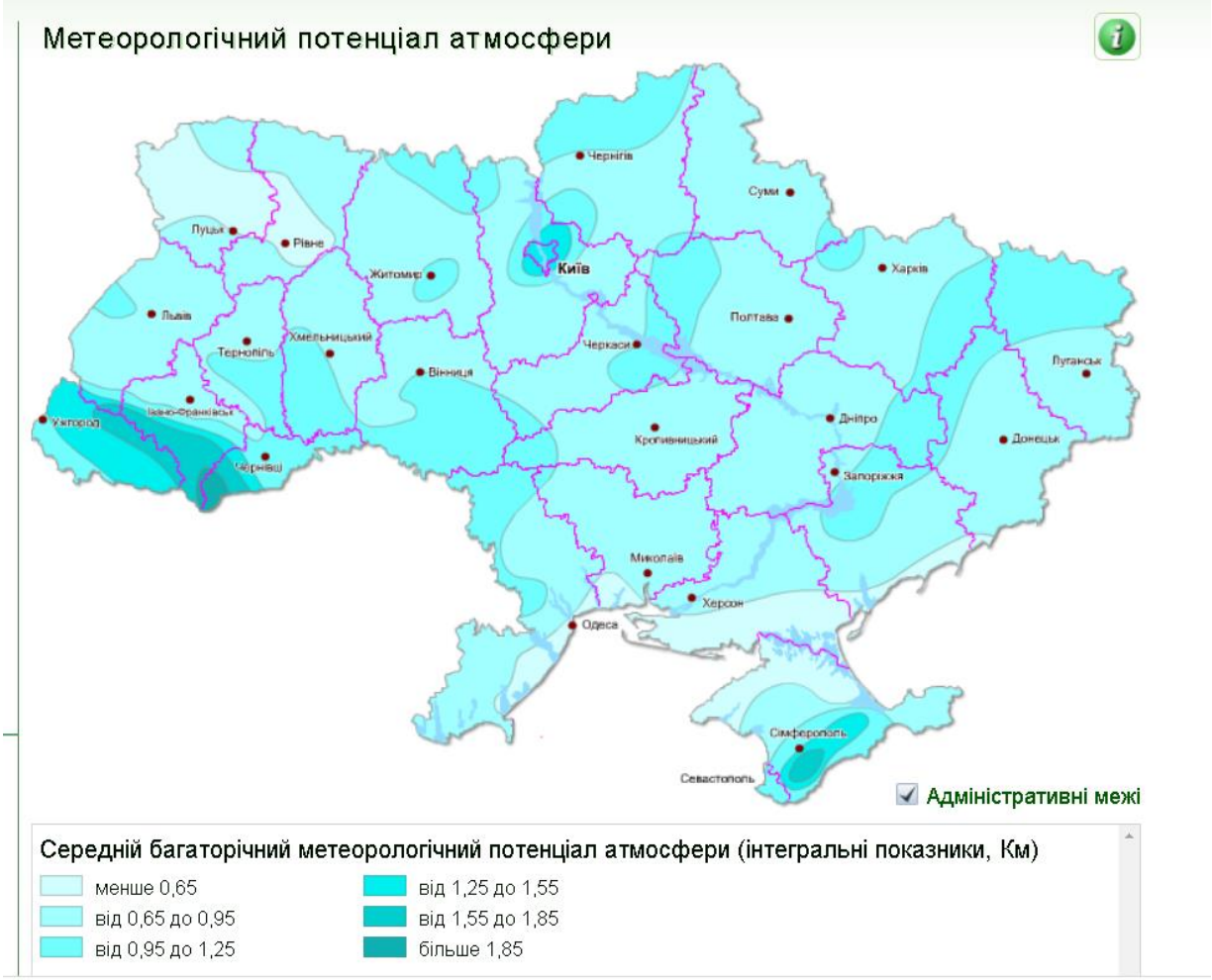
Забрудненість атмосферного повітря



Гігієнічна оцінка забрудненості атмосферного повітря (індекси забрудненості)

менше 1	допустима
від 1 до 20	підвищена
від 20 до 60	загрозлива
від 60 до 250	небезпечна
більше 250	дуже небезпечна

Індекси сумарної забрудненості розраховані за основними (пил, сірчаний газ, двоокис азоту, окис вуглецю) і специфічними забруднювачами (галогени, органічні сполуки, метали, завислі речовини)



Impact of planned activities on tangible objects

Tangible objects in the premises of the planned activities of SE Boryspil International Airport where original fine art creation or architecture creation is included and which are registered according to the requirements of the Law of Ukraine "On Copyright and Related Rights" are not accounted.

Considering the abovementioned, SE Boryspil International Airport will not impact tangible objects.

Impact of planned activities on architectural, archaeological, and cultural heritage

According to the approved urban planning documents developed for the premises of SE Boryspil International Airport, namely "Plan of the Existing Use of the Territory Combined with the Scheme of Existing Planning Limitations" from the Detailed Plan of the Territory of Hirska Village Council, there are no objects of archaeological and cultural heritage in the territory of reconstruction of the flight zone No. 2 of Boryspil airport.

According to Annex to the Decree of the Cabinet of Ministers of Ukraine dated 3 September 2009, No. 928, List of Objects of Cultural Heritage of National Significance Listed on the State Register of Real Estate Monuments of Ukraine is specified. Accordingly, there are no objects of cultural heritage of national significance in the territory of planned activities.

Impact of planned activities on landscape

Landscape is a genetically unified geosystem consisting of natural components (lithologic mass and geological formations, water mass, air, soil, biota – plants, animals, fungi, microorganisms, relied and climate) and has certain properties: integrity, functioning, degree of structure, dynamics, development, etc. In natural conditions, every landscape is a system, which

is self-regulated and characterized by a certain level of interaction and organization of non-living and living matter.

Anthropogenic landscape is a territory altered by human activity in the process of social and economical functions with a respective nature use technology. Plants and animal world, soils, micro-relief change significantly in such landscape; geological foundation and main climate feature changes are relatively small.

The planned activity territory can be classified as anthropogenic landscape.

According to functional and genetic features, the planned activity landscape belongs to industrial landscapes.

Due to implementation of planned activities, the relief of the region is not changed in vertical and horizontal directions.

During implementation of planned activities, SE Boryspil International Airport will follow the requirements and provisions determined by the European Landscape Convention and All-European Strategy for Biological and Landscape Diversity Preservation.

Impact of planned activities on social and economic conditions and interconnection between these factors

Analysis of the impact of planned activities on the surrounding social environment shows that they will not result in deterioration of social conditions for the population.

The social aspect from implementation of planned activities lies in start of production, which will potentially be able to generate added value and ensure budget replenishments of different levels, as well as create additional jobs with official employment of qualified specialists at the enterprise.

Safe working conditions for employees are provided by the accepted volume planning solutions, organization of technological process.

To ensure normal working conditions for service personnel, it is required to ensure implementation of the following measures during equipment operation:

– adhering to the project technological operation mode of production according to the set parameters;

– organization of systematic control of functionality of equipment, machines and mechanisms.

Engineering furnishing of the facility is provided for considering safe activities in terms of environment protection and includes organizational and technical measures, main of which are:

– accounting of environmental, social and economical aspects of implementation of planned activities;

– solution for ecological use of energy and natural resources, etc.;

– accountability for the requirements of local state authorities and respective city organizations, including the requirements set forth in technical conditions and conclusions (issue of power supply, etc.);

– requirements of construction rules and regulations, including the issues of physical and geographical features of the region – location of the designed facility, climatology, present anthropogenic impacts, planning and development of urban territories, sanitary and anti-epidemic requirements and confirmed by the facility project.

Based on classification of the designed object according to the nature of activity, as well as approval of architectural and planning, construction, technological, building and organizational solutions, one can draw a conclusion that activities of the object in question will not impact the social environment in the region of its location and will not favour deterioration of life activity conditions of the local population and its health.

Modern technologies and materials will be used during implementation of planned activities.

The economical impact of planned activities is reflected with tax crediting for emission of certain contaminants to the air by stationary contamination sources.

The enterprise premises are equipped with access ways. The condition of the existing roads and road pavements is satisfactory.

Social organization of the surrounding territories, living conditions of local population, activities of favouring objects are not disturbed in case of placement and operation of the designed facility.

Additionally, continuing works on reconstruction and expansion of the State International Airport of Boryspil conforms to the provisions of the Law of Ukraine “On the General Scheme of Planning of the Territory of Ukraine”. Effective use of the transit potential of the country with integration of its transport complex to European and world transport and communication system will stimulate the development of engineering and transport infrastructure of Ukraine, development of territories near transport corridors and of the country as a whole.

5. Description and assessment of the possible environmental impact of the planned activity, in particular, the size and extent of such impact (land area and population that may be affected), nature (a transfrontier impact, if any), intensity and complexity, probability, expected beginning, duration, frequency and inevitability of the impact (including direct and any indirect, incidental, cumulative, cross-border, short-term, medium-term and long-term, permanent and temporary, positive and negative effects) caused:

performance of the preparatory and construction work and implementation of the planned activity, including (if necessary) works on dismantling after completion of such activity;

use of natural resources, in particular lands, soils, water and biodiversity, in the process of implementation of the planned activity;

emissions and discharges of pollutants, noise, vibration, light, heat and radiation pollution, radiation and other influencing factors, as well as operations in the field of waste management;

risks to human health, cultural heritage sites and the environment, including due to the possibility of occurrence of emergencies;

the cumulative impact of other existing facilities, the planned activity and facilities, in respect of which the resolution on the implementation of the planned activity was obtained, taking into account all the existing environmental problems related to areas of special environmental importance, which may be affected or on which natural resources can be used;

the impact of the planned activity on the climate, including the nature and scale of greenhouse gas emissions, and the sensitivity of the activity to the climate change;

technology and substances used.

Performance of the preparatory and construction work and implementation of the planned activity, including (if necessary) works on dismantling after completion of such activity

It is provided for a complex of preparatory works on dismantling of the existing airport pavements of ARW-2, taxiways and a part of aprons “S” and “G”; the existing pavements of roads and sites; the existing elements of the wastewater removal network; the demolition of the existing buildings, objects, lighting and radio equipment, lighting masts of Manoeuvring Area No. 2, aerodrome fence and clearance of vegetation that fall in the area of planning works to be performed at the airport.

The existing airport utilities that fall under the area of planning of Manoeuvring Area No. 2 are subject to relocation in accordance with the ToR provided by the Customer.

Utilities that belong to third party users and pass through Manoeuvring Area No. 2 in transit are subject to protection.

Scheme of the general plan of object "Reconstruction of Manoeuvring Area No. 2” It is developed by SE “International Airport ‘Boryspil’” in accordance with applicable regulations of Ukraine, standards and recommended practices of ICAO in the sphere of design and operation of airports, as well as requirements of SNiP 2.05.08-85 “Aerodromes”; DBN B.2.2-12: 2018 "Planning and Development of the Territory", SNiP 2.05.07-91 "Industrial Transport" and DBN V.2.3-4: 2015 “Transport Facilities. Motor Roads”.

The construction of Manoeuvring Area No. 2 is divided into stages and start-up facilities.

Construction stage 1, start-up facility 1

- Reconstruction of the existing apron «S» with assignment of parking places (hereinafter referred to as the PP) for treatment of aircraft with the deicing fluid and arrangement of a Centralized Aircraft Refuelling System (CARS);
- reconstruction of connecting taxiways TW-9 and TW-18;

- two underground reservoirs of used deicing liquid with a capacity of 75 m^3;
- distribution point (DP);
- transformer substation (TS) of apron «S».

Construction stage 1, start-up facility 2

- a new runway with artificial pavement (ARW-2) with a length of 3800 m;
- major taxiway (MTW-2);
- the MTW as a connecting taxiway;
- connecting taxiways between TW-2 and MTW as a connecting taxiway;
- reconstruction of connecting taxi ways TW-16 and TW-17;
- a section of apron «G» and TW-10;
- ground landing of the VHF band instrument landing (ILS) of a new runway ARW as per category «III-B» with a magnetic bearing to landing of 18° and a magnetic bearing to landing of 36° (LOC and GS + DME);
- Lighting equipment as per landing category «III-B» with a magnetic bearing to landing of 36° and category «III-B» with a magnetic bearing to landing of 18°;
- an emergency rescue stations (ERS) with as fire fighting pump station and two reservoirs for firefighting water reserve with a capacity of 150 m^3;
- a TS for light signalling equipment (LSE) -1023N, TS LSE-1024N, a TS near the ERS and reconstruction of the existing TS-1023;
- installation of automatic direction finder (ADF) and transmitting radio centre (TRC);
– SPS No. 3/No. 4;
- Meteorological equipment;
– surface waste water collection and drainage system from the airfield to sewage treatment plants.

Construction stage 1, start-up facility 3

– Patrol vehicle road.
– Fences of the airport equipped with security alarm and video surveillance systems and lighting.

Construction stage 2, start-up facility 1

– Parking places for aircraft with TP.

Construction stage 2, start-up facility 2

– Parking areas intended for aircraft engines testing.

Construction stage 2, start-up facility 3

– Isolation parking place (PP).

Construction stage 3

– De-icing liquid filling station with an underground container for used de-icing liquid with a volume of 75 m^3 and parking place for 6 vehicles.
– Civil defence shelter for fire equipment and duty guards.
– Fuel filling station (FFS).

In accordance with Fig. 1 of SNiP 2.05.08-85 “Aerodromes”, the construction objective is located in road-climatic zone II with hydrogeological conditions of type I.

In terms of physical-geographic conditions, the area belongs to the Dnieper lowlands and is located on the edge of the second-third terrace above the floodplain of the left bank part of the Dnieper River valley.

The climate of the region of work execution is moderately continental.

The average temperature of the coldest month – January – is minus 4,7 °C; of the warmest month – July – is plus 19.8 °C.

The average duration of a period with a stable snow cover is from December 22 to March 14.

The snow depth varies from 10 cm (in December) to 75 cm (in February).

Average annual rainfall is 640 mm.

In winter, westward winds prevail, and in summer, northward wind prevail. The average annual speed of wind is 2.7 m/s, the highest speed 4.3 m/s is observed in February, and the lowest speed 1.6 m/s is observed in August.

In hydrogeological terms, the study area is located within the northwestern part of the Dnipro artesian basin, for which the development of aquifers, which are separated from each other by impervious layers, is typical. The surface of the area where it planned to perform works is quite flat-lying, has absolute elevations from 122 m to 131 m.

The geological structure of the area to be surveyed to an exploration depth of 6–7 m comprises quaternary eolian diluvial deposits and alluvial-diluvial deposits that are covered with topsoil (e H).

Thickness of topsoil (EGE-1) is from 0.2 m to 0.6 m, the relative content of organic matters is from 2.2% to 2.7%.

Wells No. 26, 26a encounter, met with lacustine-boggy sediments (EGE-1b) to a depth of 2.8–4.5 m that are covered with fill soil – sandy loam.

Based on the results of office processing of field and laboratory work materials, 8 engineering and geological elements (EGE) were identified in the geological section of the survey area.

Topsoil (e).

EGE-1 – humus sandy loam with plant roots of firm consistency, dark brown, layer thickness – from 0.2 to 0.6 m.

Industrial deposits (t).

EGE-1a – fill soil – solid sandy loam, from dark grey to brown colour, with interlayers of sand, in some places – with an admixture of rubble and construction waste, 5–10%. The layer thickness is 0.4 m – 3.2 m.

Lacustrine-boggy sediments (lb RIV).

EGE-1b – plastic sandy loam, silty, with a small amount of peat and an admixture of organic matter, dark grey. Met by wells No. 26 and 26a, the layer thickness is 0.6 m – 2.0 m.

Aeolian and deluvial deposits (vd RIII).

EGE-2 – hard sandy loam, silty, loess subsiding, from yellow-brown to yellow-grey, sometimes with interlayers and lenses of fine and dusty sand, 10–25%.

EGE-2a –plastic sandy loam, silty, loess subsiding, from yellow-brown to yellow-grey, sometimes with interlayers and lenses of fine and dusty sand, 10–25%.

IGE-3 – fine sand, yellow-grey, sometimes with lenses and layers of loamy sand and sandy silt 5–25%, with a low level of water saturation, of a medium density.

Alluvial and diluvial deposits (ad PIII).

EGE-4 – plastic loamy sand, sometimes hard sand, sandy silt, from greenish-brown to yellow-grey, sometime with layers and lenses of sand 5–15%.

EGE-5 – fine sand, grey, sometimes with interlayers of sandy silt, 5–15%, with a low level of water saturation, of a medium density.

Porosity ratio (e) of all the detected elements, except EGE-1b is less than 0.80.

During the period of research and to the explored depth, no groundwater was found.

Standard depth of season soil freezing is 100 cm.

In terms of subsidence, soil conditions are classified as type I.

Soil category based on seismological properties is II.

More detailed description of performance of the preparatory and construction work and implementation of the planned activity, including (if necessary) works on dismantling after completion of such activity can be found in Section 1.3 of Report from EIA.

Use of natural resources, in particular lands, soils, water and biodiversity, in the process of implementation of the planned activity

Ground, soil

The following land allotments are in constant use of SE Boryspil International Airport:

– with an area of 163.3212 hectares intended "for placing engineering and other buildings" (a state certificate of the right of the permanent use of land, series "YAYA" No. 140084 registered in the Register of State Acts on the Ownership and the Right of Permanent Use of Land, Lease Agreements under No. 322080003000048);

– with the total area of 624.8682 ha under the existing development / technical engineering and social and domestic objects/ (state act for the right of constant land use "II-KV" No. 001459 registered in the Register of State Acts on the Right of Permanent Use of Land under No. 438).

Copies of documents confirming the right of permanent use of land plots listed in Appendix No. 5.

During the implementation of the planned activity, it is planned to purchase plots of land for the reconstruction of runway strip No. 2.

Information on the owners/users of land plots of the Martusivska Village Council and Hirska Village Council that are planned to be purchased for the reconstruction of Maneuvering Area No. 2 is provided in Annex 6.

The Law of Ukraine "On Regulation of Urban Development Activities" determines that the General Scheme of Planning of the Territory of Ukraine is urban development documentation determining concept solutions of planning and use of the territory of Ukraine; detailed territory plan is urban development documentation determining the planning organization and development of the territory.

The General Scheme of Planning of the Territory of Ukraine (hereinafter – the General Scheme) approved by the Law of Ukraine "On the General Scheme of Planning of the Territory of Ukraine".

The General Scheme determines the priorities and concept solutions for planning and use of the country's territory, improvement of the system for resettlement and provision of constant development of settlements, development of production, social, and engineering and transport infrastructure, shaping of national ecological network.

The General Scheme was developed according to the laws of Ukraine and other regulatory and legal acts concerning the issues of use of territories considering the economical, geographical, historical, environmental, demographical features of regions.

The provisions of the General Scheme conform to the principles of conclusive documents of the Conference of United Nations Organization on settlement development (HABITAT-II) and corresponding recommendations of the European Economic Commission of the UN and European Council.

Clause 7 "Development of engineering and transport infrastructure" of Section III "Main courses of the use of territory of Ukraine" of the General Scheme determines that in order to satisfy the needs of population and economy in passenger and cargo transportation, continuation of reconstruction and extension works of SE Boryspil International Airport is provided.

Additionally, following the requirements of the Law of Ukraine "On Regulation of Urban Development Activities", we developed a Detailed Plan of Land Territory Located in the Premises of Hirska village council of Boryspil district of Kyiv region, considering development of surrounding territory, which, in particular, determines the location of runway No. 2 (extract from the Detailed Plan of the Territory can be found in Annex No. 7).

So, it may be stated that the planned activity of SE "International airport 'Boryspil'" on the reconstruction of runway strip No. 2 corresponds to the current planning documentation – General Scheme for Planning of the Territory of Ukraine Approved Law of Ukraine "On the General Scheme of Planning of the Territory in Ukraine."

Water

Water supply. SE "International Airport 'Boryspil'" is provided with the following sources: 7 (existing) and 3 (new, not commissioned) own artesian wells, via purification and deferrization pump station with maximum total capacity of 190 m^3/h and two second stage pump stations with total capacity of 400 m^3/h; municipal water supply ME "VKG BORYSPILVODOKANAL", water supply network of CFI Amic Ukraine.

Needs in domestic and potable water supply are 3.68 m^3/h.

Water supply system in the premises of the facility is sealed, from the connection point to the inlet complex. Water supply systems are laid underground.

Wastewater disposal is ensured by systems of sewage networks laid underground and a storm sewer system with a storm sewage pump station (SPS) No. 1 located on the north of ARW No. 1 – near the outdoor reservoir for collecting surface waters.

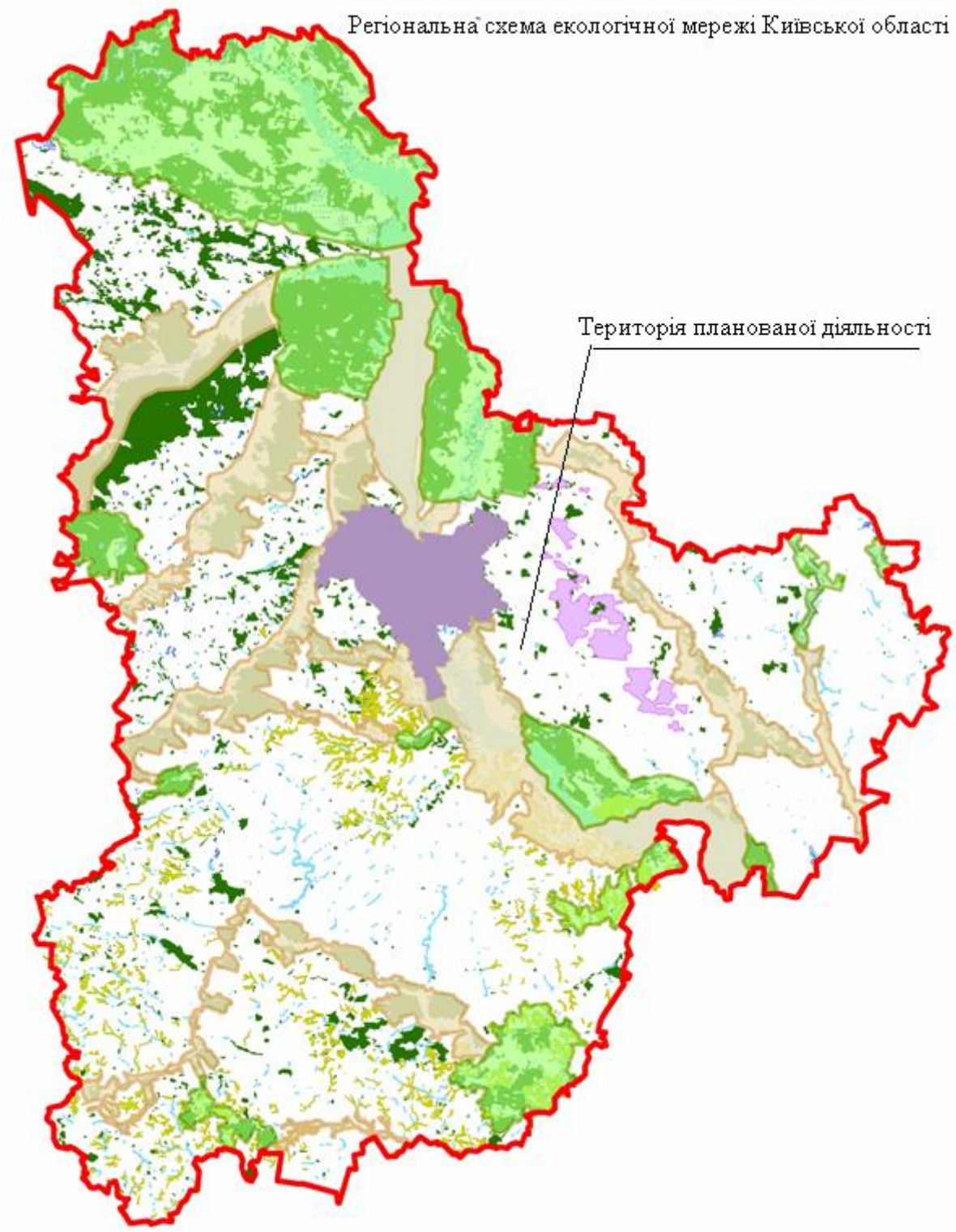
Reverse water receiver: sewage networks of ME "VKG BORYSPILVODOKANAL" (domestic waste waters); the Ikva river beyond the boundary of the village of Zatyshne, Boryspilsky district, channel pond within the boundary of the city of Boryspil (rain and thaw waters) (ref. to Annex No. 14)

Biodiversity

According to theConvention on Protection of Biodiversity dated 1992 "Biodiversity" is the diversity of living organisms from all sources, including, among others, ground, marine and other water ecosystems and ecological complexes, which they belong to; this term includes diversity within species, between species and diversity of ecosystems.

Estimation if the impact on territories and objects of ecological network

The planned activity territory is not included in territories, objects and lists of territories and objects of the ecological network, according to the provisions of the Law of Ukraine "On Ecological Network of Ukraine" and Procedure for Inclusion of Territories and Objects to Lists of Territories and Objects of Ecological Network approved by the decree of the Cabinet of Ministers of Ukraine dated 16 December 2015, No. 1196.



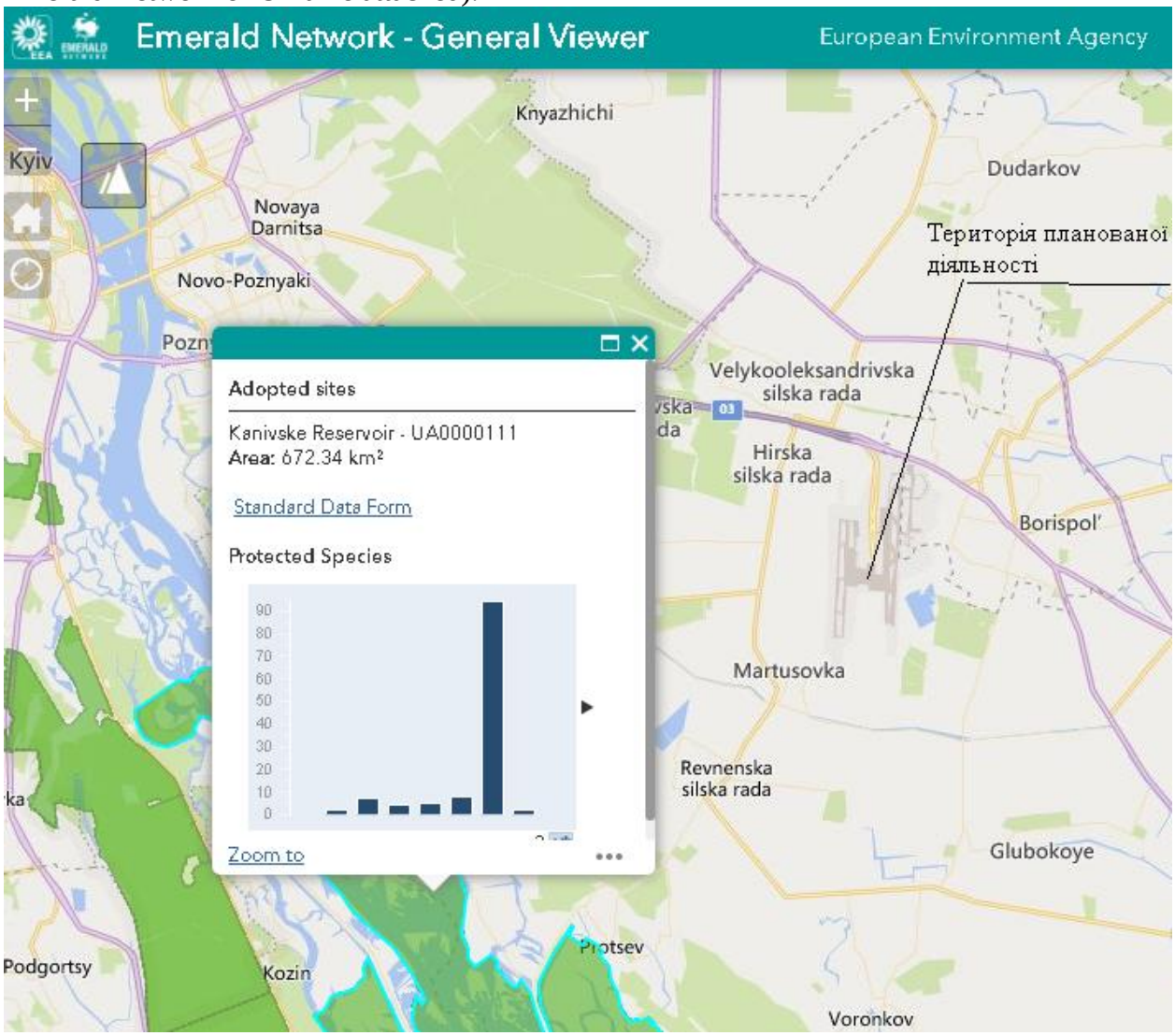
Emerald Network objects impact assessment.

Emerald Network of Ukraine is a Ukrainian part of the European

The purpose of establishing the European Emerald Network is to preserve natural fauna, flora, and habitats. It was initiated and is managed by the Berne Convention (1979). The Emerald Network is largely based on the same foundations as NATURA 2000, but operates outside the European Union, developing a pan-European approach to the protection of natural habitats. Currently, the European Union is promoting, including financially, the development of arrangements for the protection of natural habitats and the designation of Areas of Special Conservation Interest (ASCI) within the Emerald Network.

The sites within the Emerald Network, jointly with NATURA 2000 sites, form the core of the Pan-European Ecological Network (PEEN), which is also supported by the Berne Convention. Member States of the European Union comply with the Berne Convention by developing the NATURA 2000 network, and NATURA 2000 special protection areas correspond to the Areas of Special Conservation Interest of the Emerald Network.

The proposed operation site is not covered by the territory and objects of the Emerald Network of Ukraine (see the map showing the proposed operation site and objects of the Emerald Network of Ukraine attached).



The closest object of the Emerald Network of Ukraine (Kanivske Reservoir – UA0000111 area: 672.34 km²) is located about 13 km away from the proposed operation site.

emissions and discharges of pollutants, noise, vibration, light, heat and radiation pollution, irradiation and other influencing factors, as well as the implementation of waste management operations;

Emissions of pollutants

Pollutants

Atmospheric air pollutants will include nitrogen oxides, carbon monoxide, soot, sulphur dioxide, methane, etc.

Harmful substances released into the atmosphere have different properties and have varying effects on the environment and human health.

Nitrogen dioxide is a brown gas with a suffocating odour (hazard class 2).

Pathological changes in the event of human poisoning, especially in the respiratory system – oedema of the mucous membranes, respiratory tract, pulmonary enema, haemorrhage. The other internal organs are full-blooded, with small haemorrhages.

Nitrogen oxide. A colourless gas, in the form of a blue liquid in liquefied state.

Toxic effect. Blood poisoning with having a direct effect on the central nervous system.

The initial manifestation of acute poisoning is general weakness, dizziness, and numbness of the legs. In the event of mild poisoning, these symptoms disappear within a few minutes after a victim is provided access to fresh air.

More severe poisoning is also associated with nausea and sometimes vomiting.

Severe poisoning is manifested by lip cyanosis, weakened pulse, and blood discoloration.

The consequences of poisoning persist for a long time (for more than a year) in the form of impaired associative abilities, weakening of memory and muscle strength.

Carbon monoxide (hazard class 4) is a poisonous colourless and tasteless gas, with a faint odour. The toxic effect of carbon monoxide also known as sweet-damp is due to the fact that it binds easily to haemoglobin in the blood and makes it unable to carry oxygen from the lungs to the tissues. Haemoglobin restores its ability to absorb oxygen when a victim is provided access to fresh air. When small concentrations are inhaled, up to about 1 ml/l, the head feels heavy, the forehead feels compressed with "tongues", followed by a severe headache, flickering in the eyes, and pulsation in the temples.

Prolonged exposure to a gas-filled atmosphere causes drowsiness and numbness with vertigo. The central nervous system suffers the most from poisoning. As anoxaemia develops, a person gradually loses the ability to reason and coordination is impaired.

Precautions. General precautions for all places where of carbon monoxide is produced and may be released: equipment sealing, rapid removal of the released carbon monoxide.

Soot (hazard class 3). Superfine powder. Soot causes severe chronic diseases of the gastrointestinal tract and chronic hepatitis. It may cause pneumoconiosis, anthracosis, fatigue, cough, chest pain, shortness of breath, bronchitis resulting in emphysema, and changes in the heart.

Sulphur dioxide (hazard class 3). A colourless gas with a pungent odour. The overall effect is manifested in diseases of the respiratory tract causing bronchospasm.

When a victim is exposed to sulphur dioxide in the form of an aerosol formed during fog and high humidity, the irritating effect is stronger. Wet surface absorbs sulfuric anhydride, followed by sulfuric acid formation. The overall effect is impairment of carbohydrate and protein metabolism, suppression of oxidative processes in brain, liver, spleen, muscles, as well as irritation of the blood circulatory organs.

During the proposed operations, pollutants are released into the atmosphere. The sources of influence on the air during the field operation are unorganised sources of emissions. Impact on the environment, namely atmospheric air, during construction and preparatory works is not expected, the object exists, and preparatory or construction works are not included in the proposed operations. The following pollutants enter the air: carbon monoxide, nitrogen dioxide, soot, hydrocarbons, and nitrogen oxide. The sources and amounts of emissions are specified in paragraph 1.5 hereof.

The level of air pollution at the borderline of the nearest residential building is less than 1.0 of the MPC. The intensity of exposure and level of air pollution will not have an adverse impact on the population or environment. The contribution of pollutant emissions into the atmosphere during the implementation of the proposed operations will not have a significant impact on air pollution in nearby settlements due to low emissions and short-term impact.

Vibration pollution and noise

Light, heat, radiation pollution and irradiation

Aquatic resources

Water supply

Water sources at SE Boryspil International Airport include an underground aquifer (60/Cher/Dnieper/768/53; BORYSPILVODOKANAL municipal water supply system (60/Cher/Dnieper/768/53) and PE Amik Ukraine water pipeline

SE Boryspil International Airport uses water for the following needs: household, industrial use, and water supply to customers. Permission for special water use by SE Boryspil International Airport, issued by the State Agency of Water Resources of Ukraine on 17 February 2020 No. 49/KV/49d-20, the water use is allowed under the following conditions.

Total water intake (thousand m^3/year; m^3/day) 854.175 thousand m^3/year; 3,016.192 m^3/day.

Water use for own needs (thousand m^3/year; m^3/day)

from underground sources, NMT 695.26 thousand m^3/year; 2,371.72 m^3/day

from another water user – 23.708 thousand m^3/year; 93.79 m^3/day.

Volumes of water transferred to other enterprises.

The use of water in circulating water supply systems and repeated-sequential use of water is not envisaged.

Water metering equipment is installed.

Drainage

All surface waters from the territory of SE BORYSPIL International Airport are collected by two rainwater drainage systems, K2-1 from flight zone No. 1 and K2-2 from flight zone No. 2, as well as the area containing terminals D and F, which are combined at the end of the flight zone No. 2 into one main discharge collector for surface wastewater and enter Ikva River near Zatyshne village, Boryspil district, Kyiv region through the existing bio-pond and existing outlet. There are two catchment areas in the territory of flight zone No. 1, conventionally separated by a watershed. Surface wastewater generated on the catchment area 1-1 of flight zone No. 1 and in the territory of terminal D are discharged into existing collector No. 2-1 and pumped by existing wastewater pumping station No. 1 beyond the watershed into the open ditch of surface wastewater collection from the catchment area of 1-2 of flight zone No. 1. This ditch collecting the surface wastewater from the catchment area 1-2, passes into the on-site rainwater collector D 1,000 mm at the end of the runway, which also receives surface wastewater from the rainwater network of terminal D with collector No. 2 and surface water from collection trays of the airport area adjacent to collector No. 3.

From the collector No. 3, surface wastewater is discharged into the wastewater pumping station No. 6 (existing) and enters through a pressure damper into the rain collector, draining the surface wastewater from the territory of the flight zone No. 1 to the end of the runway of the flight zone No. 2, where it is connected with the self-flowing rainwater collectors from the flight zone No. 2, and from there begins the main outlet collector with a diameter of 1,000 mm for surface wastewater disposal from the airport outside its territory (6 km long) into the bio-pond near Zatyshne village, in which it settles down and is treated by the biocenosis of microorganisms and higher aquatic plants before release into Ikva River near Zatyshne village, Boryspil district, Kyiv region. The estimated catchment areas of the surface waters of SE BORYSPIL International Airport are as follows: flight zone No. 1 catchment area – 235.11 ha; flight zone No. 2 catchment area – 545.2 ha, total area – 780.3 ha.

The quality of surface return water entering the Ikva River from the territory of Boryspil Airport and the water quality of the Ikva River above and below its discharge point are checked by laboratory tests on a quarterly basis. The results of research (Annex 13) indicate the need to improve the quality of surface return water entering the Ikva River.

Waste

Risks to human health, cultural heritage sites, and the environment, including the possibility of emergencies

An assessment of the risk posed by the proposed operations and their impact on the environment will be performed in accordance with DBN A.2.2-1-2003, and includes:

– assessment of the risk posed by the proposed operations on public health;

– assessment of the social risk of the proposed operations.

Assessment of the risk posed by the proposed operations on public health

The risk of air pollution for public health is analysed by calculating the risk of non-carcinogenic and carcinogenic effects.

The risk of developing non-carcinogenic effects is determined by calculating the hazard index (HI):

$$HI = \sum HQ_i,$$

where HQ_i is the hazard quotient of the i-th substance determined as follows:

$$HQ_i = C_i / R_f C_i,$$

where C_i is the estimated average annual concentration of the i-th substance at the borderline of residential buildings, mg/m^3;

$R_f \cdot C_i$ is the reference (safe) concentration of the i-th substance, mg/m^3 (in the absence of the reference concentration, the maximum permissible concentration (MPC) is used as an equivalent).

The criteria for characterising the hazard quotient are given in the table below.

Risk characteristics	**Hazard quotient (HQ)**
The risk of adverse effects is considered to be negligibly small	< 1
A limit not requiring urgent action, which still cannot be considered acceptable enough	1
The likelihood of adverse effects increases pro rata to the increase in HQ	> 1

The data for calculating the development of non-carcinogenic effects are summarised in the table below.

Substance	**Estimated maximum single concentration on the borderline of residential buildings, C_{mi},* percentage of MPC_{ms}**	**Estimated maximum single concentration on the borderline of residential buildings, C_{mi}, mg/m^3**	**Estimated point number at the borderline of the residential buildings with the maximum surface concentration**	**Direction of wind from the company to the estimated point**	**Wind recurrence rate from the company to the estimated point, P, %**	**Maximum estimated average annual concentration on the borderline of residential buildings, C_i, $C_i = \frac{C_{мi} * P}{125}$ mg/m^3**	**Reference concentration $R_f C_i$, mg/m^3**	**Hazard quotient HQ_i $HQ_i = \frac{C_i}{R_f C_i}$**
Nitrogen dioxide	0.10	0.02	1	NE	12.6	0.002	0.04	0.05
Sulphur dioxide	0.0027	0.0014	1	NE	12.6	0.00014	0.08	0.00175
Suspended substances (TSP)	0.0074	0.0011	1	NE	12.6	0.00011	0.1	0.0011
Total (hazard index)								**0.053**

Comparing the results obtained with the data in the table, it can be concluded that the hazard factor of each substance is less than one, i.e. the non-carcinogenic risks of harmful effects on public health are extremely small and can be considered acceptable.

The risk of developing individual *carcinogenic effects* (ICR_i) from substances having carcinogenic effect is calculated as follows:

$$ICR_i = C_i \times UR_i$$

where C_i is the estimated average annual concentration of the i-th substance at the borderline of residential buildings, mg/m^3;

UR_i is a single carcinogenic risk of the i-th substance, m^3/mg, calculated according to a formula using the value of SF_i (slope factor), the standard value of human body weight (70 kg) and daily air consumption (20 m^3):

$$UR_i = \frac{SF_i}{70 \cdot 20},$$

Carcinogenic risk generated by the combined effect of several carcinogenic substances polluting the atmosphere (CR_a) is determined as follows:

$$CR_a = \Sigma ICR_i$$

where ICR_i is a carcinogenic risk of the i-th substance.

The carcinogenic risks are assessed according to the table.

Risk level	**Lifetime risk**
Unacceptable for the professional community and general public	Over 10^{-3}
Acceptable for professional community and general public	10^{-3} to 10^{-4}
Conventionally acceptable	10^{-4} to 10^{-6}
Acceptable	Less than 10^{-6}

Calculation of the risk of developing individual carcinogenic effects (ICRi) under the influence of substances having a carcinogenic effect during fuel combustion in internal combustion engines is based on emissions of carcinogenic substances, in particular benzo(a)pyrene.

Assessment of the social risk of proposed operations

The social risk of proposed operations is defined as the risk for a group of people who may be affected by the implementation of the company's business facility, taking into account the peculiarities of the natural and man-made system.

The estimated value of social risk (R_s) is determined as follows:

$$R_s = CR_a \times V_u \times N/T \times (1\text{-}N_p), \text{ man/year}$$

where CR_a is a carcinogenic risk generated by the combined effect of several carcinogenic substances polluting the atmosphere, $CR_a = 9 \times 10^{-7}$;

V_u means the territory's vulnerability to air pollution manifestation determined by the ratio of the area allocated to the business facility versus the area of the facility with a sanitary protection zone, the percentage of one, $V_u = 1$;

N means the population, number of persons. N = 6,597 persons (Karnaukhivka settlement).

T means the average life expectancy (determined for the region or taken as 70 years), person/year;

N_p is a factor determined as $N_p = \Delta N_p/N$ for construction, where ΔN_p is the number of additional jobs, $\Delta N_p = 20$ persons;

N means the population used in the formula.

$$N_p = 20/6597 = 0.003$$

The estimated value of social risk (R_s) is then determined as follows.

$$Rs = 9 \times 10^{-7} \times 1 \times 6{,}597/70 \times (1–0.003) = 8.46 \times 10^{-5} \text{ person/year}$$

The level of social risk of the proposed operations assessed in accordance with the classification of social risk levels is given in the table below.

Risk level	**Lifetime risk**
Unacceptable for the professional community and	Over 10^{-3}

general public	
Acceptable for professional community and general public	10^{-3} to 10^{-4}
Conventionally acceptable	10^{-4} to 10^{-6}
Acceptable	Less than 10^{-6}

Therefore, the level of social risk throughout the lifetime for this facility is 8.46×10^{-5} persons/year, which is conventionally acceptable for the proposed operations according to the social risk classification.

Assessment of the risk posed by the proposed operations on environmental components

Anthropogenic risk indicators (impact risk of a facility or proposed operations on the natural environment) are determined in two stages. In the first stage, the risk level of the business facility's impact on environmental components is determined according to formula (5), establishing the projected level of anthropogenic risk during the design. In the second stage, the indicator of the impact risk of each specific pollutant on the relevant environmental components is determined according to formula (5). Risks in the first and second stages are identified for facilities where such risks may actually be present.

$$R_{kj} = A \cdot e^{B \cdot e^{D_{kj}}},$$

where R_{kj} is the risk of the k-th stage for the j-th environmental component, dimensionless; A, B are constants ($A = 4.99 \times 10^{-6}$, $B = -7.557$); D_{kj} is a value determined according to the k-th stage of the risk calculation for the j-th component calculated according to formula (6).

$$D_{kj} = -e^{I_{kj}-1}, \quad (6)$$

Where I_{kj} is the index of pollution for the j-th environmental component (atmosphere, hydrosphere, soil) for the k-th stage of risk calculation, dimensionless, determined from the table.

Determination of environmental components pollution index

Environmental component	**First stage (k = 1)**		**Second stage (k = 2)**	
	Input data	**Estimated dependency of Ik_j**	**Input data**	**Estimated dependency of Ik_j**
Atmosphere (j = 1)	KP is a multiplicity of exceeding the standards, dimensionless	0.25 × KP	PZi is the index of pollution with the i-th substance in the atmosphere, %	$0.0025 \times PZ_i$
Hydrosphere (j = 2)	IZV is the index of water pollution by indicators, dimensionless	0.2 × IZV	IZVi is the index of water pollution by the i-th indicator of the hydrosphere pollution, dimensionless	$0.2 \times IZV_i$
Soil (j = 3)	Zc is the total soil contamination index, dimensionless	0.016 × Zc	Ksi is the coefficient of concentration of the i-th chemical substance	$0.016 \times K_{si}$

			contaminating the soil, dimensionless	

The risk level is assessed in accordance with the table.

Classification of risk levels of proposed operations for the natural environment

Risk level	Risk value
Unacceptable	$> 10^{-6}$
Acceptable	10^{-6} to 10^{-8}
Unconditionally acceptable	$< 10^{-8}$

At the first stage, based on the obtained value, a decision is made on the acceptability of the proposed operations with regard to this environmental component, their adjustment (for example, improvement of the wastewater treatment system, etc.), or rejection of this project.

At the second stage, based on the obtained values, a decision is made on the acceptability of the proposed operations for each specific substance (indicator) of a relevant environmental component.

The analysis of calculation results showed that the concentrations of pollutants generated at the borderline of the sanitary protection area will be as follows:

– soot –0.67247 MPC, including the background –0.4 MPC, contribution of facility sources – 0.27247 MPC;

- for nitrogen dioxide – 0.12152 MPC, including the background – 0.4 MPC, contribution of facility sources – 0.27848 MPC;

- for sulphur dioxide – 0.0099 MPC, including the background – 0.4 MPC, contribution of facility sources – 0.3901 MPC;

- for carbon oxide – 4.09718 MPC, including the background – 0.08 MPC, contribution of facility sources – 4.01718 MPC.

Analysis of the results of air pollution calculations of emissions from stationary and mobile sources showed no exceedance of sanitary limits for all substances subject to calculation.

The level of risk posed by the said pollutants to the environment is characterized as acceptable.

Having analysed the results obtained, we can conclude that the proposed operations have an insignificant impact on the environment. The actions listed in section 7 of the environmental impact assessment report will ensure reliable and long-term operation of the facility and reduce the impact on the atmosphere. The studied impact of this facility on the environment, natural and artificial components of the surrounding area showed that the impact generated by the facility should be assessed as local and acceptable.

Cumulative impact of the other existing facilities, proposed operations and facilities in respect of which a decision has been obtained to carry out the proposed operations, taking into account all existing environmental problems related to the areas of special environmental importance, which may be affected by the use of natural resources

The impact of proposed operations on the climate, including the nature and scale of greenhouse gas emissions, as well as sensitivity of operations to climate change

Ukraine signed and ratified the Association Agreement between Ukraine and the EU (Association Agreement) on 16 September 2014, and it became effective on 1 September 2017.

The Association Agreement covers a number of economic and regulatory issues. It also applies to climate change issues, which are addressed in Chapter VI, Article 365 (c) and Annexes XXX, XXXI to the Agreement. One of the requirements set in the Agreement is the establishment of procedures for monitoring, reporting and verification (MRV) of greenhouse gas emissions from energy and industrial installations (companies).

In pursuance of the Association Agreement between Ukraine and the EU, the Law of Ukraine on the Principles of Monitoring, Reporting, and Verification of Greenhouse Gas Emissions was adopted, and will enter into force on 1 January 2021.

The Law of Ukraine on the Principles of Monitoring, Reporting, and Verification of Greenhouse Gas Emissions stipulates that greenhouse gases are the gases, namely carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6) and other gaseous components of the atmosphere that absorb and emit infrared irradiation.

In accordance with Article 13 of the Law of Ukraine on the Principles of Monitoring, Reporting, and Verification of Greenhouse Gas Emissions, SE Boryspil International Airport (as a proposed operator that will carry out technical operation of installations, i.e. stationary technical facilities where operations capable of affecting greenhouse gas emissions will be carried out), during the proposed operations, will provide for:

1) registration of installations in the Unified Register for Monitoring, Reporting, and Verification of Greenhouse Gas Emissions (a unified state electronic information system providing the collection, accumulation, processing, and accounting of information on installations and documents in the field of monitoring, reporting, and verification of greenhouse gas emissions);

2) development of a monitoring plan in accordance with the procedure for monitoring and reporting on greenhouse gas emissions;

3) submission of the monitoring plan to the authorised body for approval;

4) establishment, documentation, implementation and support of written data processing procedures for monitoring and reporting on greenhouse gas emissions and provision of documents provided for in the procedure of monitoring and reporting on greenhouse gas emissions;

5) submission of a report on improvement to the authorised body for approval;

6) monitoring of greenhouse gas emissions in accordance with the monitoring plan;

7) development of the operator's report and its submission for verification;

8) providing the verifier with access to the facilities, objects and information required for the verification as stipulated by the operator's report verification procedure;

9) submission of the operator's report recognised as satisfactory according to the verification findings, to the authorised body jointly with the verification report within the period established by this Law;

10) taking into account the recommendations specified in the verification reports during the monitoring;

11) submission of the monitoring plan as amended to the authorised body for approval and a notice to the authorised body on the existence of grounds for amendment of the monitoring plan in cases provided for by the procedure for monitoring and reporting on greenhouse gas emissions;

12) storage of documents stipulated by the procedure for monitoring and reporting on greenhouse gas emissions over a specified period;

13) performance of the other obligations in accordance with laws on monitoring, reporting, and verification.

The main sources of greenhouse gas emissions during the proposed operations will be combustion emissions, i.e. emissions that occur during the exothermic reaction of fuel with oxygen.

In the course of the proposed operations, the combustion of "standardised commercial fuels" (commercial fuels, the requirements for which are established by international standards, showing the deviation of the specified lower calorific value by no more than 1% with a 95% confidence interval (AvGas), diesel fuel, gasoline, etc.) is envisaged.

The immediate sources of greenhouse gases include gas stations, sites for testing aircraft engines, and other installations.

Characteristics of the sources of pollutant emissions into the atmosphere and their parameters are given in Annex 12.

Having analysed the pollutant emissions into the air.

Research has shown that air transport operations are able to change the temperature on airport premises. It is determined that depending on flight intensity in the peak months of different seasons, the potential increase in daytime temperature is from 0.9 to 1.6 K. Obviously, the obtained temperature change values will not destabilise the energy balance of the ecosystem. However, given the prospects for the development of the aviation industry in Ukraine and the intensive expansion of traffic through Lviv International Airport, a deeper transformation of the microclimatic characteristics of this and other regional airports of the country acquiring international status can be predicted. To minimise the impact of CO_2 emissions on the environment, especially on the microclimate, it is required to provide a number of specialised preventive measures during the development of modernisation and expansion of regional airports, including limiting the age of aircraft, implementing strict control over process operations and optimising the planning of airlines to reduce emissions of pollutants during taxiing within the airport area.

Technology and substances used

6. A description of the forecasting methods used to assess the environmental impact referred to in subparagraph 5 of this paragraph and the assumptions underlying such forecasting, as well as the environmental data used (a copy of the research laboratory accreditation certificate shall be attached, if any, and a copy of the contract).

To assess the environmental impact of the proposed operations, the main methods of forecasting the state of the environment used were as follows:

- a method of systemic approach (ecological and feasibility study of the proposed operations);
- a calculation and analytical method (assessment of the impact of proposed operations on the environment);
- a system-analogue method (comparison of ecological and economic relationships between the proposed operations and typical analogous objects).

The positive and negative impacts of proposed operations on the environment were assessed using these methods on the basis of and taking into account:

- feasibility indicators of the proposed operations, provided they are carried out in the normal (planned) operation mode;
- physical-geographical and climatic characteristics of the area in which the object of the proposed operations is located.

Methods for determining the impact of proposed operations on the environment are based on natural indicators. This is the concentration of harmful impurities in the environment and the mass of harmful substances entering the environment. The degree of their compliance with the limits is assessed is MPC, MPR, MPD, etc.

In addition to natural indicators of impact on the environment, the level of safety of the proposed operations was taken into account, which is characterised by:

- the probability of man-made accidents and disasters, and likelihood of an environmental disaster;
- the degree of negative impact of man-made accidents and processes occurring during the implementation of proposed operations on man and the environment;
- the likelihood that an ecological situation in the area of implementation of the proposed operations may lead to a crisis or disaster.

The Environmental Impact Assessment Report was compiled based on the following materials:

1. Feasibility study (adjustment) of "Reconstruction of the flight zone No. 2 of SE Boryspil International Airport":

- Volume 1. Executive summary. Master plan. Emergencyandrescue support of flights. Reconstruction of the existing fuel supply networks. Engineering and technical system of perimeter protection and video surveillance. Main provisions on construction organisation. Input data.
- Volume 2. Airfieldplanning works. Drainage.
- Volume 3. Light signalling equipment. Power supply. Transformer substations. Platform illumination. Architecturalconstruction solutions.
- Volume 4. Radio engineering facilities for landing and air traffic management. Weather forecasting. Communication and management network.
- Volume 6. Assessment of noise impact on the environment.
- Volume 7. Engineeringtechnical means of civil protection (civil defence).
- Volume 11. Environmental impact assessment.

2. TECHNICAL REPORT on engineeringgeodetic survey findings. Reconstruction of the flight zone No. 2 of SE Boryspil International Airport (design works) of FeasibilityStudy stage at: Kyiv region, Boryspil district, villageof Hora, 7 Boryspilska St. Design stage “Feasibility study”, volume 1.

3. TECHNICAL REPORT on engineeringgeodetic survey findings. Reconstruction of the flight zone No. 2 of SE Boryspil International Airport (design works) of FeasibilityStudy stage at: Kyiv region, Boryspil district, villageof Hora, 7 Boryspilska St. Design stage “Feasibility study”, volume 2.

4. PROJECT CONSTRUCTION OF SURFACE WATER TREATMENT FACILITIES AT SE BORYSPIL INTERNATIONAL AIRPORT, Volume 1, book 1–10. Explanatory note. CONSTRUCTION ORGANISATION.

5. PROJECT CONSTRUCTION OF SURFACE WATER TREATMENT FACILITIES AT SE BORYSPIL INTERNATIONAL AIRPORT, Volume 1, book 1–1. Explanatory note. EIA.

6. Expert opinion on the review of design documentation for the project of Construction of Surface Water Treatment Facilities at SE Boryspil International Airport No. 00-1099-19/IZ dated 28 February 2020.

7. Permission for emission of pollutants into the atmosphere by stationary sources No. 3220883201-14 dated 27 August 2018.

8. Extract from the Report on Stock-Taking of Pollutant Emissions at SE Boryspil International Airport (production site No. 1) (adjustment). The list of pollutants emitted into the atmosphere (excluding the mobile emission sources).

9. Extracts from Documents substantiating the volumes of emissions to obtain a permission for emission of pollutants into the atmosphere by stationary sources for SE Boryspil International Airport (production site No. 1):

- List and description of production sites, processes, and process equipment.
- Information on the state of air pollution.
- Information on the type and volume of pollutants emission into the atmosphere from stationary sources.

– Assessment of the impact of pollutant emissions on the state of air pollution.

10. Situational map–layout of SE Boryspil International Airport (production site No. 1). Area of impact.

11. Extracts from the project of calculating the maximum permissible discharges of pollutants with return waters (includingby wastewater generated by precipitations) drained from the territory of SE Boryspil International Airport into a no-name pond and Ikva River.

- Characteristics of the existing treatment facilities and storm sewer systems of SE Boryspil International Airport.
- Datasheet of the wastewater treatment and disinfection facilities at the companies and other facilities. Wastewater treatment facilities of the company (Ikva River).

12. Maximum permissible discharge (MPD) of substances into a no-name pond and Ikva River in return water (including the wastewater generated by precipitations) drained from the territory of SE Boryspil International Airport and PII Amik–Ukraine.

13. Permission for special water use by SE Boryspil International Airport.

14. Action plan for achievement of MPD of the substances in return waters from SE Boryspil International Airport and PII Amik Ukraine.

15. Waste stock-taking. Waste datasheet. Declaration.

16. Registration card of the waste generation facility No. 2-08-09 dated 28 October 2014 (as amended).

17. Report on Waste generation and treatment in 2018 , form No.1-waste.

18. Expert opinion on the review of design documentation and feasibility study on "Reconstruction of the flight zone No. 2 of SE Boryspil International Airport" No. 00-1144-19/PB dated 15 June 2020.

19. State deeds of the right of permanent land use.

20. A certificate and extract of real estate ownership.

21. ECOLOGICAL-ORNITHOLOGICAL EEXAMINATION was performed by ornithologist Shrabaliuk Oleksandr Petrovych during the period from 1 October to

31 December 2019 by job order placed by Boryspil International Airport and contract agreement No.14.5.38.19.12.

22. A letter-certificate on the availability of own or leased production sites (premises) required to do business dated 21 August 2020 No. 19-22/3-532.

23. A CERTIFICATE of special forest pathological and sanitary inspection of green plantations TP-23 for SE Boryspil International Airport within the administrative boundaries of Hora Village Council, Boryspil district, Kyiv region dated 14 August 2020.

24. Contingency plan at Kyiv airfield (Boryspil) (Airfield contingency plan).

25. Development concept for Boryspil International Airport until 2045.

26. Other documents.

The report is prepared in compliance with the Law of Ukraine on Environmental Impact Assessment dated 23 May 2017 No. 2059-VIII and the Law of Ukraine on Environmental Protection dated 25 June 1991 No. 1264-XII using the data on the current status of the environment in the area of placement of the proposed operations facility (meteorological characteristics, background concentrations, site condition, etc.), results of engineering and other surveys, cartographic materials, proposed capacity of the designed facility, etc.

Annual indicators of emissions, discharges, and wastes are used as calculation periods during operation; they are determined based on production process peculiarities. The estimated periods of impact on the environmental components are determined taking into account the standard service life of the designed facility.

7. Description of proposed actions aimed at prevention, avoidance, reduction, and elimination of significant adverse impact on the environment, including (if possible) the compensatory measures

The environmental protection actions are provided for by the feasibility study

- Drainage of wastewater from new and existing airfield surfaces of the flight zone No. 2 into the drainage system under design, and transportation to treatment facilities.

– Protection of natural resources on the areas occupied and connected.

– Removal and restoration of vegetation soil on the ground areas of the runway and beyond.

– Removal of vegetation soil on the site of artificial surfaces and moving it to improve the airport territory.

– Creation of a reliable sod cover to prevent soil erosion.

– Landscaping of the reconstruction area (landscaping area – 2,402,290 m^2; landscaping ratio – 0.7269).

- Installation of a system for collecting used anti-icing fluid at the site of anti-icing aircraft treatment.

- Collection and disposal of domestic sewage from sanitary devices and showers of the ARS building (the sewage is received through the new projected sewage pumping station to the main sewage pumping station-1, followed by transportation to the filtration fields of Boryspil).

- Treatment of industrial effluents from washing the garage floor on the oil product separator with a capacity of 1.0 l/s.

- Other actions as required by applicable environmental laws.

Actions aimed at preventing, avoiding, reducing, and eliminating significant adverse impact on soils and geological environment

In the case of removal and transfer of soil cover (fertile soil layer) of the land plots during the implementation of the proposed reconstruction of the flight zone No. 2 of SE Boryspil International Airport, in accordance with the order of the State Committee of Ukraine for Land Resources dated 4 January 2005 No. 1 on Approval of the Procedure for Issuance and Revocation of Special Permits for Removal and Transfer of Soil Cover (Fertile Soil Layer) of the Land, filed with the Ministry of Justice of Ukraine on 20 January 2005 under No. 70/10350, a special permit for removal and transfer of soil cover (fertile soil layer) will be obtained, and a working project of land management, to be implemented in two stages, is developed.

The first stage is a soil survey of the land plot on which the fertile soil layer should be removed.

The second stage is design, or the stage of development of a working land management project.

According to Article 54 of the Law of Ukraine on Land Management, the working land management project will include:

a) a ToR for preparation of a working land management project;

b) an explanatory note;

c) a decision of a relevant executive body or local self-administration body to develop a working land management project (except for privately owned land plots);

d) characteristics of natural and agroclimatic conditions of a relevant territory;

e) materials of soil and other surveys;

f) geodetic survey findings and land management design documents;

g) feasibility indicators of the working land management project;

h) design solutions to determine a list of actions and scope of work for land protection;

i) calculations of the estimated cost for implementation of the projected land protection actions;

j) documents on approval of the working land management project, established by Article 186 of the Land Code of Ukraine;

k) plans of agricultural groups of soils and slope steepness;

l) proposed action plans;

m) documents on the project implementation in kind (on the ground).

Besides, in compliance with the Law of Ukraine on Land Protection, SE Boryspil International Airport:

will carry out economic activity on land plots in ways that will not have a detrimental effect on the land condition;

will promote the systematic conduct of surveying, examination, and exploration of the land condition;

will timely inform the relevant executive authorities and local self-administration bodies on the condition, degradation, and pollution of land plots;

will ensure compliance with the regime of using the lands subject to special protection established by the laws of Ukraine;

will ensure the use of land plots for their intended purpose and compliance with the restrictions (encumbrances) imposed on the land plot;

will protect lands from erosion, depletion, pollution, littering, salinization, sodification, acidification, waterlogging, flooding, overgrowing with weeds, shrubs, and small forests;

will take steps to prevent adverse and environmentally hazardous impacts on land plots and eliminate the consequences of these impacts;

soil monitoring will be conducted in order to timely identify changes in the condition of lands, their assessment, prevention and elimination of the consequences of adverse processes.

Actions to protect against the impact of birds potentially dangerous for the flights of aircraft in the territory of the flight zone No. 2 of SE Boryspil International Airport

1) Timely detection of birds at the airfield, in a particular airspace above the airfield and the strip of aircraft approach to it (ornithological observations – visual, aerovisual, and radar).

2) Prompt determination of the degree of danger on the basis of bird watching data in order to limit or stop flights when there is a high risk of aircraft collisions with birds. The degree of danger can be different depending on the number and size of birds, as well as the nature of their behaviour.

3) Providing aircraft crews with operational information on the danger of collisions with birds from the air traffic controller (officer on duty for reception and release of aircraft) and other members of air traffic control bodies, as well as performing manoeuvres by aircraft crews to prevent aircraft collisions with birds and actions to reduce the danger of such a collision.

4) Active hazing of birds at airfields by personnel of certain support units (subdivisions) using the means of active hazing of birds (firing with signal rockets, bio-acoustic, pyrotechnic means, etc.).

5) The use of stationary devices at airfields to haze birds in off-line mode, which optically or acoustically affect birds (for example, wind-driven), or various mechanical obstacles physically restraining birds (for example, roofing or fencing nets), which are used locally, in areas of frequent appearance of birds, their continuous presence, the formation of mass clusters, depending on the danger posed by birds of a particular species.

In particular, in order to ensure the safety of takeoffs and landings of aircraft, SE Boryspil International Airport developed measures for monitoring, tracking, accounting, and hazing of birds and wild animals. The airport ornithological service monitors the prevention of conditions that may attract birds.

Actions to manage the hazards posed by hazard agents:

- identification of possible nesting zones, monitoring according to the survey schedule;
- preventing birds and wild animals from entering the airfield area by installing an appropriate fence;

- hazing birds and wild animals;
- imposing restrictions to ensure that actions would not attract birds and wild animals;
- maintaining drainage systems and grass in good condition;
- exclusion of the presence of standing water on the coatings of artificial runways and taxiways;
- maintaining the proper grass height. Grass at the airport is maintained 50 mm to 300 mm high, including the grass trimming before it produces seeds, selection of seeds of appropriate grasses that cannot serve as food for birds, combating the vegetation erosion;
- removal of dead birds and animals, destruction of rodents;
- removal of nesting sites before nesting;
- switching off landing lights between flights;
- identifying and taking actions to eliminate potential places that attract birds and wild animals outside the airport (within 15 km), namely tourist recreation areas, landfills, slaughterhouses, orchards, animal feed warehouses, greenhouses with plants, farms, garbage pits, waste recycling centres, and settling ponds;
- bird chasing – the use of car headlights, sirens; bio-acoustic means are used at the airport in different areas by reproducing the cries of "danger" produced by different species of birds, laser and mechanical means to haze birds by directing a green laser beam, pyrotechnic charges, shots.

Extermination policy, applied during serious activity of birds by setting traps for certain species of birds. The decision on extermination shall be made if the other actions failed only.

Aircraft collisions with birds poses a threat to air transportation safety.

Actions aimed at preventing the penetration of birds and wild animals protect both the airport and wild animals from danger.

Actions to achieve MPD of substances with return waters

The action plan to achieve MPD of substances with return waters is given in Annex 17.

Protective regime actions in the territory of proposed operations

To ensure the internal object regime of the territory and to prevent outsiders from entering the airport, the project provides for the installation of a perimeter fence with burglar alarms and video surveillance system. The fence is designed from mesh panels 2.44 m high and a Y-shaped nozzle with a sharp tape of Egoza type. To ensure a higher degree of protection of the monitored area from unauthorized penetration, the fence shall be equipped with an antiundermining barrier. The length of the fence is 11,556.

Protection regime actions at local treatment plants

To prevent unauthorized access to the territory of local treatment facilities, a perimeter fence will be installed. The fence is designed from mesh panels 2.44 m high and a Y-shaped nozzle with a sharp tape of Egoza type 997 m long with a gate 4.50 m wide.

Actions aimed at preventing, avoiding, reducing, and eliminating significant adverse impact on the objects of architectural, archaeological, and cultural heritage

If cultural heritage sites or their parts are detected in the territory of proposed operations during the reconstruction of the flight zone No. 2 of SE Boryspil International Airport, a cultural heritage protection agreement will be concluded with a relevant protection authority in accordance with Article 23 of the Law of Ukraine on Cultural Heritage.

If an archaeological or historical artefact is discovered during any earthworks, the contractor will suspend the works and notify a relevant cultural heritage protection body, in the territory of which the earthworks are carried out, within one day as required by Article 36 of the Law of Ukraine on Cultural Heritage Protection.

The earthworks will be resumed only subject to a consent in writing, issued by a relevant cultural heritage protection body after the completion of archaeological research in a relevant area.

Upon discovery of objects or items of archaeological heritage within the territory of proposed operations, the bodies of cultural heritage protection will be informed immediately, and the relevant works to identify, record, and study archaeological sites or objects will be assisted and allowed in accordance with Article 19 of the Law of Ukraine on Archaeological Heritage Protection.

Description of proposed actions aimed at prevention, avoidance, reduction, and elimination of significant adverse impact on the generated waste

The waste will be collected and stored temporarily, depending on its composition and properties, as well as the degree of hazard posed by them to the environment and human health.

In accordance with the Law of Ukraine on Waste:

– steps will be taken to prevent and reduce waste generation;

– the composition and properties of waste generated, as well as the degree of hazard posed by waste to the environment and human health will be determined in accordance with regulations approved by the central executive body in charge of development of the state policy for sanitary and epidemiological well-being of the population, in agreement with the central executive body in charge of development of the state policy for environmental protection;

– on the basis of material and feedstock balances of production sites, the primary current accounting for quantity, type, and structure of the waste generated, collected, transported, stored, processed, utilized, neutralized and removed will be identified and recorded, and statistical reporting on the same will be submitted in accordance with the established procedure;

– full collection, proper storage and prevention of destruction and spoilage of waste, for the disposal of which there is an appropriate technology compliant with environmental safety requirements in Ukraine, is ensured;

– mixing of waste will not be allowed unless it is provided for by an existing technology and does not complicate waste management, or unless it is proved that such an action complies with environmental safety improvement requirements;

– storage and disposal of waste in unauthorized places or facilities will not be allowed;

– the condition of places or facilities of own waste disposal will be monitored;

– the environmental tax levied for waste disposal will be paid in due time in accordance with the established procedure;

– the persons responsible for waste management will be designated;

– development as appropriate and implementation of waste management organization plans etc. will be provided.

Fire prevention

The master plan provides for fire prevention by way of:

– installation of buildings and structures in compliance with regulatory requirements for firebreaks between them;

– arrangement of roads (driveways, sites) and approaches for fire fighting vehicles ability along the freely-planned area to the objects under design;

– construction of a new emergency rescue station to ensure the standard time of arrival of fire and rescue units to the thresholds of the artificial driveway-2.

Actions ensuring safe working conditions and operation of existing facilities

- Development of safety and industrial sanitation measures, which are obligatory for all construction stakeholders, by the General Contractor during the preparatory construction period.

- Development of actions providing for safe and non-hazardous operation mode during the use of toxic materials, operation of machinery and equipment, for fire, explosion, and electric safety at construction sites, during performance of works in the area where communication lines are laid, protection of dangerous zones, drinking water supply for workers at the construction site etc. as a part of the work performance project.
- Testing of the knowledge of engineering and technical personnel and workers on safety and industrial sanitation before proceeding to work.
- Slinging of structures with steel slings or special sling devices.
- Reliable fixing of concrete blocks on vehicles during their transportation.
- Reinforcement of ditch and trench walls.
- Before the start of welding works, it is required to check the serviceability of the welding machine, to provide isolation of its case, etc.
- The construction and installation works near power lines shall be performed based on the work permit.
- Fire extinguishers, water barrels, and boards with fire-fighting equipment must be installed at the construction sites.
- Construction site, work areas and workplaces, driveways and approaches to them during the nighttime, as well as lockable premises must be illuminated in compliance with DBN B.2.5-28-2018 "Natural and artificial illumination", DSTU B A.3.2- 15: 2011 "Illumination standards for construction sites".
- Providing maintenance personnel with overalls.
- When performing painting and waterproofing works, the builders must be provided with protective masks and respirators.
- It is forbidden to smoke in machines and right near them, as well as to use open flames during their maintenance.
- It is forbidden to start work when brakes, running gears, and sound alarm system are faulty.

Environmental protection measures during construction and installation works

- Cutting of a vegetative layer of soil at the work site and its storage for further use during the territory improvement. Excessive plant soil shall be taken to the dumping ground.
- Ensure the maximum possible preservation of existing vegetation when organizing construction sites.
- Performance of land reclamation works after construction completion.
- Drainage of surface water from construction sites is provided in an open way, subject to discharge of wastewater into the storm sewer networks available near the work site. And in places near which there is no storm sewer network – into a watertight cesspool, which should be arranged on the construction site during the preparatory period of construction before the start of construction and installation works.
- Release of storm waster subject to arrangement of earth wall reinforcement from erosion.
- Placement of construction sites and temporary ancillary structures for construction in the drainage area only, followed by their dismantling.
- It is proposed to arrange drainage ditches around construction sites and along access and internal construction roads, which will be used to collect storm water into tanks or wells filled with sand and gravel, where water would be purified from lubricants and oil products.
- It is proposed to take excessive soil to the dumping ground.
- It is prohibited to contaminate the soil and vegetation layer with fuel and lubricants during the operation of construction machinery and mechanisms.
- It is forbidden to bury and burn garbage at the construction sites.

- Placement of waste generated during the construction process is provided on the sites for storage of construction materials and structures, followed by their gradual removal, as they accumulate, to the dumping ground.
- The garbage and construction waste must be removed by vehicles to a designated site, the distance to which shall be determined by a special municipal agency.
- It is proposed to place sand and gravel on sites for storage of construction materials and structures, subject to sand moistening with water to prevent its spread by wind.
- It is proposed to place cement and bitumen in closed warehouses.
- Concrete mixes and mortars are proposed to be brought to the construction site by truck concrete mixers, and asphalt concrete mixes – by dump trucks to the places of their laying, subject to their unloading into the prepared buckets, receiving bunkers, and further laying into the facility structures under construction.
- Arrangement of open parking lots for construction machines with a hard surface and with local treatment facilities.
- The general contractor should ensure rinsing of wheels of the cars and the construction machinery leaving the territory of construction sites.
- Work sites, materials storage areas, and construction sites must be cleaned of construction and household waste, metal and concrete residues after the work completion.

Energy saving actions

The basis for the implementation of energy saving measures shall be the use of equipment on an advanced element base and implementation of the light signalling equipment control and monitoring system.

The use of an innovative light signalling system based on LED lights allows for significant energy savings.

The project of light signalling devices provides the following list of actions to increase the energy saving:

– the use of innovative highly efficient light sources, i.e. LED lights with increased light output to ensure the established illumination standards;

– the use of innovative lighting fixtures with reasonable light distribution;

– the use of light signalling fittings with at least IP67 degree of dust and moisture protection allows increasing the lights lifetime without significant reduction of the luminous flux;

– for high-intensity lights used on the artificial driveway of precise approach of III B categories, a stepwise or smooth adjustment of light intensity and at least five degrees of light intensity in the ratio of 100, 30, 10, 3, and 1% of the nominal are provided;

– the project provides for lamp-wise monitoring of lighting navigational aids lights, allowing to turn on the desired lighting navigational aids subsystem at the right time.

Actions to protect the environment from the harmful effects of civil aircraft flights

In compliance with Article 83 of the Air Code of Ukraine, during the operation of the flight zone No. 2 of SE Boryspil International Airport, appropriate actions will be taken to:

- ensure compliance with obligations during the operation of aircraft on the ground and in the air by aviation entities in terms of compliance with established standards for the content of pollutants in exhaust gases and the impact of physical factors, as well as taking actions to reduce emissions of pollutants, as well as noise, electromagnetic, and radiation levels;
- prohibition on the discharge of substances, waste and materials harmful to human health and the environment from aircraft, except in cases of emergency and performance of aviation chemical works.

Actions to protect the population from the harmful effects of emissions of pollutants, noise, electromagnetic radiation, as well as the risk of aviation accidents during the aircraft operation

In compliance with Article 84 of the Air Code of Ukraine, during the operation of flight zone No. 2 of SE Boryspil International Airport, appropriate actions will be taken to:

- ensure the non-admission of the maximum permissible levels established by the aviation rules of Ukraine for emission by aircraft engines and electromagnetic radiation of aviation facilities, as well as the maximum permissible noise level during the aircraft operation;
- prohibition or restriction of aircraft flights if the noise level during the operation of a civil aircraft exceeds the established maximum permissible noise level.

Actions aimed at reducing the noise levels at and near the airport based on a balanced approach to aviation noise management

– Technical reduction of noise level from aircraft to the values established by the aviation rules of Ukraine.

– Spatial zoning of the area around the airport, taking into account the conditions of aviation noise and other adverse environmental factors (emissions of pollutants, electromagnetic radiation of aviation facilities, and the risk of aviation events), its appropriate planning and development.

– Implementation of operational measures during take-off and landing of aircraft and appropriate organization of air traffic in order to reduce the impact of aircraft noise and other adverse environmental factors.

Description of proposed actions aimed at prevention, avoidance, reduction, and elimination of significant adverse impact on the generated waste

The waste will be collected and stored temporarily, depending on its composition and properties, as well as the degree of hazard posed by them to the environment and human health.

In accordance with the Law of Ukraine on Waste:

– steps will be taken to prevent and reduce waste generation;

– the composition and properties of waste generated, as well as the degree of hazard posed by waste to the environment and human health will be determined in accordance with regulations approved by the central executive body in charge of development of the state policy for sanitary and epidemiological well-being of the population, in agreement with the central executive body in charge of development of the state policy for environmental protection;

– on the basis of material and feedstock balances of production sites, the primary current accounting for quantity, type, and structure of the waste generated, collected, transported, stored, processed, utilized, neutralized and removed will be identified and recorded, and statistical reporting on the same will be submitted in accordance with the established procedure;

– full collection, proper storage and prevention of destruction and spoilage of waste, for the disposal of which there is an appropriate technology compliant with environmental safety requirements in Ukraine, is ensured;

– mixing of waste will not be allowed unless it is provided for by an existing technology and does not complicate waste management, or unless it is proved that such an action complies with environmental safety improvement requirements;

– storage and disposal of waste in unauthorized places or facilities will not be allowed;

– the condition of places or facilities of own waste disposal will be monitored;

– the environmental tax levied for waste disposal will be paid in due time in accordance with the established procedure;

– the persons responsible for waste management will be designated;

– development as appropriate and implementation of waste management organization plans etc. will be provided.

Compensatory measures

In accordance with Tax Code of Ukraine, the company has tax liabilities in respect of:

environmental tax.

– For emission of pollutants into the atmosphere by stationary pollution sources.

– For the waste placement (except for the placement of certain types (classes) of waste as secondary raw materials, which are placed in business entities' own territories (facilities)).

However, it should be noted that according to Article 195 of the Tax Code of Ukraine, transactions related to the provision of maintenance services for aircraft operating international flights are taxed at a zero rate.

Maintenance services for aircraft operating international flights include services that are comprehensively needed and directly related to the performance of an international flight, namely:

maintenance of aircraft and servicing of passengers at the airport (landing and take-off of aircraft, servicing of passengers at the airport, ensuring the aviation security, overtime parking of the aircraft);

ground handling services for aircraft and servicing of passengers at airports;

lease of airport premises in terms of their use for servicing of international flights (offices, reception desks and other office space leased by air carriers operating international flights);

aircraft maintenance personnel services.

In the event of violation of the environmental protection laws by SE Boryspil International Airport, actions will be taken immediately to eliminate the relevant violations, and the damage caused to the environment or health and property of individuals will be compensated in full in the prescribed manner.

It should also be noted that in accordance with Article 256 of the Tax Code of Ukraine, the rental shall be collected for special use of forest resources (plantations covered by the proposed operations area and subject to removal).

Compensation to landowners and land users

In accordance with Article 156 of the Land Code of Ukraine, the landowners and land users whose land plots are to be withdrawn in order to implement the project for the reconstruction of the flight zone No. 2 of SE Boryspil International Airport shall be paid compensation for losses caused by withdrawal (purchase) of agricultural land for the needs not related to agricultural and forestry production.

Compensation for agricultural production losses

Article 208 of the Land Code of Ukraine stipulates that agricultural production losses include the losses of agricultural land, as well as losses caused by restrictions on land use and deterioration of land quality.

The loss of agricultural land (arable land, perennial plantations, fallows, hayfields, pastures) as the main means of production in agriculture due to their withdrawal (purchase) for the needs not related to agricultural production is subject to compensation.

Losses caused by restriction of the rights of landowners and land users, including tenants, or deterioration of land quality due to the adverse impact caused by operations of legal entities or the state, as well as due to the exclusion of agricultural land from economic circulation due to the establishment of guarded, sanitary, and other protection zones are also subject to compensation.

Agricultural production losses caused by the withdrawal of agricultural land (arable land, perennial plantations, fallows, hayfields, pastures) for their use for the purposes other than agriculture and loss of agricultural production caused by restrictions on the rights of landowners and land users, including tenants, or deterioration of land quality due to the impact of companies' operations shall be determined in accordance with the Procedure for Determining the

Agricultural and Forestry Production Losses Subject to Compensation, approved by the resolution of the Cabinet of Ministers of Ukraine on 17 November 1997 under No. 1279.

Taking into account Article 208 of the Land Code of Ukraine and the Procedure for Determining the Agricultural and Forestry Production Losses Subject to Compensation, approved by the resolution of the Cabinet of Ministers of Ukraine on 17 November 1997 under No. 1279, SE Boryspil International Airport will provide compensation for agricultural production losses caused by withdrawal of agricultural land (for the purpose of implementation of the project for reconstruction of runway No. 2), not related to agriculture, within two months after the approval of the land allotment project in the prescribed manner.

8. Description of the expected significant adverse environmental impact of operations due to the project vulnerability to emergency risks, actions to prevent or mitigate the impact of emergencies on the environment and emergency response action

A list of actions to prevent collisions of aircraft with birds and other animals

The actions to protect aircraft against the impact of birds potentially dangerous for the flights at the airport include:

1) timely detection of birds at the airport territory, in a particular airspace above the airport and the strip of aircraft approach to it (ornithological observations – visual, aerovisual, and radar);

2) prompt determination of the degree of danger on the basis of bird watching data in order to limit or stop flights when there is a high risk of aircraft collisions with birds. The degree of danger can be different depending on the number and size of birds, as well as the nature of their behaviour;

3) providing aircraft crews with operational information on the danger of collisions with birds, as well as performing manoeuvres by aircraft crews to prevent aircraft collisions with birds and actions to reduce the danger of such a collision;

4) active hazing of birds at airfields by personnel of certain support units (subdivisions) using the means of active hazing of birds (firing with signal rockets, bio-acoustic, pyrotechnic means, etc.);

5) the use of stationary devices at the airfield to haze birds in off-line mode, which optically or acoustically affect birds (for example, wind-driven), or various mechanical obstacles physically restraining birds (for example, roofing or fencing nets), which are used locally, in areas of frequent appearance of birds, their continuous presence, the formation of mass clusters, depending on the danger posed by birds of a particular species.

In particular, in order to ensure the safety of takeoffs and landings of aircraft, the airport developed measures for monitoring, tracking, accounting, and hazing of birds and wild animals. The airport ornithological service monitors the prevention of conditions that may attract birds.

Actions to manage the hazards posed by hazard agents:

- identification of possible nesting zones, monitoring according to the survey schedule;
- preventing birds and wild animals from entering the airfield area by installing an appropriate fence;
- hazing birds and wild animals;
- imposing restrictions to ensure that actions would not attract birds and wild animals;
- maintaining drainage systems and grass in good condition;
- exclusion of the presence of standing water on the coatings of artificial runways and taxiways;
- maintaining the proper grass height. Grass at the airport is maintained 50 mm to 300 mm high, including the grass trimming before it produces seeds, selection of seeds of appropriate grasses that cannot serve as food for birds, combating the vegetation erosion;
- removal of dead birds and animals, destruction of rodents;
- removal of nesting sites before nesting;
- switching off landing lights between flights;
- identifying and taking actions to eliminate potential places that attract birds and wild animals outside the airport (within 15 km), namely tourist recreation areas, landfills, slaughterhouses, orchards, animal feed warehouses, greenhouses with plants, farms, garbage pits, waste recycling centres, and settling ponds;
- bird chasing – the use of car headlights, sirens; bio-acoustic means are used at the airport in different areas by reproducing the cries of "danger" produced by different species of birds, laser and mechanical means to haze birds by directing a green laser beam, pyrotechnic charges, shots.

Extermination policy, applied during serious activity of birds by setting traps for certain species of birds. The decision on extermination shall be made if the other actions failed only.

Aircraft collisions with birds poses a threat to air transportation safety.

Actions aimed at preventing the penetration of birds and wild animals protect both the airport and wild animals from danger.

To date, the following equipment is used to haze birds from the airfield:

– stationary bio-acoustic birdscarer Bird Guard Super Pro AMP made in the USA, 3 pieces. The operation principle is based on the reproduction of recorded danger signals for different species of birds. Specifications: the number of records is 8; the protected area is up to 12 hectares; the signal strength is up to 125 dB; day/night operation mode, round the clock: the duration of the pause between broadcasts is 1 to 30 minutes;

– gas birdscarers (thunderbolt) Guardian-2 made in Spain, 6 pieces. The operation principle of this birdscarer is based on periodic reproduction of snaps (claps) with a power of up to 110 dB. Specifications: the weight is 8 kg; the sound power is 70 to 110 dB. The devices is adjusted by means of a telescopic tube; gas (propane)-driven; the time of a snap reproduction may vary from 1 to 30 minutes by means of the gas supply valve;

– laser birdscarers LEM-50 made in France, 2 pieces. The birds are hazed away with a green laser beam. Specifications: the device weight is 820 g; the length is 35 cm; the diameter is 6.4 cm; the operating range is up to 1.5 km;

– mobile bio-acoustic birdscarers Scarecrow made in UK, 2 pieces, mounted on response vehicles. The operation principle is based on the reproduction of recorded danger signals for different species of birds. Specifications: the number of danger records is 8; the signal strength is up to 110 dB; manual operation control.

Response to fire

The area of fuel spill on a hard surface may vary from insignificant (fuel sampling), which is a regular situation, to significant (in an emergency situation).

The principal recommenced form of fire precautions for this case is as follows:

- cover the fuel spills with sand, followed by its cleaning and removal to a special site of the DCS base or another place under a relevant agreement;
- when spillage is large-scale, it is recommended to evacuate the aircraft, perform vacuum collection of spilled fuel, cover the spill with dry clean sand, followed by its cleaning and removal under a relevant agreement.

It is proposed to place the following on the apron:

- fire extinguishers (mobile foam and carbon dioxide generators, sandboxes, metal boxes to collect used rags) at least 25 m away from the aircraft;
- the aircraft parking places shall be equipped with earthing devices with resistance up to 100 Ohms. Contact sockets have special labels and are kept constantly cleared of the earth, snow, and ice.

Actions aimed at reducing and preventing the adverse impact of noise at the airport and the surrounding area

Actions aimed at reducing and preventing the adverse impact of noise at the airport at and near the airfield shall be determined in accordance with the Aviation Rules of Ukraine Requirements for the Airfield Operator on Spatial Zoning of the Area Around the Airport in Terms of the Aviation Noise Impact, approved by order of the State Aviation Service of Ukraine on 26 March 2019 under No. 381.

SE Boryspil International Airport, during the reconstruction of runway No. 2 and in the course of its further operation, provides a balanced approach to noise management based on the ICAO approach to noise management, which includes the identification of a noise issue at any airport and further analysis of various existing noise reduction actions based on the use of four key elements, namely:

- noise reduction at the source;
- land use planning and organization;
- operational noise reduction measures;
- operational restrictions in order to address the noise issue in the most cost-effective way.

To reduce the harmful effect of aviation noise, it is proposed to use noise protection devices and actions.

The four key elements of a balanced approach to be used on the runway No. 2 are as follows.

1) Noise reduction at the source:

commissioning of aircraft certified for compliance with current noise emission standards and limits;

compliance with the noise load standards during the design, construction, reconstruction, commissioning, and operation of civil aviation facilities;

determination and collection of a fee for aircraft landing in view of the noise factor;

introduction of instrumental noise control systems;

introduction of information and instrumental systems to monitor the noise load in the territory adjacent to the airport (airfield).

2) Operational actions:

use of appropriate flight routes characterized by the minimal noise load;

use of appropriate take-off runways characterized by the minimal noise load;

introduction of low-noise take-off techniques and lowering of aircraft before landing on separate flight routes near the airfield;

improvement of aircraft repair and maintenance technology.

3) Operating restrictions:

restriction of aircraft engine testing procedures;

restriction or prohibition of operation of certain types of aircraft;

restriction or prohibition of aircraft operation at night;

restriction of use of reverse engine draft.

4) Land use planning and organization:

reasonable acoustic solution for building planning and general building plans around airports (airfields);

reasonable acoustic planning of zones and regimes of vehicle movement around the airfield territory;

creation of noise protection zones;

compliance with the requirements of building codes and sound insulation of buildings near the airfield.

Protective actions

Earthing

To protect personnel from electric shock, all metal non-conductive parts of electrical equipment shall be connected to the PE (PEN) of the power cable conductor.

For the designed TS, a common 10 kV and 0.4 kV earthing device is provided. It shall consist of electrodes made of angle steel 50 × 50 × 5 mm, and connections made of stripped steel 40 × 4 mm. The earthing circuit resistance must not exceed 4 Ohms.

At emergency response services, searchlight masts, TS 1023n, and TS 1024n, the potential equalization system is provided: PE (PEN) conductors of a power supply network, metal structures, and a lightning protection circuit shall be connected to the main grounding bus.

For showers, an additional potential equalization system shall be provided by connecting pipes and metal pallets to the PE bus installed in the box with a PV1 4 mm^2 wire in a 16 mm PVC pipe.

Lightning protection

The lightning protection of buildings is made in accordance with DSTU B.V.2.5-38-2008.

TS and emergency response services are classified as level II, and searchlight masts – to level III in terms of reliability of protection against direct lightning strikes.

The lightning protection of TS and emergency response services is performed by means of a lightning receiving grid laid in the roofs of the buildings. The grid is connected to the lightning protection circuit laid in a trench at a depth of 0.5 m around the building perimeter with lightning rods.

The mast, connected to the angle steel and stripped steel grounding conductors, is used as a lightning rod for searchlight masts.

To protect the breathing valve of the diesel generator and the 5 m^3 fuel tank, a lightning rod connected to the grounding circuit with a 40 × 4 mm steel bar shall be used. Actions ensuring safe conditions for work and operation of existing facilities:

Development of safety and industrial sanitation measures, which are obligatory for all construction stakeholders, by the General Contractor during the preparatory construction period.

Development of actions providing for safe and non-hazardous operation mode during the use of toxic materials, operation of machinery and equipment, for fire, explosion, and electric safety at construction sites, during performance of works in the area where communication lines are laid, protection of dangerous zones, drinking water supply for workers at the construction site etc. as a part of the work performance project.

Testing of the knowledge of engineering and technical personnel and workers on safety and industrial sanitation before proceeding to work.

Slinging of structures with steel slings or special sling devices.

Reliable fixing of concrete blocks on vehicles during their transportation.

Reinforcement of ditch and trench walls.

Before the start of welding works, it is required to check the serviceability of the welding machine, to provide isolation of its case, etc.

The construction and installation works near power lines shall be performed based on the work permit.

Fire extinguishers, water barrels, and boards with fire-fighting equipment must be installed at the construction sites.

Construction site, work areas and workplaces, driveways and approaches to them during the nighttime, as well as lockable premises must be illuminated in compliance with DBN B.2.5-28-2018 "Natural and artificial illumination", DSTU B A.3.2- 15: 2011 "Illumination standards for construction sites".

Providing maintenance personnel with overalls.

When performing painting and waterproofing works, the builders must be provided with protective masks and respirators.

It is forbidden to smoke in machines and right near them, as well as to use open flames during their maintenance.

It is forbidden to start work when brakes, running gears, and sound alarm system are faulty.

The construction site shall be fenced with a solid protective fence 2.0 m high according to DSTU B V.2.8-43: 2011 Inventory Fencing of Construction Sites and Sites Where Construction and Installation Works Are Performed, and safety signs warning about dangerous areas shall be installed.

Premises or places for first aid kits containing medicines and other means of first aid for victims should be provided at the construction site.

According to Article 13 of the Law of Ukraine on Labour Protection, the employer shall ensure the operation of the Occupational Health and Safety Assessment System (OHSAS), for

which it shall create appropriate services and appoints officials to ensure the addressing of labour protection issues in the institution in general, in business units, at the production sites, as well as during the operation of machines and mechanisms, and performance of specific types of work at the workplaces.

The construction and installation organization shall have its own OHSAS, develop and implement actions to prevent dangerous situations that arise in the course of construction and installation works, prevention and minimization of industrial hazards, risks, and pecuniary damage.

The overall management of works related to the OHSAS creation and maintenance in the construction and installation organization shall be the employer's responsibility, while the organizational and methodical work on labour protection management – on the labour protection service.

The construction and installation works shall be carried out according to the work order project (WOP) where especially important requirements of the labour protection rules and actions to ensure their implementation in specific situations shall be reflected. Areas with permanent hazardous production factors, which must be equipped with protective (safety) fences, and zones of potentially hazardous factors, which must be equipped with a signal barrier, shall be identified. If it is required to perform construction and installation works in these areas, appropriate organizational and technical measures for labour safety must be provided for in the WOP.

The Customer and the Contractor shall:

– agree on the volumes, process sequence, and deadlines for performance of construction and installation works, as well as the terms and conditions of their combination with the institution operations;

– determine the procedure of operational management, including the actions of builders and operators in the event of emergencies;

– determine and agree on the terms and conditions of organization of complete and priority supply of equipment and materials, organization of cargo transportation and warehousing, movement of construction equipment around the institution territory, stay and movement of builders around the institution territory, placement of inventory buildings and structures, as well as sanitary and household facilities for builders;

– ensure mobile communication at each facility under construction.

Fire safety at work sites must be ensured in accordance with the Law of Ukraine on Fire Safety, the Rules of Fire Safety During Construction and Installation Works, and the Rules of Fire Safety in Ukraine (NAPB A.01.001-2014).

At the construction site, the employer shall create and be responsible for the fire safety system operation.

The employer shall appoint a person responsible for the implementation of fire safety rules at the construction site. At the construction site, it is required to have fire safety instructions and guidelines for all explosive and fire hazardous premises, sections, warehouses, etc.

The employees shall be allowed to work only after fire safety briefing, and in the case of changes in the work peculiarities – after an extraordinary briefing.

The appropriate number of primary fire extinguishers must be provided depending on the construction site peculiarities, size and operating conditions of the premises, available equipment and the number of jobs, as well as the maximum possible number of employees present.

When it is required to perform earthworks (develop ditches, trenches) in the winter, it is required to develop the soil, taking actions against freezing of the soil walls (below the level of frozen soil) and the base. For this purpose, it is required to do the following:

after the end of the pit development, and in the event of work interruptions for more than 4 hours, the pit must be closed with special portable boards;

in the case of time gaps between the end of pit development and installation of foundation or support exceeding one day, it is required to develop a pit leaving 20–30 cm to the design mark and loosen this layer;

the soil developed from a pit and intended for filling of bags must be prevented from freezing;

to reduce the freezing of the soil developed from the pit, the gaps between its walls and foundations must necessarily be filled on the day of the foundation installation.

To ensure the stability of the foundations installed in winter, as the soil thaws in the spring, it is required to perform additional backfilling with soil subject to its compaction as appropriate. These works must be performed under the supervision of a construction foreman.

The construction organization must establish systematic supervision of foundations laid in winter until complete thawing of the soil before the foundation commissioning.

When digging trenches in winter to lay the cable more than 0.4 m deep, the frozen soil must be warmed up. Soil shall be warmed up with burners available in the construction organization.

The cable may be unrolled, relocated and laid in the cold period only after its preheating within a short time.

The drums with cables shall be warmed up in cars, greenhouses, tents or other premises heated by furnaces, pipes or steam heating radiators, heating and ventilation systems, air ducts, and portable heaters.

A portable heater shall be used to warm up the cable drum outdoors.

Actions in response to emergencies during radioactive material transportation by air

When planning actions in the event of an accident during the transportation of radioactive materials to the airport or in the event of an accident resulting from a plane crash, SE Boryspil International Airport will adhere to the general concept of actions stipulated in Section 3 of the Regulation on Planning Actions and Responses to Accidents During Transportation of Radioactive Materials, approved by the order of the State Committee for Nuclear Regulation of Ukraine dated 7 April 2005 No. 38.

The key environmental protection measures for 2020 are given in Annex 27.

General actions to reduce the harmful impact of operations of SE Boryspil International Airport are given in the Draft Action Plan to Reduce the Harmful Environmental Impact of Operations of SE Boryspil International Airport below.

Draft Action Plan to Reduce the Harmful Environmental Impact of Operations of SE Boryspil International Airport

No.	Actions envisaged	Persons in charge of monitoring	Note
1	Taking atmosphere protection actions		
1.1	Compliance with requirements of permissions for emission of pollutants into the atmosphere by stationary sources		
1.1.1	Monitoring of the content of pollutants in exhaust gases from mobile sources	Head of STS	
1.1.2	Operation and monitoring of technical condition of gas treatment plants in compliance with the Rules of Technical Operation of gas Treatment Plants	Head of GONS SGT	
1.1.3	Checking the efficiency of gas treatment plants	Officer in charge of natural environment protection in the company	
1.1.4	Monitoring of compliance with the established maximum permissible emissions of pollutants at stationary sources	Officer in charge of the natural environment protection in the company	Pollutant concentrations shall be determined by the emission permit dated 27 August 2018 No. 3220883201-14.
1.1.5	Reporting according to the statistical form No. 2-tp (air) – annual	Head of GONS SGT	
1.1.6	Operation of boilers according to process flow diagrams	Chief Power Engineer	
1.2	Adjustment of the inventory report on emission of pollutants at stationary emission sources of SE Boryspil International Airport	Officer in charge of the natural environment protection in the company	During the reconstruction of the runway No. 2, adjustments shall be made to the inventory of pollutant emissions at stationary emission sources in connection with arrangement of additional emission sources
1.3	Spatial zoning of the territory near the airport in view of the aviation noise conditions	Officer in charge of the natural environment protection in the company	
2	**Implementation of actions in the field of protection and reasonable use of water resources**		

2.1	Compliance with requirements of the special water use permit		
2.1.1	Monitoring of compliance with the limits of intake and use of water from underground sources	Completed: water intake and use for own household needs was carried out during 2019 within	Limits Set by a Permit for Special Water Use No. 73/8 dated 6 March 2017
2.1.2	Monitoring of compliance with the limits of pollutant discharge with return waters into natural water objects according to issues No. 1, 2, 3	Completed: the monitoring was carried out quarterly during 2019; no excess of pollutant concentrations in return waters was recorded	Officer in charge of the natural environment protection in the company
2.1.3	Monitoring of return water quality discharged into natural water objects	Completed: the monitoring in accordance with the concluded agreement was carried out quarterly during 2019	Officer in charge of the natural environment protection in the company
2.1.4	Reporting according to statistical forms: No. 2 – TP water economy (annual), No. 7-gr	To be completed by 20 January 2020	Officer in charge of natural environment protection in the company
2.2	Actions to reduce return water pollution		
2.2.1	Operation and maintenance of existing local treatment facilities (LTFs) for surface wastewater treatment: LTFs for storm water of terminal F; LTFs for storm water of fuelling station-1; Solap-6 (parking lot D3); NPP-8 oil catcher (parking lot D2); Rainpark BMO-200 (parking lot D1); ACO Oleopator-KNS 20 (4 pieces, domestic flight area of terminal D)	Officer in charge of the natural environment protection in the company, head of GONS SGT	
2.2.2	Inspection and performance of repair works, cleaning of wells of the storm sewer system	Head of AS	
2.2.3	Construction of local treatment facilities as a part of construction of a pumping and filtration station of the centralized fuelling system warehouse	ZGD with KD and RI, head of the fuel and lubricant warehouse	
2.2.4	Construction of surface water treatment facilities at SE Boryspil International Airport	Officer in charge of the natural environment protection in the company	

2.3	Compliance with requirements of a special subsoil use permit		
2.3.1	Implementation of the Geological Study Program, Including the Experimental and Industrial Development of Drinking Groundwater in the Subsoil Area Where the Water Intake of SE Boryspil International Airport is located: wells No. 2190 (1a), No. 7 (3000), No. 9 (3001), No. 1577 "P" (4), No. 5 "P", No. 2190 (6), No. 950 (7), No. 2205 (8), No. 2204 (9), and No. 2202 (10) in order to obtain a subsoil (groundwater) use permit for 20 years	Officer in charge of the natural environment protection in the company	
3	**Implementation of land protection actions**		
3.1	Carrying out the works for treatment of ground waters from oil products at the core fuel and lubricant warehouse	Head of the fuel and lubricant warehouse	
3.2	Reconstruction of the tank stock of the centralized fuelling system (installation of a monitoring system to prevent spillage/leakage of oil from tanks) (2nd stage)	ZGD with KD and RI, head of the fuel and lubricant warehouse	
3.3	Reconstruction of a filtration facility for draining oil products at the core fuel and lubricant warehouse (inv. No. 47707)	ZGD with KD and RI, head of the fuel and lubricant warehouse	
4	**Implementation of waste management actions**		
4.1	Maintaining a primary record of the amount of waste generated, transferred for storage, treatment, disposal, decontamination, and removal	Head of GONS SGT	Completed: the quarterly maintenance is provided
4.2	Reporting according to statistical forms: information on the status of waste oil management business; No. 1 – waste (annual)	Head of GONS SGT	

4.3	Implementation of organizational measures for the sale or transfer of waste to other enterprises, institutions and organizations engaged in waste collection, treatment and disposal	Completed: the waste of different hazard classes that have been accumulated at the company during the reporting year was transferred for disposal and removal; the waste in the form of used tires, scrap of non-ferrous and ferrous metals, used batteries, and used oil products generated at the company during the reporting year was sold	Officer in charge of the natural environment protection in the company
4.4	Timely obtaining of a permit for waste management operations	Not completed: there is no regulation on the permit obtaining procedure	Officer in charge of the natural environment protection in the company
5	**Implementation of energy saving actions**		

5.1	Implementation of the Program of Energy Saving Actions at SE Boryspil International Airport for 2019–2020: – organizational measures of continuous monitoring and control of the use of energy resources; - – technical and process energy saving actions and increase of energy efficiency during operation of buildings, engineering networks of electricity, heat, and water supply, as well as sewerage; - regular inspection of production premises (inspection of window coverings, door seals, and locks for tightness); - monitoring of compliance with technical recommendations concerning the operation of air conditioners, temperature restrictions for outdoor air, closing of windows and doors; – measurement of the illumination level in working and storage premises in order to prevent overuse of lighting; - conducting thermal imaging of airport buildings to locate the places of heat loss; - reconstruction of Boryspil hotel heating point; to increase its thermal capacity; - replacement of obsolete personal computer system units and monitors with energy-efficient equipment, 300 pcs. (replacement of old 200 pcs., 100 pcs. as new workstations); - a list of systemic energy-intensive IT equipment to be replaced with more energy-efficient one in 2020 has been compiled; - implementation of energy-saving lighting devices (based on LED technologies) during the reconstruction of the Airport Highway No. 1; - replacement of 30 luminaires with 2 kW quartz-	Officer in charge of the natural environment protection in the company	

	halogen lamps with LED luminaires; replacement of the heating network section near the distribution power grid		

		200 m long composed of 4 pipes (800 m); – regulation of heat release into the heating system of buildings with individual heating points due to the programming of controllers to reduce the temperature of the heat transfer agent supply to the heating system during non-working/night hours and on public holidays (for buildings without staff on duty)	
6	**Staff training, ensuring the participation in operations of international environmental organizations**		
6.1	Advanced training and exchange of experience of environmental protection agency employees	Head of SU and RP	
6.2	Implementation of Operational Guideline No. ED-11-17 Balanced List of Requirements for Flight Safety and Environmental Protection	Officer in charge of the natural environment protection in the company	
7	**Post-project monitoring**		
7.1	Ensuring a post-project monitoring to identify any discrepancies and deviations in the projected levels of impact and effectiveness of actions taken to prevent and reduce environmental pollution	Officer in charge of the natural environment protection in the company	If provided for by the environmental impact assessment report

9. Identification of all difficulties (technical deficiencies, lack of sufficient technical means or knowledge) identified during the preparation of the environmental impact assessment report

The objectives of the planned activity is the reconstruction of maneuvering area No. 2 of SE “IA ‘Boryspil’". According the law, the decision on the conducting of the planned activity related to "Reconstruction of Maneuvering Area No. 2 of SE IA ‘Boryspil’” shall be an opinion on environmental impact assessment published by the Ministry of Environment and Natural Resources of Ukraine.

In 2019, the Cabinet of Ministers of Ukraine approved the Concept of Development of the Boryspil International Airport until 2045, the main priorities of which are the development of the infrastructure and introduction of modern services.

The planned activities are aimed at developing the infrastructure of the Boryspil airport, attracting new airlines, and improving service quality.

The purpose of an environmental impact assessment is to identify and estimate levels of the environmental impact of the State Enterprise Boryspil International Airport (SE IA Boryspil) after the implementation of complex of works on reconstruction of Manoeuvring Area No. 2 of SE IA Boryspil, determine the feasibility and acceptability of the planned activity and justify technical, organizational, health, public-legal and other measures on ensuring environmental safety. Assessment is done takin into account the current environmental impact of economic activity of SE IA Boryspil and existing constraints (emissions permit, permit for the special use, etc., existing settlements).

No difficulties were identified in the course of preparation of the environmental impact assessment report on “Reconstruction of the Flight Zone No. 2 of SE IA Boryspil.

10. All comments and suggestions of the public regarding the proposed operations, scope of research and the level of detail of information to be included in the environmental impact assessment report (a table with information on full consideration, partial consideration or reasonable rejection by the business entity of comments and suggestions provided in the process of public discussion of the scope of research and the level of detail of information is attached)

According to paragraph 2 of Article 4 of the Law of Ukraine on Environmental Impact Assessment, SE Boryspil International Airport published on the official website of the Ministry of Ecology and Natural Resources of Ukraine http://eia.menr.gov.ua a notice on the proposed operations for reconstruction of the flight zone No. 2 (registration number – 20199134502; date of official publication: 18 September 2019). The notice on proposed operations is presented in Annex 28.

In compliance with Article 4 of the Law of Ukraine on Environmental Impact Assessment, the notice on proposed operations is published in two printed media, the distribution area of which covers administrative territorial units that may be affected by the proposed operations, and posted on local bulletin boards of self-administration bodies, as well as in other public places in the territory where it is planned to conduct the proposed operations (Annexes 29 and 30).

According to paragraph 7 of Article 5 of the Law of Ukraine on Environmental Impact Assessment, within 20 business days from the date of official publication of notice on proposed operations subject to environmental impact assessment, the public was able to provide the authorized central body with comments and suggestions on proposed operations, research volume and level of details of information to be included in the environmental impact assessment report.

The Environmental Safety and Permitting-Licensing Activities Department of the Ministry of Energy and Environmental Protection of Ukraine in its letter dated 21 October 2019 No. 10/7/6006-19 notes that since the date of official publication of a notice on proposed operations regarding the reconstruction of the flight zone No. 2 of SE Boryspil International Airport (registration file No. 20199134502; date of official publication: 18 September 2019), the comments and proposals regarding the assessment volume and level of detailed information to be included in the environment impact assessment report were received from:

– I. M. Fitsev and Y. O. Fitseva;
– A. A. Fedirko;
– M. M. Rusan;
– O. M. Savchuk;
– citizens of the village of Zatyshne, Boryspil district;
– L. O. Semeniuk;
– citizens of the village of Hora, Boryspil district;
– citizens of the village of Voronkiv, Boryspil district;
– Martusivka Village Council of Boryspil District.

The comments and suggestions regarding the proposed operations are given in Annex 31.

The comments and proposals regarding the proposed operations, assessment volume and level of detailed information to be included in the environment impact assessment report were taken into account partially.

The comments and proposals of O. G. Dzhyha, L. M. Beketova, A. M. Kozeletska, and residents of Kalush, which are attached to the letter of the Environmental Safety and Permitting-Licensing Activities Department of the Ministry of Energy and Environmental Protection of Ukraine dated 21 October 2019 No. 10/7/6006-19 are not related to the proposed operations of SE Boryspil International Airport.

General information on taking into account the comments and proposals regarding the assessment volume and level of detailed information to be included in the environment impact assessment report is given in the table below.

Comments and proposals regarding the proposed operations	The result of consideration of comments and proposals (full taking into account, partial taking into account, or justification of deviation)
Comments and suggestions regarding the proposed operations from Fitsev Ihor Mykolaiovych and Fitseva Yulia Oleksandrivna	
Paragraph 8 of this notice "on the types of eventual environmental impact", namely with regard to the village of Martusivka, where I live. Does not confirm the acoustic impact assessment. Namely that the acoustic impact on the adjacent settlements will remain within the current limits. The vague wording, namely "LAmax> 80 dBA partly: (...) to the south – partly Zatyshne, Martusivka; to the west: certain quarters of Hora" does not explicitly indicate: (a) current acoustic impact limits; (b) current values of such impact; (c) the body that conducted the expert assessment and its conclusions. Preventing to assess the acoustic impact	**Taken into account** Noise maps with outlined maximum sound levels (LAmax) and equivalent levels (LAeqv) for day and night time under current and prospective load conditions of Boryspil International Airport prepared by Ukrdorproekt Institute are provided in Annex 4 to the Environmental Impact Assessment Report. See Annex 32 for risk zone charts regarding the Kyiv/Boryspil airfield aviation noise impact. Zone D: further residence, school or health facility development will only be approved in emergency circumstances. Zone C: noise level meets morning requirements, however at night noise level is 5 dB over night time requirements. New house developments will only be approved if construction provides noise reduction for at least 30 dB. Zone B: noise level meets daytime and night requirements. New house developments will only be approved if construction provides noise reduction for at least 25 dB. Zone A: standard construction regulations applied
Paragraph 8 of this notice "on the types of eventual environmental impact", namely with regard to the village of Martusivka, where I live. Does not provide information about electromagnetic radiation. Namely, the propagation of electromagnetic radiation during the radio navigation equipment operation. No assessment is provided. Still, paragraph 5 on the general specifications indicates the installation of two radio beacons, course and glide path, with the operation range of 46 km and 18 km, respectively, as well as a long-range beacon. Accordingly, there is no indication of: (a) current electromagnetic radiation limits, including for airports; (b) current radiation values for nearby settlements; (c) the body that conducted scientific and technical	**Taken into account** Landing system radio-transmitters are the EMS source that generate EMS field in bandwidth classified in SNiP 239: • course beacon LLZ 421 – bandwidth 8 (108–112 MHz); • glide slope beacon GP 422 with distance measurement DME 415 – bandwidth 9 (329–335 MHz) and (900–1,200 MHz) respectively. Special operation conditions – none. Electromagnetic field for bandwidth 8 is estimated by Field Strength. Electrical Filed Strength is measured in Volts per metre (V/m). Electromagnetic field for bandwidth 9 is estimated by Surface Flow Density (SFD). SFD is measured in Watt per square metre (W/m^2), microwatt pet square centimetre ($\mu W/cm^2$). Electromagnetic field for bandwidth 9 is estimated by Surface Flow Density (SFD). SFD is measured in Watt per square metre (W/m^2), microwatt pet square centimetre ($\mu W/cm^2$).

examination and its conclusions. Preventing to assess the electromagnetic impact	Operation – 24 h, autonomous at a high safety/dependability level, not requiring service personnel involvement. No permanent/interim operators. All diagnostics and control operations are made with the use of remote controls. This facility excludes any emergency that can affect environment or equipment. Landing system equipment is located in containers and meets current health regulation standards. A Sanitary Protection Zone (SPZ) and Restricted Development Zone (RDZ) are established to protect people from EMP exposure. Sanitary Protection Zone is the area adjacent to the radio-facility service site where maximum permissible EMP level is exceeded at 2 m above ground level. SPZ external boundary is defined at 2 m above ground level beyond maximum permissible EMP (MPL). Restricted development zone includes area where MPL is exceeded at 2 m above ground level. The Zone's external boundary is defined based on maximum height of houses in the development area, at the third floor were EMP is within MPL. According to DSP 173-96 for the facilities with antennas emitting electromagnetic radiation at defined horizontal angle and EMP is variable depending on its position above ground level restricted development zones are subject to vertical differentiation by height (metres). 3, 6, 9, 12, 15, etc. Project landing radio facilities are located at airfield. According to current regulatory documents airport runways shouldn't have any facilities excluding facilities whose functionality requires such location (radio navigation and landing facilities) and vegetation (bushes, trees, etc.) Height of facilities located within airfield is limited by Ukraine Airside Certification Requirements. Due to the above Development Restriction Zone is not required. See DSNiP 239 Table 1.2 for maximum permissible values of electromagnetic field generated by radio facilities. According to DSNiP 239, Maximum Permissible Strength (MPV) for VHF transmitters (bandwidth 8) is 6 V/m; Maximum Permissible Power Flow Density (MPPFD) for UHF transmitters (bandwidth 9) is 10 μW/cm^2. Sanitary zone calculation results. Calculation of electromagnetic field generated by RTO feeder antenna devices is made with the use of Antenna Impact Calculation software. Sanitary zone calculations are made with the regard to the adjacent technical

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For the purpose of calculation the reference point (±0.00) above ground level is the RTO antenna foundation above sea level.
Total expected EMP levels generated by KRM/GRM transmitters at 2.0 m above ground are above Maximum Permissible Level (MPL). In view of the above, the Sanitary Protected Zones (SPZ) for the above RTOs shall be defined.
SPZ boundary:
1. KRM-36L: 26 m long from KRM antenna along the ShZPS rwy axis in the 18R ShZPS threshold direction; 32 m wide (16 m at each side of rwy axis);
2. For GS-36L: 16 m long from the GS antenna along the axis that is parallel to the ARW axis in the 36L ARW threshold direction; 10 m wide.
3. KRM-18R: 26 m long from KRM antenna along the ShZPS rwy axis in the 36L ShZPS threshold direction; 32 m wide (16 m at each side of rwy axis);
4. GRM-18R: 16 m long from GRM antenna along the axis parallel to the ShZPS rwy axis in the 18R ShZPS threshold direction; 16 m wide.
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</table>
In general, the location and operation conditions of Boryspil airport’s ShZPS-2 navigation and landing equipment as an EMS source meet “EMS Exposure Sanitary Regulations” approved by the order 01.08.1996 of the Ministry of Health of Ukraine of 239 (August 1996).</td>
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<td>Paragraph 8 of this notice "on the types of eventual environmental impact", namely with regard to the village of Martusivka, where I live.
Does not provide information on emissions into the air. Obviously, the construction of an additional runway should increase harmful emissions from aviation fuel only at least twice. However, the general wording, namely that "the operations involve the release of pollutants into the atmosphere by stationary and mobile sources of pollutant emissions" does not in any way specify:</td>
<td>Taken into account
SE Boryspil International Airport emits pollutants from its stationary sources in accordance with Emission Permit 3220883201-14 issued by the Department of Ecology and Natural Resources of the Kyiv Regional State Administration on 27 August 2018. Permit is valid for 10 years – from 27 August 2018 to 27 August 2028.
Based on pollutant dispersion in lower surface: pollutant concentration in lower surface bordering closest residence area is within permissible level.
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For more details on pollutants from stationary and mobile sources see Environment</td>
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</table>

(a) current emission limits for harmful substances, including for airports; (b) current emission values for all nearby settlements; (c) expected emissions and the body that conducted an expert impact assessment. Preventing to assess the harmful emissions	Impact Assessment, sections 1.5 and 5.
Given the above facts, I hereby request to: 1. Ban the construction of the artificial runway and all other related works indicated in notice No. 20199134502 until an independent and qualified environment impact assessment is performed. 2. Conduct a qualified environment impact assessment of Boryspil International Airport operations, including the operations primarily affecting the village of Martusivka. 3. Publish the examination findings in the media and at the same time inform the community of the village of Martusivka through the village council and/or the leaders of the united territorial community. 4. Enable repeated public discussion within the community of the Boryspil International Airport's proposed operations in compliance with applicable laws	**Taken into account in part** According to the law of Ukraine on Environment Impact Assessment (Law), Article 2, environmental impact assessment is the procedure that includes the following: 1) the entity prepares an environmental impact assessment report in accordance with Articles 5, 6, and 14 of this Law; 2) the community conducts a public discussion in accordance with Articles 7, 8, and 14 of this Law; 3) in accordance with Article 9 of this Law, a respective authority conducts analysis of the information provided in the environmental impact assessment report, any other additional information provided by the entity, and information provided by the community during the public discussion and transboundary impact assessment, as well as any other information; 4) the authority provides a reasoned opinion on the environmental impact assessment that includes analysis results described in paragraph 3 above; 5) the opinion on the environmental impact assessment is taken into account in the decision on the proposed operations in accordance with Article 11 of this Law. Article 9 of the Law of Ukraine on Environment Impact Assessment says that the central authority shall provide an opinion on environment impact assessment which based on assessment of impact of scheduled activities including size and level of such impact (area, population that can be exposed), nature (including transboundary), intensity and complexity, probability, expected beginning, duration, frequency and inevitability of impact (including any direct, indirect, accumulated, transboundary, short-term, middle-term and long-term, constant and temporary, positive and negative impacts), controls provided to prevent, divert, avoid, mitigate, exclude environment impact determines whether the scheduled activities are acceptable or not and defines environmental conditions for such activities. Central Authority shall publish an Environment Impact Conclusion within three business days after its approval as described in Article 4 of this Law and file the same with the Unified Environment Impact Assessment Register.

	Article 7 of the Law of Ukraine on Environment Impact Assessment says that public discussion during environmental impact assessment is conducted to discover, collect and take into account community's observations and suggestions on the proposed operations . Public has the right to submit any comment or suggestion without a justification as it deems relevant to the proposed operations. Comments and suggestions may be submitted in writing (including electronically) and orally during the public discussion and shall be included in the minutes. Written comments and suggestions shall be submitted during the public discussion within the timeframes established in part seven of Article 5 of this Law and part six of the said article. The central authority undertakes to ensure a public discussion during the environmental impact assessment. Public discussion of the assessment volume and level of detail of information to be included in the environmental impact assessment report shall be conducted in accordance with Article 5 of this Law. After the Environment Impact Assessment Report is submitted, the public discussion of the proposed operations shall be conducted in the form of public hearings and submission of comments and suggestions (including electronically). After the Environment Impact Assessment Report is submitted, the public discussion of the proposed operations shall commence on the day the official announcement about the commencement of the public discussion of the Environment Impact Assessment Report is published and public is provided access to the Environment Impact Assessment Report for review as stipulated by Article 4 of this Law, and last for no less than 25 and no more than 35 business days. All public comments and suggestions received within the set timeframe shall be considered by the central authority. Suggestions submitted after the set timeframe shall not be considered. When no comments and suggestions are submitted within the set timeframe, they shall be considered non-existent. The central authority shall be responsible for the preparation of the public discussion report. The information publication data as defined by Article 4 of this Law, including the confirmation of such publication, list of materials submitted for public discussion, minutes of public hearings, all written comments and suggestions submitted by public, and a table that includes information about full or partial taking into account or reasoned rejection of comments and suggestions submitted during public discussion shall form an integral part of the Environmental Impact Assessment Report. The Public Discussion Report shall be filed with the Unified Environmental Impact Register within the period specified in part seven of Article 9 of this Law. The central authority shall set the requirements as to the format and

	contents of the Public Discussion Report. The business entity shall bear all costs associated with public discussion. The public discussion procedure during the environmental impact assessment is approved by Enactment No. 989 of the Cabinet of Ministers of Ukraine dated 13 December 2017. This Enactment stipulates, including, but not limited to, that a repeated public discussion shall only be conducted if a public discussion is recognised void due to default of the public hearing organiser. Further, please note that the Article 17 of the law of Ukraine on Environmental Impact Assessment defines that on a temporary basis, for the period of validity and within the boundaries of the quarantine declared by the Cabinet of Ministers of Ukraine to prevent the spread of COVID-19 across Ukraine, until and for 30 days after complete quarantine cancellation, the public discussion of proposed operations shall be held via submission of comments and suggestions in writing (including electronically), as shall be announced in the announcement of commencement of a public discussion of the Environmental Impact Assessment Report and Public Discussion Report. Public hearings provided for by Article 7 of this Law shall not be held or scheduled for the duration of quarantine. Public hearings scheduled for that period shall be deemed void and shall not be re-scheduled
Comments and suggestions regarding the proposed operations from Fedirko Andrii Anatoliiovych	
Since spring 2019, the existing aircraft traffic began to create discomfort for residents of several villages, namely: Velyka Oleksandrivka, Chubynske, and Hora. Due to the reduction of the movement trajectory, now the planes lower and rise directly above the residential buildings of the said settlements. We hereby ask you, as a relevant ministry, to take part in the planning of these works, in particular to ensure comfortable living for the residents of the surrounding villages (including, but not limited to): Velyka Oleksandrivka, Chubynske, and Hora. Also please, check whether there is any alternative regarding the direction of aircraft movement during takeoff and landing (other than above settlements), and whether the noise from the existing	**Taken into account in part** Aircraft/helicopter take-off and landing requirements are defined in Order No. 628 of the State Aviation Agency of Ukraine dated 5 July 2018 on Approval of Aviation Regulations of Ukraine, Airworthiness Technical Requirements and Administrative Procedures in Civil Aviation. Take-off/landing paths depend on aircraft/helicopter specifications, weather, air traffic, etc. Noise maps with outlined maximum sound levels (LAmax) and equivalent levels (LAeqv) for day and night time under current and prospective load conditions of Boryspil International Airport prepared by Ukrdorproekt Institute are provided in Annex 4 to the Environmental Impact Assessment Report. See Annex 32 for risk zone charts regarding the Kyiv/Boryspil airfield aviation noise impact. Zone D: further residence, school or health facility development will only be approved in emergency circumstances. Zone C: noise level meets morning requirements, however at night noise level is 5 dB

trajectory meets the limits and standards	over night time requirements. New house developments will only be approved if construction provides noise reduction for at least 30 dB. Zone B: noise level meets daytime and night requirements. New house developments will only be approved if construction provides noise reduction for at least 25 dB. Zone A: standard construction regulations applied
Comments and suggestions regarding the proposed operations from Rusan Mykola Mykolaiovych	
Currently, the planes landing for and taking off from Boryspil Airport pass above Voronkovo and above my house very low. There is a lot of noise around the clock, especially at night; it is impossible to sleep. The Constitution of Ukraine, Article 45, guarantees the right to rest. Now this right is violated, because it is impossible to rest in these conditions. Very often black stripes can be seen during landing and take-offs. The number of cancer patients and patients with allergy has increased in the village. According to Article 24 of the Law of Ukraine on Ensuring Sanitary and Epidemic Welfare of the Population, the noise at protected facilities during the implementation of any operations should not exceed the levels established by sanitary limits for the relevant time of day. Order of the Ministry of Health of Ukraine No. 463 dated 22 February 2019 on Approval of the State Sanitary Limits of Permissible Noise Levels in Residential and public Buildings and in Residential Areas, paragraph 42, establishes the following values: 55 during the daytime, and 45 during the night	**Taken into account in part** Aircraft/helicopter take-off and landing requirements are defined in Order No. 628 of the State Aviation Agency of Ukraine dated 5 July 2018 on Approval of Aviation Regulations of Ukraine, Airworthiness Technical Requirements and Administrative Procedures in Civil Aviation. Take-off/landing paths depend on aircraft/helicopter specifications, weather, air traffic, etc. Noise maps with outlined maximum sound levels (LAmax) and equivalent levels (LAeqv) for day and night time under current and prospective load conditions of Boryspil International Airport prepared by Ukrdorproekt Institute are provided in Annex 4 to the Environmental Impact Assessment Report. See Annex 32 for risk zone charts regarding the Kyiv/Boryspil airfield aviation noise impact: Zone D: further residence, school or health facility development will only be approved in emergency circumstances. Zone C: noise level meets morning requirements, however at night noise level is 5 dB over night time requirements. New house developments will only be approved if construction provides noise reduction by at least 30 dB. Zone B: noise level meets daytime and night requirements. New house developments will only be approved if construction provides noise reduction for at least 25 dB. Zone A: standard construction regulations applied SE Boryspil International Airport emits pollutants from its stationary sources in accordance with Emission Permit 3220883201-14 issued by the Department of Ecology and Natural Resources of the Kyiv Regional State Administration on 27 August 2018. Permit is valid for 10 years – from 27 August 2018 to 27 August 2028. Based on pollutant dispersion in lower surface: pollutant concentration in lower surface bordering closest residence area is within permissible level. See Annex 23 to the Environmental Impact Assessment Report for specifications and parameters of new and renewed pollution sources.

	For more details on pollutants from stationary and mobile sources see Environment Impact Assessment, sections 1.5 and 5.
Comments and suggestions regarding the proposed operations from Savchuk Oleksandr Mykolaiovych	
Paragraph 8 of this notice "on the types of eventual environmental impact", namely with regard to the village of Martusivka, where I live. Does not confirm the acoustic impact assessment. Namely that the acoustic impact on the adjacent settlements will remain within the current limits. The vague wording, namely "LAmax> 80 dBA partly: (…) to the south – partly Zatyshne, Martusivka; to the west: certain quarters of Hora" does not explicitly indicate: (a) current acoustic impact limits; (b) current values of such impact; (c) the body that conducted the expert assessment and its conclusions. Preventing to assess the acoustic impact	**Taken into account** Noise maps with outlined maximum sound levels (LAmax) and equivalent levels (LAeqv) for day and night time under current and prospective load conditions of Boryspil International Airport prepared by Ukrdorproekt Institute are provided in Annex 4 to the Environmental Impact Assessment Report. See Annex 32 for risk zone charts regarding the Kyiv/Boryspil airfield aviation noise impact. Zone D: further residence, school or health facility development will only be approved in emergency circumstances. Zone C: noise level meets morning requirements, however at night noise level is 5 dB over night time requirements. New house developments will only be approved if construction provides noise reduction for at least 30 dB. Zone B: noise level meets daytime and night requirements. New house developments will only be approved if construction provides noise reduction for at least 25 dB. Zone A: standard construction regulations applied
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Total expected EMP levels generated by KRM/GRM transmitters at 2.0 m above ground are above Maximum Permissible Level (MPL). In view of the above, the Sanitary Protected Zones (SPZ) for the above RTOs shall be defined.
SPZ boundary:
1. KRM-36L: 26 m long from KRM antenna along the ShZPS rwy axis in the 18R ShZPS threshold direction; 32 m wide (16 m at each side of rwy axis);
2. for GS-36L: 16 m long from the GS antenna along the axis that is parallel to the ARW axis in the 36L ARW threshold direction; 10 m wide;
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In general, the location and operation conditions of Boryspil airport’s ShZPS-2 navigation and landing equipment as an EMS source meet EMS Exposure Sanitary Regulations, approved by order No. 239 of the Ministry of Health of Ukraine dated 1 August 1996.</td>
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SE Boryspil International Airport emits pollutants from its stationary sources in accordance with Emission Permit No. 3220883201-14, issued by the Department of Ecology and Natural Resources of the Kyiv Regional State Administration on 27 August 2018. Permit is valid for 10 years – from 27 August 2018 to 27 August 2028.
Based on pollutant dispersion in lower surface: pollutant concentration in lower surface bordering closest residence area is within permissible level.
See Environment Impact Assessment Attachment 23 for specifications and parameters of new and renewed pollution sources.
For more details on pollutants from stationary and mobile sources see Environment Impact Assessment, sections 1.5 and 5.</td>
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(b) current emission values for all nearby settlements; (c) expected emissions and the body that conducted an expert impact assessment. Preventing to assess the harmful emissions	
Given the above facts, I hereby request to: 1. ban the construction of the artificial runway and all other related works indicated in notice No. 20199134502 until an independent and qualified environment impact assessment is performed. 2. Conduct a qualified environment impact assessment of Boryspil International Airport operations, including the operations primarily affecting the village of Martusivka. 3. Publish the examination findings in the media and at the same time inform the community of the village of Martusivka through the village council and/or the leaders of the united territorial community. 4. Enable repeated public discussion within the community of the Boryspil International Airport's proposed operations in compliance with applicable laws	**Taken into account in part** According to the law of Ukraine on Environment Impact Assessment (Law), Article 2, environmental impact assessment is the procedure that includes the following: 1) the entity prepares an environment impact assessment report in accordance with Articles 5, 6, and 14 of this Law; 2) the community conducts a public discussion in accordance with Articles 7, 8, and 14 of this Law; 3) in accordance with Article 9 of this Law, a respective authority conducts analysis of the information provided in the Environmental Impact Assessment Report, any other additional information provided by the entity, and information provided by the community during the public discussion and transboundary impact assessment, as well as any other information; 4) the authority provides a reasoned opinion on the environmental impact assessment that includes the analysis results described in paragraph 3 above; 5) the opinion on the environmental impact assessment shall be taken into account in the decision on the proposed operations in accordance with Article 11 of this Law. Article 9 of the Law of Ukraine on Environment Impact Assessment says that the central authority shall provide an opinion on environment impact assessment which based on assessment of impact of scheduled activities including size and level of such impact (area, population that can be exposed), nature (including transboundary), intensity and complexity, probability, expected beginning, duration, frequency and inevitability of impact (including any direct, indirect, accumulated, transboundary, short-term, middle-term and long-term, constant and temporary, positive and negative impacts), controls provided to prevent, divert, avoid, mitigate, exclude environment impact determines whether the scheduled activities are acceptable or not and defines environmental conditions for such activities. The Central Authority shall publish an Environmental Impact Conclusion within three business days after its approval as described in Article 4 of this Law and file the same with the Unified Environment Impact Assessment Register. Article 7 of the Law of Ukraine on Environment Impact Assessment says that public

	discussion during environmental impact assessment shall be conducted to discover, collect, and take into account public comments and suggestions on the proposed operations. Public has the right to submit any comment or suggestion without a justification as it deems relevant to the proposed operations. Comments and suggestions may be submitted in writing (including electronically) and orally during the public discussion and shall be included in the minutes. Written comments and suggestions shall be submitted during the public discussion within the timeframes established in part seven of Article 5 of this Law and part six of the said article. The central authority shall ensure a public discussion during the environmental impact assessment procedure. Public discussion of the scope of research and level of detail of information to be included in the Environmental Impact Assessment Report shall be conducted in accordance with Article 5 of this Law. After the Environmental Impact Assessment Report is submitted, the public discussion of the proposed operations shall be conducted in the form of public hearings and submission of comments and suggestions in writing (including electronically). After the Environment Impact Assessment Report is submitted, the public discussion of the proposed operations shall commence on the day the official announcement about the commencement of the public discussion of the Environment Impact Assessment Report is published and public is provided access to the Environment Impact Assessment Report for review as stipulated by Article 4 of this Law, and last for no less than 25 and no more than 35 business days. All public comments and suggestions received within the set timeframe shall be considered by the central authority. Suggestions submitted after the set timeframe shall not be considered. When no comments and suggestions are submitted within the set timeframe, they shall be considered non-existent. The authorized central authority shall be responsible for the preparation of the public discussion report. The information publication data as defined by Article 4 of this Law, including the confirmation of such publication, the list of materials submitted for public discussion, public hearing minutes, all comments and suggestions submitted by the public in writing, and a table containing information about full or partial taking into account or reasoned rejection of comments and suggestions received during public discussion shall form an integral part of the Environmental Impact Assessment Report. The Public Discussion Report shall be filed with the Unified Environmental Impact Register within the period specified in part seven of Article 9 of this Law. The central authority shall set the requirements as to the format and contents of the Public Discussion Report.

	The business entity shall bear all costs associated with public discussion. The public discussion procedure during the environmental impact assessment is approved by Enactment No. 989 of the Cabinet of Ministers of Ukraine dated 13 December 2017. This Enactment stipulates, including, but not limited to, that a repeated public discussion shall only be conducted if a public discussion is recognised void due to default of the public hearing organiser. Further, please note that the Article 17 of the law of Ukraine on Environmental Impact Assessment defines that on a temporary basis, for the period of validity and within the boundaries of the quarantine declared by the Cabinet of Ministers of Ukraine to prevent the spread of COVID-19 across Ukraine, until and for 30 days after complete quarantine cancellation, the public discussion of proposed operations shall be held via submission of comments and suggestions in writing (including electronically), as shall be announced in the announcement of commencement of a public discussion of the Environmental Impact Assessment Report and Public Discussion Report. Public hearings provided for by Article 7 of this Law shall not be held or scheduled for the duration of quarantine. Public hearings scheduled for that period shall be deemed void and shall not be re-scheduled
Comments and suggestions on the proposed operations, submitted by residents of Zatyshne village, Boryspil district	
We, the residents of Zatyshne village, withhold our approval of the Flight Zone No. 2 Renovation Project of SE Boryspil International Airport due the following items included in paragraph 8 of the Project: – flights will be done over Zatyshne village (no flight chart is provided), which is a violation of clause 5.21 of the current sanitary requirements, approved by Order No. 173 of the Ministry of Health of Ukraine dated 19 June 1996; – stationary and mobile facilities will emit pollutants into the air, which is a violation of the law of Ukraine on Air Protection; – excess of hygienic noise limits specified in Annex 16 to the State Sanitary Regulations, approved by Order No. 173 of the Ministry of Health of Ukraine dated 19 June 1996; – excess of the maximum permissible levels of	**Taken into account in part** In compliance with the State Sanitary Rules for Settlement Planning and Development, approved by Order No. 173 of the Ministry of Health of Ukraine dated 19 June 1996 (paragraph 5.21), the proposed reconstruction of the flight zone No. 2 of SE Boryspil International Airport will be carried out outside urban and rural settlements as required by DBN B.2.2-12: 2018 Territory Planning and Development in compliance with the Air Code of Ukraine (Articles 41, 54). The Law of Ukraine on Environmental Impact Assessment and Enactment No. 989 of the Cabinet of Minister of Ukraine dated 13 December 2017 on Approval of the Public Hearing Procedure During Environment Impact Assessment stipulate that when assessing the environmental impact and holding the public hearing, public comments and suggestions may be taken into account in full, in part, or reasonably rejected. The need for a public approval in the course of the environmental impact assessment and holding of a public hearing is not stipulated by laws. SE Boryspil International Airport emits pollutants from its stationary sources in accordance with Emission Permit No. 3220883201-14, issued by the Department of Ecology and Natural Resources of the Kyiv Regional State Administration on

electromagnetic radiation – excess of indicators in Annex 21 to the State Sanitary Regulations, approved by Order No. 173 of the Ministry of Health of Ukraine dated 19 June 1996	27 August 2018. Permit is valid for 10 years – from 27 August 2018 to 27 August 2028. Based on the Law of Ukraine on Air Protection, in the case of change of emission source parameters and quantity, qualitative and quantitative chemical composition of pollutants, or actions to reduce them to a permissible limit, the said Permit will be amended as appropriate. Based on pollutant dispersion in lower surface: pollutant concentration in lower surface bordering closest residence area is within permissible level. See Annex 23 to the Environmental Impact Assessment Report for specifications and parameters of new and renewed pollution sources. Noise maps with outlined maximum sound levels (LAmax) and equivalent levels (LAeqv) for day and night time under current and prospective load conditions of Boryspil International Airport prepared by Ukrdorproekt Institute are provided in Annex 4 to the Environmental Impact Assessment Report. See Annex 32 for risk zone charts regarding the Kyiv/Boryspil airfield aviation noise impact. Zone D: further residence, school or health facility development will only be approved in emergency circumstances. Zone C: noise level meets morning requirements, however at night noise level is 5 dB over night time requirements. New house developments will only be approved if construction provides noise reduction for at least 30 dB. Zone B: noise level meets daytime and night requirements. New house developments will only be approved if construction provides noise reduction for at least 25 dB. Zone A: standard construction regulations applied. Landing system radio-transmitters are the EMS source that generate EMS field in bandwidth classified in SNiP 239: • course beacon LLZ 421 – bandwidth 8 (108–112 MHz); • glide slope beacon GP 422 with distance measurement DME 415 – bandwidth 9 (329–335 MHz) and (900–1,200 MHz) respectively. Special operation conditions – none. Electromagnetic field for bandwidth 8 is estimated by Field Strength. Electrical Filed Strength is measured in Volts per metre (V/m). Electromagnetic field for bandwidth 9 is estimated by Surface Flow Density (SFD). SFD is measured in Watt per square metre (W/m^2), microwatt pet square centimetre ($\mu W/cm^2$). Electromagnetic field for bandwidth 9 is estimated by Surface Flow Density

	(SFD). SFD is measured in Watt per square metre (W/m^2), microwatt pet square centimetre ($\mu W/cm^2$). Operation – 24 h, autonomous at a high safety/dependability level, not requiring service personnel involvement. No permanent/interim operators. All diagnostics and control operations are made with the use of remote controls. This facility excludes any emergency that can affect environment or equipment. Landing system equipment is located in containers and meets current health regulation standards. A Sanitary Protection Zone (SPZ) and Restricted Development Zone (RDZ) are established to protect people from EMP exposure. Sanitary Protection Zone is the area adjacent to the radio-facility service site where maximum permissible EMP level is exceeded at 2 m above ground level. SPZ external boundary is defined at 2 m above ground level beyond maximum permissible EMP (MPL). Restricted development zone includes area where MPL is exceeded at 2 m above ground level. The Zone's external boundary is defined based on maximum height of houses in the development area, at the third floor were EMP is within MPL. According to DSP 173-96 for the facilities with antennas emitting electromagnetic radiation at defined horizontal angle and EMP is variable depending on its position above ground level restricted development zones are subject to vertical differentiation by height (metres). 3, 6, 9, 12, 15, etc. Project landing radio facilities are located at airfield. According to current regulatory documents airport runways shouldn't have any facilities excluding facilities whose functionality requires such location (radio navigation and landing facilities) and vegetation (bushes, trees, etc.) Height of facilities located within airfield is limited by Ukraine Airside Certification Requirements. Due to the above Development Restriction Zone is not required. See DSNiP 239 Table 1.2 for maximum permissible values of electromagnetic field generated by radio facilities. According to DSNiP 239 (Health Standards), the Maximum Permissible Strength (MPS) for VHF transmitters (bandwidth 8) is 6 V/m; the Maximum Permissible Power Flow Density (MPPFD) for UHF transmitters (bandwidth 9) is 10 $\mu W/cm^2$. Sanitary zone calculation Calculation of electromagnetic field generated by feeder antenna devices RTO

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<td>made by “Antenna Impact Calculation” software.
Sanitary zone calculations with regard to the adjacent technical terrain.
For the purpose of calculation, the reference point (± 0.00) above ground level is the RTO antenna foundation above sea level.
Total expected EMP levels generated by KRM/GRM transmitters at 2.0 m above ground are above the Maximum Permissible Level (MPL). Based on this, the Sanitary Protected Zones (SPZ) for the above RTO’s are defined.
SPZ boundary:
1. KRM-36L: 26 m long from KRM antenna along the ShZPS rwy axis in the 18R ShZPS threshold direction; 32 m wide (16 m at each side of rwy axis);
2. GRM-36L: 16 m long from GRM antenna along the axis parallel to the ShZPS rwy axis in the 36L ShZPS threshold direction; 10 m wide.
3. KRM-18R: 26 m long from KRM antenna along the ShZPS rwy axis in the 36L ShZPS threshold direction; 32 m wide (16 m at each side of rwy axis);
4. GRM-18R: 16 m long from GRM antenna along the axis parallel to the ShZPS rwy axis in the 18R ShZPS threshold direction; 10 m wide.
<table>
<tr><th>Facility</th><th>Emission bearing, degrees</th><th>Maximum EMP level at 2.0 m</th><th>SPZ boundary</th></tr>
<tr><td>KRM-36L</td><td>182° 36`</td><td>4.569</td><td>26.00x32.00</td></tr>
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<tr><td>KRM-18R</td><td>2° 36`</td><td>32.184</td><td>16.00x10.00</td></tr>
</table>
In general the location and operation conditions of Boryspil Airport’s ShZPS-2 navigation and landing equipment as an EMS source meet the “EMS Exposure Sanitary Regulations” approved by the Order 239 of the Ministry of Health of Ukraine of 1 August 1996.</td>
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<td>Today we, the residents of the village of Zatyshne, are exposed to excess noise levels and pollutant emissions from aircraft flying over our houses day and night. This results in loss of crops, damage to our health, and Boryspil International’s treatment facilities are located only 300 m away from our houses which doesn’t provide the minimum green space required for treatment facility sanitary zones (50 m from planted trees and bushes). This damages residents’ health, promotes ailments and causes air</td>
<td>Sustained in part
Noise maps with outlined maximum sound levels (LAmax) and equivalent levels (LAeqv) for day and nighttime under the current and prospective load conditions of Boryspil International drawn by the Ukrdorproekt Institute are provided in Annex 4 to the Environmental Impact Assessment report.
See Annex 32 for Boryspil International noise level risk zone charts.
Zone D: further residence, school or health facility development will only be approved in emergency.
Zone C: noise levels are within the morning limit, however at night the noise level is</td>
</tr>
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pollution.	5 dB over the nighttime limit. New house developments will only be approved if construction provides noise reduction for at least 30 dB. Zone B: noise level are within daytime and nighttime limit. New house developments will only be approved if construction provides for noise reduction of at least 25 dB. Zone A: standard construction regulations applied. Boryspil International emits pollutants from its stationary sources in accordance with Emission Permit 3220883201-14 issued by Kyiv Regional Environment Department 27 August 2018. The permit is valid for 10 years - from 27 August 2018 to 27 August 2028. Based on pollutant dispersion in lower surface: the pollutant concentration in lower surface bordering the closest residence area is within permissible levels. See Environmental Impact Assessment Annex 23 for specifications and parameters of new and renewed pollution sources. For more details on pollutants from stationary and mobile sources see the Environmental Impact Assessment, sections 1.5 and 5. The project provides for construction of a Local Treatment Facility (LTF) site at Flight Area 2. It includes: LTF building with integrated KNS 5 pump for polluted surface water; 46 500 m^3 storage for conditionally clean surface water (4 sections); 8 800 m^3 storage for polluted surface water; sealed final treatment bio plateau for return water; underground wastewater treatment facility next to LTF; 5 m^3 process water container; transformer station (TS) to supply power to LTF. The LTF building exterior area will be covered with concrete asphalt. The LTF site is surrounded by a meshed fence including a gate for vehicles. Two locked underground sewage pump stations will be located next to the LTF site. KNS 3 for polluted surface water from Flight Area 2; KNS 4 for conditionally clean surface water from Flight Area 2. Landscaping works include the following: paving of access roads, pavements, vehicle manoeuvring areas; defining lawn areas. In accordance with the Housing Development Health Regulations approved by Order 173 of the Ministry of Health of Ukraine of 19 June 1996, the distance between wastewater treatment facilities and residential areas shall be estimated by calculation, but may not be less than 100 m. The health protection zone for the current facility is 100 m. Location - within airport area, SPZ area meets requirements. A location map (1:20000) is attached to the Environmental Impact Assessment (Annex 2).
We request that audit Boryspil International's	**Overruled**

compliance with the State Health Requirements in relation to the development of the Flight Area 2 renovation project design be audited, and that Boryspil International be compelled to respect the current law on no-fly zones over residential houses in a developed area as well as take landscaping measures at treatment facilities. We also request that compel Boryspil International be compelled to develop an alternative renovation plan which provides for the relocation of runway the adjacent developed area.	Legal and organisational basis, state inspection (oversight) requirements in relation to economic activity, the powers of state inspection (oversight) authorities, the powers of officers of the latter and the responsibilities of economic entities during a state inspection (oversight) are provided for in the Law of Ukraine "On the Main Principles of State Inspection (Oversight) of Economic Activity". State inspection (oversight) is the activity of central executive authorities, local agencies, state collegial bodies, executive agencies of the Autonomous Republic of Crimea, local state administrations and local governments (hereinafter referred to as state inspection (oversight) authorities) with the authority provided for by law regarding the discovery and prevention of violations committed by economic entities and the securing of public interest, including oversight of adequate quality of products, works and services, as well as the provision of adequate public safety and environmental protection. The environmental impact assessment procedure doesn't provide for state inspection (oversight) checks required to discover and prevent violations of legal requirements by economic entities and secure public interest, including oversight of adequate quality of products, works and services, as well as the provision of adequate public safety level, protect environment.
Observations and suggestions related to the scheduled activities by Ms. Lyudmyla O. Semenyuk	
The information doesn't include an expert conclusion on the potential impact or data about the expert body that conducted works in the village of Martusivka which is the closest village to the airport. Also the information doesn't include current noise level standards. In addition, similar EMS level standards are also missing as well as harmful fuel emission levels, etc. The information doesn't include a comparison with current values. In this way, the information provided is not sufficient to assess the impact of construction of a new runway. Based on the above, I request: 1. that construction of the runway and all other works be prohibited until an independent environmental impact assessment is conducted. 2. That an environmental impact assessment of Boryspil International's activities, including those activities	**Sustained in part** According to the law of Ukraine "On Environmental Impact Assessment" (Law) Article 2 environmental impact assessment is the procedure that includes the following: 1) the entity prepares an environmental impact assessment report in accordance with Articles 5, 6, and 14 of this Law; 2) the community conducts a public discussion in accordance with Articles 7, 8, and 14 of this Law; 3) in accordance with Article 9 of this Law a respective authority conducts analysis of the information provided in the environment impact report, any other additional information provided by the entity, and information provided by the community during the public discussion and transboundary impact assessment, and any other information; 4) the authority provides a reasoned opinion on the environmental impact assessment that includes analysis results described in paragraph 3 above; 5) the opinion on the environmental impact assessment is taken into account in the decision on scheduled activities in accordance with Article 11 of this Law. Article 9 of the Law of Ukraine "On Environmental Impact Assessment" says that the central authority shall provide an opinion on environmental impact assessment which based

that affect the village of Martusivka be set up in the first place. 3. That the assessment results be published in media and that the Martusivka community be informed by the local authorities. 4. That repeated public discussion be held within the community concerning Boryspil International's scheduled activities with regard to current laws.	on assessment of impact of scheduled activities including size and level of such impact (area, population that can be exposed), nature (including transboundary), intensity and complexity, probability, expected beginning, duration, frequency and inevitability of impact (including any direct, indirect, accumulated, transboundary, short-term, middle-term and long-term, constant and temporary, positive and negative impacts), controls provided to prevent, divert, avoid, mitigate, exclude environment impact determines whether the scheduled activities are acceptable or not and defines environmental conditions for such activities. The central authority publishes environmental impact assessment opinion within three work days from implementation date in a way described in Article 4 of this Law, and within the same period submits it to the Environmental Impact Assessment Unified Register. Article 7 of the Law of Ukraine "On Environmental Impact Assessment" says that public discussion during environmental impact assessment is conducted to discover, collect and take into account community's observations and suggestions on scheduled activities. Public has the right to submit any observations or suggestions that require no discussion which it sees relevant to scheduled activities. Observations and suggestions can be submitted in writing (including electronic format) and orally during public discussion and shall be included in the minutes. Written observations and suggestions of the public discussion are submitted within the time defined in Article 5, Part 7 of this Law and Part six of this Article. The central authority undertakes to ensure a public discussion within the procedure of environmental impact assessment. Public discussion of the assessment volume and level of detailed information to be included in the environmental impact assessment report is conducted in accordance with Article 5 of this Law. After the Environmental Impact Assessment Report is submitted the public discussion of the scheduled activities is conducted in a form of public hearings and submission of observations and suggestions (including electronic format). After the Environmental Impact Assessment Report is submitted the public discussion of the scheduled activities starts on the day the official announcement about beginning of the public discussion of the Environmental Impact Assessment Report is published and public gets access to the Environmental Impact Assessment Report for the purpose of familiarisation defined in Article 4 of this Law, and continues within 25 to 35 work days. All public observations and suggestions received within the set time require

	consideration of the central authority. Suggestions submitted after the set time are not considered. In case no observations and suggestions are submitted within the set time they are considered non-existent. The central authority is responsible for the preparation of the public discussion report. The information publication data are the integral part of the Environmental Impact Assessment Report as defined by Article 4 of this Law, including confirmation of such publication, list of materials submitted for public discussion, minutes of public hearings, all written observations and suggestions submitted by public and a table that includes information about full or partial sustaining or reasoned overruling of observations and suggestions submitted during public discussion. The Public Discussion Report is submitted to the Environment Impact Unified Register within the period defined in the seventh paragraph of the Article 9 of this Law. The central authority defines requirements to the format and contents of the Public Discussion Report. The economic entity bears all costs associated with public discussion. Public discussion procedure within Environmental Impact Assessment approved by Enactment 989 of the Cabinet of Ministers of Ukraine of 13 December 2017. Among other things this Enactment defines the following: repeated public discussion is only conducted if a public discussion is not recognised valid due to failure to appear of organiser. In addition, please note that the Article 17 of the law of Ukraine "On Environment Assessment" defines the following on a temporary basis, for the period of validity and within quarantine boundaries established by the Government of Ukraine to prevent spreading of COVID-19 across Ukraine, until the end of the quarantine and during 30 days after its end, all observations and suggestions within the public discussion of scheduled activities shall be submitted in writing (including electronic format) which shall be announced in the open public discussion of the Environmental Impact Assessment Report and Public Discussion Report. Public hearings provided for by Article 7 of this Law shall not be held or appointed for the duration of quarantine. Public hearings which have been appointed for that period are deemed non-effective and are not re-appointed.
Observations and suggestion to the scheduled activities offered by residents of the village of Gora (Boryspil district)	
We, residents of the village of Gora, withhold our approval of the "Flight Zone 2 Renovation" Project by Boryspil International due the following items included in cl.8 of the Project: - Flights will be done over Gora village (flight chart	**Sustained in part** The law of Ukraine "On Environmental Impact Assessment" and Government Enactment 989 of 13 December 2017 "On Approval of Public Discussion Procedure for Environmental Impact Assessment say that in assessing of environment impact and conducting of public discussion public observations and suggestions can be sustained in

is not provided) - violation (para. 5.21) of current health requirements approved by Order 173 of the Ministry of Health of Ukraine of 19 June 1996. Stationary and mobile facilities will pollute air against requirements of the law of Ukraine “On Air Protection, - Excessive noise level doesn’t meet requirements specified in Annex 16 to the Government Health Regulations approved by Order 173 of the Ministry of Health of Ukraine of 19 June 1996. Excessive maximum EMS level doesn’t meet values specified in Annex 21 to the Government Health Regulations approved by Order 173 of the Ministry of Health of Ukraine of 19 June 1996.	full, sustained in part or overruled with substantiation. Need for a public approval by way of assessment of environment impact and public discussion is not legally recognised. Aircraft/helicopter take-off and landing requirements are defined in Order 628 of the State Aviation Agency of Ukraine of 05 July 2018 “On Approval of Aviation Regulations of Ukraine “Airworthiness Technical Requirements and Administrative Procedures in Civil Aviation. Take-off/landing path depends on aircraft/helicopter specifications, weather, traffic, etc. Noise maps with outlined maximum sound levels (LAmax) and equivalent levels (LAeqv) for day and nighttime under the current and prospective load conditions of Boryspil International drawn by the Ukrdorproekt Institute are provided in Annex 4 to the Environmental Impact Assessment report. See Annex 32 for Boryspil International noise level risk zone charts. Zone D: further residence, school or health facility development will only be approved in emergency. Zone C: noise levels are within the morning limit, however at night the noise level is 5 dB over the nighttime limit. New house developments will only be approved if construction provides noise reduction for at least 30 dB. Zone B: noise level are within daytime and nighttime limit. New house developments will only be approved if construction provides for noise reduction of at least 25 dB. Zone A: standard construction regulations applied. Boryspil International emits pollutants from its stationary sources in accordance with Emission Permit 3220883201-14 issued by Kyiv Regional Environment Department 27 August 2018. The permit is valid for 10 years - from 27 August 2018 to 27 August 2028. Based on pollutant dispersion in lower surface: the pollutant concentration in lower surface bordering the closest residence area is within permissible levels. See Environmental Impact Assessment Annex 23 for specifications and parameters of new and renewed pollution sources. For more details on pollutants from stationary and mobile sources see Environmental Impact Assessment, sections 1.5 and 5. Landing system radio-transmitters are the EMS source that generate EMS field in bandwidth classified in SNiP 239: • course beacon LLZ 421 - bandwidth 8 (108 - 112 MHz); • glide slope beacon GP 422 with distance measurement DME 415 - bandwidth 9

	(329-335 MHz) and (900-1200 MHz) respectively. Special operation conditions - none. Electromagnetic field for bandwidth 8 is estimated by Field Strength. Electrical Filed Strength is measured in Volts per metre (V/m). Electromagnetic field for bandwidth 9 is estimated by Surface Flow Density (SFD). SFD is measured in Watt per square metre (W/m^2), microwatt pet square centimetre ($\mu W/cm^2$). Electromagnetic field for bandwidth 9 is estimated by Surface Flow Density (SFD). SFD is measured in Watt per square metre (W/m^2), microwatt pet square centimetre ($\mu W/cm^2$). Operation - 24h, autonomous at a high safety/dependability level, not requiring service personnel involvement. No permanent/interim operators. All diagnostics and control operations are made with the use of remote controls. This facility excludes any emergency that can affect environment or equipment. Landing system equipment is located in containers and meets current health regulation standards. A Sanitary Protection Zone (SPZ) and Restricted Development Zone (RDZ) are established to protect people from EMP exposure. Sanitary Protection Zone is the area adjacent to the radio-facility service site where maximum permissible EMP level is exceeded at 2 m above ground level. SPZ external boundary is defined at 2 m above ground level beyond maximum permissible EMP (MPL). Restricted development zone includes area where MPL is exceeded at 2 m above ground level. The Zone's external boundary is defined based on maximum height of houses in the development area, at the third floor were EMP is within MPL. According to DSP 173-96 for the facilities with antennas emitting electromagnetic radiation at defined horizontal angle and EMP is variable depending on its position above ground level restricted development zones are subject to vertical differentiation by height (metres). 3, 6, 9, 12, 15, etc. Project landing radio facilities are located at airfield. According to current regulatory documents airport runways shouldn't have any facilities excluding facilities whose functionality requires such location (radio navigation and landing facilities) and vegetation (bushes, trees, etc.). Height of facilities located within airfield is limited by Ukraine Airside Certification Requirements. Due to the above Development Restriction Zone is not required.

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See DSNiP 239 Table 1.2 for maximum permissible values of electromagnetic field generated by radio facilities, according to the para. 1.3.3 DSNiP 239.
According to DSNiP 239 (Health Standards), the Maximum Permissible Strength (MPS) for VHF transmitters (bandwidth 8) is 6 V/m; the Maximum Permissible Power Flow Density (MPPFD) for UHF transmitters (bandwidth 9) is 10 μW/cm^2.
Sanitary zone calculation results.
Calculation of electromagnetic field generated by RTO feeder antenna devices is made with the use of Antenna Impact Calculation software.
Sanitary zone calculations are made with the regard to the adjacent technical terrain.
For the purpose of calculation, the reference point (± 0.00) above ground level is the RTO antenna foundation above sea level.
Total expected EMP levels generated by KRM/GRM transmitters at 2.0 m above ground are above the Maximum Permissible Level (MPL). Based on this, the Sanitary Protected Zones (SPZ) for the above RTO’s are defined.
SPZ boundary:
1. For KRM-36L:26 m long from KRM along runway axis towards 18R threshold; 32 m wide (16 m per runway side).
2. GRM-36L: 16 m long from GRM along axis parallel to runway axis towards 36L threshold; 10.00 m wide.
3. KRM-18R: 26 m long from KRM along the ShZPS runway axis towards 36L threshold; 32 m wide (16 m per runway side);
4. GRM-18R: 16 m long from GRM antenna along the axis parallel to the ShZPS rwy axis in the 18R ShZPS threshold direction; 10 m wide.
<table>
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</table>
In general location and operation conditions of Boryspil airport’s ShZPS-2 navigation and landing equipment as an EMS source meet “EMS Exposure Sanitary Regulations” approved by the order 239 of the Ministry of Health of Ukraine of 01.08.1996.
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<tr>
<td>We, residents of Gora, suffer from aircraft flying over our houses day and night, High noise level, emissions</td>
<td>
Sustained in part
Aircraft/helicopter take-off and landing requirements are defined in Order 628 of the
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cause declined yields, affect our residents health. Villagers fall victims of various diseases, village air gets polluted.	State Aviation Agency of Ukraine of 05 July 2018 "On Approval of Aviation Regulations of Ukraine "Airworthiness Technical Requirements and Administrative Procedures in Civil Aviation. Take-off/landing path depends on aircraft/helicopter specifications, weather, traffic, etc. Noise maps with outlined maximum sound levels (LAmax) and equivalent levels (LAeqv) for day and nighttime under the current and prospective load conditions of Boryspil International drawn by the Ukrdorproekt Institute are provided in Annex 4 to the Environmental Impact Assessment report. See Annex 32 for Boryspil International noise level risk zone charts. Zone D: further house, school, hospital development will only be approved in emergency Zone C: noise levels are within the morning limit, however at night the noise level is 5 dB over the nighttime limit. New house developments will only be approved if construction provides noise reduction for at least 30 dB. Zone B: noise level are within daytime and nighttime limit. New house developments will only be approved if construction provides for noise reduction of at least 25 dB. Zone A: standard construction regulations applied. Boryspil International emits pollutants from its stationary sources in accordance with Emission Permit 3220883201-14 issued by Kyiv Regional Environment Department 27 August 2018. The permit is valid for 10 years - from 27 August 2018 to 27 August 2028. Based on pollutant dispersion in lower surface: the pollutant concentration in lower surface bordering the closest residence area is within permissible levels. See Environmental Impact Assessment Annex 23 for specifications and parameters of new and renewed pollution sources.
We request to audit Boryspil International's compliance with the State Health Requirements at the development of the Flight Area 2 renovation project design, compel Boryspil International to respect current law on no-fly zone over resident houses in a built-up area, take landscaping measures at treatment facilities. We also request to compel Boryspil International to develop an alternative renovation plan which provides for relocation of runway in direction opposite to the built-up area.	**Overruled** Legal and organisational basis, state inspection (oversight) requirements in relation to economic activity, the powers of state inspection (oversight) authorities, the powers of officers of the latter and the responsibilities of economic entities during a state inspection (oversight) are provided for in the Law of Ukraine "On the Main Principles of State Inspection (Oversight) of Economic Activity". State inspection (oversight) is the activity of central executive authorities, local agencies, state collegial bodies, executive agencies of the Autonomous Republic of Crimea, local state administrations and local governments (hereinafter referred to as state inspection (oversight) authorities) with the authority provided for by law regarding the discovery and

	prevention of violations committed by economic entities and the securing of public interest, including oversight of adequate quality of products, works and services, as well as the provision of adequate public safety and environmental protection. The environmental impact assessment procedure doesn't provide for state inspection (oversight) checks required to discover and prevent violations of legal requirements by economic entities and secure public interest, including oversight of adequate quality of products, works and services, as well as the provision of adequate public safety level, protect environment.
Observations and suggestions on scheduled activities by Zatyshne residents (Boryspil district).	
To ensure comprehensive and impartial consideration of issues regarding environmental impact assessment we hereby request to enquire Boryspil International about the following: 1. Flight charts over Gora, Martusivka, Zatyshne. 2. Beacon diagram including flight slope beacon, operating bandwidth 329-335 MHz with indicated distances to Gora, Martusivka, Zatyshne housing. 3. Provide confirmation which indicates distances between Gora, Martusivka, Zatyshne housing and Flight Zone 2 facilities, direction and length of main taxiway, link taxiways and high speed taxiways. 4. Substantiation of harmful electromagnetic impact including area and distance to resident houses, villagers health impact including provision of health standard values. Measures and methods to compensate health damages for Gora, Martusivka, Zatyshne residents caused by day and night flying over their houses, emissions from stationary and mobile sources, excessive noise, electromagnetic radiation	**Sustained in part** Aircraft/helicopter take-off and landing requirements are defined in Order 628 of the State Aviation Agency of Ukraine of 05 July 2018 "On Approval of Aviation Regulations of Ukraine "Airworthiness Technical Requirements and Administrative Procedures in Civil Aviation. Take-off/landing path depends on aircraft/helicopter specifications, weather, traffic, etc. Flights can be tracked (including Boryspil Intnl.) in real time at https://flightaware.com/live/airport/UKBB. See Annex 22 for Master Plan and Facility Operations. It should be noted that based on Article 9 of the law of Ukraine "Environmental Impact Assessment" the Central Authority in its environment impact report: 1) Establishes the type, main features and location of scheduled activities; 2) Determines if scheduled activities are acceptable or substantiates unacceptability; 3) Defines terms of use of land and natural resources during pre-construction work and on-going scheduled activities; 4) Sets environment protection and environmental safety conditions during pre-construction work and on-going scheduled activities; 5) Sets conditions to prevent emergency and address the effects; 6) Sets conditions to minimise transboundary impact from scheduled activities assessed under transboundary impact procedure; 7) If required by Environmental Impact Assessment: Compensation measures - assigns responsibility; Prevention, avoidance, reduction (mitigation), elimination, restriction, and monitoring of scheduled activities environmental effect - assigns responsible for respective actions; Additional environmental impact assessment at a different project phase - to define

	timeframe and validate implementation requirements; additional environmental impact assessment is conducted based on the procedure described in this Law; Post-project monitoring - to establish implementation procedure, timeframe and requirements . In case during the environmental impact assessment procedure an environmentally substantiated option different from that proposed by economic entity has been selected out of all considered reasonable alternatives this option shall be included in the Environment Impact Conclusion upon a written approval of the economic entity.
Observations and suggestions to the scheduled activities by Mr. Mykola M. Rusan	
Airplanes that land and take off at Boryspil International currently fly over my house. They make noise day and night. It is virtually impossible to live there. It feels like a torture. Based on Article 27 of the Constitution of Ukraine "Each individual has the inalienable right to life", Article 45 "Those who work have the right to leisure", Article 50 "Each individual has the right to safe environment and to compensation of damages arising from violation of the above right", and Law of Ukraine "On Ensuring Sanitary and Epidemic Safety of the Population" Article 24 and Order 463 of the Government of Ukraine of 22 February 2019 and Article 84 of the Aviation Code of Ukraine I request that the level of noise and emission clearly exceeding all permissible standards is reduced within requirements of current laws of Ukraine. Airplanes fly over residence area, school, hospital and pre-school facility (next to my house).	**Sustained in part** Aircraft/helicopter take-off and landing requirements are defined in Order 628 of the State Aviation Agency of Ukraine of 05 July 2018 "On Approval of Aviation Regulations of Ukraine "Airworthiness Technical Requirements and Administrative Procedures in Civil Aviation. Take-off/landing path depends on aircraft/helicopter specifications, weather, traffic, etc. Noise maps with outlined maximum sound levels (LAmax) and equivalent levels (LAeqv) for day and nighttime under the current and prospective load conditions of Boryspil International drawn by the Ukrdorproekt Institute are provided in Annex 4 to the Environmental Impact Assessment report. See Annex 32 for Boryspil International noise level risk zone charts. Zone D: further residence, school or health facility development will only be approved in emergency. Zone C - noise level is within daytime noise standards, but exceeds them at night by 5 dB. New house developments will only be approved if construction provides noise reduction for at least 30 dB. Zone B: noise level are within daytime and nighttime limit. New house developments will only be approved if construction provides for noise reduction of at least 25 dB. Zone A: standard construction regulations applied. Boryspil International emits pollutants from its stationary sources in accordance with Emission Permit 3220883201-14 issued by Kyiv Regional Environment Department 27 August 2018. The permit is valid for 10 years - from 27 August 2018 to 27 August 2028. Based on pollutant dispersion in lower surface: the pollutant concentration in lower surface bordering the closest residence area is within permissible levels. See Environmental Impact Assessment Annex 23 for specifications and parameters of

	new and renewed pollution sources. For more details on pollutants from stationary and mobile sources see the Environmental Impact Assessment, sections 1.5 and 5.
Observations and suggestions on scheduled activities by residents of Voronkiv village (Boryspil district)	
We request you yo to alleviate the problem that emerged in Voronkiv village of Boryspil district Kyiv region. When airplanes land at Boryspil International they fly over right over the built-up area: resident houses, kindergarten, school and medical ambulatory at low and very low altitude. Number of planes flying over Voronkiv village. Boryspil district, Kyiv region has increased significantly. When planes fly over at low altitude the built-up area gets contaminated with fuel combustion products, noise level exceeds health standards and has an adverse effect on people's health. Number of chronic disease in children and adults has increased. We have asked more than once to verify if Boryspil International legally discharges waste in the Ikva river, but regretfully without result. Chemicals contaminated water is discharged into the Ikva river which ends up in wells and has an adverse effect on people's life and health. We request you take into account Boryspil International's adverse effect on environment and health of Voronkiv residents at issuing approvals and assist in damage rectification.	**Sustained in part** Aircraft/helicopter take-off and landing requirements are defined in Order 628 of the State Aviation Agency of Ukraine of 05 July 2018 "On Approval of Aviation Regulations of Ukraine "Airworthiness Technical Requirements and Administrative Procedures in Civil Aviation. Take-off/landing path depends on aircraft/helicopter specifications, weather, traffic, etc. Boryspil International emits pollutants from its stationary sources in accordance with Emission Permit 3220883201-14 issued by Kyiv Regional Environment Department 27 August 2018. The permit is valid for 10 years - from 27 August 2018 to 27 August 2028. Based on the Law of Ukraine "On Air Protection" requirements, in case of change of emission source parameters, pollutant number, qualitative and quantitative chemical composition, measures to reduce amount to permissible level respective changes will be implemented. Based on pollutant dispersion in lower surface: the pollutant concentration in lower surface bordering the closest residence area is within permissible levels. See Environmental Impact Assessment Annex 23 for specifications and parameters of new and renewed pollution sources. Noise maps with outlined maximum sound levels (LAmax) and equivalent levels (LAeqv) for day and nighttime under the current and prospective load conditions of Boryspil International drawn by the Ukrdorproekt Institute are provided in Annex 4 to the Environmental Impact Assessment report. See Annex 32 for Boryspil International noise level risk zone charts. Zone D: further residence, school or health facility development will only be approved in emergency. Zone C: noise levels are within the morning limit, however at night the noise level is 5 dB over the nighttime limit. New house developments will only be approved if construction provides noise reduction for at least 30 dB. Zone B: noise level are within daytime and nighttime limit. New house developments will only be approved if construction provides for noise reduction of at least 25 dB. Zone A: standard construction regulations applied.

	Legal and organisational basis, state inspection (oversight) requirements in relation to economic activity, the powers of state inspection (oversight) authorities, the powers of officers of the latter and the responsibilities of economic entities during a state inspection (oversight) are provided for in the Law of Ukraine “On the Main Principles of State Inspection (Oversight) of Economic Activity”. State inspection (oversight) is the activity of central executive authorities, local agencies, state collegial bodies, executive agencies of the Autonomous Republic of Crimea, local state administrations, local governments (hereinafter referred to as state inspection (oversight) authorities) within the authority provided for by law regarding discovery and prevention of violations committed by economic entities and securing of public interest including oversight of adequate quality of products, works, services, provide adequate public safety level, protect environment. The environmental impact assessment procedure doesn’t provide for state inspection (oversight) checks required to discover and prevent violations of legal requirements by economic entities and secure public interest, including oversight of adequate quality of products, works and services, as well as the provision of adequate public safety level, protect environment. It should be noted that based on Article 9 of the law of Ukraine “Environmental Impact Assessment” the Central Authority in its environment impact report: 1) Determines type, key features and location of scheduled activities; 2) Determines if scheduled activities are acceptable or substantiates unacceptability of scheduled activities; 3) Determines terms of use of land and natural resources during preparation and construction work and on-going scheduled activities; 4) Determines environment protection and environmental safety conditions during preparation and construction work and on-going scheduled activities; 5) Determines conditions to prevent emergency and address its effects; 6) Determines conditions to minimise transboundary impact from scheduled activities assessed under transboundary impact procedure; 7) If required by Environmental Impact Assessment: Compensation measures - assigns responsibility; Prevention, avoidance, reduction (mitigation), elimination, restriction, and monitoring of scheduled activities environmental effect - assigns responsible for respective actions; Additional environmental impact assessment at a different project phase - to define timeframe and validate implementation requirements; additional environmental impact

	assessment is conducted based on the procedure described in this Law; Post-project monitoring - to establish implementation procedure, timeframe and requirements. In case during the environmental impact assessment procedure an environmentally substantiated option different from that proposed by economic entity has been selected out of all considered reasonable alternatives this option shall be included in the Environment Impact Conclusion upon a written approval of the economic entity.
Observations and suggestions to the scheduled activities by council of Martusivka village	
The information doesn't include an expert conclusion on the potential impact or data about the expert body that conducted works in the village of Martusivka which is the closest village to the airport. Also the information doesn't include current noise level standards. In addition, similar EMS level standards are also missing as well as harmful fuel emission levels, etc. The information doesn't include a comparison with current values. In this way, the information provided is not sufficient to assess the impact of construction of a new runway. Based on the above, I request: 1. that construction of the runway and all other works be prohibited until an independent environmental impact assessment is conducted. 2. Set up an environmental impact assessment of Boryspil International activities, including the activities that affect the village of Martusivka in the first place. 3. Publish assessment results in media, inform Martusivka community via village authorities. 4. Enable repeated public discussion within the community of the Boryspil International's scheduled activities with regard to current laws.	**Sustained in part** According to the law of Ukraine "On Environmental Impact Assessment" (Law) Article 2 environmental impact assessment is the procedure that includes the following: 1) the entity prepares an environmental impact assessment report in accordance with Articles 5, 6, and 14 of this Law; 2) the community conducts a public discussion in accordance with Articles 7, 8, and 14 of this Law; 3) in accordance with Article 9 of this Law a respective authority conducts analysis of the information provided in the environment impact report, any other additional information provided by the entity, and information provided by the community during the public discussion and transboundary impact assessment, and any other information; 4) the authority provides a reasoned opinion on the environmental impact assessment that includes analysis results described in paragraph 3 above; 5) the opinion on the environmental impact assessment is taken into account in the decision on scheduled activities in accordance with Article 11 of this Law. Article 9 of the Law of Ukraine "On Environmental Impact Assessment" says that the central authority shall provide an opinion on environmental impact assessment which based on assessment of impact of scheduled activities including size and level of such impact (area, population that can be exposed), nature (including transboundary), intensity and complexity, probability, expected beginning, duration, frequency and inevitability of impact (including any direct, indirect, accumulated, transboundary, short-term, middle-term and long-term, constant and temporary, positive and negative impacts), controls provided to prevent, divert, avoid, mitigate, exclude environment impact determines whether the scheduled activities are acceptable or not and defines environmental conditions for such activities. Central Authority publishes Environment Impact Conclusion within three work days from approval as described in Article 4 of this Law and submits it to the Environment

	Impact Assessment Unified Register. Article 7 of the Law of Ukraine "On Environment Impact Assessment" says that public discussion during environment impact assessment is conducted to discover, collect and take into account community's observations and suggestions on scheduled activities. Public has the right to submit any observations or suggestions that require no discussion which it sees relevant to scheduled activities. Observations and suggestions can be submitted in writing (including electronic format) and orally during public discussion and shall be included in the minutes. Written observations and suggestions of the public discussion are submitted within the time defined in Article 5, Part 7 of this Law and Part six of this Article. The central authority undertakes to ensure a public discussion within the procedure of environment impact assessment. Public discussion of the assessment amount and level of detailed information to be included in the environment impact assessment report is conducted in accordance with Article 5 of this Law. After the Environment Impact Assessment Report is submitted the public discussion of the scheduled activities is conducted in a form of public hearings and submission of observations and suggestions (including electronic format). After the Environment Impact Assessment Report is submitted the public discussion of the scheduled activities starts on the day the official announcement about beginning of the public discussion of the Environment Impact Assessment Report is published and public gets access to the Environment Impact Assessment Report for the purpose of familiarisation defined in Article 4 of this Law, and continues within 25 to 35 work days. All public observations and suggestions received within the set time require consideration of the central authority. Suggestions submitted after the set time are not considered. In case no observations and suggestions are submitted within the set time they are considered non-existent. The central authority is responsible for the preparation of the public discussion report. The information publication data are the integral part of the Environment Impact Assessment Report as defined by Article 4 of this Law, including confirmation of such publication, list of materials submitted for public discussion, minutes of public hearings, all written observations and suggestions submitted by public and a table that includes information about full or partial sustaining or reasoned overruling of observations and suggestions submitted during public discussion. The Public Discussion Report is submitted to the Environment Impact Unified Register within the period defined in the seventh

	paragraph of the Article 9 of this Law. The central authority defines requirements to the format and contents of the Public Discussion Report. The economic entity bears all costs associated with public discussion. Public discussion procedure within Environment Impact Assessment approved by Enactment 989 of the Cabinet of Ministers of Ukraine of 13 December 2017. Among other things this Enactment defines the following: repeated public discussion is only conducted if a public discussion is not recognised valid due to failure to appear of organiser. In addition, please note that the Article 17 of the law of Ukraine “On Environment Assessment” defines the following on a temporary basis, for the period of validity and within quarantine boundaries established by the Government of Ukraine to prevent spreading of COVID-19 across Ukraine, until the end of the quarantine and during 30 days after its end, all observations and suggestions within the public discussion of scheduled activities shall be submitted in writing (including electronic format) which shall be announced in the open public discussion of the Environmental Impact Assessment Report and Public Discussion Report. Public hearings provided for by Article 7 of this Law shall not be held or appointed for the duration of quarantine. Public hearings which have been appointed for that period are deemed non-effective and are not re-appointed.

11. Summary of programs for monitoring and control of the environmental impact during the implementation of the planned activity, as well as (if necessary) post-project monitoring plans

Ukraine establishes a state environment monitoring system to collect, process, store and analyse environment information, forecast changes and prepare evidence-based recommendations to facilitate efficient management decisions. Environmental pollution monitoring is carried out by the Central Authority that implements national environment protection policy, other special authorities and other businesses, institutions and organisations which activities deteriorate or may deteriorate environment.

Based on Government Enactment 391 requirements of 30 March 1998 "On Approval of State Environment Monitoring Provisions" Boryspil International shall:

- conduct environmental monitoring of its operations and state of its industrial areas, collect, store and provide for free data and/or general information for the following integrated data processing (for this purpose monitoring system entities and data provider make a respective contract);

make and duly approve plans of facility monitoring controls to prevent any hazardous process, economic or other activities.

Aviation noise monitoring and control

Order 381 of the State Aviation Authority of 26 March 2019 "On Approval of Aviation Regulations of Ukraine "Airside Operator Requirements on Spatial Zoning Around Airport Regarding Aviation Noise Impact" provides for regular aviation noise monitoring with the use of stationary and mobile Aviation Noise Monitoring Systems (ANMS).

Need for ANMS at airside adjacent area is determined by airport (airfield) operator.

Installation of stationary ANMS will ensure:

Regular aviation noise level measurements;

Recording of aircraft aviation noise sound events;

Continuous measuring of background noise levels;

Regular measuring path calibration checks (automatic or manual);

Annual metrological checks;

Identification of aircraft type, flight number, air carrier name, altitude, other landing/take-off info and noise events created;

Statistical record of noise violations at aircraft flight paths (departure/arrival) based on time of day, aircraft type, noise level foe each measuring terminal, impact zone, background noise level;

Receiving of weather information;

Data sharing with Flight Control System;

Determination of total noise impact level, in case of more than one aircraft within noise impact area aircraft with maximum estimated index shall be identified;

timing.

Aviation noise measurements will be periodically published on airport website (https://kbp.aero/) and used as compliance base for aviation noise reduction controls .

Aviation noise monitoring data will be used as an informational database to generalise aviation noise parameter stats in the airport and neighbourhood, enable public awareness, report noise specs to respective national and local authorities, define actual aviation noise impact areas at airport neighbourhood to include these data in future development plans.

Monitoring data will include the following information:

Location of aviation noise measuring points and permissible aviation noise values;

List of aircraft types that exceeded permissible value for a measuring point and weather condition at data recording;

Equivalent noise levels calculated at different time frames (day, night, 24 hours, week, months, etc.), and total number of recorded events;

noise stats at measuring points from different aircraft types in different operation conditions based on range change of measured levels, average stats and comparative noise level assessment.

Database collected in the course of long-time, regular measuring of aviation noise values can also be used as the development and implementation basis for noise reduction controls at Boryspil International.

Ambient air protection monitoring

Public monitoring in ambient air protection (ambient air protection monitoring) is conducted to collect, process, store and analyse ambient air quality information, assess and forecast changes and level of risk, development of evidence-based recommendations for ambient air protection management decisions, environment protection, air quality public awareness, effect of air pollution on people's health and well-being.

Based on ambient air monitoring data the following shall be determined: level of pollution within certain area, within certain period of time, whether ambient air status meets quality standards; how emission reduction controls impact ambient air, how ambient air pollution impacts environment, people's health and well-being.

Ambient air monitoring is the part of the national environment monitoring system.

Ambient air monitoring is based on qualitative indicators of:

ambient air;

precipitation.

Scheduled activities of Boryspil International result or may result in ambient air deterioration. Based on this, according to Enactment 827 of the Government of Ukraine of 14 August 2019 "Some Issues of State Monitoring in Ambient Air Protection" includes the following:

Monitoring of levels of pollutants based on Ambient Air State Monitoring Procedures approved by Enactment 827 of the Government of Ukraine of 14 August 2019;

Ensuring of secure access to initial information (monitoring data) for managing bodies responsible for ambient air quality in respective areas and agglomerations.

Based on requirements of the Law of Ukraine "On Ambient Air Protection", Enactment 1655 of the Government of Ukraine "On Approval of Government Accounting Procedure in Ambient Air Protection" of 13 December 2001 Boryspil International upon completion of innovation shall provide inventory materials on air emissions at runway 2.

As necessary, based on guidelines On Procedure and Criteria of Public Record of Facilities That Have or May Have Adverse Effect On People's Health and Ambient Air, Emission Types and Amounts" approved by Order 177 of the Ministry of Environment And Natural Resources of Ukraine of 10 May 2002, registration 445/6733 of the Ministry of Justice of 22 May 2002 Boryspil International shall provide respective documents required for public record of facilities, types and amounts of air pollutants.

Based on Article 10 of the Law of Ukraine "On Ambient Air Protection" Boryspil International shall monitor the amount and composition of air pollutants and the level of physical effect and keep an on-going record of those.

The resulting data of ambient air monitoring shall include the following:

Initial emission and environment monitoring data;

Ambient air pollutant concentration;

General information on pollution level at given area over particular time;

General information on pollutant composition and amount;

Pollution risk assessment for environment and people;

Pollutant composition and amount assessment.

Ambient air monitoring is conducted by certified measurement laboratories with the use of instrumental or express (indicator) methods.

Within the time established by law the scheduled activities shall be under state environment protection statistical reporting No 2-TP (air) (annual) "Pollutant and Greenhouse Gas Emissions by Stationary Sources".

In addition, Boryspil International within their authority shall take measures described in "Emission Registry and Pollutant Transfer Protocol" ratified by Law of Ukraine 980-VIII of 03 February 2016.

Greenhouse gas monitoring

For the purpose of compliance with the UN's Climate Change framework convention and Paris Agreement after the Law of Ukraine "On Principles of Reporting Monitoring and Verification of Greenhouse Gas Emissions" becomes effective (from 1 January 2021) Boryspil International shall collect, process, analyse and store data intended for greenhouse emission amount monitoring.

The monitoring shall be conducted whin the Monitoring Plan requirements, This plan provides for multiple monitoring activities and based on standard or simplified monitoring forms.

Mandatory Monitoring Plan activities:

- Data collection (record data, proforma invoices, operating protocols, etc.);
- Material/fuel sampling;
- Laboratory testing of material and fuel samples;
- Measuring instrument maintenance and calibration;
- Description of calculations and formulas to be used in greenhouse emission assessment;
- Control activities;
- Date backup (including tampering protection);
- On-going search of ways of improving of the Monitoring Plan";
- Management and staff responsibilities;
- Data stream and control procedures
- Data quality controls;
- Alternative data evaluation method in case any data gap detected;
- Regular revision of the Monitoring Plan for relevance with current facility situation (including uncertainty assessment as required);
- Sampling Plan;
- Sampling Plan revision procedure;
- Other controls and processes described in the Law of Ukraine "On Monitoring Reporting Principles and Verification of Greenhouse Gas Emission" and associated secondary legislation.

Development of the Greenhouse Gas Monitoring Plan includes the following milestones:

- Establishing of facility boundaries (greenhouse gas source);
- Establishing of facility category based on annual greenhouse gas amount estimation;
- Inventory of all emission sources and flows of material
- Setting of level of accuracy requirements with respect to facility category;
- Inventory and assessment of potential data sources;
- Determining the level of fuel or raw material;
- Inventory of measuring devices for smooth operation;
- Calculated coefficients (NTZ, emission factor or carbon content, oxidation factor or transformation factor, biomass share) depending on required level of accuracy (to be determined based on facility category and classification of material flows), etc.

Monitoring in water protection

State water protection monitoring is provided to ensure collection, processing, storage, generalisation, and analysis of water bodies status, forecast changes and develop evidence-based recommendations used to make application decisions, water protection and resource rehabilitation.

State water monitoring is the part of the State Environment Monitoring System.

Enactment 758 of the Government of Ukraine of 19 September 2018 "On Approval of the State Water Monitoring Procedure" includes the following at ground water abstraction facilities of over 100 m3 per day within sanitary protection zones and neighbouring areas water users shall arrange a local network of control wells to measure water amount and physical and physical and chemical parameters and submit control data to Derzhgeonadra.

Based on special water management permit Boryspil International intakes water from underground sources in amount of 2371.72 m3 per day. Sanitary protection zones and neighbouring areas therefore require a network of control wells to measure water amount and physical and physical and chemical parameters and submit control data to Derzhgeonadra.

In addition, it should be noted that based on primary water management measuring device records, resulting water quality parameter measurements (taken at least once per quarter) Boryspil International as required by Article 44 of the Water Code of Ukraine and Order 78 of the Ministry of Environment and Natural Resources of Ukraine of 16 March 2015 “On Approval of State Water Use Accounting Procedure”, registry 382/26827 by the Ministry of Justice of Ukraine of 03 April 2015 will make a water management report based on Form 2 (annual) and submit it to an organisation associated with Water Management Agency of Ukraine including water quality measurements.

Boryspil International will keep record of water used to systematise the following data: water collection and use, discharge of return water and pollutants, return water supply systems, including their capacity, wastewater treatment system including performance parameters.

Waste management monitoring

To determine and forecast environment waste impact and prevent and address adverse effect in timely manner Boryspil International in course of scheduled activities will monitor waste source, storage, and disposal locations including monitoring of own waste location/facility status as required by Articles 17 and 29 of the Law of Ukraine “On Waste”.

Boryspil International in course of scheduled activities will introduce a primary waste reporting system. Primary waste reporting will be based on standard primary forms (cards, logs, questionnaires) using technical, regulatory, paper, accounting, and other records. When completing the form, executive appointee uses waste certificate, inventory records (payment and receipt documents, material acceptance certificates, hazardous material/substance consignment notes, warehouse inventory documents, waste disposal documents, etc.).

Boryspil International in course of scheduled activities will introduce a primary waste reporting system. Primary waste registration will be based on standard primary forms (cards, logs, questionnaires) using technical, regulatory, paper, accounting, and other documents. When completing the form the executive appointee uses waste certificates, payment and receipt documents (warrants, material acceptance certificates, hazardous material/substance consignment notes, warehouse inventory documents, waste disposal documents, etc.).

Based on primary reporting data, Boryspil International as provided by Order 243 of State Statistical Service of Ukraine of 19 August 2014 “On Approval of State Environment, Forestry and Gamekeeping Statistical Reporting Forms” keeps and submits a reporting form No1 waste (annual) “Waste Generation and Management in the year of ____”.

Based on Article 17 of the Law of Ukraine “On Waste” and Order 342 of the Ministry of Environment and Natural Resources of Ukraine “On Approval of Standard Primary Reporting Form No 1-VT "Packing Material and Tare Waste Reporting” and Completion Guidelines” of 07 July 2008, Ministry of Justice of Ukraine registration 824/15515 09 September 2008 Boryspil International shall issue an Order “On Implementation of Standard Primary Reporting Form No 1-VT "Packing Material and Tare Waste Reporting" and guidelines on completion of standard primary reporting form No 1-VT "Packing Material and Tare Waste Reporting" at runway 2.

Order of Boryspil International shall include the following:

1. Assign a primary reporting officer responsible for reporting of packing material and tare waste at runway 2 (hereinafter referred to as Primary Reporting) (name, position) from (date).

2. Primary reporting officer (name, position) together with unit managers shall make based on data of previous survey a list of primary reporting facilities (production areas that include individual equipment or perform individual operations), list of particular waste types and packing materials and tare subject to reporting per facility, and reporting intervals for each type of waste (packing) (date).

3. Unit managers together with primary reporting officer (name, position) shall issue appointment orders to assign individuals responsible for keeping and storing of standard forms No 1-

VT "Packing Material and Tare Waste Reporting" and No 1 waste (annual) "Waste Generation and Management in the year of ____" per each individual reporting facility respective to their functions and speciality (qualification) from (date).

4. Primary reporting officer (name, position) together with respective unit managers shall establish the procedure of provision of the following for individuals specified in Paragraph 3:

Paper form No 1-VT "Packing Material and Tare Waste Reporting" and No 1 waste (annual) "Waste Generation and Management in the year of ____" and/or respective software;

Respective control and metrological devices;

Calculation sheets to convert waste/package amount into tonnes before (date).

Waste/package reporting as per form No 1-VT shall be kept using either paper or electronic media per each individual process, operation, equipment unit that generates waste and utilises packing.

Boryspil International information is provided in standard format No 1 "Packing Material and Tare Waste Reporting" and No 1 waste (annual) "Waste Generation and Management in the year of ____" are used to report and register waste, prepare specifications, make generation site registry cards, process and dispose of waste, keep inventory, approve limits and obtain waste generation and placement permissions, obtain waste/packing management licenses and permission, make prompt decisions on rejected and hazardous product management, identify and register potentially hazardous facilities and make safety declarations, complete documents for transboundary transportation of waste, etc.

Waste material (oils) management

Scheduled activities may result in electrically insulating oil.

Due to the above, based on waste oil/grease collection, transportation, storage, processing, disposal and/or destroying procedure approved by Enactment 1221 of the Government of Ukraine of 17 December 2012 (as revised by Enactment 1198 of the Government of Ukraine of 25 November 2015) Boryspil International shall:

- Ensure separate collection (absorption) of waste oil/grease as provided for by hazardous waste management regulations and provisions of respective service agreements on waste oil/grease collection, transportation, storage, processing, disposal and/or destroying;
- ensure depositing of waste oil/grease at collection points or directly at recycle facilities;
- keep primary reporting of oil/grease purchase, use, waste oil/grease management;
- Submit quarterly report to the State Environment Inspection (Derzhekoinspektsia) on waste oil/grease management status per the form set out in Attachment 5 to the Waste Oil/Grease Collection, Transportation, Storage, Processing, Disposal and/or Destroying Procedure approved by Enactment 1221 of the Government of Ukraine of 17 December 2012 by 10th of each next month.

Electromagnetic field management monitoring

In the course of scheduled activities Boryspil International uses equipment, instruments, devices, etc. that generate electromagnetic fields.

Due to this, based on Order 476 of the Ministry of Health of Ukraine "On Approval of State Health Standards and Regulations when Working with Electromagnetic Field Sources" of 18 December 2002, Ministry of Justice of Ukraine registry 203/7524 of 13 March 2003 provides for constant/alternating electromagnetic field exposure level control within 50Hz, 1kHz-300MHz by way of measuring of electromagnetic field electric and magnetic strength within 300MHz-300GHz by way of measuring of energy flow density with regard to the time personnel remain in the area of exposure.

Electromagnetic field level studies at work places are conducted by enterprise own health laboratory certified by certification commission of the Ministry of Health of Ukraine or public facilities of the health agency of Ukraine.

Ornithological situation monitoring

In order to ensure safe aircraft takeoff and landing, the airport developed measures to monitor, track, register, and scare off birds. The airport ornithological service ensures the conditions that may attract birds are prevented.

Ornithological service personnel working at the airside keep track of the bird situation 24 hours a day to ensure timely detection of birds within airport monitored area (part of airspace) and assess aircraft potential risk;

Ornithological situation analysis within airport area and at the flight paths (flight zones) includes the following: collection and generalisation of ornithological data (bird number, species, flying patterns and altitude, etc.) including as required data of airfield ornithological monitoring and other sources of reference. This includes use of not only own sources of information but also all possible sources such as other airfields (testing grounds) including civil airfields, and reference literature.

Ornithological situation assessment includes identifying of number of birds, bird species, and behaviour within set time and particular area, potential changes and risk for aircraft.

12. The information summary of non-technical nature specified in subparagraphs 1–11 of this Report is intended for the general public.

The objectives of the planned activity is the reconstruction of manoeuvring area No. 2 of SE Boryspil International Airport. According the law, the decision on the conducting of the planned activity related to "Reconstruction of Manoeuvring Area No. 2 of SE Boryspil International Airport shall be an opinion on environmental impact assessment published by the Ministry of Environment and Natural Resources of Ukraine.

In 2019, the Cabinet of Ministers of Ukraine approved the Concept of Development of the Boryspil International Airport until 2045, the main priorities of which are the development of the infrastructure and introduction of modern services.

The planned activities are aimed at developing the infrastructure of the Boryspil airport, attracting new airlines, and improving service quality.

The purpose of an environmental impact assessment is to identify and estimate levels of the environmental impact of the State Enterprise Boryspil International Airport (SE Boryspil IA) after the implementation of complex of works on reconstruction of Manoeuvring Area No. 2 of SE Boryspil IA, determine the feasibility and acceptability of the planned activity and justify technical, organizational, health, public-legal and other measures on ensuring environmental safety. Assessment is done takin into account the current environmental impact of economic activity of SE Boryspil IA and existing constraints (emissions permit, permit for the special use, etc., existing settlements).

State Enterprise “International Airport “Boryspil” is located in the South-West of the city of Boryspil in the Kyiv region. Administratively, it is located at the following address: Kyiv region, Boryspilsky district, the village of Hora.

The airport territory is in operation since 1959.

The airport is located about 1 km to the West from the edge of the city of Boryspil and 6 km to the West from Boryspil city centre, 29 km to the East from Kyiv city centre. Routes of approaches for landing and leaving the airfield go over the residential areas of the following settlements:

– villages of Trebukhiv, Dudarkiv, Velyka Oleksandrivka — to the North of the airport;

– multistory development area and suburbs of the city of Boryspil to the East;

– majority of the villages of Voronkivka, Martusivky, Zatyshne to the South;

– the village of Hora to the West

At the Borispol airport, there are:

- two parallel independent artificial runways (ARW): ARW-1 with dimensions of 4000 × 60 m and ARW-2 with dimensions of 3500 × 63 m;

- a system of taxi ways (major, connecting, high-speed exit taxiways), ways of taxiing on the apron and parking place, holding bays and bays for application of deicing fluid, etc.;

- passenger and cargo aprons, parking places for aircrafts, including those for transit ACs.

Planning decisions

Planned location of buildings and facilities is determined by their functionality, technological relationship, the minimum length of utilities, requirements of sanitary and fire regulations.

The area of the Boryspil airport land plotted out for reconstruction of Manoeuvring Area No. 2 of the airfield of the SE "International airport “Boryspil” is 387.06 hectares.

To provide the necessary requirements concerning working zones of localizers, additional land acquisition in the amount of 22.68 ha is required.

To accommodate a ground for training of the airport’s rescuing service, dog training center, engineering support facilities, etc., , additional land acquisition in the amount of 27.52 ha is required.

Total area of the plot for reconstruction of Manoeuvring Area No. 2 of the airfield of SE "International airport "Boryspil" is 437.26 hectares.

Total development footprint is 1,970,310 m^2, including:

- the existing buildings and structures — 6200 m^2

- buildings and structures that are under design — 24,227 m^2

- aerodrome pavement area — 1,064,105 m^2
- area of road asphalt pavement — 70,435 m^2
- area of agrotechnical operations of the airfield — 776,093 m^2.

Landscaping area is 2,402,290 m^2.
The ratio of area built up with building and structures to total area is 0.0136.
Aerodrome pavement ration is 0,2434.
Road pavement ration is 0.0161.
Green coverage ratio is 0.7269.

Boryspil International's Flight Zone 2 Renovation Plan is made in accordance with applicable regulations of Ukraine, ICAO standards and recommended practices for airport design and operation, and SNiP 2.05.08-85 "Aerodromes"; DBN B.2.2-12:2018 "Area Planning and Development", SNiP 2.05.07-91 "Industrial Transport" and DBN V.2.3-4:2015 "Transport Facilities" requirements. Motor Roads".

The construction of the Flight Zone 2 is divided into phases and start-up procedures (3 construction phases in total: phase 1 - 3 start-up procedures, phase 2 - 3 start-up procedures, phase 3 - 1 start-up procedure):

Construction phase 1 start-up procedure 1:

- Reconstruction of the existing apron "S" with assignment of parking places (hereinafter referred to as the PP) for treatment of aircrafts with the deicing fluid and arrangement of a Centralized Aircraft Refuelling System (CARS);
- Reconstruction of connecting taxiways TW-9 and TW-18;
- Two underground reservoirs of used deicing liquid of 75 m^3 each;
- Distribution point (DP);
- Transformer substation (TS) of apron "S".

Construction phase 1 start-up facility 2:

- New runway with artificial surface (ARW-2) 3800 m long;
- Main taxiway (MTW-2);
- MTW as a connecting taxiway;
- Connecting taxiways between MTW-2 and MTW as a connecting taxiway;
- Renovation of connecting taxiways TW-16 and TW-17;
- Apron "G" section and TW-10;
- VHF instrument landing system (ILS) ground equipment of the new cat, III-B ARW with 18°/36° landing MB (LOC and GS + DME);
- Lighting equipment as per landing cat. III-B with 36°/18° cat. III-B landing MB;
- Emergency Rescue Stations (ERS) with fire fighting pump station and two 150 m^3 reservoirs for firefighting water reserve;
- Signalling equipment TS (LSE) -1023N, TS LSE-1024N, TS next to ERS and existing TS-1023 renovation;
- Installation of automatic direction finder (ADF) and transmitting radio centre (TRC);
- SPS No. 3/No. 4;
- Weather equipment;
- System of collection and drainage of airfield surface water to waste treatment plants.

Construction phase 1 start-up facility 3:

- Patrol road;
- Airport fencing with security alarm and video surveillance and lighting systems;

Construction phase 2 start-up facility 1:

- Aircraft (AC) ramp with TP.

Construction phase 2 start-up facility 2:

- Engine testing AC ramp;

Construction phase 2 start-up facility 3:
- Isolation AC ramp (ACR);

Construction phase 3:
- Deicing liquid filling station with a 75 m^3 underground container for used de-icing liquid and a 6-car parking;
- Civil fire protection depot with crew premises;
- Petrol filling station.

It is provided for a complex of preparatory works on dismantling of the existing airport pavements of ARW-2, taxiways and a part of aprons «S» and "G"; the existing pavements of roads and sites; the existing elements of the wastewater removal network; the demolition of the existing buildings, objects, lighting and radio equipment, lighting masts of Manoeuvring Area No. 2, aerodrome fence and clearance of vegetation that fall in the area of planning works to be performed at the airport.

Boryspil International's scheduled runway 2 renovation activities meet current city planning document "Master Diagram of Planning of the Land of Ukraine approved by the Law of Ukraine "On the Master Diagram of Planning of the Land of Ukraine."

Boryspil International uses the following land on an ongoing basis:
- 163.3212 ha with intended use: "positioning of engineering and other facilities" (permanent land use state certificate YaYa No. 140084 registered in the State Land Ownership and Lease Agreements Register under No. 322080003000048);
- 624.8682 ha for the current engineering and social facilities (State Land Ownership Certificate II-KV No 001459 registered in the State Land Ownership and Lease Agreements Register under No 438).

During execution of preparatory and construction works on the territory of the planned activity on the reconstruction of Manoeuvring Area No. 2 of SE "International Airport "Boryspil", there will be the following impacts on the environment. The set of preparatory works will include the following:
- dismantling of the existing aerodrome pavements of Maneuvering Area No. 2: runway, taxiways (RD), aerodrome pavement shoulders and the existing passages at the aerodrome;
- dismantling of utilities that fall into the reconstruction zone (networks of fuel pipelines, water supply, wastewater disposal, communication cables, airfield lighting systems, etc.);
- removal of tree and shrub vegetation;
- stripping.

Characteristics of planted vegetation to be deleted in the process of conducting the planned activities

The commission consisting of: Head of the Production Department of State Enterprise "International Airport "Boryspil" (hereinafter referred to as SE "International Airport "Boryspil") S.O. Rora, Project Manager of the Department of Project Works of SE "International Airport "Boryspil" M. I. Tsilyk, Chief Forest Pathologist of State Specialized Forest Protection Enterprise "Kyivlisozakhyst" V. V. Holyk, conducted this special forest pathological and sanitary examination of green plantations TS-23 of SE "International Airport "Boryspil" with accounting by technical validity categories and distribution by the quality state of plantations within the administrative boundaries of Hirska Village Council of the Boryspilsky district of e Kyiv region, confirmed by this act.

The need of this examination is caused by the fact that a need of modernization of infrastructure facilities appeared in connection of the planned activity of SE "International Airport "Boryspil".

Inspection has found that Boryspil International's plants TP-23 are located on land with cadastre number 3220883200:02:004:0140; 3220883200:02:004:0142, public ownership, intended use: 12.08 For placement and operation of buildings and structures of additional transport services and auxiliary operations for placement and operation of buildings and structures of additional transport services and auxiliary operations, estimated area is 7.0 ha.

Plantations are represented by tree breeds of cherry, willow, sorbus, maple, walnut, apple tree, plum tree, apricot tree, oak, birch, poplar, chestnut, pear tree, and pine tree. The quality state of trees in the majority of plantations is good and satisfactory — the trees are healthy but with slow growth, unevenly developed crown, insufficiently dense leaves, with minor mechanical damages and small hollows.

Tree age is from 30 to 50 years. There are overmature trees of willow and poplar in the plantations. Overmature trees are severely weakened, such tree categories are potentially dangerous trees, and belong to Category III according to biological condition categories. In case of squall wind gusts and galling of wet snow in winter, the branches of different orders can fall, creating potential hazard for traffic, life and health of airport workers.

No.	Tree species	Unit of measurement	Quantity	Diameter cm	Quality
1.	Pine	pcs.	10	8–44	Satisfactory
2.	Birch	pcs.	5	16–60	Good
3.	Willow	pcs.	12	20–68	Satisfactory
4.	Rowan	pcs.	1	24	Satisfactory
5.	Oak	pcs.	2	32	Satisfactory
6.	Maple	pcs.	23	8–80	Satisfactory
7.	Chestnut	pcs.	1	20	Satisfactory
8.	Poplar	pcs.	1	88	Satisfactory
9.	Apricot	pcs.	6	16–36	Satisfactory
10.	Cherry	pcs.	85	8–52	Satisfactory
11.	Walnut	pcs.	5	8–32	Good
			6	8-56	Satisfactory
12.	Pear	pcs.	2	12	Satisfactory
13.	Plum	pcs.	5	16–40	Satisfactory
14.	Apple	pcs.	7	8–40	Good
			20	8-36	Satisfactory
Total			191		

The Commission considers it possible to remove all trees that fall under the zone of modernization of the infrastructure of TS-23 of SE "MI "Boryspil". "Measures not related to forestry" – by another felling, solid method, on an approximate area of 7.0 ha, a total number of 191 (one hundred and ninety-one) trees.

Together with felling of trees, bush and tree species scrubs are subject to cutting as part of infrastructure modernization.

The height of tree stubs according to the current regulations shall be 10 cm at the tree diameter up to 30 cm, and 1/3 of the stub diameter at the tree diameter over 30 cm.

Cogs shall be subject to mandatory cleaning from wood cutting dirtiness as part of cutting.

The complex of construction works provides for a new construction of buildings and structures:

- artificial runway (ARW-2), main taxiway, connecting taxiways and rapid exit ways;
- an isolation parking space for aircrafts (AC), parking place for testing aircraft engines; parking places for cargo aircrafts;
- radio navigation and light signalling equipment systems;
- Emergency rescue stations (ARS);
- systems for collection of rainwater, wastewater and their disposal from aerodrome sites and treatment facilities;
- transformer substations;

- a fuel filling station (FFS);
- a patrol motor road, access roads and sites;
- fences of the airport equipped with security alarm and video surveillance systems;
- an operational base for deicing (preparation of deicing liquid) and places for parking of motor vehicles;
- civil defence shelter for fire equipment and duty guards.

It is provided for the reconstruction of the existing buildings and structures.

- transformer substations;
- networks of fuel lines;
- ramp «S» with arrangement of a platform for handling aircrafts with anti-icing agent.

Construction works are expected to be performed in the conditions of the operating airport, with the cessation of operation of Manoeuvring Area No. 2.

The following impact on the environment is expected during the planned activities.

- air environment: emissions of pollutants into the atmosphere by stationary and mobile sources of emissions of pollutants, determination of compliance with the restrictions established by the Permit for Emissions of Pollutants;
- aquatic environment: discharge of pollutants into the Ikva river, assessment of compliance with the requirements of the existing Permit for Special Water Use;
- soil: during operation of the facility, there is no soil contamination of the adjacent territories, preventive measures are considered;
- flora and fauna: the impact on the existence of birds during the implementation of measures for ensuring safety of the movement of aircrafts within the airport during the accounting, tracking and prevention of entry of wild animals and birds into the airport;
- social environment (population): the impact on the development of adjacent territories; impact of acoustic conditions on settlements, the impact of the spread of electromagnetic radiation during the operation of radio navigation equipment; assessment of compliance with the requirements of State Sanitary Norms and Rules;
- technogenic environment: waste generation during preparatory works and operation of the facility; hazard identification, identification of possible danger zones.

During execution of preparatory and construction works on the territory of the planned activity on the reconstruction of Manoeuvring Area No. 2 of SE “International Airport “Boryspil”, there will be the following impacts on the environment. The set of preparatory works will include the following:

- dismantling of the existing aerodrome pavements of Maneuvering Area No. 2: runway, taxiways (RD), aerodrome pavement shoulders and the existing passages at the aerodrome;
- dismantling of utilities that fall into the reconstruction zone (networks of fuel pipelines, water supply, wastewater disposal, communication cables, airfield lighting systems, etc.);
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- stripping.

The complex of construction works provides for a new construction of buildings and structures:

- artificial runway (ARW-2), main taxiway, connecting taxiways and rapid exit ways;
- an isolation parking space for aircrafts (AC), parking place for testing aircraft engines; parking places for cargo aircrafts;
- radio navigation and light signalling equipment systems;
- Emergency rescue stations (ARS);
- systems for collection of rainwater, wastewater and their disposal from aerodrome sites and treatment facilities;
- transformer substations;
- a fuel filling station (FFS);
- a patrol motor road, access roads and sites;
- fences of the airport equipped with security alarm and video surveillance systems;

- an operational base for deicing (preparation of deicing liquid) and places for parking of motor vehicles;

- civil defence shelter for fire equipment and duty guards.

It is provided for the reconstruction of the existing buildings and structures.

- transformer substations;

- networks of fuel lines;

- ramp «S» with arrangement of a platform for handling aircrafts with anti-icing agent.

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- flora and fauna: the impact on the existence of birds during the implementation of measures for ensuring safety of the movement of aircrafts within the airport during the accounting, tracking and prevention of entry of wild animals and birds into the airport;

- social environment (population): the impact on the development of adjacent territories; impact of acoustic conditions on settlements, the impact of the spread of electromagnetic radiation during the operation of radio navigation equipment; assessment of compliance with the requirements of State Sanitary Norms and Rules;

- technogenic environment: waste generation during preparatory works and operation of the facility; hazard identification, identification of possible danger zones.

Assessment according to the types and quantities of expected emissions and water pollution that are generated as a result of preparatory and construction works as well as the implementation of the planned activity

During the implementation of the complex of preparatory works, works on dismantling of the existing aerodrome pavements of the runway (RW-2), taxi ways (TW), sections of aprons S and G, pavements of the patrol road, driveways and platforms, existing utilities, elements of the wastewater disposal system, dismantling of the existing buildings, lighting and radio equipment facilities, lighting towers and fencing of Manoeuvring Area No. 2 are carried out.

Construction waste generated during the dismantling of the existing buildings is not stored on construction sites. It is provided for the organized removal.

Characteristics of waste generated during the implementation of the ST “International Airport ‘Boryspil’ planned activity

Ser. No.	**Nomenclature name of waste according to DSTU 3910-99 or packaging according to the documentation of the enterprise**	**Physical state of care or type of packaging**	**Waste name per DK 005-96 or packing name per DK 016-97**	**Waste amount unit**	**Hazard class**
1	*2*	*3*	*5*	*6*	*7*
1	Construction waste accumulated during destroying/dismantling of buildings, concrete structures, reinforced concrete structures, artificial surfaces, woodwork	Solid	Concrete wall products, columns, damaged, soiled or unidentified concrete roof tiles unusable for intended purpose	t	IV
2		Solid	Scrapped bricks, stone wall materials	t	IV
3		Solid	Woodwork, damaged, soiled or unidentified residues of wood	t	IV

			and wood chips, including unusable wood or parquet floor residues		
4	Construction waste accumulated during destroying/dismantling of buildings, concrete structures, reinforced concrete structures, artificial surfaces	Solid	Mixed soil and rock	t	IV
5		Solid	Residual asphalt and mixed asphalt and concrete without tar content	t	IV
6		Solid	Reinforced concrete and metal structures and damaged or unidentified iron and steel parts	t	IV
7		Solid	Mixed construction and demolition waste	t	IV
8		Solid	Gravel, crushed stone, sand, dolomite flour, fillers, gypsum cement, hydraulic insulating mastic, bonding agents	t	IV
9	Oil contaminated sand	In form of slurry or paste	Damaged, used or contaminated absorbents	t	III
10	Oil contaminated cloth	Mixed	Damaged, used or contaminated cloth	t	III
11	Power equipment	Solid	Damaged, used power production, communication, construction and other equipment (except for general purpose electronic equipment)	t	IV
12	Electronic equipment	Solid	Damaged, used or broken beyond repair general purpose electronic equipment	t	IV
13	Electronic equipment	Solid	Scrapped electronic components	t	IV
14	Insulated wire and cables	Solid	Trimmed cables	t	IV
15		Solid	Damaged, contaminated or unidentified high-resistance alloys (manganin) unusable for intended purpose	t	IV
16		Solid	Damaged, contaminated or unidentified armoured tape, armoured wire unusable for intended purpose	t	IV
17	Metal structures	Solid	Other small ferrous metal scrap	t	IV

Existing structures, equipment, buildings, will be dismantled within a single phase. Project doesn't provide for a warehouse storage. Waste will be disposed in bulk.

Specification of sediment generated in surface wastewater treatment at Boryspil International LWTP.

Waste name	**Waste hazard class, chemicals (compounds) content in waste, %**	**Waste physical and chemical specifications (fire and explosion hazard, physical state, solubility, moisture)**	**Waste generated, t/year**	**Waste transferred to enterprises, organizations**
1. Sludge mechanically dehydrated in sand separators after oil and sand traps	Hazard class IV. Composition: sand, clay, soil – 60 %, water – 40 %	Solid, non-flammable, non-explosive, fire safe virtually insoluble, humidity – 40 %, density – 1.6 t/m^3	18.16	Disposal of solid waste at landfills
2. Clarifier sludge mechanically dehydrated in screw dehydrators after aerobic stabilisation	Hazard class IV. Composition: Organic particles – 10 %, clay, iron	Solid, non-flammable, explosion-proof, Fire safe, virtually insoluble,	63,62	Used to improve soil fertilizing ability

	hydroxide, mech. particles – 25, % water – 65 %	humidity – 65 %, density – 1.18 t/m^3		
3. Biosorption bond biohumus	Hazard class IV. Composition: biohumus biomass 60 %, water 40 %	Solid, non-flammable, humidity – 40 %, density – 1.18 t/m^3	0.084	Used to improve soil fertilizing ability
4. Plant's dehydrated excess sludge TOPAS AUTOMATIC	Hazard class IV. Composition: biohumus biomass 40 %, water 60 %	Solid, non-flammable, humidity – 60 %, density – 1.18 t/m^3	0.069	Used to improve soil fertilizing ability
Total:			81.873	

Based on estimated composition, analyse results and expert conclusions on similar facilities LWTP sediment is rated as hazard class IV, subject to disposal to improve soil fertility and mechanical structure.

After the commissioning of the facility, during the economic activity, the increase of generated waste and generation of new types of hazardous waste is not expected. The generated waste, including that generated during the preparatory work, belongs to the waste of known reuse, processing, destruction, and disposal methods.

Assessment by expected emission type and amount resulting from the preparatory and construction work as well as from the implementation of the scheduled activities

Ambient air pollution within the airport area during operation is mainly the result of aircraft engine and special vehicle emissions including other associated facilities operated by Boryspil International.

Output data are calculated based on Boryspil International departures/arrivals intensity, actual operating fleet profile, Boryspil International Pollutant Inventory Report developed by TOV Ekotekhservis in 2018 and duly registered.

In addition, prospective runway operation information has been provided as the output data (after the completion of runway No. 2 renovation).

The predicted total number of operations is 350 takeoffs/landings.

Distribution by RW (since 2030): RW 1 – 50%; RW 2 – 50%.

Newly created sources of pollutant emissions into the atmosphere were identified. It is envisaged to dismantle the existing one and build a new fuel filling station, the location of which is supposed to be at a standard distance from aircraft parking places. In connection with this reconstruction, the existing sources of long-distance emissions of ES No. 68–73 and 176–180 are to be liquidated, and new sources of pollutant emissions into the atmospheric air of ES No. 201–212 are to be created at the construction site of the fuel filling station.

The construction of a new fuel filling station provides for installation of:

- horizontal double-walled steel tanks with a capacity of 60 m^3 located underground;
- 6 pcs. for storage of special de-icing fluids necessary for the treatment of aircraft and the runway hard surfaces.

The company plans to use propylene glycol produced by Safewing MP II Fligth to prevent aircraft icing (please refer to the Appendix No. 10 – Conclusion of the State Sanitary and Epidemiological Expertise No. 602-123-20-3/37153 dated 28 August 2018).

At the consumer level, propylene glycol is used in automotive windshield products to ensure safe driving.

Propylene glycol does not pose a threat to the environment. Therefore, the calculation of emissions during storage and when processing aircraft with this substance is not performed.

- horizontal double-walled steel tanks with a capacity of 14 m^3 located underground
- 2 pcs. for storage of special de-icing fluids necessary for the runway hard surfaces treatment.

For the processing of runways, taxiways, and aprons of airports in the autumn and winter period, it is planned to use potassium formate produced by Runway Guard KF (please refer to the

Appendix No. 11 – Conclusion of the State Sanitary and Epidemiological Expertise No. 602-123-20-1/4974 dated 16 December 2016).

Potassium formate does not pose a threat to the environment. Therefore, the calculation of emissions during storage and when processing hard surfaces with this substance is not performed.

2 checkpoints. Each checkpoint consists of two filling stations (FS) and two tanks (20 m^3 and 10 m^3) for storing diesel fuel (DF) and Jet-A1 fuel (aviation kerosene), so you can simultaneously refuel 4 cars.

For continuous operation of radio and lighting equipment necessary for aircraft landing, diesel generators are installed on the territory of the airport. It is planned to dismantle the existing diesel generator sets of the existing emission sources ES No. 117-119, 133-135, 146-149, and the construction of new transformer substations for lighting equipment (1023H) with the installation of new diesel generator sets creating new sources of pollutants emissions into the air ES No. 213-218.

It is planned to arrange a parking area for testing aircraft engines, that is, a newly formed source of pollutants emissions into the air ES No. 219.

It is planned to build an emergency rescue station (ERS). The garage part of the building is rectangular in plan with dimensions in the axes of 18.0 × 33.54 m, with a height of 6.5 m, designed to accommodate four boxes for estimated fire trucks in each six-meter span of the building and one box for rescue equipment and ambulance – the emission of pollutants into the air is carried out through a deflector installed on the roof of the building, a newly formed source ES 220.

When calculating pollutants emissions into the air, an increase in the number of aircraft (AC) during landing and takeoff (LTO) cycles (from 156 to 350) with a distribution of 50% (AR-1) and 50% (AR-2) was taken into account. The existing ES No. 190 – AR-1 and the reconstructed one (repair of the track and increase in length: from 3,500 m to 3,800 m) ES No. 200 – AR-2.

When calculating pollutants emissions into the air, the redistribution of emissions from internal combustion engines of special vehicles, when driving along the apron of terminals B and D, as well as when driving along the reconstructed apron of terminal F (taking into account the redistribution of the number of cars due to an increase in the LTO cycle), were taken into account. Existing ES No. 191–193.

It is envisaged to build an S apron with a platform for processing aircraft with the de-icing fluid – newly formed ES No. 221.

The degree of pollutant emissions influence on the air

Calculations of pollutants dispersion in the surface layer of the atmosphere were made in accordance with the OND-86 “Methodology for calculating atmospheric concentrations of harmful substances contained in enterprise emissions” according to the EOL+ program, version 5.3.8. The software complex was developed by the TOPAZ system programming design bureau, Kyiv

Based on calculation results, an analysis of the influence of design solutions on the state of air at the border of residential development in the surface layer is presented taking into account all of the enterprise emission sources and the existing background pollution.

In accordance with the requirement of clause 2.19 of the OND-86, the calculated rectangle size is 10000 × 10000 m with a step of 250 m. The calculation was carried out for 49 pollutants and 14 summation groups.

Based on pollutant dispersion in lower surface: pollutant concentration in lower surface bordering closest residence area is within permissible level.

Considering the above, the enterprise is increasing the number of sources of pollutant emission and the level of the total capacity of pollutant emissions into the air. Currently, the enterprise has 178 sources of pollutant emissions into the air, 120 of which are organized and 56 are unorganized sources (11 of them are flat platforms of mobile sources (taking into account emissions of pollutants from the movement of special vehicles and aircraft)) with a total emission capacity of 16116.458 tons/year, 46 types of pollutants. After commissioning of the facility, the total number of emission sources will be 202; 129 of them will be organized, 63 – unorganized sources (at the same time, 15 of them will be flat platforms of mobile sources (special vehicles and aircraft (AC))). 48 types of pollutants will be emitted

into the air. The total emission capacity is 17067,6618 tones/year (taking into account the emissions of pollutants during the movement of special vehicles and aircraft).

At control design points located on the border of residential buildings, the amount of pollutants in the air is within the maximum permissible concentration.

Assessment according to the types and quantities of expected emissions and water pollution that arise as a result of preparatory and construction works as well as the implementation of scheduled activities

According to the calculation of the flow rate of wastewater (rain, irrigation, and melt) generated on the territory of the airport and calculated for the maximum capacity during the rain period, the calculated intensity is 7,800 m^3/day, 96,807 m^3/year.

To ensure the purification of rain and melt water from the Boryspil International Airport State Enterprise, construction of modern highly efficient local waste treatment plants (LWTP) is envisaged.

Assessment according to the types and quantities of expected emissions and water pollution that arise as a result of preparatory and construction works as well as the implementation of scheduled activities is positive. The establishment of LWTP reduces the concentration of pollutants during the discharge of water into the Ikva River. Requirements established in the Permit for special water use are met. The threshold limit values of pollutants in water bodies are observed.

Noise impact assessment

Today the problem of aircraft noise (AN) is relevant for Ukrainian airports in the field of environmental protection from the aircraft impact. The effect of noise generated by aircraft arriving at or departing from an airport depends on a number of factors, namely:

– types of aircraft operated at the airport aerodrome;

– the total number of takeoffs and landings of aircraft in the busiest week of the design year (determined by the airport data);

– distribution of aircraft by routes (determined by the airport data);

– operating conditions;

– distribution of aircraft by periods of the day (determined by the airport data);

– the number of runways and their use;

– weather conditions and airport-specific flight rules;

– projected runway volumes and the aircraft fleet structure in the long term.

The process of investigating noise effects around airports involves noise contours modelling.

Noise contour is a line of constant sound level of aircraft noise, averaged over a period of time, which is generated during the flights of aircraft of various types under normal operating conditions.

Boryspil International Airport State Enterprise has “A” class airfield. Working hours: round the clock.

Local time: UTC +2/+3 hours.

Currently, the airport has two runways with artificial turf with the following dimensions: runway No. 1 – 4000 × 60; runway No. 2 – 3500 × 63.

According to the Aeronautical Information Manual (AIM), runways have flight directions corresponding to the following RWY designations: runway No. 1 – 18L, 36R; runway No. 2 – 18R, 36L.

In accordance with the requirements of the Aviation Regulations of Ukraine “Requirements for the aerodrome operator for spatial zoning of the area around the airport from the conditions of aircraft noise exposure” approved by the order of the State Aviation Service dated 26 March 2019 No. 381, until 31 December 2020, by the contractor organization, Boryspil International Airport State Enterprise, carries out work on spatial zoning near the aerodrome territory taking into account the conditions of aircraft noise (assessment of the aircraft noise level, construction of a noise map and an explanatory note). The performance of the work involves carrying out full-scale instrumental measurements of aircraft noise at the airport and in the area near it (11 settlements) during takeoff, flight, aircraft landing, starting and testing of aircraft engines followed by the construction of noise maps and an explanatory note to them.

Currently, the Boryspil International Airport State Enterprise uses the runway No. 1 for takeoff and landing operations. According to information from the aerodrome service, the runway No. 2 will not be used until the end of 2020. Therefore, measurements of aircraft noise during takeoff and landing operations conducted on the runway No. 2 are not expected.

Assessment of the vibration pollution impact

Vibration sources are engines of construction machines and mechanisms.

Vibration levels of equipment used in construction and installation work do not exceed the permissible standard values in accordance with the requirements of SSS 3.3.6.039-99 “State sanitary standards for industrial general and local vibration”.

Thermal pollution assessment

Electrical equipment (with the exception of diesel generators operating in emergency situations) is environmentally friendly and does not pose a threat to the environment.

Light pollution assessment

The lighting facilities are environmentally friendly and do not pose a threat to the environment.

Electromagnetic radiation impact

Location and operation conditions of Boryspil International AR-2 navigation and landing equipment as EMS source meet “EMS Exposure Sanitary Regulations” approved by the Order of the Ministry of Health of Ukraine No. 239 dated 1 August 1996.

Impact on territories and objects of ecological network

The scheduled activities area is not included in the areas, facilities and area and facility lists of environmental network as provided for by the Law of Ukraine “On Environmental Network of Ukraine” and the Procedure for Inclusion of Areas and Facilities to Area and Facility Lists of Environmental Network approved by Enactment1196 of the Government of Ukraine of 16 December 2015.

Impact on Emerald Network objects.

The scheduled activities area does not belong to area and facilities of the Emerald Network of Ukraine. The closest object of the Emerald Network of Ukraine (Kanivske Reservoir - UA0000111 area: 672.34 km²) is located about 13 km away from the proposed operation site.

Impact on territories and objects of nature reserve fund

There are no objects of nature reserve fund in the land plot of planned activities or near it. There is no impact objects of nature reserve fund.

Impact of planned activities on state of fauna

According to the materials of “Plan of management of hazards created by representatives of wild nature in the airfield area” in the airport area and neighbouring territories, constant monitoring, control and accounting of birds and wild animals is performed.

Based on the results of observations and accounting of the ornithological division of SE “International Airport “Boryspil”, the following species of birds/wild animals were seen in the last five years:

White stork (Ciconia ciconia)
Northern goshawk (Accipiter gentilis)
Common mallard (Anas platyrhynchos)
Common buzzard (Buteo buteo)
European herring gull (Larus argentatus)
Rough-legged buzzard (Buteo lagopus)
Hooded crow (Corvus cornix L.)
Hen harrier (Circus cyaneus)
Rook (Corvus frugilegus)

Black-headed gull (Larus ridibundus)
Pigeon (Columba livia)
Northern lapwing (Vanellus vanellus)
Common kestrel (Falco tinnunculus)
Western jackdow (Corvus monedula)
Eurasian magpie (Pica pica)
Red-footed falcon (Falco vespertinus)
Common starling (Sturnus vulgaris)
Common swift (Apus apus)
Old World sparrow (Passeridae)
Swallow (Hirundo)

The following equipment is used to scare off birds from the airfield:

- Stationary bio-acoustic birdscarer Bird Guard Super Pro AMP made in the USA, 3 pieces. The operation principle is based on the reproduction of recorded danger signals for different species of birds.

Technical specifications:

- number of records - 8;
- protection area up to 12 ha;
- signal power up to 125 db.
- day/night operation mode, round the clock.
- duration of pause between broadcasts from 1 to 30 min.

Gas birdscarers (thunderbolt) Guardian-2 made in Spain, 6 pieces. The operation principle of this birdscarer is based on periodic reproduction of snaps (claps) with a power of up to 110 dB.

Technical specifications:

- weight 8 kg;
- acoustic power from 70 to 110 Db. Regulated using a telescopic tube;
- operates on gas (propane);
- regulation of shot playback time in the range from 1 to 30 minutes using the gas feed valve.

Laser birdscarers LEM-50 made in France, 2 pieces.

The birds are hazed away with a green laser beam.

Technical specifications:

- Equipment weight – 820 g;
- Length - 35 cm;
- Diameter – 6.4 cm;
- Range up to 1.5 km.

- Mobile bio-acoustic birdscarers Scarecrow made in UK, 2 pieces, mounted on response vehicles. The operation principle is based on the reproduction of recorded danger signals for different species of birds.

Technical specifications:

- Number of hazard records - 8;
- Signal power up to 110 Db;
- Device operation control in manual mode.

In particular, in order to ensure the safety of takeoffs and landings of aircraft, the airport developed measures for monitoring, tracking, accounting, and hazing of birds and wild animals. The airport ornithological service monitors the prevention of conditions that may attract birds.

Actions to manage the hazards posed by hazard agents:

- identification of possible nesting zones, monitoring according to the survey schedule;
- preventing birds and wild animals from entering the airfield area by installing an appropriate fence;
- hazing birds and wild animals;
- imposing restrictions to ensure that actions would not attract birds and wild animals;
- maintaining drainage systems and grass in good condition;

- exclusion of the presence of standing water on the coatings of artificial runways and taxiways;
- maintaining the proper grass height. Grass at the airport is maintained 50 mm to 300 mm high, including the grass trimming before it produces seeds, selection of seeds of appropriate grasses that cannot serve as food for birds, combating the vegetation erosion
- removal of dead birds and animals, destruction of rodents
- removal of nesting sites before nesting;
- switching off landing lights between flights;
- identifying and taking actions to eliminate potential places that attract birds and wild animals outside the airport (within 15 km), namely tourist recreation areas, landfills, slaughterhouses, orchards, animal feed warehouses, greenhouses with plants, farms, garbage pits, waste recycling centres, and settling ponds;
- bird chasing – the use of car headlights, sirens; bio-acoustic means are used at the airport in different areas by reproducing the cries of "danger" produced by different species of birds, laser and mechanical means to haze birds by directing a green laser beam, pyrotechnic charges, shots.

Extermination policy, applied during serious activity of birds by setting traps for certain species of birds. The decision on extermination shall be made if the other actions failed only.

Aircraft collisions with birds poses a threat to air transportation safety.

Actions aimed at preventing the penetration of birds and wild animals protect both the airport and wild animals from danger.

Current environment status (basic scenery) and its potential changes in case no scheduled activities are provided

Waiver of planned activities will result in dismissal of qualified employees able to work and decrease the activity of Boryspil airport, the only airport of Ukraine competing successfully with big European hub airports. It will have a negative impact on the social area of the enterprise location region, and, considering the fact that the enterprise is one of the biggest taxpayers in the district, it will also have an adverse effect on local budgets.

Planned activities in terms of reconstruction of the flight area No. 2 of SE Boryspil International Airport have a positive impact. Continuing works on reconstruction and expansion of the State International Airport Boryspil conforms to the provisions of the Law of Ukraine “On the General Scheme of Planning of the Territory of Ukraine”. Effective use of the transit potential of the country with integration of its transport complex to European and world transport and communication system will stimulate the development of engineering and transport infrastructure of Ukraine, development of territories near transport corridors and of the country as a whole.

Without planned activities of the enterprise, the quality indicators of the environment state will most likely remain at the current level.

Additionally, we shall mention the fact that the situation will have consequences for social and economical activities of the enterprise and the region as a whole:

will lead to decrease of the number of jobs at the enterprise;

will decrease the size of revenue (taxes, rent payment) for the region;

will slightly decrease the level of physical pollution for the environment.

Boryspil International will provide the following:

- proposed actions aimed at prevention, avoidance, reduction, and elimination of significant adverse effect on environment, including (where possible) compensatory measures.
- prevention measures or measures to mitigate environment impact by emergency and response measures.

As per paragraph 2 of Article 4 of the Law of Ukraine on Environmental Impact Assessment, SE Boryspil International Airport published on the official website of the Ministry of Ecology and Natural Resources of Ukraine http://eia.menr.gov.ua a notice on the proposed operations for

reconstruction of the flight zone No. 2 (registration number – 20199134502; date of official publication: 18 September 2019).

In compliance with Article 4 of the Law of Ukraine "On Environmental Impact Assessment" scheduled activities notice is published in two printed media distributed within administrative units exposed to scheduled activities impact and placed on local government bulletin boards and other public places of scheduled activities.

According to paragraph 7 of Article 5 of the Law of Ukraine on Environmental Impact Assessment, within 20 business days from the date of official publication of notice on proposed operations subject to environmental impact assessment, the public was able to provide the authorized central body with comments and suggestions on proposed operations, research volume and level of details of information to be included in the environmental impact assessment report.

The Environmental Safety and Permitting-Licensing Activities Department of the Ministry of Energy and Environmental Protection of Ukraine in its letter dated 21 October 2019 No. 10/7/6006-19 notes that since the date of official publication of a notice on proposed operations regarding the reconstruction of the flight zone No. 2 of SE Boryspil International Airport (registration file No. 20199134502; date of official publication: 18 September 2019), the comments and proposals regarding the assessment volume and level of detailed information to be included in the environment impact assessment report were received from:

– I. M. Fitsev and Y. O. Fitseva;
– A. A. Fedirko;
– M. M. Rusan;
– O. M. Savchuk;
– citizens of the village of Zatyshne, Boryspil district;
– L. O. Semeniuk;
– citizens of the village of Hora, Boryspil district;
– citizens of the village of Voronkiv, Boryspil district;
– Martusivka Village Council of Boryspil District.

The comments and proposals regarding the proposed operations, assessment volume and level of detailed information to be included in the environment impact assessment report were taken into account partially.

Ukraine establishes a state environment monitoring system to collect, process, store and analyse environment information, forecast changes and prepare evidence-based recommendations to facilitate efficient management decisions. Environmental pollution monitoring is carried out by the Central Authority that implements national environment protection policy, other special authorities and other businesses, institutions and organisations which activities deteriorate or may deteriorate environment.

Based on Government Enactment 391 requirements of 30 March 1998 "On Approval of State Environment Monitoring Provisions "

Boryspil International shall:

- conduct environmental monitoring of its operations and state of its industrial areas, collect, store and provide for free data and/or general information for the following integrated data processing (for this purpose monitoring system entities and data provider make a respective contract);

- make and duly approve plans of facility monitoring controls to prevent any hazardous process, economic or other activities.

13. A list of references indicating the sources used for the descriptions and assessments contained in the environmental impact assessment report.

1. The Code of Ukraine on Mineral Reserves.
2. The Land Code of Ukraine.
3. The Law of Ukraine “On Fishery, Industrial Fishing and Protection of Water Bioresources”.
4. The Water Code of Ukraine.
5. The Tax Code of Ukraine.
6. The Law of Ukraine “On Environment Impact Assessment”.
7. The Law of Ukraine “On Environment Protection”.
8. The Law of Ukraine “On Waste”.
9. The Law of Ukraine “On Ambient Air Protection”.
10. The Law of Ukraine “On Ensuring Sanitary and Epidemic Safety of the Population”.
11. The Law of Ukraine “On Land Management”.
12. The Law of Ukraine “On the Red Book of Ukraine”.
13. The Law of Ukraine “On the State Land Cadastre”.
14. The Law of Ukraine “On Land Protection”.
15. The Law of Ukraine “On Copyright and Related Rights”.
16. The Law of Ukraine “On Protection of Cultural Heritage”.
17. The Law of Ukraine “On Protection of Architectural Heritage”.
18. Convention On Environment Protection in Transboundary Context.
19. The Enactment of the Government of Ukraine No 465 of 25 March 1999 “On Approval of Protection Regulations of Surface Water Pollution From Return Water”.
20. The Enactment of the Government of Ukraine of 15 February 2002 No 175 “On Approval of Loss Estimation Method Incurred in the Result of Emergency Resulting from Man-Made or Natural Disasters”
21. The Enactment of the Government of Ukraine No 2034 of 1 November 1999 “On Approval of the Procedure of State Reporting and Registration of Waste”.
22. Provisions of hazardous waste transboundary transportation, disposal/destroying monitoring and Yellow and Green Waste List approved by the Government of Ukraine No 1120 of 13 July 2000.
23. The Enactment of the Government of Ukraine No 486 of 24 January 2002 “On Approval of the Procedure of Determination of Size and Boundaries of Water Protected Zones and Economic Activity Mode Within Them”.
24. The Enactment of the Government of Ukraine No 502 of 11 April 2002 “On Approval of the Procedure for Amending of Targeted Use of Land Owned by Individuals or Entities”.
25. The Green Book of Ukraine Provisions approved by Enactment of the Government of Ukraine No 1286 of 29 August of 2002.
26. Public discussion procedure during the environmental impact assessment approved by Enactment No 989 of the Government of Ukraine of 13 December 2017.
27. Enactment of the Government of Ukraine No 1026 of 13 December 2017 “On Approval of the Procedure for Transferring of Environment Impact Assessment Documents and Funding Environment Impact Assessment and the Procedure of Keeping the Environment Impact Assessment Registry”.
28. “Procedure of Entering of Areas and Facilities into the List of Environment Network of Areas and Facilities“ approved by Enactment of the Government of Ukraine 1196 of 16 December 2015.
29. Enactment of the Government of Ukraine No 1279 of 17 November 1997 “On Amount and Procedure of Identification of Losses Incurred by Agricultural and Forestry Businesses Entitled for Compensations”.
30. Enactment of the Government of Ukraine No 761 of 23 May 2007 “On Addressing of Special Purpose Forest Resources Issues “.
31. NPAOP 0.00-1.24-10 “Occupational Safety Regulation During Open Pit Operations”, rev. 2010

32. Targeted Use Types Classification approved by Order No 548 of the State Committee of Land Resources of Ukraine of 23 July 2010, **registration** by the Ministry of Justice No 1011/18306 of 1 November 2010.

33. State Sanitary Regulations “Human Consumption Potable Water Hygienical Requirements” (DSanPiN 2.2.4-171-10).

34. Provisions on Designing of Mining Enterprises of Ukraine and Identifying of Natural Resource Reserves Based on Mining Preparedness approved by Order No 221 of the Ministry of Industrial Policy of Ukraine of 07 May 2004, registration No 846/9445 of the Ministry of Justice of Ukraine of 7 July 2004.

35. Order No 286 of the Ministry of Environment and Natural Resources of Ukraine of 30 July 2001 “On Approval of the Procedure of Identification of the Background Pollutant Concentration in Ambient Air“, registration No 700/5891 of the Ministry of Justice of Ukraine of 15 August 2001.

36. State Build-up Planning and Development Sanitary Regulations approved by Order 173 of the Ministry of Health of Ukraine of 19 June 1996.

37. State Built-Up Area Ambient Air Protection Regulations (against chemical and biological pollutants) approved by Order 201 of the Ministry of Health of Ukraine of 9 July 1997.

38. Instruction On Development and Approval of Maximum Permissible Discharge (MPD) of Substances in Water Bodies with Return Water approved by Order 116 of the Ministry of Environment Protection of Ukraine of 15 December 1994.

39. GOST 12.1.003-89 SSBT “Noise. General Safety Requirements

40. State Sanitary General and Local Vibration Regulations approved by decision of Chief Sanitary Officer of Ukraine of 01 December 1999 No 39 (DSN 3.3.6.039-99).

41. Terms of application of Natural Resource Reserve Classification of the State Fund of Mineral Reserves to peat deposits approved by Order 224 of the State Commission of Ukraine for Natural Resource Reserves within the State Committee of Natural Resources of Ukraine of 25 October 2004, registry No 1418/10017 of 8 November 2004.

42. Order No 342 of the Ministry of Environment and Natural Resources of Ukraine “On Approval of Primary Reporting Form No 1-BT "Waste and Packing Material and Tare Registration" of 7 July 2008, registration No 824/15515 of the Ministry of Justice of Ukraine of 9 September 2008.

43. Instruction On completion of Form 1 of the State Statistical Survey of Hazardous Waste - “I-III Hazard Class Waste Generation, Processing and Disposal Report” approved by Order No 494 of the State Statistical Committee of Ukraine of 24 October 2006, registration No 1195/13069 of the Ministry of Justice of Ukraine of 10 November 2006.

44. List of the most valuable soil groups approved by Order No 245 of the State Land Committee of Ukraine (Derzhkomzem) of 6 October 2003, registration No 979/8300 of the Ministry of Justice of Ukraine of 28 October 2003.

45. Order No 248 of the Ministry of Health of Ukraine of 08 April 2014 “On Approval of the State Sanitary Regulations “Hygienic Labour Classification by Harm and Risk Levels of Production Environment, Difficulty and Pressure of Labour Process”.

46. DBN V.2.5-28 - 2006 “Building and Structure Engineering Systems. Natural and Artificial Lighting.”

47. DSTU 4839:2007 “Improved Quality Petrol for Vehicles.”

48. DSTU 4840:2007 “Improved Quality Diesel Fuel, Specifications.”

50. Vehicle tyre mileage standards approved by Order No 420 of the Ministry of Transport of Ukraine of 8 December 1997.

51. Acid battery inspection and maintenance rules ND 7214 U 95120-157-97 approved by Order No 417 of the Ministry of Transport of Ukraine of 8 December 1997.

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53. “Pollutant Calculation Practices for Unorganised Air Pollution Sources” - Donetsk 1994.

54. Urban Development. Planning and Development of Urban and Rural Settlements. DBN 360-92. - K.: Ministry of Construction and Architecture of Ukraine, 1993.

55. Harmful Substances in Industry. Vol. 1, 2/Edited by professor I.V. Lazarev. - M. - L.: Chemistry. 1965.

56. “Pollutant Calculation Practices for Unorganised Air Pollution Sources”. Donetsk, OAO “UkrTEK”, 1999. – 154 p.

57. OND-86 "Ambient Air Concentration Calculation Method for Industrial Emissions", L., Gidrometeoizdat, 1987.

58. Methodical Recommendations for People Health Risk Estimation Resulting from Air Pollution approved by Order 184 of the Ministry of Health of Ukraine of 13 April 2017.

59. DBN A.2.2-3-2014 Construction Design Documents Content.

60. DBN V.1.2-8-2008 “Buildings and Structures Basic Requirements. People Safety and Environment Protection.”

61. DSTY-N B.B.1.1-10:2010. “Guidelines On Using “Environment Protection” Sections within Urban Development Documents. Content and Requirements.”

62. DSTU N B V.1.1-27:2010 Construction Climatology.

63. DSTU-N B V.1.1-35:2013 Indoor and Outdoor Noise Calculation Guidelines.

64. DBN V.1.2-10-2008 Buildings and Structures Basic Requirements. Noise Protection.

65. DBN V. 1.1-31:2013 “Protection of Areas, Buildings and Structures Against Noise.”

66. DSTU-N B V.1.1-33:2013 “Rural Area Noise Protection Calculation Guidelines.”

67. DSN 3.3.6.037-99 Industrial Noise, Ultrasound and Infrasound Sanitary Standards.

68. Enactment No 327 of the USSR Government of 14 July 1976 “On Land Rehabilitation, Conservation and Efficient Use of Topsoil at Mining Mineral Resources and Peat, Exploration, Construction, and Other Work.”

69. Enactment of the Government of Ukraine No. 1070 of 10 December 2008 “On Approval of Household Waste Removal Regulations.”

70. State Build-up Planning and Development Sanitary Regulations approved by Order 173 of the Ministry of Health of Ukraine of 19 June 96, registration No 379/1404 of the Ministry of Justice of Ukraine of 24 July 1996. DSP-173-96.

71. Maximum Permissible Concentration of Chemicals and Biological Substances in Built-Up Area Ambient Air. Approved by acting chief sanitary officer of Ukraine S.V. Protas 3 March 2015

72. Guiding Safe Impact Levels (GSIL) of Built-Up Air Pollutants. Hygienic Standard GN 2.2.6.-184-2013, Kyiv, 2013. State Sanitary and Epidemiological Service of Ukraine.

73. Safety Regulations at Handling Industrial Explosives approved by Order No 35 of the Ministry of Energy and Coal Mining Industry (Minenergovugillya) of Ukraine of 12 June 2013.

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75. Order No 22 of the Ministry of Industrial Policy (Minptompolitika) of 7 May 2004 “On Approval of the Design Procedure of Mining Enterprises of Ukraine and Mineral Resource Reserve Identification by Mining Preparedness.”

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77. Industrial Emission Concentration Calculation Practices. OND-86.

78. “Maximum Permissible Emissions from Stationary Sources” approved by Order No 309 od the Ministry of Environment Protection of Ukraine of 27 June 2006.

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81. List of pollutants and threshold values for potential emissions subject to state registration (Attachment No1 to the procedure and criteria of registration of facilities that have or nay have an adverse effect on people’s health and ambient air, emitted pollutant types and amounts approved by Order No 177 of the Minekoresursy of Ukraine, registration No 445/6733 of the Ministry of Justice of Ukraine of 22 May 2002.

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87. "Basic Radiation Safety Sanitary Regulations of Ukraine" approved by Order No4 of the Ministry of Health of Ukraine, registration No 552/10832 of the Ministry of Justice of Ukraine of 20 May 2005.

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93. Risk Evaluation and Permissible Levels for High-Risk Facilities Identification Methods approved by Order No 268 of the Ministry of Labour and Social Policy of Ukraine.

94. Emergency Situation Man-Made and Natural Effect Assessment Methods approved by Enactment No 175 (175-2002-p) (including revisions) of the Government of Ukraine of 15 February 2002.

95. 2017 Environment Certificate of Dnipropetrovsk region.

96. Regional report on 2017 Dnipropetrovsk region environment conditions.

102. Road Machine and Special Machinery Fuel and Lubricant Consumption Rates N218. "Ukravtodor" 043-96 approved by Order No 156 of Ukravtodor Corporation of 14 August 1998

103. Road Machine and Special Machinery Fuel and Lubricant Consumption Rates (addition to N218). "Ukravtodor" 043-960, Ukrainian State Corporation for Construction, Repair and Maintenance of Motor Roads "Ukravtodor".

104. Vehicle Fuel and Lubricant Consumption Rates approved by Order No 43 of the Ministry of Transport of Ukraine of 10 February 1998.

105. DBN B.2.8-12-2000 Construction Machinery, Equipment, and Tools. Standard Fuel and Lubricant Consumption for Construction Machinery Operation.

106. Wheeled Vehicle and Special Wheeled Vehicle Average Tyre Service Life approved by Order No 488 of the Ministry of Transport and Communications of Ukraine of 20 May 2006, registration No 712/12586 of the Ministry of Justice of Ukraine of 15 June 2006.

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109.Calculation Methods for Unorganised Emissions of Dust and Harmful Gases During Blasting Work at Mining and Chemical Enterprises, 1987"

110."Harmful Substance Emission Calculation at Goskomneftrprodukt Enterprises of Russia", 1988, Astrakhan.

111.Industrial Wastewater Acceptance Procedure for Utilities and Departmental Systems of Ukrainian Cities approved by Order No 37 of the Ministry of Construction of Ukraine (Derzhbud) of 19 February 2002, registration No 403/6691 of the Ministry of Justice of Ukraine of 26 April 2002.

112.Surface Wastewater Treatment Facilities Interim Instructions. VSN 496-77.

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114.Enactment No 238 of the Government of Ukraine of 3 October 1991 “On Amount and Procedure of Identification of Losses Incurred by Agricultural and Forestry Businesses Entitled for Compensations”.

115.“People Health Risk Estimation Resulting from Air Pollution” recommendations approved by Order No 184 of the Ministry of Health of Ukraine of 13 July 2007.

116.“Identification of Potentially Hazardous Facilities Method”. Approved by Order No 98 of the Ministry of Emergency on Chornobyl Disaster Effect Protection of 23 February 2006, registration No 286/12160 of the Ministry of Justice of Ukraine of 20 March 2006.

117.Emergency Classification Criteria approved by Order No 119 of the Ministry of Emergency of Ukraine of 22 April 2003, registration No 656/7977 of the Ministry of Justice of Ukraine of 29 July 2003.

118.Forecast Methods of Harmful Chemicals Effect (Emission) at Industrial and Transport Accidents approved by Order No 73/82/64/1220326-01 of the Ministry of Emergency, Ministry of Agricultural Policy, Ministry of Economy, Ministry of Environment and Natural Resources of Ukraine of 27 March 2001, registration No 326/5517 of the Ministry of Justice of Ukraine of 10 April 2001.

119.Emergency and Accident Localisation and Liquidation Plan Development Procedures approved by Order No 112 of the Occupational Safety Supervising Committee of 17 June 1999, registration No 424/3717 of the Ministry of Justice of Ukraine of 30 June 1999.

120.Emergency Situation Man-Made and Natural Effect Assessment Methods approved by Enactment No 175 (175-2002-p) (including revisions) of the Government of Ukraine of 15 February 2002.

121.Guiding Principles for National Inventory of Greenhouse Gases MGEZK, 2006. (http://www.ipcc-nggip.iges.or.jp/public/2006gl/).

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124.General Installation Management, Guiding Document 1, version of 16 July 2012 (https://ec.europa.eu/clima/sites/clima/files/ets/monitoring/docs/gd1_guidance_installations_en.pdf.

Executed by 1*

_____ _____

(surname, name, qualification) (signature)

_____

Executed by 2

_____ _____

(surname, name, qualification) (signature)

_____

Executed by 3

_____ _____

(surname, name, qualification) (signature)

_____

* Environment Assessment Report shall have signatures of all authors (executive officers) and include their qualification.

Attachment list

Annex 3

Ministry of Infrastructure of Ukraine
State Enterprise
"Boryspil" International Airport
Boryspil -7 str, Gora village, Boryspil district
Kyiv region, Ukraine, 08300
USREOU code 20572069
tel: +38 044 281 78 54 | fax: +38 044 281 71 22 | info@kbp.aero | AFTN: UKBBYDYD

8/21/2020 No 19-22/3-523

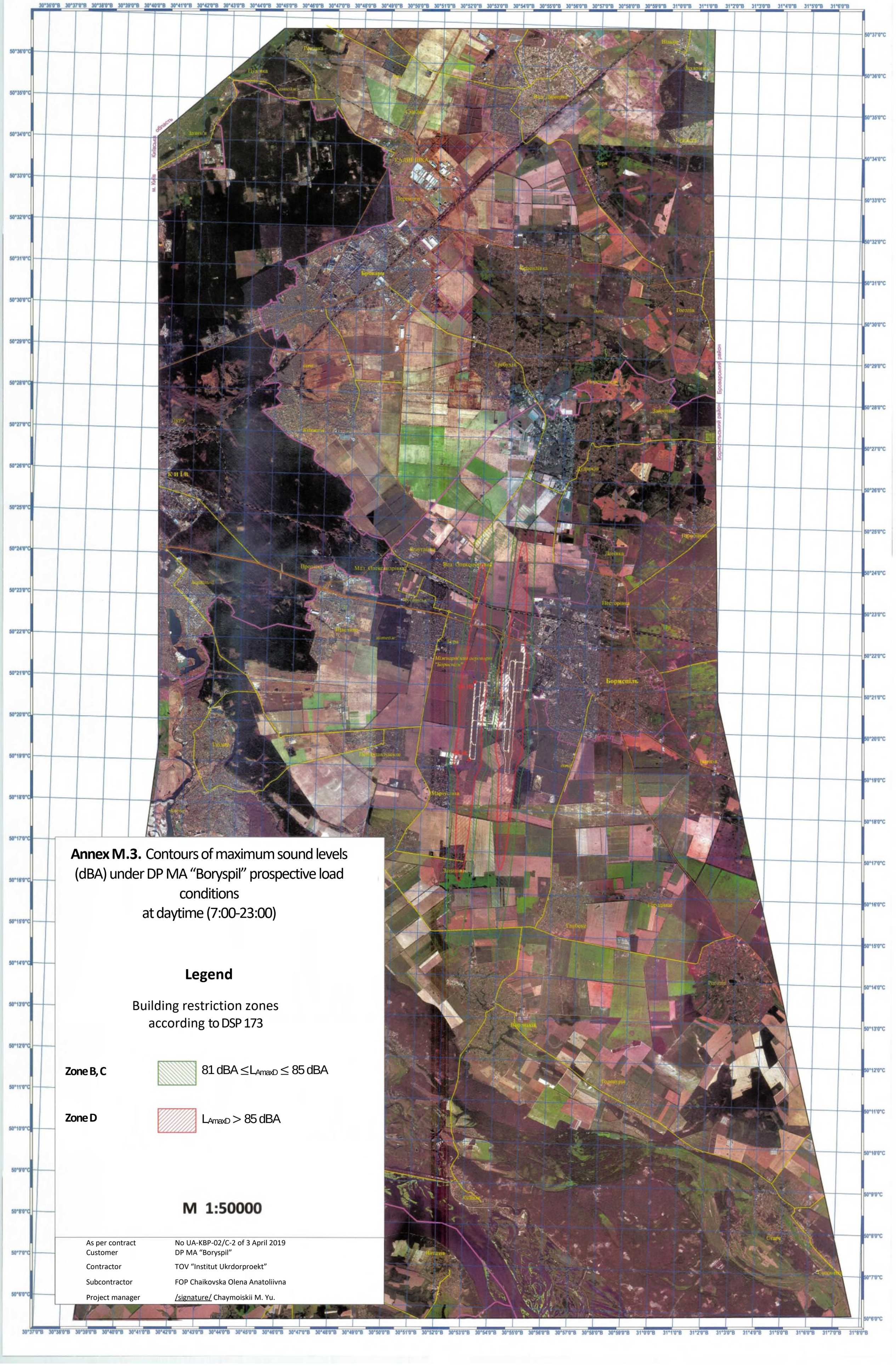
A letter-certificate on the availability of owned or leased production sites (premises) required to do business

This is to provide information on the availability of owned or leased production sites/premises of DP MA "Boryspil" required to perform ***"Reconstruction of Manoeuvring Area No 2 of DP MA "Boryspil",*** including:

Runway and taxiways of manoeuvring area No 1;
Runway and taxiways of manoeuvring area No 2;
Aircraft aprons;
Administration and production buildings;
Passenger terminal "B" (inventory No 6909);
Passenger terminal "D" (inventory No 47895);
Passenger terminal "F" (inventory No 47570);
Perimeter fencing of the premises (with alarm and video surveillance system) (inventory number 47487);
Boryspil Airport access road (inventory No 47747);
Temporary storage warehouse No 1,2,3 (inventory No 8308);
Temporary storage warehouse No 4,5 (inventory No 8306);
Aviation engineering service hangar (inventory No 47497);
Emergency-and-rescue stations;
Transformer substations;
Sewage pump stations;
Technical buildings;
etc.

Deputy Director General
for Commercial Activities and Development of Infrastructure *[signature]* Georgii Zubko

Anton Kovbas, 281-78-32



Annex M.3. Contours of maximum sound levels (dBA) under DP MA "Boryspil" prospective load conditions at daytime (7:00-23:00)

Legend

Building restriction zones according to DSP 173

Zone B, C — 81 dBA $\leq L_{AmaxD} \leq$ 85 dBA

Zone D — L_{AmaxD} > 85 dBA

M 1:50000

As per contract	No UA-KBP-02/C-2 of 3 April 2019
Customer	DP MA "Boryspil"
Contractor	TOV "Institut Ukrdorproekt"
Subcontractor	FOP Chaikovska Olena Anatoliivna
Project manager	/signature/ Chaymoiskii M. Yu.

Annex M.4. Contours of maximum sound levels (dBA) under DP MA "Boryspil" prospective load conditions
at nighttime (23:00-7:00)

Legend

Building restriction zones
according to DSP 173

Zone B		$71\ dBA \leq L_{AmaxN} \leq 75\ dBA$
Zone C		$76\ dBA \leq L_{AmaxN} \leq 80\ dBA$
Zone D		$L_{AmaxN} > 80\ dBA$

M 1:50000

As per contract	No UA-KBP-02/C-2 of 3 April 2019
Customer	DP MA "Boryspil"
Contractor	TOV "Institut Ukrdorproekt"
Subcontractor	FOP Chaikovska Olena Anatoliivna
Project manager	/signature/ Chaymoiskii M. Yu.

Annex M.1. Contours of maximum sound levels (dBA) under DP MA "Boryspil" current load conditions
at daytime (7:00-23:00)

Legend

Building restriction zones
according to DSP 173

Zone B, C		81 dBA $\leq L_{AmaxD} \leq$ 85 dBA
Zone D		L_{AmaxD} > 85 dBA

M 1:50000

As per contract	No UA-KBP-02/C-2 of 3 April 2019
Customer	DP MA "Boryspil"
Contractor	TOV "Institut Ukrdorproekt"
Subcontractor	FOP Chaikovska Olena Anatoliivna
Project manager	/signature/ Chaymoiskii M. Yu.

Annex M.2. Contours of maximum sound levels (dBA) under DP MA "Boryspil" current load conditions
at nighttime (23:00-7:00)

Legend

Building restriction zones
according to DSP 173

Zone B		71 dBA $\leq L_{AmaxN} \leq$ 75 dBA
Zone C		76 dBA $\leq L_{AmaxN} \leq$ 80 dBA
Zone D		L_{AmaxN} > 80 dBA

M 1:50000

As per contract	No UA-KBP-02/C-2 of 3 April 2019
Customer	DP MA "Boryspil"
Contractor	TOV "Institut Ukrdorproekt"
Subcontractor	FOP Chaikovska Olena Anatoliivna
Project manager	/signature/ Chaymoiskii M. Yu.

Annex No 5

STATE CERTIFICATE
of the right of permanent land use

Series ЯЯ No 140084

State certificate of the right of permanent land use issued to

Boryspil International Airport State Enterprise,
(name of legal entity and

Kyiv region, city of Boryspil, Boryspil International Airport
(its location — address)

and, based on a decision of a public authority or a self-administration body,

Order of Kyiv Regional State Administration No 314 of 7/25/2012
(name of the body, date and number of decision)

is a permanent user of land with an area of 163.3212 hectares
(hectares or square meters)

within the boundaries according to the layout.

The land plot is located Kyiv region, Boryspil district, Martusivska village counsil
(address — street, settlement,

district, region)

Intended purpose (use) of the land For accommodating engineering-and-technical

and other buildings and structures

The state certificate is made in two copies, the first one has been handed over to the permanent land user, the second one remains with

Derzhkomzem department in Boryspil district
(name of the public land resources authority)

The certificate has been registered in the Registry of state certificates of land ownership and land use rights (illegible), land lease agreements under No 322080003000048

Head of Boryspil District State Administration
(name of local state administration or local self-administration body)

Seal here

/signature/ Ya. V. Dobrianskyi
signature last name

*/stamp: BORYSPIL DISTRICT STATE ADMINISTRATION * UKRAINE * Kyiv region * USREOU code 24209740/*

Head of Derzhkomzem department in Boryspil district
(name of the public land resources authority)

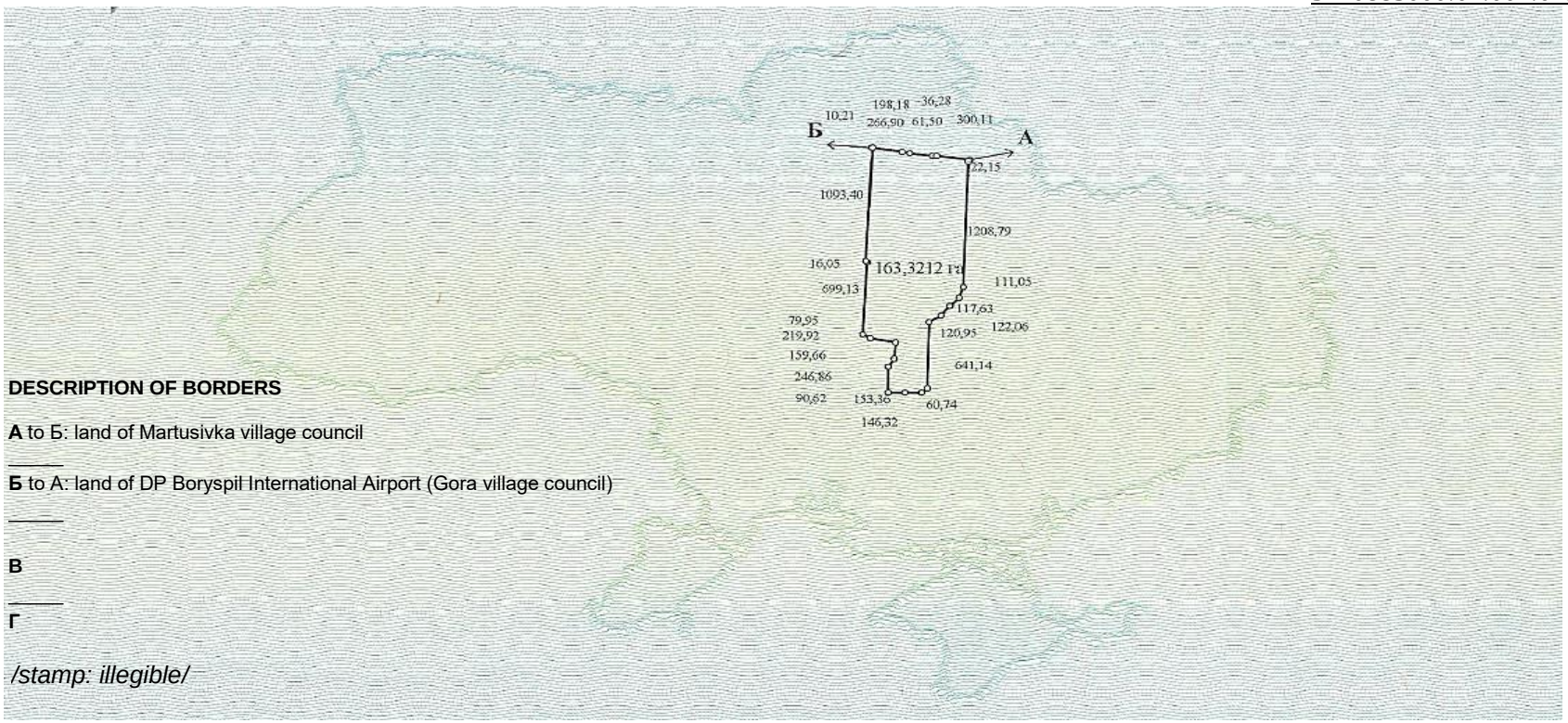
/signature/ O. V. Maistrov
signature last name

8/29/2012

(The Enactment of the Cabinet of Ministers of Ukraine No 449 of 4/2/2002 "On approval of forms of the state certificate of land ownership right and the state certificate of right of permanent land use")

Layout of the land plot borders

Cadastral number of the land plot
3220885000:04:001:0298



DESCRIPTION OF BORDERS

А to Б: land of Martusivka village council

_____

Б to А: land of DP Boryspil International Airport (Gora village council)

_____

В

_____

Г

/stamp: illegible/

Head of public land resources authority

Derzhkomzem department in Boryspil district

/signature/
signature

O. V. Maistrov
last name

/stamp: illegible/

Scale 1: 50000

EXTRACT

from the State register of real estate titles
in respect of other corporeal right registration

Extract index number:	30760183
Date, time of compilation:	12/10/2014 15:09:09
Extract provided by:	Registration service of Boryspil city and district department of justice in Kyiv region
Grounds for providing the extract:	application registered under number: 9345909, date and time of application registration: 12/10/2014 14:58:51, applicant: Volik Vitalii Volodymyrovich (authorized representative)

Relevant information about the state registration of other corporeal right

Number of entry on other corporeal right: 7939111

Date, time of state registration:	12/3/2014 11:37:51
State registrar:	Podzirei Olha Vasylivna,
Grounds for creation of other corporeal right:	State certificate of the right of permanent land use, series and number: ЯЯ No 140084, issued on 8/29/2012, issued by: Derzhkomzem department in Boryspil district of Kyiv region
Grounds for making an entry:	Decision on the state registration of rights and encumbrances thereof, index number: 17716419 of 12/4/2014 12:50:14
Type of other corporeal right:	the right of permanent land use
Information about the holder of other corporeal right:	**Entity exercising the right: BORYSPIL INTERNATIONAL AIRPORT STATE ENTERPRISE**, USREOU code: 20572069, state of registration: Ukraine **Owner: Boryspil district state administration,** USREOU: 24209740, state of registration: Ukraine

Information about the object of other corporeal right

Description of object of other corporeal right	a land plot with a total area of 163.3212 hectares

Information about the real estate property

The real estate property:	land plot
Address:	Kyiv region, Boryspil district, Martusivka village council

/QR code/
EEO 059731

Cadastral number:	3220885000:04:001:0298
Intended purpose	for accommodating engineering and other buildings and structures that support the operation of the air transport
Extract compiled by	Podzirei O.V.
State registrar	Podzirei O.V.
Signature	*/signature/*

*/stamp: State registrar of real estate property rights * Podzirey Olha Vasylivna Registration Service of Boryspil city and district department of justice in Kyiv region* /

EXTRACT
from the State Land Cadastre regarding the land plot

Extract number	HB-3201786382013
Compilation date	11/18/2013
Application (request) submitted by	Onoprienko Andrii Oleksiiovich
	11/18/2013, 3B-3201874I42013

Data used for searching for information in the State Land Cadastre

Land plot cadastral number	3220885000:04:001:0298

General information about the land plot

Cadastral number	3220885000:04:001:0298
Location (geographical administrative division)	Kyiv region, Boryspil district, Martusivska village counsil
Intended purpose:	12.08
Land category	Lands intended for use in industrial sector, transportation, communications, energetics, defence, and for other uses
Type of use of the land plot	for accommodating engineering and other buildings and structures that support the operation of the air transport
Form of ownership	State property
Land plot area, hectares	163.3212

Information about the state registration of the land plot

Information about the land management documentation that served as grounds for the state registration of the land plot	Land management technical documentation regarding the creation of documents that certify the right for the land plot, including parcelling or merging the land plots, 7/25/2012; DP “Holovnyi instytut zemleustroiu”, Chernenka O.I.
Body that registered the land plot	Derzhkomzem department in Boryspil district
Date of the state registration of the land plot	8/29/2013

Information about the right of ownership / right of permanent use

Type of right	Right of permanent use of the land plot
Information about the owners (users) of the land plot	
Name	Boryspil International Airport State Enterprise.
Details of the identification document	
Tax number	20572069
Location	804, city of Boryspil
Document that serves as grounds for creating the right	Decision of executive authority No 314 of 8/29/2012

Document that certifies the right	the state certificate of 8/29/2012 ЯЯ No 140084

Information regarding the land plot usage limitations

Information regarding the land plot usage limitations set by the Rules of maintaining the State land cadastre approved by the Enactment of the Cabinet of Ministers of Ukraine No 1051 of 10/17/2012 are not registered.

Information about the state cadastral registrar (notary) that provided the extract from the State land cadastre regarding the land plot

The extract compiled and provided by	V.V. Harashchenko, Derzhzemahentstvo department in Boryspil district

Signature

Seal here */signature/*

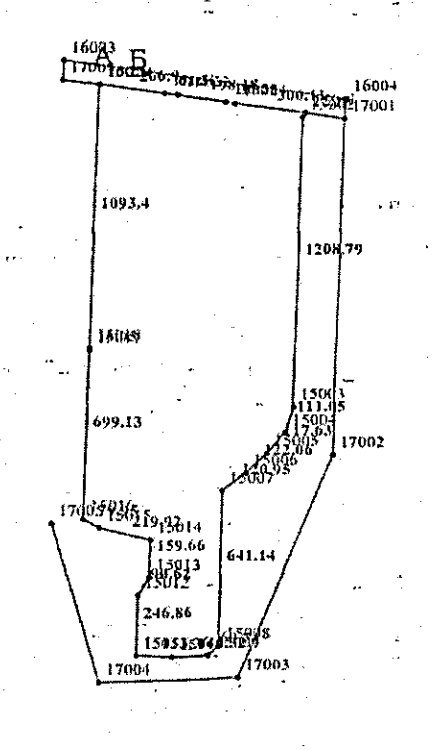
Created using the software of the State Land Cadastre.

*/stamp: THE STATE AGENCY OF THE LAND RESOURCES OF UKRAINE **
HEAD DERZHZEMAHENTSTVO DEPARTMENT IN KYIV REGION
DERZHZEMAHENTSTVO DEPARTMENT IN BORYSPIL DISTRICT IN KYIV REGION
*State cadastral registrar * ID code 38380245*
HARASHENKO VOLODYMYR VASYLOVYCH /

Annex to the extract from the State Land Cadastre regarding the land plot No HB 3201786382013 of 11/18/2013

Cadastral plan of the land plot

Cadastral number of the land plot 3220885000:04:001:0298



Scale 1:25000

Description of boundaries
А to Б: land of Martusivka village council;
Б to Б: lands of DP International Airport Boryspil (Gora village council);

Legend:

Schedule of the land:

Total area of the land, hectares	Also beyond the land, hectares:
	Under airports and relevant structures
1	2
	163.3212 */signature/*

*/stamp: THE STATE AGENCY OF THE LAND RESOURCES OF UKRAINE **
HEAD DERZHZEMAHENTSTVO DEPARTMENT IN KYIV REGION
DERZHZEMAHENTSTVO DEPARTMENT IN BORYSPIL DISTRICT IN KYIV REGION
*State cadastral registrar * ID code 38380245*
HARASHENKO VOLODYMYR VASYLOVYCH /

Information about the state cadastral registrar who compiled the cadastral plan of the land plot

Surname and initials of the State cadastral registrar who compiled the cadastral plan of the land plot	Harashchenko V.V.
Signature of the State cadastral registrar who compiled the cadastral plan of the land plot	*/signature/*

*/stamp: THE STATE AGENCY OF THE LAND RESOURCES OF UKRAINE **
HEAD DERZHZEMAHENTSTVO DEPARTMENT IN KYIV REGION
DERZHZEMAHENTSTVO DEPARTMENT IN BORYSPIL DISTRICT IN KYIV REGION
*State cadastral registrar * ID code 38380245*
HARASHENKO VOLODYMYR VASYLOVYCH /

Created using the software of the State Land Cadastre.



STATE

CERTIFICATE

OF THE RIGHT
OF PERMANENT LAND USE

РК “Ukraina”* Deputy*. 3-4085

II – КВ № 001459

CHANGES IN LAND USE

Number on the layout	Date, number and contents of the document that served as grounds for introducing a change	Area, ha
13	Land plots appropriated according to the decree of Kyiv Regional State	2.0002
14	Administration No. 742 dated 12/6/2002, No. 208 dated 3/14/2003, No. 614 dated 10/15/2003. Returned to Boryspil	18.1436
15	International Airport for permanent use according to the decisions of the Kyiv	7.344
	Regional Business Court dated 8/31/2005 (case No. 81/13-05/17) and 9/14/2005 (case No. 70/17-05)	

3/24/2006

*/stamp: THE STATE COMMITTEE ON THE LAND RESOURCES OF UKRAINE * UKRAINE HEAD DEPARTMENT OF LAND RESOURCES OF KYIV REGION * DEPARTMENT OF LAND RESOURCES OF BORYSPIL DISTRICT ID code 24214504/*

Seal here

Land surveyor

/signature/
signature

O.P. Polishchuk
last name

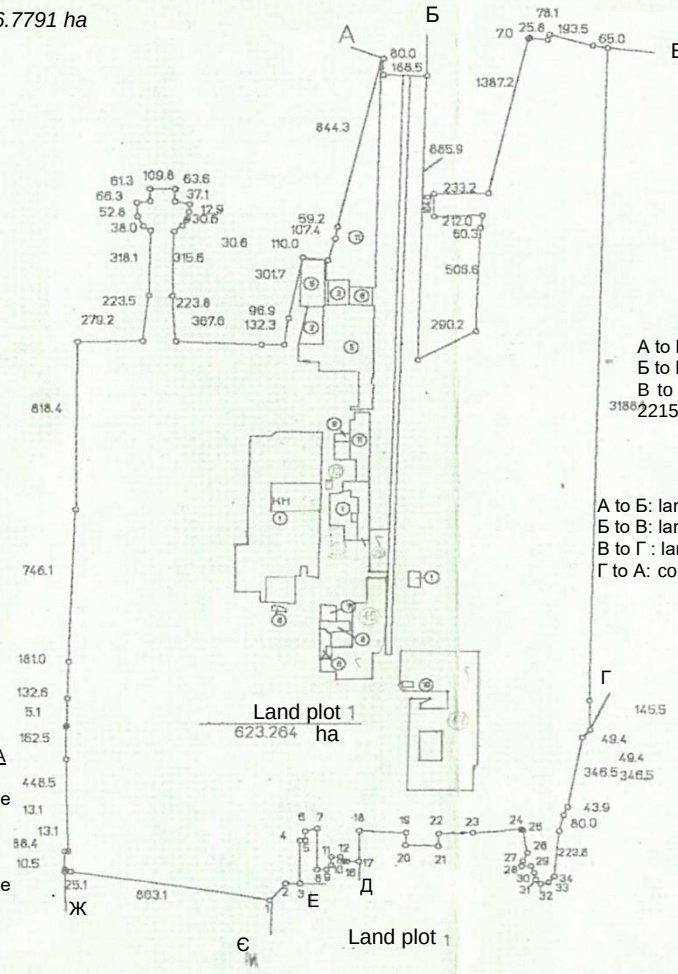
LAYOUT OF OUTER LAND USE BOUNDARIES
OF THE STATE INTERNATIONAL AIRPORT "BORYSPIL"
in the territory of Gora village council of Boryspil district

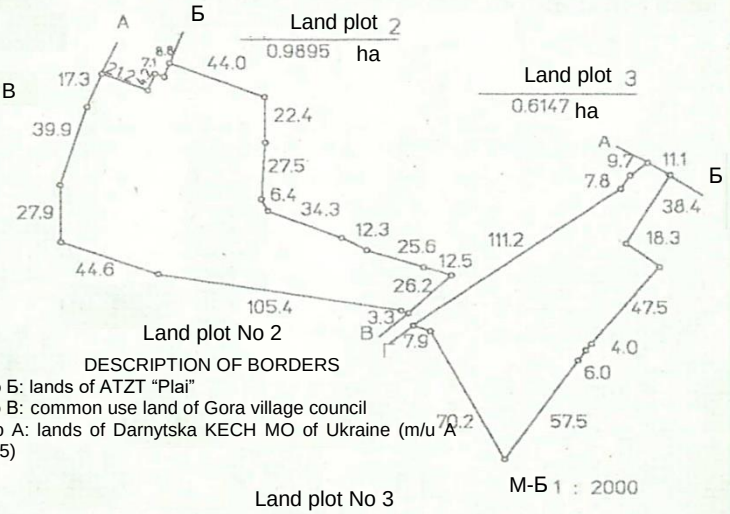
DMA "BORYSPIL": 624.8682 ha
Across the land plots, in total: 696.7791 ha

N
W E
S

Callout

Номера точок	Довжина лінії, метрів	Номера точок	Довжина лінії, метрів
1–2	107.2	17–18	57.0
2–3	161.4	18–19	150.5
3–4	209.8	19–20	201.21
4–5	21.7	20–21	61.3
5–6	45.0	21–22	143.5
6–7	52.2	22–23	61.1
7–8	199.5	23–24	356.61
8–9	40.3	24–25	6.6
9–10	29.8	25–26	111.7
10–11	40.0	26–27	43.8
11–12	37.3	27–28	26.4
12–13	21.0	28–29	39.01
13–14	18.5	29–30	37.1
14–15	6	30–31	35.1
15–16	10	31–32	28.4
16–17	6	32–33	35.3
		33–34	36.0





Land plot No 1

DESCRIPTION OF BORDERS
А to Б: lands of VAT stud farm "Bartnichi"
-"- Б to В: lands of SHED-639
-"- В to Г: lands of military state farm "Boryspilskii"
-"- Г to Д: lands of Darnytska KECH MO of Ukraine (m/u A 2215)
Д to Е: lands of DMA "BORYSPIL" (Hlyboke village council)
Е to Є: lands of ZAT SP "Krebo"
Є to Ж: lands of SP TOV "Boryspilske"
Ж to А: lands of DMA "BORYSPIL" (Martusivka village council)

Land plot No 2

DESCRIPTION OF BORDERS
А to Б: lands of ATZT "Plai"
Б to В: common use land of Gora village council
В to А: lands of Darnytska KECH MO of Ukraine (m/u A 2215)

Land plot No 3

DESCRIPTION OF BORDERS
А to Б: lands of Boryspil public services production department
Б to В: lands of specialized production ATZT "Aviaspetsmontazh"
В to Г : lands of Darnytska KECH MO of Ukraine (m/u A 2215)
Г to А: common use land of Gora village council

other land users within the layout
1. Airline company "Avialinii Ukraini" 27.5472 ha
2. OKPP "Kyiv-Aeroport" - 4.5581 ha
3. "Ukraviaspetsmontazh" trust - 1.0999 ha
4. SHED-639 - 7.0424 ha
5. "Stripa" control unit - 13.3967 ha
6. Boryspil customs – 1.1972 ha
7. Post office – 0.5191 ra
8. TsUVD – 0.6360 ra
9. TOV "Vinchester-Servis" – 0.33 ha
10. ATZT "Plai" – 0.1262 ha
11. Reserve lands of Gora village council – 15.4581 ha

Land surveyor

/signature/ signature

Yosipok V.I. last name

CHANGES IN LAND USE

Number on the layout	Date, number and contents of the document that served as grounds for introducing a change	Area, ha
12	Decision of Boryspil district state administration dated 9/6/2002 No.591	0.2254
	Decision of Boryspil district state administration dated 12/6/2002 No.742	
13	Decision of Kyiv regional state	2.0002
14	administration dated 4/14/2003 No.208	18.1436
15	Decision of Kyiv regional state administration dated 10/15/2003 No.614	7.344

State certificate of the right of permanent land use issued to

the State International Airport "Boryspil"

(name and location of the land user)

Kyiv region, city of Boryspil-7 B

by Boryspil district state administration , by the Council of people's deputies of _____ district of Kyiv region of Ukraine certifying that the specified land user is provided with 624.8682 hectares of land within the boundaries according to the land use plan for permanent use

The land is provided for permanent use for under existing buildings /engineering and social amenity facilities/

(purpose)

according to the decision of Boryspil district state administration of the Council of people's deputies of «10» June 2002 No 366

The state certificate is made in two copies, the first one has been handed over to the permanent land user, the second one remains with Boryspil district department of land resources the Council of people's deputies.

The certificate has been registered in the Register of State Certificates of the Right of Permanent Use of Land under No. 438

Land surveyor

/signature/ signature

Yosipok V.I. last name

*/stamp: THE STATE COMMITTEE ON THE LAND RESOURCES OF UKRAINE * UKRAINE*
*HEAD DEPARTMENT OF LAND RESOURCES OF KYIV REGION **
DEPARTMENT OF LAND RESOURCES OF BORYSPIL DISTRICT
ID code 24214504/

Seal here

/signature/
signature

Land surveyor

last name

Boryspil district state administration

Seal here Head of the Council of people's deputies

/signature/
signature

Zhuk. O.V.
last name

July 19, 2002
/stamp: BORYSPIL DISTRICT STATE ADMINISTRATION OF KYIV REGION UKRAINE
II – KB № 001459

Land surveyor

/signature/
signature

Yosipok V.I.
last name

Annex No 6

Information about owners/users of Martusivska and Gora village council lands
planned for purchase for renovation
of Manoeuvring area No 2

No.	Land owner	Cadastral number	Land plot area, ha	Intended purpose
1	Karpenko Paraskoviia Oleksiivna	3220885001:02:006:0018	0.6132	02.01
2	Voloshyna Olga Oleksiivna	3220885000:02:006:0013	0.6132	02.01
3	Maistrenko Nina Oleksandrivna	3220885000:02:006:0004	0.6133	02.01
4	Sakhno Vira Andriivna	3220885000:02:006:0017	0.6133	01.03
5	Babych Oksana Mykolaivna	3220885000:02:006:0016	0.6133	01.03
6	Shum Nataliia Oleksiivna	3220885000:02:006:0015	0.6132	01.03
7	Voshkulat Zinaida Mykhailivna	3220885000:02:006:0014	0.6133	01.03
8	Shvets Kateryna Petrivna	3220885000:02:006:0005	0.6133	01.03
9	Babych Vasyl Ivanovych	3220885000:04:002:0001	0.6133	01.03
10	Morhushko Lidiia Yaroslavivna	3220885001:02:006:0002	0.6132	01.03
11	Kryvolapchuk Olga Musiivna	3220885000:02:006:0003	0.6133	01.03
12	Turlo Nina Borysivna	3220885000:04:002:0053	1.4300	01.01
13	Liashchenko Olena Volodymirivna	3220885000:04:002:0044	3.4001	01.01
14	Kyshko Oksana Mykolaivna	3220885000:04:002:0032	3.2500	01.01
15	Balykina Tetiana Vasylivna	3220885000:04:002:0041	3.2501	01.01
16	Sereda Anatolii Mykolaiovych	3220885000:04:002:0050	3.2500	01.01
17	Turlo Nina Borysivna	3220885000:04:002:0052	2.0700	01.01
18	Priatko Kateryna Mykolaivna	3220885000:04:002:0037	3.2458	01.01
19	Kolomiiets Mykhalo Mykolaiovych	3220885000:04:003:0022	1.1201	01.01
20	Mishchanska Iryna Mykolaivna	3220883200:04:002:0038	3.2500	01.01
21	Shum Zoia Musiivna	3220883200:04:002:0034	3.2500	01.01
			31.01	

Land surveyor

/signature/ Yosipok V.I.

signature last name

Information about owners/users of Gora village council lands planned for purchase for renovation of Manoeuvring area No 2

No.	Land owner	Cadastral number	Land plot area, ha	Intended purpose
1	Zhurbas Volodymyr Kostiantynovych; Osadcha Nataliia Kostyantynivna	3220883200:02:003:0087	0.5108	1.01
2	Voloshchuk Vira Ivanivna	3220883200:02:003:0204	0.5332	1.01
3	Voloshchuk Vira Ivanivna	3220883200:02:003:0090	0.5116	1.01
4	Kurochkin Andrii Andriiovych	3220883200:02:003:0091	0.5105	1.01
5	Faizulina Mariia Fedorivna	Old type certificate	0.5105	
6	Kompaniiets Nina Petrivna	3220883200:02:003:0203	0.5104	1.01
7	Levkivskii Ivan Ivanovych	Old type certificate	0.5105	
8	Klymenko Nataliia Vasylivna	3220883200:02:003:0202	0.5126	1.01
9	Prykhodko Nataliia Mykolaivna	3220883200:02:003:0096	0.5401	1.01
15	Zavitailo Ihor Ivanovych	3220883200:02:003:0103	0.9354	1.01
16	Uzvaryk Olha Ivanivna	3220883200:02:003:0105	0.9354	1.01
17	Hrebenko Mariia Ivanivna	3220883200:02:003:0106	0.9354	1.01
20	Shtuts Nadiia Stepanivna	3220883200:02:003:0205	0.9355	1.01
22	Selentii Valentyna Yakivna (sold)	3220883200:02:003:0113	0.9559	1.01
23	PAT “Pleminnyi zavod “Bortnychi”	3220883200:02:003:1194	7.067	1.04
			16.4148	

Land surveyor

/signature/ Yosipok V.I.

signature last name

Annex No 8

MINISTRY FOR COMMUNITIES AND TERRITORIES DEVELOPMENT OF UKRAINE

STATE ENTERPRISE

"SPECIALIZED STATE EXPERT ORGANIZATION
CENTRAL SERVICE OF UKRAINIAN STATE EXPERT CONSTRUCTION INSPECTION"
DP "UKRDERZHBUDEKSPERTYZA"

DSTU ISO 9001:2015
certificate for quality control system No 8O038.01-18 of 1/29/2018

26 Lesi Ukrainky Blvd., Kyiv 01133
www.ukrbudex.org.ua
Phone/Fax: +38(044) 281-60-57; Phone: +38(044) 280-83-69;
e-mail: (illegible)

APPROVED
Acting Director
DP "Urkderzhbudekspertyza"
/signature/ O.V. Berendieieva
6/15/2020
Seal: (illegible)

Kyiv
No. 00-1144-19ПБ

EXPERT REPORT

regarding design documents review
according to technical and economic feasibility study
"Reconstruction of maneuvering area No. 2 of SE "Boryspil International Airport""
(Correction)

Construction project owner – State Enterprise "Boryspil International Airport"

General design contractor – Limited Liability Company "Institut Ukrdorproekt"

Upon the technical design review and resolution of issues it has been established that the abovementioned design documents are executed according to the initial design data with compliance to the requirements to durability, robustness and lasting quality of the construction project as well as its operational safety and engineering support including requirements as to creating conditions for unhindered access of disabled persons and other people with limited mobility, sanitary and epidemiological welfare of population, environment, energy saving, estimate part of the design documents, and it may be **approved** in the ordinary course with the following technical and economic performance:

Performance	Unit of measure	Quantity									
		including the reconstruction stages									
		Total	1st phase				2nd phase				3rd phase
			Total for the 1st phase	including start-up facilities (SUF)			Total for the 2nd phase	including start-up facilities (SUF)			
				1st SUF	2nd SUF	3rd SUF		1st SUF	2nd SUF	3rd SUF	
Type of construction – reconstruction											
Fire resistance index of buildings and structures – II											
Land plot area within the scope of design	ha	437.26	437.26								
Airfield pavement area, which includes:	m^2	1064105.0	944245.0	157215.0	787030.0	–	119860.0	83780.0	19950.0	16130.0	–
- Paved runway-2 (PR) (with shoulders)	m^2	271195.0	271195.0	-	271195.0	-	-	-	-	-	-
- MTW-2 (with shoulders)	m^2	137760.0	137760.0	-	137760.0	-	-	-	-	-	-
- MTW as f connecting TW (with shoulders)	m^2	136990.0	136990.0	-	136990.0	-	-	-	-	-	-
- Rapid-exit connecting TW (with shoulders)	m^2	154865.0	154865.0	-	154865.0	-	-	-	-	-	-
- connecting TWs:							-	-	-	-	-
- **TW (with shoulders)**	m^2	63770.0	63770.0	-	63770.0	-	-	-	-	-	-
- **TW-9 (with shoulders)**	m^2	28520.0	28520.0	28520.0	-	-	-	-	-	-	-
- **TW-10 + apron "G" part (with shoulders)**	m^2	13060.0	13060.0	-	13060.0	-	-	-	-	-	-
- **TW-16 (with shoulders)**	m^2	4765.0	4765.0	-	4765.0	-	-	-	-	-	-
- **TW-17 (with shoulders)**	m^2	4625.0	4625.0	-	4625.0	-	-	-	-	-	-
- **TW-18 (with shoulders)**	m^2	3375.0	3375.0	3375.0	-	-	-	-	-	-	-
- Parking stand (PS) for aircraft (A/C) engine testing	m^2	19950.0	-	-	-	-	19950.0	-	19950.0	-	-
- isolating parking stand	m^2	16130.0	-	-	-	-	16130.0	-	-	16130.0	-
- place for deicing A/C	m^2	21390.0	21390.0	21390.0	-	-	-	-	-	-	-
- apron "S" (after reconstruction)	m^2	103930.0	103930.0	103930.0	-	-	-	-	-	-	-
- PS for A/C	m^2	83780.0	-	-	-	-	83780.0	83780.0	-	-	-
Area of pavement	m^2	70435.0	63075.0	1440.0	23640.0	37995.0	3000.0	650.0	1770.0	580.0	4360.0
Area of buildings and structures	m^2	24227.0	22762.0	328.0	22434.0	-	120.0	120.0	-	-	1345.0
*Continued at page No **3***											

Total area of buildings and structures:											
- emergency-and-rescue stations (ERS)	m^2	2160.0	2160.0	–	2160.0	–	–	–	–	–	–
- FFS control room	m^2	50.70	–	–	–	–	–	–	–	–	50.70
- anti-icing fluid filling station	m^2	289.40	–	–	–	–	–	–	–	–	289.40
- civil defence shelter for fire equipment and duty guards	m^2	465.0	–	–	–	–	–	–	–	–	465.0
Building volume of buildings and structures:										–	
- emergency-and-rescue stations (ERS)	m^3	11270.0	11270.0	–	11270.0	–		–	–	–	–
- FFS control room	m^3	212.40	–	–	–	–		–	–	–	212.40
- anti-icing fluid filling station	m^3	2522.0	–	–	–	–		–	–	–	2522.0
- civil defence shelter for fire equipment and duty guards	m^3	2636.0	–	–	–	–		–	–	–	2636.0
Length of ARW-2	m	3800.0	3800.0	–	3800.0	–		–	–	–	–
Width of ARW-2	m	45.0	45.0	–	45.0			–	–	–	–
Length of taxiways (TW):											
- major (MTW-2)	m	23,0	23,0	–	23,0	–		–	–	–	
- MTW as a connecting TW	m	23,0	23,0	–	23,0	–	–	–	–	–	
- connecting rapid exit TW	m	23,0	23,0	–	23,0	–	–		–	–	–
- connecting TWs:											
-TW	m	23,0	23,0	–	23,0	–	–		–	–	
-TW-9	m	23,0	23,0	23,0	–	–	–		–	–	
-TW-16	m	24.5	24.5	–	24.5	–	–		–	–	
- TW-18	m	23,0	23,0	23,0	–	–	–		–		
-TW-17	m	23,0	23,0	–	23,0	–	–		–	–	
- TW-10 + apron "G" part	m	23,0	23,0	–	23,0	–	–		–	–	–
Length of patrol motor road	m	11165.0	11165.0	–	–	11165.0	–	–	–	–	–
Continued at page No 4											

Width of patrol motor road	m	3.50	3.50	–	–	3.50	–	–	–	–	–
Length of perimeter fencing	m	11565.0	11565.0	–	–	11565.0	–	–	–	–	–
Lighting equipment - category - with МКп-18п and with МКп-36л ІІІВІСАО											
Total estimated cost of reconstruction at current prices as on 4/27/2020, including:	thous. UAH	11181818.923	9818297.118	1830226.395	7850032.088	138038.635	1284062.021	905800.040	223778.575	154483.406	79459.784
- construction works	thous. UAH	8399751.237	7344975.683	1388138.977	5875513.681	81323.025	1028021.542	724575.446	180355.236	123090.860	26754.012
- equipment and furniture	thous. UAH	709928.005	648892.904	32367.444	584136.515	32388.945	23245.279	13932.483	4656.398	4656.398	37789.822
- other expenses	thous. UAH	2072139.681	1824428.531	409719.974	1390381.892	24326.665	232795.200	167292.111	38766.941	26736.148	14915.950
Reconstruction time	month	41.5	33.0	16.5	20.0	8.5	11.5	11.5	6.5	6.0	9.0
Annual electric power requirements	thous. kW· h.	12396.0	11802.0	2144.0	9608.0	50.0	372.0	322.0	25.0	25.0	222.0

Notes:

1. *Mandatory annex is an integral part of an expert report.*
2. *The release of this expert report annuls the positive conclusion No 436 - 2010/ПБ (ТЕО "Reconstruction of manoeuvring area No 2 of DP MA "Boryspil") provided by DP "Urkderzhbudekspertyza" on 10/14/2010, and invalidates expert reports No 00-1412-15/13 (RP "Reconstruction of perimeter fencing of the premises of DP MA "Boryspil" (inventory No 47487) (with alarm and video surveillance system") of 9/30/2015 and No 00-0788-17/ПБ (RP "Construction of road along perimeter fencing of RW No 2 of DP MA "Boryspil") of 10/10/2017 provided by DP "Urkderzhbudekspertyza".*

Chief expert of the project	*/signature/* */stamp: illegible/*	**T. D. Hamolia** (certificate AE No 000041)
Specialist, I category	*/signature/* */stamp: illegible/*	**O. Yu. Pakhniuk**
Deputy Director	*/signature/*	S.O. Bukhanenko (certificate AE No 000025)
Head of Cost Estimation and POB Department	*/signature/* */stamp: illegible/*	L.M. Koltovych (certificate AE No 000091)
Head of Specialized Expert Examination Department	*/signature/* */stamp: illegible/*	O.Ye. Rubliova (certificate AE No 004515)
Engineering Support Sector Manager	*/signature/* */stamp: illegible/*	I. V. Savenko (certificate AE No 000152)
Manager of Sector of Expert Examination of Urban Development Documentation	*/signature/* */stamp: illegible/*	L. T. Shepelenko (certificate AE No 000209)
Lead Construction Expert, Specialized Expert Examination Department	*/signature/* */stamp: illegible/*	V.P. Skochko (certificate AE No 001599)
Lead Construction Expert, Ecology Sector of Specialized Expert Examination Department	*/signature/* */stamp: illegible/*	V.G. Tarasenko (certificate AE No 000649)
Lead construction expert	*/signature/* */stamp: illegible/*	N.V. Gindiuk (certificate AE No 000047)
Lead construction expert	*/signature/* */stamp: illegible/*	L.I. /illegible/ (certificate AE No 001443)
Lead construction expert	*/signature/* */stamp: illegible/*	*/illegible/* (certificate AE No 001446)
Lead construction expert	*/signature/* */stamp: illegible/*	N.Ye. Illarioniva (certificate AE No 003123)
Lead construction expert	*/signature/* */stamp: illegible/*	S.M. Korubchuk (certificate AE No 001451)
Lead construction expert	*/signature/* */stamp: illegible/*	S.M. Hrybok (certificate AE No 004512)
Specialist, I category	*/signature/* */stamp: illegible/*	O. Yaroslavova

/stamp: STATE SPECIALIZED FOREST-PROTECTION ENTERPRISE "KYIVLISOZAKHYST"
Identification code 19417252
09113 Kyiv region., city of Bila Tserkva,
Sichnevoho Proryvu str, 43/

city of Boryspil
of Boryspil district
8/14/2020

C E R T I F I C A T E

A CERTIFICATE of special forest pathological and sanitary Linspection of green plantations TP-23 for SE Boryspil International Airport within the administrative boundaries of Hora Village Council, Boryspil district, Kyiv region

Upon request of TOV "EKO HLOBAL NEST" (letter No.202 of 8/6/2020), Commission comprised of: director of the production department of the state enterprise of Boryspil International Airport (hereinafter – SE Boryspil International Airport) S. O. Ror, project manager of project department of SE Boryspil International Airport M. I. Tsilyk, chief forest pathologist of the state specialized forest protection enterprise "Kyivlisozakhyst" V. V. Holyk conducted this special forest pathological and sanitary inspection of green plantations TP-23 of SE Boryspil International Airport with accounting by technical validity categories and distribution by the quality state of plantations in the administrative boundaries of Hirska village council of Boryspil district, Kyiv region, confirmed by this act.

The need of this examination is caused by the fact that a need of modernization of infrastructure facilities (reconstruction of manoeuvring area No2) arose in connection with the proposed operations of SE "International Airport 'Boryspil'".

Inspection has found that Boryspil International's plants TP-23 are located on land with cadastre number 3220883200:02:004:0140; 3220883200:02:004:0142, public ownership, intended use: 12.08 For placement and operation of buildings and structures of additional transport services and auxiliary operations for placement and operation of buildings and structures of additional transport services and auxiliary operations, estimated area – 7.0 ha.

Plantations are represented by tree breeds of cherry, willow, sorbus, maple, walnut, apple tree, plum tree, apricot tree, oak, birch, poplar, chestnut, pear tree, and pine tree. The quality state of trees in the majority of plantations is good and satisfactory – the trees are healthy but with slow growth, unevenly developed crown, insufficiently dense leaves, with minor mechanical damages and small hollows.

Tree age is from 30 to 50 years. There are overmature trees of willow and poplar in the plantations. Overmature trees are severely weakened, such tree categories are potentially dangerous trees, and belong to Category III according to biological condition categories. In case of squall wind gusts and galling of wet snow in winter, the branches of different orders can fall, creating potential hazard for traffic, life and health of airport workers.

No.	Tree breed	Unit of measurement	Quantity	Diameter, cm	Quality
1.	Pine	pcs.	10	8–44	Satisfactory
2.	Birch	pcs.	5	16–60	Good
3.	Willow	pcs.	12	20–68	Satisfactory
4.	Rowan	pcs.	1	24	Satisfactory
5.	Oak	pcs.	2	32	Satisfactory
6.	Maple	pcs.	23	8–80	Satisfactory
7.	Chestnut	pcs.	1	20	Satisfactory
8.	Poplar	pcs.	1	88	Satisfactory
9.	Apricot	pcs.	6	16–36	Satisfactory
10.	Cherry	pcs.	85	8–52	Satisfactory
11.	Walnut	pcs.	5	8–32	Good
			6	8-56	Satisfactory
12.	Pear	pcs.	2	12	Satisfactory
13.	Plum	pcs.	5	16–40	Satisfactory
14.	Apple	pcs.	7	8–40	Good
			20	8-36	Satisfactory
Total			191		

The Commission sees **possible** the removal of all trees within the TS-23 infrastructure upgrade area of SE "MI 'Boryspil'". **"Measures not related to forest management" – by another clearing, clear cut, within estimated 7.0 ha, total number 191 (one hundred and ninety-one) trees**.

Undergrowth and young trees are also subject to clearing along with clearing of trees within the infrastructure upgrading.

As per current regulations, stubs shall be 10 cm in height for trees of up to 30 cm in diameter, and 1/3 of stub diameter for trees of over 30 cm in diameter.

Clearing requires removal of all blocking during work.

Tree felling may be conducted provided that the requirements of the Law of Ukraine on "On Environment Impact Assessment" are met, a tree-felling permit is available, and the effective environment protection laws of Ukraine are adhered to.

Optimal terms of tree felling - till the end of 2020.

Annex: Field record with a list of registered trees -1 sheet.

Certificate made in three copies.

Signatures of commission members:

Head of Production Department
of AS of
"Boryspil" International Airport State
Enterprise S.O. Rora

Project Manager of
Project Operations Department of
DP MA "Boryspil" M.I. Tsilyk

Chief Forest Pathologist of
DSLP "Kyivlisozakhyst"

/stamp: illegible/

/signature/ V. V. Holyk

/stamp: STATE SPECIALIZED FOREST-PROTECTION ENTERPRISE “KYIVLISOZAKHYST”
Identification code 19417252
09113 Kyiv region., city of Bila Tserkva, Sichnevoho proryvu str, 43/

FIELD RECORD

with a list of registered trees at the land plots with cadastre numbers 3220883200:02:004:0140; 3220883200:02:004:0142, SE Boryspil International Airport TP-23

(illegible)	Number of trees by breed																	
	Pine			Willow			Rowan	Maple	Walnut	Cherry	Apple	Plum	Apricot	Oak	Birch	Poplar	Chestnut	Pear
	firewood	firewood	firewood	firewood	firewood	firewood	firewood	firewood	firewood	firewood	firewood	firewood	firewood	firewood	firewood	firewood	firewood	Firewood



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Listing was performed: 8/14/2020 Total registered 191 (one hundred ninety-one) trees. Chief Forest Pathologist of DSLP “Kyivlisozakhyst” */signature/* V. V. Holyk

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Annex No 10

STATE SERVICE OF UKRAINE ON
FOOD SAFETY AND CONSUMER PROTECTION
B. Hrinchenka str. 1, Kyiv, tel: 279-12-70, 279-75-58, fax: 279-48-83,
e-mail: info@consumer.gov.ua

APPROVED
Head of Food Safety and Consumer
Protection Service of Ukraine
Lapa V.I.
(Full name)

/signature/
(signature)
/stamp: illegible/
Seal here

CONCLUSION
of the State Sanitary and Epidemiological Expertise

dated 8/28/2018 No 602-123-20-3/37153

Subject of Expertise: Liquid Antifreeze, brand "Safewing MP II Flight",

produced in accordance with -

DKPP, UKTZED code, item No: 3820

Field of application and sales of the subject of expertise: used for deicing and prevention of ice formation, wholesale and retail trade

Country of production: "Clariant Produkte (Deutschland) GmbH" Company, Bruningstrasse 50, D-65926,
Frankfurt/Main, Germany
(address, location, telephone, fax, e-mail, website)

Submitter of request for an expertise: TOV "Yukoil", Ukraine, 03680, Kyiv city, Akademika Palladina str, 32, office 434, tel: +38 (044) 452-45-46, USREOU code 31510568
(address, location, telephone, fax, e-mail, website)

Details of the contract for delivery of the subject to Ukraine: Contract No 01/CLYU/18 of 7/10/2018

The subject of expertise meets the established medical criteria of safety / indicators:
based on the results of identification, assessment of risk for public health, the results of examination of documents provided by the submitter of the request, the conducted studies, the subject of the expertise meets the established medical criteria of safety / indicators: when using the product, the content of chemical particles in the air in the working area must be monitored (MPC, max, mg/m^3): propylene glycol - 7 ("p+a", Hazard class - 3), that meets the requirements of GOST 12.1.007- 76 "Occupational safety standards system. Noxious substances. Classification and general safety requirements"; SN 4617-88 "Maximum permissible concentrations (MPC) of hazardous substances in the air in the working area"
Prerequisites for use/application, storage, transportation, disposal, destruction: a) list of prerequisites ensuring prevention of possible risk of adverse impacts that may occur when using the mentioned products in the stated field of application in human habitation area, the following requirements must be met:

GOST 12.1.007-76 “Occupational safety standards system. Noxious substances. Classification and general safety requirements”; SN 4617-88 “Maximum permissible concentrations (MPC) of hazardous substances in the air in the working area”; “List of maximum permissible concentrations of chemical and biological agents in the atmospheric air of settlements” approved on 3/3/2015 by acting chief sanitary officer of Ukraine, b) ensuring that the storage and transportation conditions meet the manufacturer’s recommendations set out in the accompanying documentation; c) disposal and destruction of wastes must be performed according to requirements of currently effective waste management regulations of Ukraine.

Based on the results of the State Sanitary and Epidemiological Expertise, Liquid antifreeze of “Safewing MP II Flight” brand meets the requirements of effective sanitation laws of Ukraine and, provided that the requirements of this conclusion are adhered to, may be used in the stated field of application.

Shelf life: guaranteed by manufacturer

Information regarding the label, instructions, rules of labelling is required. The conclusion may not be used for advertising the consumer properties of the subject of expertise.

The conclusion is valid for: 5 years

Adhering to the requirements of this conclusion is the responsibility of the submitter of request.

Safety indicators subject to border control: control of human health safety indicators is not required

Safety indicators subject to control during customs clearance: subject to state sanitary and epidemiological control in the customs territory of Ukraine.

Current sanitary and epidemiological state inspection of the established medical safety criteria, conditions of use/application, storage, transportation, disposal, and destruction is conducted according to the requirements of this conclusion at the state sanitary and epidemiological inspection facilities in the scope and with intervals set out by inspection programs according to the effective sanitary laws of Ukraine.

Commission on the State
Sanitary and Epidemiological Expertise
of the State Institution “Kundiiev Institute of Occupational
Health of the National Academy of
Medical Sciences of Ukraine”
Report on expertise No 22185 of 16 August 2018
(Report No, date of approval)
Deputy Head of the Expert Commission,
Director of State Institution “Kundiiev Institute of Occupational Health of the National Academy of Medical Sciences of Ukraine”

Seal here

01033, Kyiv city, Saksahanskoho str., 75
tel: reception: (044) 284-34-27,
e-mail: yik@nanu.kiev.ua
secretary of the expert commission
(044) 289-63-94, e-mail: test-lab@ukr.net
(name, location, telephone, fax, e-mail, website)

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(signature)

Cherniuk V.I.
(initials and surname)

UKRAINE

MINISTRY OF DEFENCE OF UKRAINE

10 Chemmotology Centre

CERTIFICATE OF CONFORMITY

Registered in the registry of conformity assessment authority under No 10ХЦ.00032-18

Term of validity 11/2/2018 to 11/1/2019

Certificate issued to **TOV "YUKOIL"**
03680, Kyiv city, Akademika Palladina ave., 32, office 434, USREOU 31510568
(authorization by GOV "Klariant Ukraina" company w/o No, dated 10/27/2017.)

Products **Anti-icing liquid Safewing MP II Flight** **3820**

(Full name, type, sort, band, trade name (trade mark)) (Code (according to) UKTZED (Ukrainian Commodity Coding System)), DK 016-10)

Meets the requirements of **TU 6-00-57.63445-10-89 «Anti-icing Liquid «Arktika». Specifications» (Table 1, item 1, 2, 4, 5, 7) (for Arktika brand).**

names and IDs of regulatory documents

Manufacturer(s) «Clariant Produkte (Deutschland) GmbH» company, Bruningstrasse 50, D-65926, Frankfurt/Main, Germany.

Additional information Safewing MP II Flight anti-icing liquid is mass-produced and imported in Ukraine from 11/2/2018 till 11/1/2019, taking the shelf life into account. Technical inspection - 1 time during certificate validity period. Liquid is produced according to SAE AMS 1428, ISO 11078. Voluntary certification.

Certificate has been issued by the conformity assessment authority OOV '10 Chemmotology Centre', 03115, Kyiv city, Vidpochynku str., 9a, telephone 38 014 4523401, accreditation certificate No 10032 of 9/14/2015.

On the grounds of test certificate: No 109 of 11/2/2018, VTs '10 Chemmotology Centre' (03115, Kyiv city, Vidpochynku str., 9a, accreditation certificate No 2H389 of 9/14/2015 valid through 9/16/2018)

*/stamp: MINISTRY OF DEFENCE OF UKRAINE * Code 08108487*
10 Chemmotology Centre/

Head of the conformity assessment authority */signature/* V.P. PYVOVAR

(signature, initials, surname)

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Validity of the certificate of conformity can be checked in the database of the conformity assessment authority located at www.10XCentr.com.ua
or by telephone (044)452-34-01

Series AA No 0 0 0 6 7 9

CLARIANT PRODLIKTFE (DEUTSCHLAND) GMBH

(illegible)

CLARIANT

CLARIANT PRODLIKTFE (DEUTSCHLAND) GMBH
B450E BURGKIRCHEN, GERMANY

TECHNICAL APPLICATION
AVIATION

DR. JESSE ROOSE
(illegible)

Top whom it may concern

Burgkirchen, 04.10.2018

The Density of Safewing^{R} MPII FLIGHT as a Function of the Temperature

Dear Sir or Madam,

Attached to this letter you can find a table that lists the densities of Safewing^{R} MP II FLIGHT as a function of the temperature.

In case you have any further request, please do not hesitate to contact us.

Sincerely.
Clariant Produkte (Deutschland) GmbH

/signature/
/stamp: CLARIANT
Clariant Produkte (Deutschland) GmbH
Dr. Jesse Roose
Technical Application
/illegible//

Dr. Jesse Roose
Technical Application EMEA, Aviation

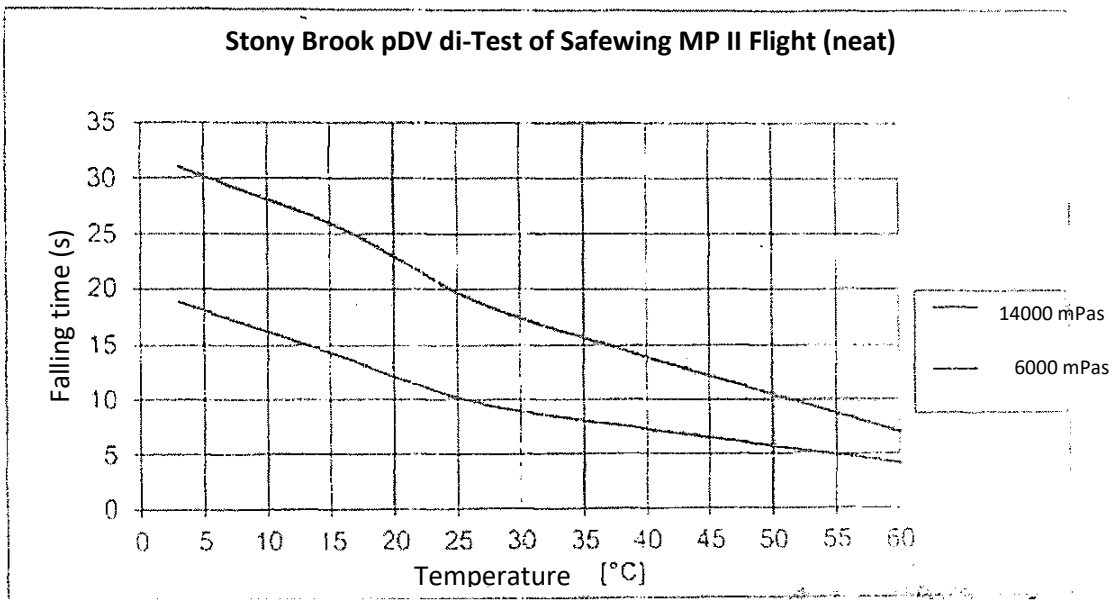
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CONFIDENTIAL

Density of Safewing^{R} MP II FLIGHT as a function of the temperature. Below: Viseosity as a function of the temperature.

Temperature, ° C	Density, g/cm^3	Temperature, ° C	Density, g/cm^3	Temperature, ° C	Density, g/cm^3
-35.0	1.0721	-10.0	1.0582	15.0	1.0431
-34.0	1.0715	-9.0	1.0576	16.0	1.0424
-33.0	1.0710	-8.0	1.0570	17.0	1.0418
-32.0	1.0705	-7.0	1.0565	18.0	1.0412
-31.0	1.0699	-6.0	1.0559	19.0	1.0405
-30.0	1.0694	-5.0	1.0553	20.0	/illegible/
-29.0	1.0689	-4.0	1.0547	21.0	/illegible/
-28.0	1.0683	-3.0	1.0541	22.0	1.0386
-27.0	1.0678	-2,0	1.0535	23.0	1.0380
-26.0	1.0672	-1.0	1.0529	24.0	1.0373
-25.0	1.0667	0	1.0523	25.0	1.0367
-24.0	1.0661	1.0	1.0517	26.0	/illegible/
-23.0	1.0656	2.0	1.0511	27.0	1.0354
-22.0	1.0650	3.0	1.0505	28.0	1.0347
-21.0	1.0645	4.0	1.0499	29.0	1.0341
-20.0	1.0639	5.0	1.0493	30.0	1.0334
-19.0	1.0633	6.0	1.0487	31.0	1.0327
-18.0	1.0628	7.0	1.0480	32.0	1.0321
-17.0	1.0622	8.0	1.0474	33.0	/illegible/
-16.0	1.0616	9.0	1.0468	34.0	/illegible/
-15.0	1.0611	10.0	1.0462	35.0	/illegible/
-14.0	1.0605	11.0	1.0456		
-13.0	1.0599	12.0	1.0450		
-12.0	1.0504	13.0	1.0443		
-11,0	1.0588	14.0	1.0437		



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CONFIDENTIAL

Stony Brook PDV DI-Test

Safewing MP II FLIGHT

Falltime [sec]		
At Temperature [C°]	6000 mPas	14000 mPas
5	24	/illegible/
10	22	38
15	17.5	31.5
20	15.5	27.5
25	12.5	22
30	10	/illegible/
35	8.5	15.5
40	7	12
45	6	10

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TOB Clariant Produkte (Germany)

Production and consumer special oil products
Industrieparkstr. 1.
84508 Burgkirchen
Germany
www.clariant.de

CLARIANT
Technical Application (illegible)

TOB Clariant Produkte (Germany)
84508 Burgkirchen – Germany

Dr. Jesse Roose

To be presented upon request.

Tel +49 8679 75214
Fax +49 8679 75085
E-mail: jesse.roose@clariant.com

Burgkirchen. 10/4/2018

The Density of Safewing^{R} MPH FLIGHT as a Function of the Temperature

Dear Sir or Madam,
Attached to this letter you can find a table that lists the densities of Safewing^{R} MP II FLIGHT as a function of the temperature.
In case you have any further request, please do not hesitate to contact us.

Sincerely.
TOB Clariant Produkte (Germany)

Signature
Stamp:
Clariant
TOB Clariant Produkte (Germany)
Dr. Jesse Roose
Technical Application
Industrieparkstr. 1.
84508 Burgkirchen

Dr. Jesse Rosse
Technical Application
in Europe, Middle East, Africa, Aviation

The Board:
Oliver Kinkel
Lars Janson

Registry of Legal Entities:
Frankfurt am Main
HRB 42045

Location of the partnership company:
Frankfurt am Main

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Head of the Supervisory Board:
Patrick Jeny

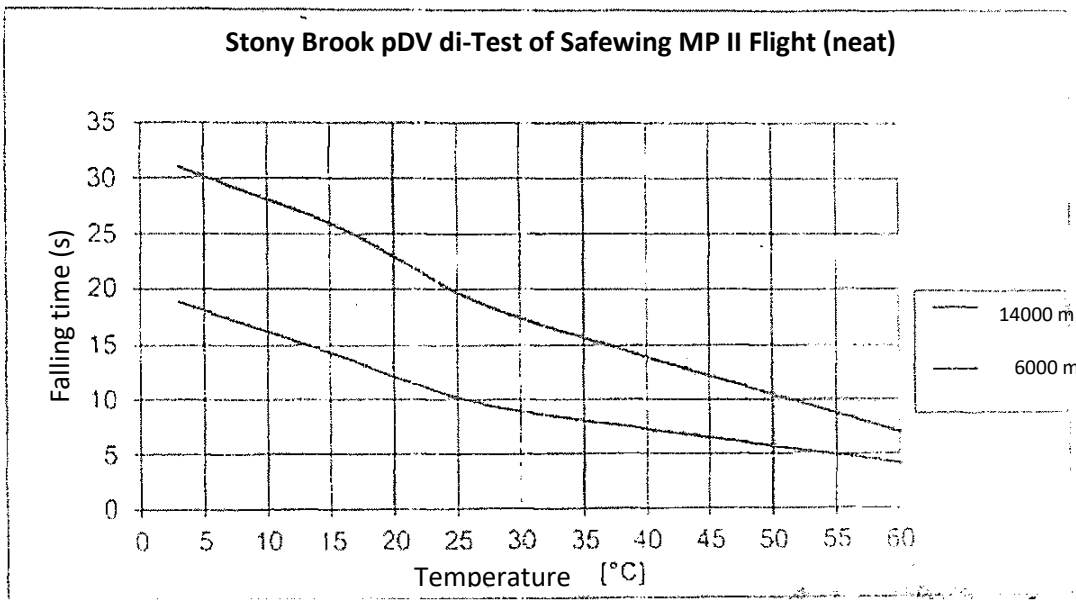
Bank account details:
Deutche Bank AG
IBAN: DE93500700100091870600 EUR

(illegible)

Confidential

Density of Safewing MP II Flight as fugacity of temperature. Viscosity as fugacity of temperature is given below.

Temperature, ° C	Density, g/cm^3	Temperature, ° C	Density, g/cm^3	Temperature, ° C	Density, g/cm^3
-35.0	1.0721	-10.0	1.0582	15.0	*/illegible/*
-34.0	1.0715	-9.0	1.0576	16.0	*/illegible/*
-33.0	1.0710	-8.0	1.0570	17.0	*/illegible/*
-32.0	1.0705	-7.0	1.0565	18.0	*/illegible/*
-31.0	1.0699	-6.0	1.0559	19.0	*/illegible/*
-30.0	1.0694	-5.0	1.0553	20.0	*/illegible/*
-29.0	1.0689	-4.0	1.0547	21.0	*/illegible/*
-28.0	1.0683	-3.0	1.0541	22.0	*/illegible/*
-27.0	1.0678	-2,0	1.0535	23.0	*/illegible/*
-26.0	1.0672	-1.0	1.0529	24.0	*/illegible/*
-25.0	1.0667	0	1.0523	25.0	*/illegible/*
-24.0	1.0661	1.0	1.0517	26.0	*/illegible/*
-23.0	1.0656	2.0	1.0511	27.0	*/illegible/*
-22.0	1.0650	3.0	1.0505	28.0	*/illegible/*
-21.0	1.0645	4.0	1.0499	29.0	*/illegible/*
-20.0	1.0639	5.0	1.0493	30.0	*/illegible/*
-19.0	1.0633	6.0	1.0487	31.0	*/illegible/*
-18.0	1.0628	7.0	1.0480	32.0	*/illegible/*
-17.0	1.0622	8.0	1.0474	33.0	*/illegible/*
-16.0	1.0616	9.0	1.0468	34.0	*/illegible/*
-15.0	1.0611	10.0	1.0462	35.0	*/illegible/*
-14.0	1.0605	11.0	1.0456		
-13.0	1.0599	12.0	1.0450		
-12.0	1.0504	13.0	1.0443		
-11.0	1.0588	14.0	1.0437		



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Stony Brook PDV di-Test Safewing MP II FLIGHT (neat)	
Falling time [s]	Falling time (s)
Temperature [°C]	Temperature, ° C
mPas	mPa *s

Stony Brook Planar Doppler Velocimetry data interpretation test of Safewing MP II FLIGHT liquid

Falling time (s)		
at Temperature, C°	6000 mPa *s	14000 mPa *s
5	24	/illegible/
10	22	38
15	17.5	31.5
20	15.5	27.5
25	12.5	22
30	10	19
35	8.5	15.5
40	7	12
45	6	10

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Karte/KFZ: 100015

Firma: 1 Clariant

Abteilung: 11 Clariant
Clariant - Versand

Die eichfahig ermittelten Wagedaten konnen an der Waage eingesehen werden.

Auftrag-Nr.:

Karnmer-Nr.: 2

Erst			
Brutto	18.12.2018 11:07:18	35.16 t	118437
Tara	12/18/2018 09:34:37	15.01 t	118412
		20.15 s	

/signature/
/stamp: illegible/

Safety data sheet according to ISO 11014

Substance code: 000000273002 New revision date: 03/01/2018
Version: - / Date of printing 11.10.2018

1. Substance / Name of manufacturer

Trade mark
SAFEWING MP II FLIGHT

Application of the substance/agent.
Industry : Functional chemistry
Type of application: Anti-icing liquid

name of the company
Clariant Produkte (Germany) GmbH

65926 Frankfurt am Main
Telephone number : +49 69 305 18000

Information about the substance/agent
Div. Functional Chemicals/PRODUCT SAFETY
++49(0)69-305-2092/15315/32251

Telephone number for emergency calls +49 69 305 6418

2. Composition / Constituents data

Chemical specification
Polymer-thickened propylene glycol, corrosion inhibitors and water based anti-icing liquid

3. Possible hazards

No known specific risk factors

4. First aid measures

General information
Immediately take off contaminated and sodden clothes.

After inhalation
In case of inhalation of vapours, move the affected person outside and seek medical attention.

After skin contact
In case of skin contact, immediately wash off with soap and water

After eye contact
In case of eye contact, thoroughly wash the eyes with plenty of water and seek medical attention.

After ingestion
Immediately call for a doctor.

5. Fire-fighting measures

Suitable fire-extinguishing means

water spray
alcohol resistant foam
dry powder
carbon dioxide

Separate types of risks associated with the substance itself, combustion products or vapours thereof

In case of fire, hazardous combustion gases are released (carbon monoxide (CO))

Specialized protection equipment for fire-extinguishing

Use self-contained breathing apparatus.

6. Measures taken in case of an accidental loss of package sealing

Personal precautions

Use required personal protection equipment.
Ensure sufficient ventilation.

Methods of removal/collection

Collect using adsorbent (e.g. sand, fossil meal, universal binding agent)

7. Handling and storing the product

Safe handling instructions

Provided that the product is stored and handled properly, special measures are not required.
The product must be pumped only with special pumps (diaphragm or eccentric screw pumps) by gravity or using compressed air.

8. Precautions and personal protection equipment

General measures of protection

Avoid skin and eye contact

Hygiene measures

Follow the usual precautions for handing chemicals.
Store separately from food and beverages.

Hand protection:

In case of a long-time exposure.
Butyl rubber gloves.
Minimal penetration time / gloves: 480 min
Minimal thickness / gloves 0.7 mm

In case of a short-time exposure (splash protection)
PVC / nitrile rubber gloves
Minimal penetration time / gloves: 30 min
Minimal thickness / gloves 0.4 mm

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	Protective gloves of such type are offered by several manufacturers. Pay attention to detailed specification attached by manufacturer, especially to minimal thickness and minimal penetration time. Also consider the specific working conditions under which the gloves are used.
Eye protection:	protective eyewear

9. Physical and chemical properties

Form:	Liquid, viscous
Colour:	yellowish
Odour:	slightly sensible
melting point:	-35 °C Method: ASTM D 2386
Boiling temperature:	103 °C Method: ASTM D 1120
Flash point:	> 100 °C Method: ASTM D 92 (closed cup)
temperature spontaneous ignition:	> 400 °C Method: DIN 51794
Oxidizing properties:	not applicable
Temperature of spontaneous ignition:	Not spontaneously ignitable
Lower explosive limit	not determined
Upper explosive limit	not determined
Evaporation rate:	not determined
Vapour pressure:	not determined
Density:	1.04 g/cm3 (20 °C) Method: DIN 51757
Bulk density:	not applicable
Vapour density relative to air:	not determined
Water solubility:	soluble
Soluble in ... :	glycol soluble
pH value:	7-7.5 Method: DIN 19261 determined in undiluted form

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Log P octanol/water (log Pов): not applicable

Viscosity (dynamic): 6 000 - 14.000 mPa.s (20 °C)
Method: ASTM O 2196

Viscosity (kinematic): not determined
Flammability number: not determined

10. Stability and reactivity

Thermal decomposition: > 400 °C
Method: DIN 52794
Source: Analogy

Hazardous reactions:
When storing and handling according to the specified instructions, no hazardous reactions occur

11. Toxicity data

Acute oral toxicity: not determined

Acute inhalation toxicity: not determined

Acute dermal toxicity: not determined
Skin irritant action: not determined

Eye irritant action: not determined

Sensitization: not determined

Mutagenicity: not determined

Notes
The product was classified based on calculations according to production directive (1999/45/EC)

12. Environmental specification

Biodegradability: 98 % (1 d)
Method: OECD 301 E
Source: Analogy

Fish toxicity: LC50 2.433 mg/l (rainbow trout.)
Method: EPA OPPTS Draft directive 8501075 (1996)

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	LC50 2 433 mg/l (96 h, fathead minnow) Method: EPA OPPTS Draft directive 850.1075 (1996)
Daphnia toxicity:	EC50 626 mg/l (48 h, Ceriodaphnia species) Method: US-EPA OPPTS 850.1010
Algae toxicity:	EC50 2,266 mg/l (72 h, green algae - freshwater (Pseudokirchneriella subcapital)) Method: OECD 201
Bacteria toxicity:	EC50 5.2 g/l (30 min) Method: DIN EN ISO 11348-2 Source: Analogy
Dissolved organic carbon (DOC):	245 mg/g Method: DIN/EN 1484 Source: Analogy
Chemical oxygen demand (COD):	830 mg/g Method: DIN 38-109 T.41 Source: Analogy
Biochemical oxygen demand (BOD):	285 mg/g Method: DIN/EN 1899-1 Source: Analogy

Notes

Biodegradable, when diluted may be destroyed at a biological treatment plant.

13. Transportation data

ADR	without limitations
ADNR	without limitations
RID	without limitations
IATA	without limitations
IMDG	without limitations

14. Instructions

Labelling according to EU directives

hazard warning labelling not mandatory

Classification according to calculations methods provided in Preparations Directive (1999/45/EC).

15. Additional information

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This data is based on our current knowledge level. It is intended to describe our products in terms of safety requirements and does not imply any guarantees as to particular product properties. The consumer must check whether the product is suitable for use in a specific area and for intended purposes by himself/herself. Manufacturer is not liable for any damages arising in connection with the use of this information. In each case, our General Sale conditions apply.

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Annex No 11

STATE SERVICE OF UKRAINE ON
FOOD SAFETY AND CONSUMER PROTECTION
B. Hrinchenka str. 1, Kyiv, 01001 tel: 279-12-70, 279-75-58, fax: 279-48-83,
e-mail: info@consumer.gov.ua

APPROVED
Head of Food Safety and Consumer
Protection Service of Ukraine
Lapa V.I.
/signature/
/stamp: STATE SERVICE OF UKRAINE ON FOOD SAFETY AND CONSUMER PROTECTION Certification code 3/illegible/224774/*
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CONCLUSION
of the State Sanitary and Epidemiological Expertise

of 12/16/2016 No 602-123-20-1/4974

Subject of Expertise: **Anti-icing liquid "Runway Guard KF"**

produced in accordance with TU U 20.5-37258505-002:2016 "Anti-icing liquid "Runway Guard KP""

DKPP, UKTZED code, item No: DKPP code 20.59.43-50.00

Field of application and sales of the subject of expertise: Used for treatment of runways (RWs), taxiways and airport aprons in autumn and winter: for treatment of walkways, flyovers, roads and highways, for technological production sites, for destruction of ice on virtually any flat surfaces; sold via retail and wholesale network

Country of production: Ukraine, TOV "D R Energy Group", Ukraine, 02068, Kyiv, Drahomanova str., 31-B, USREOU code 37258505; production site address: Kyiv region, city of Boryspil, Zavokzalna str., 1

(address, location, telephone, fax, e-mail, website)

Submitter of request for an expertise: TOV "D R Energy Group", Ukraine, 02068, Kyiv, Drahomanova str., 31-B, USREOU code 37258505

(address, location, telephone, fax, e-mail, website)

Details of the contract for delivery of the subject to Ukraine: Produced domestically

/stamp: Limited liability company "D R Energy Group", Kyiv, Ukraine, ENERGY GROUP identification code 37258505/

The subject of expertise meets the established medical criteria of safety / indicators:
During production processes, the air of the working area is to be monitored for potassium formate content (MPC, similarly to sodium formate – 10 mg/m^3, a, Hazard class IV) according to CN 4617-88 "Maximum permissible concentrations (MPC) of hazardous substances in the air in the working area" according to approved methodology guidelines.
Prerequisites for use/application, storage, transportation, disposal, destruction: The product must be used in accordance with the requirements of regulatory documentation and instructions for use; GOST SSBT 12.1.005-88 "Occupational safety standards system.

General sanitary requirements for working zone air"; SP 1042-73 "Sanitary rules of organisation of technological processes, hygienic requirements for production equipment", use personal protection equipment according to DSTU 7239:2011 "Occupational safety standards system. Personal protection equipment. General requirements and classification."

Based on the results of the State Sanitary and Epidemiological Expertise, Anti-icing liquid "Runway Guard KF" meets the requirements of effective sanitation laws of Ukraine and, provided that the requirements of this conclusion are adhered to, may be used in the stated field of application.

Shelf life: guaranteed by manufacturer

Information regarding the label, instructions, rules of labelling is required. The conclusion may not be used for advertising the consumer properties of the subject of expertise.

The conclusion is valid for: for the term of validity of TU U 20.5-37258505-002:2016 "Anti-icing liquid "Runway Guard KF""

Adhering to the requirements of this conclusion is the responsibility of the submitter of request.

Safety indicators subject to border control: produced domestically

Safety indicators subject to control during customs clearance: produced domestically

Current sanitary and epidemiological state inspection is conducted according to the requirements of this conclusion: fulfilment of conditions of use

State Institution "Institute of Occupational Health of NAMS of Ukraine"

01033, Kyiv city, Saksahanskoho str., 75
tel: reception: (044) 284-34-27,
e-mail: yik@nanu.kiev.ua;
secretary of the expert commission
(044) 289-63-94, e-mail: test-lab@ukr.net
(name, location, telephone, fax, e-mail, website)

Report on expertise No 2770 of 12 December 2016
(Report No , date of approval)

Deputy Head of the Expert Commission,
Deputy Director of Research
of DU "Institute of Occupational Health of NAMS of Ukraine"

/signature/ (Signature)

Cherniuk V.I. (initials and surname)

Seal here
*/stamp: STATE INSTITUTION * Kyiv * Ukraine * "*Institute of Occupational Health of the National Academy of Medical Sciences of Ukraine*" identification code 22946309 №1/*

MINISTRY FOR DEVELOPMENT OF ECONOMY AND TRADE
STATE CERTIFICATION SYSTEM

Series ВГ

CERTIFICATE OF CONFORMITY

UA1.010.0018366-17

Registered in the System Registry under No _____

Term of validity from 20 November 2017 till 19 November 2018

Products	Code UKT ZED, TN ZED
anti-icing liquid 'Runway Guard KF'	**20.59** DKPP, OKP code

Meets the requirements

TU U 20.5-37288505-002:2016 (p. 3 Table. 1 (pp. 1,4))'Anti-icing liquid 'Runway Guard KP. Specification'; DSTU GOST 18995.2:2009, GSTU 3-050:2004 'Chemical products (household products). Labelling'

Product manufacturer	**TOV 'D R ENERGY GROUP' (USREOU code 37258505), 02068, Kyiv, Drahomanova str., 31-B, production site location: Kyiv region, city of Boryspil, Zavokzalna str., 59**
Certificate issued to	**TOV 'D R ENERGY GROUP' (USREOU code 37258505), 02068, Kyiv, Drahomanova str., 31-B**

Additional information

/illegible/ mass-produced from 11/20/2017 till 11/19/2018 according to TU U 20.5-37258505-002:2016 'Anti-icing liquid 'Runway Guard KF. Specification'. Technical inspection: once a year. Voluntary certification.

Certificate issued by certification authority

Products certification authority: TOV 'Promelektronsart', appointment/authorization certificates: No UA PN.010, No UA P.010 of 11/20/2013, registered at: 04136, Kyiv, Pivnichno-Syretska str., 3, tel 2009545

On the grounds of

Certified test report No 0930/182П of 10/31/2017 - VL TOV 'Scientific-Technical Centre 'VNDIKhIMPROEKT (at. No 2H061 of 06/01/2013), 02660, Kyiv, M. Raskovoi, 11. The Conclusion of the State Sanitary and Epidemiological Expertise No 602-123-20-1/4974 of 12/16/2016 Decision of SA of 11/17/2017

Director of the Certification Authority	*/signature/*	Mashynska O.O.
	signature	**Initials, surname**

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Validity of the Certificate of Conformity may be checked in the System Registry by telephone number (044) 528-84-28

LIMITED LIABILITY COMPANY
"D R ENERGY GROUP" 02068, KYIV,
DRAHOMANOVA STR., 31 B
TEL.: 00 380 (44) 383 00 74
WWW.DR.UA
ADMIN@DR.UA

RUNWAY GUARD KF®

RUNWAYS DEICING LIQUID

SAEAMS1435

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2016

In cases when the ice layer has already formed on the surface, especially if it is thicker than 3 mm, prior to applying the liquid reagent, mechanical and chemical pretreatment should by performed.

The liquid is applied in an undiluted form by spraying it onto the surface.

Runway Guard KF® usage rate:

0...-5 ° C	15-25 g/m^2 without precipitation, ice thickness up to 1 mm
5... 10°C	25-30 g/m^2 without precipitation, ice thickness up to 1 mm
-10...-15°C	35-45 g/m^2 without precipitation, ice thickness up to 1 mm
0...-5°C	15-30 g/m^2 Wet conditions, ice thickness up to 1 mm
-5...-10°C	30-45 g/m^2 Wet conditions, ice thickness up to 1 mm
-10...-15°C	40-50 g/m^2 Wet conditions, ice thickness up to 1 mm
0...-5°C	30-40 g/m^2 Packed snow
-5...-10°C	40-50 g/m^2 Packed snow
-10…-15 °C	50-65 g/m^2 Packed snow
0...-5°C	35-50 g/m^2 Wet snow, rain with snow
-5...-10°C	50-60 g/m^2 Wet snow, rain with snow
-10...-15°C	55-75 g/m^2 Wet snow, rain with snow

Storage conditions:

Liquid **Runway Guard KF®** must be stored in well ventilated rooms in containers or tanks. Mandatory labelling: ***name, batch, shelf life, volume.*** Liquid containers must be tightly closed. Prior to application, ensure that there are no sediments, check for changes in pH value, and changes in density. Do not store in contaminated containers. Do not mix with water.

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+ 38 044 383-00-74
DRENERGY COM.UA

Safety Data Sheet according to 1907/2006/EU, Article 31
Printed on: 3/12/2015

1. Name of substance/mixture/and enterprise
Material Safety Data Sheet (MSDS) for "Runway Guard KF" product

1.1 Product identification

Name of product	Runway Guard KF
Chemical Name	Potassium formate
Number according to CAS	590-29-4
Number according to EC	209-677-9
Item No	RG090916

1.2 Important identified application of liquid/mixture and unrecommended applications

Application of liquid/mixture	Anti-icing
Detailed description of application	Anti-icing/ Deicing of airport runways

1.3 Information about the supplier that provides the safety data sheet

Manufacturer/supplier

TOV “D R Energy Group”
Drahomanova 316
02068, Kyiv, Ukraine
www.drenergy.com.ua
sergii.ezhov@gmail.com

1.4 Department that provides safety information: Safety and Quality department

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Emergency telephone: 103

Section 2. Possible hazards

Classification of liquid or mixture

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Product properties	Liquid
Additional information as to components classification	No components fall under

Section 4. First aid measures

General	Immediately move the affected person away from the place of exposure. Enable access to fresh air, warm them up, and let them rest. If the affected person is unconscious, fix them in a lateral position.
In case of inhalation	Wash mouth and nasopharynx with plenty of water. If the symptoms persist, call for a doctor.
In case of skin contact	Take off all contaminated clothes, wash oneself with plenty of water. Wash oneself with soap and wash off with water.
In case of eye contact	Wash with plenty of water. Wash the area below eyelids too. If the symptoms persist, call for a doctor.
In case of ingestion	Do not induce vomiting. Drink plenty of milk or water. Seek for medical consultation.

Section 5. Fire-extinguishing means

Fire-extinguishing media	Powder fire extinguisher C02, water, sand

5.1 Special precautions as to fire-extinguishing

Warning	The product is not inflammable. However if the temperature rises above 300 Celsius, it immediately vaporizes and potassium formate splits releasing oxygen and oxalate. Release of hydrogen may cause an explosion.

5.2 Advice for firefighters

General advice

Use all suitable methods of individual protection. Wear safety mask and provide oxygen supply. Fire-extinguishing should be performed from a safe distance.

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Component: potassium formate

MPC	Worker Type of contact: skin Time of exposure: short Type of impact: systemic Value: 6167 mg/kg, daily
MPC	Worker Type of contact: inhalation Time of exposure: short Type of impact: systemic Value: 430 mg/m3
MPC	Buyer Type of contact: skin Time of exposure: short Type of impact: systemic Value: 3080 mg/kg, daily
MPC	Buyer Type of contact: inhalation Time of exposure: short Type of impact: systemic Value: 107 mg/m3
MPC	Buyer Type of contact: ingestion Time of exposure: short Type of impact: systemic Value: 30 mg/kg, daily
Hand protection	Use nitrile or rubber gloves. Do not use gloves made of woven materials. Thickness of gloves material > 0.55 Breakthrough time > 480 min
Eye protection	Properly fitting goggles. If splashing is possible, a protective mask may be used.

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Skin protection	Wear protective suit

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Section 13. Instructions for disposal

Small amounts may be washed down the sewers provided that they are additionally washed with water. Large amount should be recycled or sent to specialized companies for disposal.

Section 14. Information regarding transportation

The product is not dangerous goods.

***Department that issued the Safety Data Sheet**:* Quality and safety department

· ***Contact:*** *Yezhov S.V.*

/stamp: Limited liability company “D R Energy Group”, Kyiv, Ukraine,
ENERGY GROUP identification code 37258505

SMI, Inc.
12219 SW131 Avenue
Miami, Florida 33186-6401 USA
Telephone: (305)971-7047
Fax: (305)971-7048

Recipient: Serhii Yezhov
"D R Energy Group"
Drahomanova str. 31-b
02068, Kyiv, Ukraine

Date: 22 June 2018

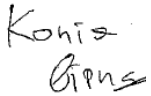
SMI/ Ref.: 1803-616

Product: **RUNWAY GUARD KF (Batch 20/03/01)** (received on 13 April 2018)

Dilution: As received

Periodic testing in accordance with
AMS1435C
Fluid, generic, deicing/anti-icing
For treatment of aprons and RWs

4.2.2	Periodic tests	
3.2.4	Freezing Point	Conforms
3.2.5	Effect on Aircrafts Metals	Conforms
3.2.5.1	Sandwich Corrosion	Conforms
3.2.5.2	Total Immersion Corrosion	Conforms
3.2.5.3	Low Embrittling Cadmium Plate	Conforms
3.2.5.3.1	Cyclic Immersion Corrosion of Cadmium Plate	Informational
3.2.5.4	Hydrogen Embrittlement	Conforms
3.2.5.5	Stress-Corrosion Resistance	
	AMS 4911	Conforms
	AMS 4916	Informational
3.2.6	Effect on Transparent Plastics	
	MIL-P-25690 (Type C)	Conforms
	MIL-P-83310 (polycarbonate)	Conforms
3.2.7	Effect on Painted Surfaces	Conforms
3.2.8	Effect on Unpainted Surfaces	Conforms
3.2.9	Rinsibility	Conforms
3.2.10	Effect on Runway Pavements	
3.2.10.1	Runway Concrete Scaling Resistance	Conforms
3.2.10.2	Asphalt Concrete Degradation Resistance	Not performed by SMI



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Respectfully submitted,
Patricia D. Viani, SMI Inc.

4.2.2 Periodic tests: Freezing point, (3.2.4), effect on aircraft metals (3.2.5), effect on transparent plastics (3.2.6), effect on painted surfaces (3.2.7), effect on unpainted surfaces (3.2.8), rinsibility (3.2.9), and runway concrete scaling resistance (3.2.10) are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser, but in no case less than once every two years.

3.2.4 Freezing point:

3.2.4.1 Freeze point of fluid diluted 1:1 by weight wish demineralized water (ASTM D 1193 Тип IV) shall be reported and shall be lower than -14.5°C (+6°F) determined in accordance with ASTM D 1177.

Freezing point (fluid diluted 1:1): -15°C

Result Conforms

3.2.4.2 Shall be reported and shall be within 4°C (7°F) of the certified value established in 4.2.3, determined in accordance with ASTM D 1177.

Freezing point ***(fluid diluted 1:1***): ***-15* °C**

Result _____ Informational

3.2.1 Effect on Aircrafts Metals:

3.2.5.1 Sandwich Corrosion: Specimens, after testing in accordance with ASTM F 1110, shall not show corrosion worse than control panels run using ASTM D 1193, type IV, water.

	2024-T3 Bare Anodized	2024-T3 Alclad	7075-T6 Bare Anodized	7075-T6 Alclad
Product	1	1	1	1
Control	1	1	1	1

Result Conforms

3.2.5.2 Total Immersion Corrosion: The fluid, tested in accordance with ASTM F 483 except that panels of AMS 4376 shall be tested for 24 hours, shall neither show evidence of corrosion of panels nor cause a weight change of any test panel greater than shown in Table:

Material of specimen	**WEIGHT CHANGE (mg/cm^2/24 hours)**	
	Allowable	**Result**
AMS 4037 Aluminium; anodized as in AMS 2470	0.3	**+ 0.02**
AMS 4041 Aluminium Alloy	0.3	**< 0.01**
AMS 4049 Aluminium Alloy	0.3	**< 0.01**
AMS 4376 Mg Alloy, dichromate treated as in AMS 2475	0.2	**+0.04**
AMS 4911 Titanium Alloy	0.1	**<0.01**
AMS 5045 Carbon Steel	0.8	**+0.01**

Result Conforms

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3.2.5.3 Low Embrittling Cadmium Plate: Test panels coated with low-embrittling cadmium plate shall not show a weight change greater than 0.3 mg/cm^2/24 hours, determined in accordance with ASTM F 1111.

Concentrate: <0.01 mg/cm^2/24 hours

Result Conforms

3.2.5.3.1 The fluid shall be tested for cyclic immersion corrosion of cadmium plate in accordance with AIR6130 and the results reported as specified in Section 4 of AIR6130A.

Initial pH of solution: 10.7 **Final pH of solution:** 10.5

Panel weights	Replicate#	Weight (g)		
		Initial	Final	**Weight change**
	1	8.4581	8.4625	**+ 0.0044**
	2	8.3438	8.3473	**+ 0.0035**
	3	8.4600	8.4628	**+ 0.0028**
Average weight change = +0,0036				

AIR 6130A: A runway deicing fluid of solid compound tested in accordance with this document that exhibits a weight loss of more than 0.3 mg/cm^2 may cause undesirable corrosion effects to airplane equipment and/or airport equipment.

Average weight change = + 0.13 mg/cm^2

Note: "+" indicates weight gain

Result Informational

See separate report for complete data tables.

3.2.5.4 Hydrogen Embrittlement: The fluid shall be nonembrittling, determined in accordance with ASTM F 519, Type 1a, 1c, or 2a.

Specimens: Type 1c, cadmium-plated per MIL-STD-870.
Test temperature: 20 °C (68F); load: 45%, immersed for 150 hours.

As received: No changes occurred within 150 hours.

Result Conforms

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3.2.5.5 Stress-Corrosion Resistance: The fluid shall not cause cracks in AMS 4911 or MAM 4911 titanium alloy specimens, determined in accordance with ASTM F 945, Method A. *(3% salt control: cracking evident)*

As received: No cracking evident.

Result Conforms

3.2.5.5.1 The fluid shall be tested in accordance with ASTM F 945, Method A using AMS 4916 specimens. Report shall detail the effect of the fluid and the effect of control solution. The results shall be reported for informational purposes only. *(100 ppm salt control: cracking evident)*

As received: Cracking evident

Result Informational

3.2.6 Effect on Transparent Plastics:

3.2.6.1 The fluid, at 25°C +/- 2 (77°F + 4), shall not craze, stain, or discolor MIL-P-25690 stretched acrylic plastic, determined in accordance with ASTM F 484.

MIL-P-25690: no craze, stain, or discolor

Result Conforms

3.2.6.2 The fluid, at 25°C +/- 2 (77°F + 4), shall not craze, stain, or discolor MIL-P-83310 polycarbonate plastic, determined in accordance with ASTM F 484., except that the specimens shall be stressed for 30 minutes +/-2 to an outer fiber stress of 13.8 MPa (2000 psi).

MIL-P-83310: no craze, stain, or discolor

Result Conforms

3.2.7 Effect on Painted Surfaces: The fluid, at 25°C +/- 2 (77°F + 4), shall neither decrease the paint film hardness by more than two pencil hardness levels nor shall it produce any streaking, discoloration, or blistering of the paint film, determined in accordance with ASTM F 502.

ASTM F 502: No decrease in film hardness; no detrimental effect

Result Conforms

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3.2.8 Effect on Unpainted Surfaces: The fluid, tested in accordance with ASTM F 485, shall neither produce streaking nor leave any stains requiring polishing to remove.

AMS 4049: No streaking or stains

AMS 4911: No streaking or stains

Result Conforms

3.2.9 Rinsibility: The fluid shall be completely rinsible in tap water, determined in accordance with 3.2.9.1

3.2.9.1 A 75 x 200 mm panel of clear glass shall be cleaned to provide a surface free of waterbreak, dried, and coated with deicer/anti-icer fluid by pouring the fluid over the panel while it is held in a horizontal position. The coated panel shall be inclined at an angle of 45 degrees for 10 minutes, then placed in a horizontal position for 24 at room temperature. After the 24 exposure, the panel shall be rinsed in tap water for 5 to 6 minutes, followed by a rinse with ASTM D 1193, Type IV, water, allowed to dry at ambient temperature, and examined for visible traces of deicer/anti-icer fluid.

Fluid was completely rinsed

Result ___ Conforms _____

3.2.10 Effect on Runway Pavements

3.2.10.1 Runway Concrete Scaling Resistance:

The condition of the runway concrete surface shall have a rating not greater than 1 for 50 freeze-thaw cycles, determined in accordance with ASTM C 672 except that concrete shall:

- □ Be air-entrained with an air content as specified ASTM C 672
- □ Have a minimum cement content of 510 pound per cubic yard +/- 10 (302 kg/ m3 +/- 6))
- □ Have a slump, 1.5 inches +/- 0.5 (38 mm +/- 13)

A 25% by volume solution of the deicer/anti-icer fluid, as supplied by the manufacturer. In commercial concentration in tap water shall be substituted for calcium chloride. Performing more than one freeze-thaw cycle per day is acceptable.

Rating after 50 cycles: 1

Result Conforms

3.2.10.2Surface damage resistance (Appendix A, for products used in EU)

Result: *Not performed by SMI

/signature/

/stamp: Limited liability company "D R Energy Group", Kyiv, Ukraine, ENERGY GROUP identification code 37258505

SMI, Inc.

12219 SW131 Avenue
Miami, Florida 33186-6401 USA

Telephone: (305)971-7047
Fax: (305)971-7048

Recipient: Serhii Yezhov
"D R Energy Group"
Drahomanova str. 31-b

02068, Kyiv, Ukraine

Date: 22 June 2018

SMI/ Ref.: 1803-616

Product: **RUNWAY GUARD KF (Batch 20/03/01)** *(received on 13 April 2018)*
Dilution: As received

Testing in accordance with
SAE AIR6130A
Cadmium plate cyclic corrosion test (2017-05)

Cadmium plate cyclic corrosion test:

Initial pH of solution: 10.7 **Final pH of solution: 10.5**

	REPLICABLE #	Weight (g)		
		Initial	Final	**Weight change**
WEIGHT OF SPECIMEN	1	8.4581	8.4625	**+ 0.0044**
	2	8.3438	8.3473	**+ 0.0035**
	3	8.4600	8.4626	**+ 0.0028**

Average weight change = + 0.0036 g (+0.13 mg/sm^2)
Note: "+ " indicates weight gain
A runway deicing fluid of solid compound tested in accordance with this document that exhibits a weight loss of more than 0.3 mg/cm^2 may cause undesirable corrosion effects to airplane equipment and/or airport equipment
See separate report for complete data tables

Result: Informational

/stamp: Limited liability company "D R Energy Group", Kyiv, Ukraine, ENERGY GROUP identification code 37258505

Respectfully submitted, */signature/*

Patricia D. Viani, SMI Inc.

Cadmium plate cyclic corrosion test

3. Test Specimen Preparation

Substrate: 4130 Steel

Size: 1" x 2" x 0.04" x 0.040" (25.40 mm x 50.80 mm x 1.02 mm)

Finish: Cadmium plating in accordance with AMS QQ-P-416., Type I Class I,

(0.0005"- 0.0008" inch plating per side).

There shall be no supplementary chromate treatment.

a. Three cadmium plated test specimens shall be used for each fluid to be tested
b. Sample of AMS1435 Runway Deicing Fluid shall be tested as received from the supplier.
c. Sample of AMS1431 Runway Deicing Fluid shall be tested in a diluted form - – diluted with ASTM D 1193 Type IV, water to 15% by weight solids.
d. Procure soft flexible brushes for test (paintbrush type, 1,5 inches (3,8 cm) wide, with synthetic bristles approx. 1.5 inches (3.8 cm) long.

4. Environmental Exposure Preparation

Preset humidity chamber to 90 +/- 5° F and 30 +/- 5% humidity. Affix plastic ties or other inert material as hangers (hangers shall be made from an inert material that will not react with the sample; plastic, plastic coated metals, monofilament fishing line or stainless steels are acceptable) in the chamber to hold specimens during the environmental exposure period.

5. Test procedure

a. Measure and record pH of solution to be tested (record to one decimal place).
b. Solvent cleaners cadmium plated specimens with acetone; wipe gently with an acetone-soaked wiper. Without allowing the acetone to evaporate, gently remove excess acetone with a dry wiper. Allow samples to dry 10 minutes in a desiccator. Do not accelerate drying

Note. Care should be taken not to touch the cleaned specimens with bare hands; use tweezers, clean gloves or equivalent tool.

Monday	Tuesday	Wednesday	Thursday	Friday
				Friday Start - Day 0
Day 3	Day 4	Day 5	Day 6	Day 7
Day 10	Day 11	Day 12	Day 13	Day 14

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/stamp: Limited liability company "D R Energy Group", Kyiv, Ukraine, ENERGY GROUP identification code 37258505

d. **Friday Start -** Fill glass containers with solution to be tested, one container for each coupon. Refer to 3b or 3c for solution being used (consider filling one extra container to give extra conditioned fluid available). Container shall be large enough so the solution completely covers the specimens. Cover the container with loose fitting cover and place filled container into the humidity chamber to environmentally condition the solution for a minimum of 24 +/- 1 hours before the start of test, up to 72 +/- 1 hours.

e. Day 3 - Remove the solution container from the humidity chamber and the specimens from the desiccator. Place specimens in container oriented such that the specimens are not resting flush against the bottom or side of the container. Place the container with cover back into the humidity chamber for 24 +/- 1 hours.

f. Day 4 - After 24 hour immersion in the solution, remove the specimens, but do not rinse them. Place them into the humidity chamber by hanging for 22.5 +/- 0.5 hours. Hangers shall be made from an inert material that will not react with the sample (such as plastic, plastic coated metals and stainless steels are acceptable).

g. Day 5 / Day 10 / Day 12 - Remove the specimens from the humidity chamber. Rinse the specimens with deionized water. Lightly brush (12 strokes per side) the specimen surface with the soft flexible brush while rinsing to remove loose corrosion products. Immerse samples into acetone for 10 seconds while agitating specimen. Allow samples to dray for 10 minutes in a desiccator. Weigh and record the specimen weights. Do not accelerate drying of samples with oven drying.

   Note: If multiple solutions are being tested, use different brushes for each solution to avoid cross contamination.

   Immediately after weighing the specimens, return them to their test solution container to soak for 90 +/- 5 minutes in the humidity chamber. Specimens shall be oriented such that they are not resting flush against the bottom or side of the container. After 90 minutes remove the specimens but do not rinse them. Place them in the humidity chamber by hanging for 22.5 +/- 0.5 hours, maintaining the specimen in the initial orientation throughout the cycle.

h. Day 6 / Day 11 / Day 13 - Return the specimen to the test solution chamber for 90 +/- 5 minutes in the humidity chamber. Specimens shall be oriented such that they are not resting flush against the bottom or side of the container. After 90 minutes remove the specimen but do not rinse it. Replace it in the humidity chamber by hanging for 22.5 +/- 0.5 hours, maintaining the specimen in the initial orientation throughout the cycle.

i. Day 7 - Remove specimens from the humidity chamber. Rinse the specimens with deionized water. Lightly brush (12 strokes per side) the specimens surface with the soft flexible brush while rinsing to remove loose corrosion products. Immerse samples into acetone for 10 seconds while agitating specimen. Allow samples to dry for 10 minutes in a desiccator. Weigh and record the specimen weights. Do not accelerate drying of samples with oven drying.

   Note: If multiple solutions are being tested, use different brushes for each solution to avoid cross contamination.

Immediately after weighing the specimens, return them to their test solution container in the humidity chamber. Specimens shall be oriented such that they are not resting flush against the bottom or side of the container. Specimens shall be left in the test solution chamber container in the humidity chamber from DAY 7 to DAY 10.

/signature/

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J Day 14 - Remove specimens from the humidity chamber. Rinse the specimens with deionized water. Lightly brush (12 strokes per side) the specimen surface with the soft flexible brush while rinsing to remove loose corrosion products. Immerse samples into acetone for 10 seconds while agitating specimen. Allow samples to dry for 10 minutes in a desiccator. Weigh and record the specimen weights. Do not accelerate drying of samples with oven drying.

Note: If multiple solutions are being tested, use different brushes for each solution to avoid cross contamination.

K. Measure and record final pH of solution (record to one decimal place)

Test Data:

pH at start of test: **10.7**
pH at end of test: **10.5**

Initial panel weights

REPLICATE#	WEIGHT (g)
1	8.4581
2	8.3438
3	8.4600

	REPLICATE#	WEIGHT (g)		
		Monday	Wednesday	Friday
Week #1 PANEL WEIGHTS	1	-	8.4615	8.4599
	2	-	8.3459	8.3444
	3	-	8.4619	8.4614

	REPLICATE#	WEIGHT (g)		
		Monday	Wednesday	Friday
Week #2 PANEL WEIGHTS	1	8.4596	8.4616	8.4625
	2	8.3434	8.3460	8.3473
	3	8.4606	8.4619	8.4628

/signature/

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Test Date (continued)

REPLICATE #1	Initial weight	Week 1 Wed	Week 1 Fri	Week 1 Mon	Week 2 Wed	Week 2 Fri
	8.4581	8.4615	8.4599	8.4596	8.4616	8.4625
Cumulative weight change ("+" indicates weight gain)	—	+ 0.0034	+ 0.0018	+ 0.0015	+ 0.0035	**+ 0.0044 (Final)**

REPLICATE #2	Initial weight	Week 1 Wed	Week 1 Fri	Week 1 Mon	Week 2 Wed	Week 2 Fri
	8.3438	8.3459	8.3444	8.3443	8.3460	8.3473
Cumulative weight change ("+" indicates weight gain)	--	+ 0.0021	+ 0.0006	+ 0.0005	+ 0.0022	**+0.0035 (Final)**

REPLICATE #3	Initial weight	Week 1 Wed	Week 1 Fri	Week 1 Mon	Week 2 Wed	Week 2 Fri
	8.4600	8.4619	8.4614	8.4606	8.4619	8.4628
Cumulative weight change	-	+ 0.0019	+ 0.0014	+ 0.0006	+ 0.0019	**+ 0.0028 (Final)**

Summary

	Replicate#	Weight change (g)	Average change	
Weight change	1	**+ 0.0044**	**+ 0.13mg/cm^2(+ 0.0036g)**	**Informational**
	2	**+ 0.0035**		
	3	**+ 0.0028**		

("+" indicates weight gain)
Summary:

A runway deicing fluid or solid compound tested in accordance with this document that exhibits a weight loss of more than 0.3 mg/cm2 may cause undesirable corrosion effects to airplane equipment and/or airport equipment.

/stamp: Limited liability company "D R Energy Group", Kyiv, Ukraine, ENERGY GROUP identification code 37258505

/signature/

SMI, Inc.
12219 SW 131 Avenue **Phone: (305)971-7047**
Miami, Florida 33186-6401 USA **Fax: (305)971-7048**

Attn: Sergii ezhoy
DR Energy Group
31b Dragomanova str.
02068 Kiev, Ukraine

Date: 22-Jun-2018

SMI/REF: 1803-616

Product: **RUNWAY GUARD KF (Batch 20/03/01)** *(received 13-Apr-2018)*

Dilition: As received

Periodic testing in accordance with'
AMS 1435C
FLUID, GENERIC, DEICING/ANTI-ICING
Runways and Taxiways

4.2.2	Periodic Tests	
3.2.4	Freezing Point	Conforms
3.2.5	Effect on Aircrafts Metals	
3.2.5.1	Sandwich Corrosion	Conforms
3.2.5.2	Total Immersion Corrosion	Conforms
3.2.5.3	Low Embrittling Cadmium Plate	Conforms
3.2.5.3.1	Cyclic Immersion Corrosion of Cadmium Plate	Informational
3.2.5.4	Hydrogen Embrittlement	Conforms
3.2.5.5	Stress-Corrosion Resistance	
	AMS-4911	Conforms
	AMS-4916	Informational
3.2.6	Effect on Transparent Plastics	
	MIL-P-25690(Type C)	Conforms
	MIL-P-83310 (Polycarbonate)	Conforms
3.2.7	Effect on/Painted Surfaces	Conforms
3.2.8	Effect on Unpainted Surfaces	Conforms
3.2.9	Rinsibility	Conforms
3.2.10	Effect on Runway Pavements	
3.2.10.1	Runway Concrete Scaling Resistance	Conforms
3.2.10.2	Asphalt Concrete Degradation Resistance	Not performed by SMI

Testing required for deicer/anti-icer products used in Europe. This test is not performed by SMI.

signature/

/stamp: Limited liability company "D R Energy Group", Kyiv, Ukraine, ENERGY GROUP identification code 37258505

Respectfully submitted,
/signature/
Patricia D.Viani, SMI Inc.
/For the true copy/

Client: DR Energy Group Date: 22-Jun-2018
Product: **RUNWAY GUARD KF (Batch 20/03/01)** SMI/REF: 1803-616
Dilution: As received.
AMS 1435C Periodic Tests Page 2 of 5

4.2.2 Periodic Tests: Freezing point (3.2.4), effect on aircraft metals (3.2.5), effect on transparent plastic (3.2.6), effect on painted surfaces (3.2.7), effect on unpainted surfaces (3.2.8), rinsibility (3.2.9), and runway concrete scaling resistance (3.2.10) are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser, but in no case less than once every two years.

3.2.4 Freezing Point:

3.2.4.1 Freeze point of fluid diluted 1:1 by weight with ASTM D 1193 Type IV water shall be reported and shall be lower than -14.5°C (+6°F) determined in accordance with ASTM D 1177.

Freezing point (fluid diluted 1:1): -15 °C

Result Conforms

3.2.4.2 Shall be reported and shall be within 4°C (7°F) of the preproduction value established in 4.2.3, determined in accordance with ASTM D 1177.

Freezing point (fluid diluted 1:1): -15 °C

Result Informational

3.2.5 Effect on Aircraft Metals:

3.2.5.1 Sandwich Corrosion: Specimens, after testing in accordance with ASTM F 1110, shall not show corrosion worse than control panels run using ASTM D 1193, type IV, water.

	2024-T3 Bare Anodized	2024-T3 Alclad	7075-T6 Bare Anodized	7075-T6 Alclad
DEICER FLUID	**1**	**1**	**1**	**1**
CONTROL	1	1	1	1

Result Conforms

3.2.5.2 Total Immersion Corrosion: The fluid, tested in accordance with ASTM F 483 except that panels of AMS 4376 shall be tested for 24 hours, shall neither show evidence of corrosion of panels nor cause a weight change of any test panel greater than shown in Table 1:

TEST PANEL	WEIGHT CHANGE (mg/cm²/24hrs)	
	ALLOWABLE	RESULTS
AMS 4037 Aluminum Alloy, anodized as in AMS 2470	0.3	**+ 0.02**
AMS 4041 Aluminum Alloy	0.3	**< 0.01**
AMS 4049 Aluminum Alloy	0.3	**< 0.01**
AMS 4376 Mg Alloy, dichromate treated as in AMS 2475	0.2	**+ 0.04**
AMS 4911 or MAM 4911 Titanium Alloy	0.1	**< 0.01**
AMS 5045 Carbon Steel	0.8	**+ 0.01**

"+" indicates weight gain

Result Conforms

Client: DR Energy Group Date: 22-Jun-2018
Product: **RUNWAY GUARD KF (Batch 20/03/01)** SMI/REF: 1803-616
Dilution: As received
AMS 1435C Periodic Tests Page 3 of 5

3.2.5.3 Low-Embrittling Cadmium Plate: Test panels, coated with low-embrittling cadmium plate, shall not show a weight change greater than 0.3 mg/cm²/24hrs, determined in accordance with ASTM F 1111.

As received: < 0.01 mg/cm²/24hrs

Result Conforms

3.2.5.3.1 The fluid shall be tested for cyclic immersion corrosion of cadmium plate in accordance with AIR6130 and the results reported as specified in Section 4 of AIR6130A.

Initial pH of solution: 10.7 **Final pH of solution:** 10.5

	REPLICATE #	Weight (g)		
		Initial	Final	**Weight change**
PANEL WEIGHTS	1	8.4581	8.4625	**+ 0.0044**
	2	8.3438	8.3473	**+ 0.0035**
	3	8.4600	8.4628	**+ 0.0028**
	Average weight change = + 0.0036			

AIR6130A: A runway deicing fluid or solid compound tested in accordance with this document that exhibits a weight loss of more than 0.3 mg/cm² may cause undesirable corrosion effects to airplane equipment and/or airport equipment.

Average weight change = + 0.13 mg/cm²

Note: "+" indicates weight gain

Result: **Informational**

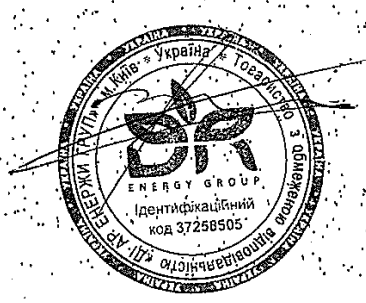
see separate report for complete data tables.

3.2.5.4 Hydrogen Embrittlement: The fluid shall be nonembrittling, determined in accordance with ASTM F 519, Type 1a, 1c, or 2a.

Specimens: Type 1c, cadmium-plated per MIL-STD-870.
Parameters: 45% load, notch immersed in fluid for duration (150 hours)

As received: No failures occurred within 150 hours.

Result Conforms



Client: DR Energy Group Date: 22-Jun-2018
Product: **RUNWAY GUARD KF (Batch 20/03/01)** SMI/REF: 1803-616
Dilution: As received
AMS 1435C Periodic Tests Page 4 of 5

3.2.5.5 Stress-Corrosion Resistance: The fluid shall not cause cracks in AMS 4911 or MAM 4911 titanium alloy specimens, determined in accordance with ASTM F 945, Method A. *(3% salt control: cracking evident)*

As received: No cracking evident.

Result Conforms

3.2.5.6.1 The fluid shall be tested in accordance with ASTM F 945, Method A using AMS 4916 specimens. Report shall detail the effect of the fluid and the effect of control solution. The results shall be reported for informational purposes only. *(100 ppm salt control: cracking evident)*

As received: Cracking evident.

Result Informational

3.2.6 Effect on Transparent Plastics:

3.2.6.1 The fluid, at 25°C ± 2 (77°F ± 4), shall not craze, stain, or discolor MIL-P-25690 stretched acrylic plastic, determined in accordance with ASTM F 484.

MIL-P-25690: No craze, stain, or discolor

Result Conforms

3.2.6.2 The fluid, at 25°C ± 2 (77°F ± 4), shall not craze, stain, or discolor MIL-P-83310 polycarbonate plastic, determined in accordance with ASTM F 484, except that the specimens shall be stressed for 30 minutes ± 2 to an outer fiber stress of 13.8 MPa (2000 psi).

MIL-P-83310: No craze, stain, or discolor

Result Conforms

3.2.7 Effect on Painted Surfaces: The fluid, at 25°C ± 2 (77°F ± 4), shall neither decrease the paint film hardness by more than two pencil hardness levels nor shall it produce any streaking, discoloration, or blistering of the paint film, determined in accordance with ASTM F 502.

ASTM F502: No decrease in film hardness; no detrimental effect

Result Conforms



Client: DR Energy Group Date: 22-Jun-2018
Product: **RUNWAY GUARD KF (Batch 20/03/01)** SMI/REF: 1803-616
Dilution: As received
AMS 1435C Periodic Tests Page 5 of 5

3.2.8 Effect on Unpainted Surfaces: The fluid, tested in accordance with ASTM F 485, shall neither produce streaking nor leave any stains requiring polishing to remove:

AMS 4049: No streaking or stains
AMS 4911: No streaking or stains

Result Conforms

3.2.9 Rinsibility: The fluid shall be completely rinsible in tap water, determined in accordance with 3.2.9.1

3.2.9.1 A 75 x 200 mm panel of clear glass shall be cleaned to provide a surface free of waterbreak, dried, and coated with the deicer/anti-icer fluid by pouring the fluid over the panel while it is held in a horizontal position. The coated panel shall be inclined at an angle of approximately 45 degrees for 10 minutes ± 0.5, then placed in a horizontal position for 24 hours ± 0.25 at room temperature. After the 24 exposure, the panel shall be rinsed in tap water for 5 to 6 minutes, followed by a rinse with ASTM D 1193, Type IV, water, allowed to air dry at ambient temperature, and examined for visible traces of deicer/anti-icer fluid.

Fluid was completely rinsible.

Result Conforms

3.2.10 Effect on Runway Pavements

3.2.10.1 Runway Concrete Scaling Resistance: The condition of the runway concrete surface shall have a rating not greater than 1 for 50 freeze-thaw cycles, determined in accordance with ASTM C 672 except that concrete shall:

☒ Be air-entrained with an air content as specified in ASTM C 672
☐ Have a minimum cement content of 510 pound per cubic yard ± 10 (302 kg/m³ ± 6)
☐ Have a slump, 1.5 inches ± 0.5 (38 mm ± 13)

A 25 % by volume solution of the deicer/anti-icer fluid, as supplied by the manufacturer in commercial concentration, in tap water shall be substituted for calcium chloride. Performing more than one freeze-thaw cycle per day is acceptable.

Rating after 50 cycles: 1

Result Conforms

2.10.2 Asphalt Concrete Degradation Resistance (Appendix A, valid for deicer/anti-icer products used in Europe)

Result *Not performed by SMI

****Testing required for deicer/anti-icer products used in Europe. This test is not performed by SMI.***



SMI, Inc.
12219 SW 131 Avenue
Miami, Florida 33186-6401 USA

Phone: (305) 971-7047
Fax: (305) 971-7048

Attn: Sergii Ezhov
DR Energy Group
31b Dragomanova str.
02068 Kiev, Ukraine

Date: 22-Jun-2018
SMI/REF: 1803-618

Product: **RUNWAY GUARD KF (Batch 20/03/01)** *(received 13-Apr-2018)*

Dilution: As received

Testing in accordance with
SAE AIR6130A
CADMIUM PLATE CYCLIC CORROSION TEST (2017-05)

Cadmium Plate Cyclic Corrosion Test

Initial pH of solution: 10.7 Final pH of solution: 10.5

Replicate	Initial (g)	Final (g)	Weight change (grams)
1	8.4581	8.4625	**+ 0.0044**
2	8.3438	8.3473	**+ 0.0035**
3	8.4600	8.4628	**+ 0.0028**
Average weight change = + 0.0036 g (+ 0.13 mg/cm²) Note: "+" indicates weight gain			

AIR6130A states: A runway deicing fluid or solid compound tested in accordance with this document that exhibits a weight loss of more than 0.3 mg/cm² may cause undesirable corrosion effects to airplane equipment and/or airport equipment.

See separate report for complete data tables

Result Informational

Client: DR Energy Group Date: 22-Jun-2018
Product: **RUNWAY GUARD KF (Batch 20/03/01)** SMI/REF: 1803-616
Dilution: As received Page 2 of 5
SAE AIR6130A, Cadmium Plate Cyclic Corrosion Test.

Cadmium Plate Cyclic Corrosion Test

AMS 1431 Compound, Solid Runway and Taxiway Deicing/Anti-Icing

AMS 1435 Fluid, Generic, Deicing/Anti-Icing Runways and Taxiways

3 Test Specimen Preparation

Substrate: 4130 Steel

Size: 1" x 2" x 0.04" x 0.048" (25.40 mm x 50.80 mm x 1.22 mm).

Finish: Cadmium plating in accordance with AMS QQ-P-416, Type I Class I, (0.0005"- 0.0008" inch plating per side).

There shall be no supplementary chromate treatment.

a. Three cadmium plated test specimens shall be used for each fluid to be tested

b. Sample of AMS1435 Runway Deicing Fluid shall be tested as received from the supplier

c. Sample of AMS1431 Runway Deicing Solid Compound shall be tested in a diluted form – diluted with ASTM D 1193, Type IV, water to 15% by weight solids.

d. Procure soft flexible brushes for test (paintbrush type, 1.5 inches (3.8 cm) wide, with synthetic bristles approx 1.5 inches (3.8 cm) long

4 Environmental Exposure Preparation
Preset humidity chamber to 90 ± 5°F and 30 ± 5% humidity. Affix plastic ties or other inert material as hangers (hangers shall be made from an inert material that will not react with the sample, plastic, plastic coated metals, monofilament fishing line or stainless steels are acceptable) in the chamber to hold specimens during the environmental exposure period.

5 Test Procedure

a. Measure and record pH of solution(s) to be tested (record to one decimal place).

b. Solvent clean cadmium plated specimens with acetone; wipe gently with an acetone-soaked wiper. Without allowing the acetone to evaporate, gently remove excess acetone with a dry wiper. Allow samples to dry for 10 minutes in a desiccator. Do not accelerate drying of samples with oven drying.

Note: Care should be taken not to touch the cleaned specimens with bare hands; use tweezers, clean gloves or equivalent tool.

c. Weigh and record initial specimen weight in grams. Record all weights throughout the test to the nearest 0.0001 gram. Return specimens to desiccator until Day 3.

Monday	Tuesday	Wednesday	Thursday	Friday
				Friday Start – Day 0
Day 3	Day 4	Day 5	Day 6	Day 7
Day 10	Day 11	Day 12	Day 13	Day 14



Client: DR Energy Group
Product: **RUNWAY GUARD KF (Batch 20/03/01)**
Dilution: As received

Date: 22-Jun-2018
SMI/REF: 1803-616
Page 3 of 5

SAE AIR6130A, Cadmium Plate Cyclic Corrosion Test

d. FRIDAY START - Fill glass containers with solution to be tested, one container for each coupon. Refer to 3b or 3c for solution being used (consider filling one extra container to have extra conditioned fluid available). Container shall be large enough so the solution completely covers the specimens. Cover the container with loose fitting cover and place filled container into the humidity chamber to environmentally condition the solution for a minimum of 24 ± 1 hours before the start of test, up to 72 ± 1 hours.

e. Day 3 – Remove the solution container from the humidity chamber and the specimens from the desiccator. Place specimens in container oriented such that the specimens are not resting flush against the bottom or side of the container. Place the container with cover back into the humidity chamber for 24 ± 1 hours.

f. Day 4 - After the 24 hour immersion in the solution, remove the specimens, but do not rinse them. Place them into the humidity chamber by hanging for 22.5 ± 0.5 hours. Hangers shall be made from an inert material that will not react with the sample (such as plastic, plastic coated metals and stainless steels are acceptable).

g. Day 5 /Day 10 /Day 12 – Remove the specimens from the humidity chamber. Rinse the specimens with deionized water. Lightly brush (12 strokes per side) the specimen surface with the soft flexible brush while rinsing to remove loose corrosion products. Immerse samples into acetone for 10 seconds while agitating specimen. Allow samples to dry for 10 minutes in a desiccator. Weigh and record the specimen weights. Do not accelerate drying of samples with oven drying.

Note: If multiple solutions are being tested, use different brushes for each solution to avoid cross contamination.

Immediately after weighing the specimens, return them to their test solution container to soak for 90 ± 5 minutes in the humidity chamber. Specimens shall be oriented such that they not resting flush against the bottom or side of the container. After 90 minutes, remove the specimens but do not rinse them. Place them in the humidity chamber by hanging for 22.5 ± 0.5 hours, maintaining the specimen in the initial orientation throughout the cycle.

h. Day 6 /Day 11 /Day 13 - Return the specimen to the test solution container to soak for 90 ± 5 minutes in the humidity chamber. Specimens shall be oriented such that it is not resting flush against the bottom or side of the container. After 90 minutes, remove the specimen but do not rinse it. Replace it in the humidity chamber by hanging for 22.5 ± 0.5 hours, maintaining the specimen in the initial orientation throughout the cycle.

i. Day 7 – Remove specimens from the humidity chamber. Rinse the specimens with deionized water. Lightly brush (12 strokes per side) the specimens surface with a soft flexible brush while rinsing to remove loose corrosion products. Immerse samples into acetone for 10 seconds while agitating specimen. Allow samples to dry for 10 minutes in a desiccator. Weigh and record the specimen weights. Do not accelerate drying of samples with oven drying.

Note: If multiple solutions are being tested, use different brushes for each solution to avoid cross contamination.

Immediately after weighing the specimens, return them to their test solution container in the humidity chamber. Specimens shall be oriented such that they are not resting flush against the bottom or side of the container. Specimens shall be left in the test solution container in the humidity chamber from DAY 7 to DAY 10.

DR ENERGY GROUP Ідентифікаційний код 37258505

Client: DR Energy Group Date: 22-Jun-2018
Product: **RUNWAY GUARD KF (Batch 20/03/01)** SMI/REF: 1803-616
Dilution: As received Page 4 of 5
SAE AIR6130A, Cadmium Plate Cyclic Corrosion Test

j. Day 14 – Remove specimens from the humidity chamber. Rinse the specimens with deionized water. Lightly brush (12 strokes per side) the specimen surface with a soft flexible brush while rinsing to remove loose corrosion products. Immerse samples into acetone for 10 seconds while agitating specimen. Allow samples to dry for 10 minutes in a desiccator. Weigh and record the specimen weights. Do not accelerate drying of samples with oven drying.

Note: If multiple solutions are being tested, use different brushes for each solution to avoid cross contamination.

k. Measure and record final pH of solution (record to one decimal place).

l. Report the initial weight of the specimen, the weight after each periodic weighing, and the final weight. Calculate and report the value of the cumulative weight lost from each specimen after each periodic weighing procedure.

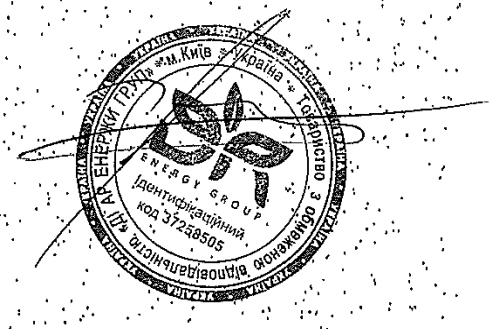
Test Data:

pH at start of test: 10.7
pH at end of test: 10.5

	REPLICATE #	Weight (g)
INITIAL PANEL WEIGHTS	1	8.4581
	2	8.3438
	3	8.4600

	REPLICATE #	Weight (g)		
		Monday	Wednesday	Friday
WEEK #1 PANEL WEIGHTS	1	----	8.4615	8.4599
	2	----	8.3459	8.3444
	3	----	8.4619	8.4614

	REPLICATE #	Weight (g)		
		Monday	Wednesday	Friday
WEEK #2 PANEL WEIGHTS	1	8.4596	8.4616	8.4625
	2	8.3443	8.3460	8.3473
	3	8.4606	8.4619	8.4628



Client: DR Energy Group
Product: **RUNWAY GUARD KF (Batch 20/03/01)**
Dilution: As received
Date: 22-Jun-2018
SMI/REF: 1803-616
Page 5 of 5

SAE AIR6130A, Cadmium Plate Cyclic Corrosion Test

TEST DATA (continued)

REPLICATE #1	INITIAL WEIGHT (grams)	WEEK 1 WED (grams)	WEEK 1 FRI (grams)	WEEK 2 MON (grams)	WEEK 2 WED (grams)	WEEK 2 FRI (grams)
	8.4581	8.4615	8.4599	8.4596	8.4616	8.4625
CUMULATIVE WEIGHT CHANGE ("+" indicates weight gain)	--	+ 0.0034	+ 0.0018	+ 0.0015	+ 0.0035	**+ 0.0044 (FINAL)**

REPLICATE #2	INITIAL WEIGHT	WEEK 1 WED	WEEK 1 FRI	WEEK 2 MON	WEEK 2 WED	WEEK 2 FRI (FINAL WEIGHT)
	8.3438	8.3459	8.3444	8.3443	8.3460	8.3473
CUMULATIVE WEIGHT CHANGE ("+" indicates weight gain)	--	+ 0.0021	+ 0.0006	+ 0.0005	+ 0.0022	**+ 0.0035 (FINAL)**

REPLICATE #3	INITIAL WEIGHT	WEEK 1 WED	WEEK 1 FRI	WEEK 2 MON	WEEK 2 WED	WEEK 2 FRI (FINAL WEIGHT)
	8.4600	8.4619	8.4614	8.4606	8.4619	8.4628
CUMULATIVE WEIGHT CHANGE ("+" indicates weight gain)	--	+ 0.0019	+ 0.0014	+ 0.0006	+ 0.0019	**+ 0.0028 (FINAL)**

SUMMARY:

	REPLICATE #	Weight Change (g)	Average Weight Change	
WEIGHT CHANGE	1	**+ 0.0044**	**+ 0.13mg/cm^2 (+ 0.0036 g)**	**Informational**
	2	**+ 0.0035**		
	3	**+ 0.0028**		

Note: "+" indicates a weight gain.

AIR6130A: A runway deicing fluid or solid compound tested in accordance with this document that exhibits a weight loss of more than 0.3 mg/cm^2 may cause undesirable corrosion effects to airplane equipment and/or airport equipment.

Respectfully Submitted,

Patricia D. Viani, SMI Inc.

Annex No 12

Calculations of volumes of pollutant emissions Impact on atmospheric air

Table 1.5.9 Specification and parameters of new and renewed sources of pollutant emissions into the atmosphere and their parameters

Emission source number	Emission source name	Emission source height, m	Emission source diameter, m	Coordinates of the source					Gas-and-dust flow parameters at the measuring point			Substance code, according to 2-TP air	Inventory code	Pollutant name	Initial data for emission volume determination						Emission rate determination	
				Point of start of a line source; centre of symmetry of a planar source		Other end of a line source; width and length of a planar source		Angle of length of a planar source Relative to OX fact.sys. Deg	Flow rate, nm^3/sec	Velocity, m/s	Temperature, °C				Maximum estimated mass concentration of the pollutant, mg/nm^3	Maximum mass concentration of the pollutant, * mg/nm^3	Est.		According to manufacturer's data			
				X1	Y1	X2	Y2										g/sec	tons/year	g/sec	tons/year	g/sec	tons/year
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
190	RW-1 inorganic moving sources aircraft	2		2679	6061	600	4000				27.4	4001	301	Nitrogen dioxide			0.018903	35.6482			0.018903	35.6482
												6000	337	Carbon oxide			0.116708	50.9382			0.116708	50.9382
												11000	2754	Saturated hydrocarbons C12-C19			0.013191	5.8705			0.013191	5.8705
												3000	2902	suspended particles undifferentiated by composition			0.000125	0.09676			0.000125	0.09676
												3004	328	soot								
191	apron of terminal D inorganic mobile motor transport	2		2281	7166	200	800	-3			27.4	4001	301	Nitrogen dioxide			0.03961	0.04970			0.03961	0.04970
												4003	303	Ammonia			0.0000001	0.000002			0.0000001	0.000002
												4002	304	Nitrogen oxide			0.00017	0.00021			0.00017	0.00021
												5001	330	Sulphur dioxide			0.00569	0.00622			0.00569	0.00622
												6000	337	Carbon oxide			0.08156	0.24437			0.08156	0.24437
												12000	410	Methane			0.00045	0.00108			0.00045	0.00108
												13101	703	Benzo[a]pyrene			0.00004	0.00000			0.00004	0.00000
												11000	2754	Non-methane volatile organic compounds			0.01150	0.03683			0.01150	0.03683
												3000	2902	suspended particles undifferentiated by composition			0.00912	0.00912			0.00912	0.00912
												3004	328	soot								
													-	Carbon dioxide			4.22375	5.90782			4.22375	5.90782
192	apron of terminal B inorganic mobile motor transport	2		1912	5506	225	620	-3			27.4	4001	301	Nitrogen dioxide			0.017131	0.013500			0.017131	0.013500
												4003	303	Ammonia			0.00000008	0.000001			0.00000008	0.000001
												4002	304	Nitrogen oxide			0.000075	0.000056			0.000075	0.000056
												5001	330	Sulphur dioxide			0.017131	0.001699			0.017131	0.001699
												6000	337	Carbon oxide			0.037018	0.064487			0.037018	0.064487
												12000	410	Methane			0.000196	0.000287			0.000196	0.000287
												13101	703	Benzo[a]pyrene			0.000003	0.000001			0.000003	0.000001
												11000	2754	Non-methane volatile organic compounds			0.0052193	0.00973			0.0052193	0.00973
												3000	2902	suspended particles undifferentiated by composition			0.003909	0.002501			0.003909	0.002501
												3004	328	soot								
													-	Carbon dioxide			1.83259	1.59523			1.83259	1.59523

Table 1.5.9 (continued) Specification of new and renewed sources of pollutant emissions into the atmosphere and their parameters

Emission source number	Emission source name	Emission source height, m	Emission source diameter, m	Coordinates of the source				Angle of length of a planar source Relative to OX fact.sys. Deg	Gas-and-dust flow parameters at the measuring point			Substance code, according to 2-TP air	Inventory code	Pollutant name	Initial data for emission volume determination						Emission rate determination	
				Point or start of a line source; centre of symmetry of a planar source		Other end of a line source; width and length of a planar source			Flow rate, nm³/sec	Velocity, m/s	Temperature, °C				Maximum estimated mass concentration of the pollutant, mg/nm3	Maximum mass concentration of the pollutant,* mg/nm3	Est.		According to manufacturer's data			
				X1	Y1	X2	Y2										g/sec	tons/year	g/sec	tons/year	g/sec	tons/year
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
193	apron of terminal F inorganic mobile motor transport	2		1307	6276	225	2000	-3			27.4	4001	301	Nitrogen dioxide			0.03108	0.03754			0.03108	0.03754
												4003	303	Ammonia			0.0000001	0.000001			0.0000001	0.000001
												4002	304	Nitrogen oxide			0.00014	0.00015			0.00014	0.00015
												5001	330	Sulphur dioxide			0.00447	0.00490			0.00447	0.00490
												6000	337	Carbon oxide			0.06288	0.15303			0.06288	0.15303
												12000	410	Methane			0.00031	0.00071			0.00031	0.00071
												13101	703	Benzo[a]pyrene			0.00003	0.000003			0.00003	0.000003
												11000	2754	Non-methane volatile organic compounds			0.00839	0.02305			0.00839	0.02305
												3000	2902	suspended particles undifferentiated by composition			0.00717	0.00739			0.00717	0.00739
												3004	328	soot								
													-	Carbon dioxide			3.30745	4.32412			3.30745	4.32412
200	RW-2 inorganic mobile sources aircraft	2		1137	5572	600	3800				27.4	4001	301	Nitrogen dioxide			0.04333	35.64816			0.04333	35.64816
												6000	337	Carbon oxide			0.21772	50.93818			0.21772	50.93818
												11000	2754	Saturated hydrocarbons C12-C19			0.01877	5.87049			0.01877	5.87049
												3000	2902	suspended particles undifferentiated by composition			0.00047	0.09676			0.00047	0.09676
												3004	328	soot								
201	Breathing valve of the service station (including car refuelling); FFS — DF storage	5	0.05	1621	5584						27.4	5002	333	Hydrogen sulphide			2.0E-09	6.4E-08			2.0E-09	6.4E-08
												11000	2754	Non-methane volatile organic compounds			7.2E-07	2.3E-05			7.2E-07	2.3E-05
												11000	10312	Aromatic hydrocarbons			1.1E-09	3.4E-08			1.1E-09	3.4E-08

Table 1.5.9 (continued) Specification of new and renewed sources of pollutant emissions into the atmosphere and parameters thereof

Emission source number	Emission source name	Emission source height, m	Emission source diameter, m	Coordinates of the source				Angle of length of a planar source Relative to OX fact.sys. Deg	Gas-and-dust flow parameters at the measuring point			Substance code, according to 2-TP air	Inventory code	Pollutant name	Initial data for emission volume determination						Emission rate determination	
				Point or start of a line source; centre of symmetry of a planar source;		Other end of a line source; width and length of a planar source									Maximum estimated mass concentration of the pollutant, mg/nm3	Maximum mass concentration of the pollutant,* mg/nm3	Est.		According to manufacturer's data			
				X1	Y1	X2	Y2		Flow rate, nm³/sec	Velocity, m/s	Temperature, °C						g/sec	tons/year	g/sec	tons/year	g/sec	tons/year
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
202	Breathing valve of the service station (including car refuelling); FFS — aviation fuel (kerosene) storage	5	0.05	1621	5576						27.4	5002	333	Hydrogen sulphide			2.9E-10	9.3E-09			2.9E-10	9.3E-09
												11000	2754	Non-methane volatile organic compounds			4.9E-07	1.5E-05			4.9E-07	1.5E-05
												11000	10312	Aromatic hydrocarbons			4.9E-10	1.5E-08			4.9E-10	1.5E-08
203	breathing valve of the service station (including car refuelling); FFS — DF storage	5	0.05	1621	5566						27.4	5002	333	Hydrogen sulphide			2.2E-09	6.9E-08			2.2E-09	6.9E-08
												11000	2754	Non-methane volatile organic compounds			7.7E-07	2.4E-05			7.7E-07	2.4E-05
												11000	10312	Aromatic hydrocarbons			1.2E-09	3.7E-08			1.2E-09	3.7E-08
204	breathing valve of the service station (including car refuelling); FFS — DF storage	5	0.05	1621	5560						27.4	5002	333	Hydrogen sulphide			3.9E-07	1.3E-08			3.9E-07	1.3E-08
												11000	2754	Non-methane volatile organic compounds			1.4E-04	4.5E-06			1.4E-04	4.5E-06
												11000	10312	Aromatic hydrocarbons			2.1E-07	6.8E-09			2.1E-07	6.8E-09
205	Filler neck of inorg. service station (including car refuelling); FFS, DF	4	0.5	1621	5582						27.4	5002	333	Hydrogen sulphide			3.9E-07	1.3E-08			3.9E-07	1.3E-08
												11000	2754	Non-methane volatile organic compounds			1.4E-04	4.5E-06			1.4E-04	4.5E-06
												11000	10312	Aromatic hydrocarbons			2.1E-07	6.8E-09			2.1E-07	6.8E-09

Table 1.5.9 (continued) Specification of new and renewed sources of pollutant emissions into the atmosphere and parameters thereof

Emission source number	Emission source name	Emission source height, m	Emission source diameter, m	Coordinates of the source					Gas-and-dust flow parameters at the measuring point			Substance code, according to 2-TP air	Inventory code	Pollutant name	Initial data for emission volume determination						Emission rate determination	
				Point or start of a line source; centre of symmetry of a planar source		Other end of a line source; width and length of a planar source		Angle of length of a planar source Relative to OX fact.sys. Deg							Maximum estimated mass concentration of the pollutant, mg/nm3	Maximum mass concentration of the pollutant,* mg/nm3	Est.		According to manufacturer's data			
				X1	Y1	X2	Y2		Flow rate, nm3/sec	Velocity, m/s	Temperature, °C						g/sec	tons/year	g/sec	tons/year	g/sec	tons/year
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
206	filler neck of inorg. service station (including car refuelling); FFS, aviation fuel (kerosene)	4	0.5	1621	5578						27.4	5002	333	Hydrogen sulphide			4.4E-06	4.7E-08			4.4E-06	4.7E-08
												11000	2754	Non-methane volatile organic compounds			7.3E-03	7.9E-05			7.3E-03	7.9E-05
												11000	10312	Aromatic hydrocarbons			7.3E-06	7.9E-08			7.3E-06	7.9E-08
207	Filler neck of inorg. service station (including car refuelling); FFS, DF	4	0.5	1621	5562						27.4	5002	333	Hydrogen sulphide			3.9E-07	1.6E-08			3.9E-07	1.6E-08
												11000	2754	Non-methane volatile organic compounds			1.4E-04	5.5E-06			1.4E-04	5.5E-06
												11000	10312	Aromatic hydrocarbons			2.1E-07	8.3E-09			2.1E-07	8.3E-09
208	Filler neck of inorg. service station (including car refuelling); FFS, DF	4	0.5	1621	5564						27.4	5002	333	Hydrogen sulphide			3.9E-07	1.3E-08			3.9E-07	1.3E-08
												11000	2754	Non-methane volatile organic compounds			1.4E-04	4.5E-06			1.4E-04	4.5E-06
												11000	10312	Aromatic hydrocarbons			2.1E-07	6.8E-09			2.1E-07	6.8E-09
209	dispensing gun inorg. service station (including car refuelling); FFS, DF	1.5	0.1	1620	5584						27.4	5002	333	Hydrogen sulphide			1.4E-04	2.7E-05			1.4E-04	2.7E-05
												11000	2754	Non-methane volatile organic compounds			5.0E-02	9.6E-03			5.0E-02	9.6E-03
												11000	10312	Aromatic hydrocarbons			7.5E-05	1.4E-05			7.5E-05	1.4E-05

Table 1.5.9 (continued) Specification of new and renewed sources of pollutant emissions into the atmosphere and parameters thereof

Emission source number	Emission source name	Emission source height, m	Emission source diameter, m	Coordinates of the source					Gas-and-dust flow parameters at the measuring point			Substance code, according to 2-TP air	Inventory code	Pollutant name	Initial data for emission volume determination						Emission rate determination	
				Point or start of a line source; centre of symmetry of a planar source		Other end of a line source; width and length of a planar source		Angle of length of a planar source Relative to OX fact.sys. Deg							Maximum estimated mass concentration of the pollutant, mg/nm3	Maximum mass concentration of the pollutant,* mg/nm3	Est.		According to manufacturer's data			
				X1	Y1	X2	Y2		Flow rate, nm3/sec	Velocity, m/s	Temperature, °C						g/sec	tons/year	g/sec	tons/year	g/sec	tons/year
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
210	dispensing gun inorg. service station (including car refuelling); FFS, aviation fuel (kerosene)	1.5	0.1	1622	5584						27.4	5002	333	Hydrogen sulphide			1.2E-10	1.0E-11			1.2E-10	1.0E-11
												11000	2754	Non-methane volatile organic compounds			1.9E-07	1.7E-08			1.9E-07	1.7E-08
												11000	10312	Aromatic hydrocarbons			1.9E-10	1.7E-11			1.9E-10	1.7E-11
211	dispensing gun inorg. service station (including car refuelling); FFS, DF	1.5	0.1	1620	5559						27.4	5002	333	Hydrogen sulphide			7.8E-05	2.9E-05			7.8E-05	2.9E-05
												11000	2754	Non-methane volatile organic compounds			2.8E-02	1.0E-02			2.8E-02	1.0E-02
												11000	10312	Aromatic hydrocarbons			4.2E-05	1.6E-05			4.2E-05	1.6E-05
212	dispensing gun inorg. service station (including car refuelling); FFS, DF	1.5	0.1	1622	5559						27.4	5002	333	Hydrogen sulphide			7.8E-05	1.3E-05			7.8E-05	1.3E-05
												11000	2754	Non-methane volatile organic compounds			2.8E-02	4.5E-03			2.8E-02	4.5E-03
												11000	10312	Aromatic hydrocarbons			4.2E-05	6.8E-06			4.2E-05	6.8E-06
213	Pipe stationary engines; FRLES, CMS, diesel generator plant; diesel generator	7	0.15	636	3832				1.08	61.12	630	4001	301	Nitrogen dioxide	185.185		0.200000	0.05454			0.200000	0.05454
												5001	330	Sulphur dioxide	57.870		0.062500	0.01704			0.062500	0.01704
												6000	337	Carbon oxide	149.498		0.161458	0.04431			0.161458	0.04431
												13101	703	Benzo[a]pyrene	0.000		0.0000002	0.0000001			0.0000002	0.0000001
												11049	1325	Formaldehyde	1.653		0.001786	0.00049			0.001786	0.00049
												11000	2754	Non-methane volatile organic compounds	39.958		0.043155	0.01169			0.043155	0.01169
												11000	2902	suspended particles undifferentiated by composition	6.889		0.007440	0.00195			0.007440	0.00195
												3004	328	soot								

Table 1.5.9 (continued). Specification of new and renewed sources of pollutant emissions into the atmosphere and parameters thereof

Emission source number	Emission source name	Emission source height, m	Emission source diameter, m	Coordinates of the source					Gas-and-dust flow parameters at the measuring point			Substance code, according to 2-TP air	Inventory code	Pollutant name	Initial data for emission volume determination						Emission rate determination	
				Point or start of a line source; centre of symmetry of a planar source		Other end of a line source; width and length of a planar source		Angle of length of a planar source Relative to OX fact.sys. Deg							Maximum estimated mass concentration of the pollutant, mg/nm3	Maximum mass concentration of the pollutant,* mg/nm3	Est.		According to manufacturer's data			
				X1	Y1	X2	Y2		Flow rate, nm3/sec	Velocity, m/s	Temperature, °C						g/sec	tons/year	g/sec	tons/year	g/sec	tons/year
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
214	breathing valve and other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator plant; DF reservoir	7	0.05	636	3828						27.4	5002	333	Hydrogen sulphide			2.8E-11	8.9E-10			2.8E-11	8.9E-10
												11000	2754	Non-methane volatile organic compounds			1.0E-08	3.2E-07			1.0E-08	3.2E-07
												11000	10312	Aromatic hydrocarbons			1.5E-11	4.8E-10			1.5E-11	4.8E-10
215	filler neck inorg. other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator plant; DF reservoir	4	0.5	636	3823						27.4	5002	333	Hydrogen sulphide			3.9E-07	7.6E-10			3.9E-07	7.6E-10
												11000	2754	Non-methane volatile organic compounds			1.4E-04	5.0E-07			1.4E-04	5.0E-07
												11000	10312	Aromatic hydrocarbons			2.1E-07	1.4E-09			2.1E-07	1.4E-09
216	Pipe stationary engines; FRLES, CMS, diesel-generator plant; diesel generator	7	0.15	630	6969				1.08	61.12	630	4001	301	Nitrogen dioxide	185.185		0.200000	0.05454			0.200000	0.05454
												5001	330	Sulphur dioxide	57.870		0.062500	0.01704			0.062500	0.01704
												6000	337	Carbon oxide	149.498		0.161458	0.04431			0.161458	0.04431
												13101	703	Benzo[a]pyrene	0.000		0.0000002	0.0000001			0.0000002	0.0000001
												11049	1325	Formaldehyde	1.653		0.001786	0.00049			0.001786	0.00049
												11000	2754	Non-methane volatile organic compounds	39.958		0.043155	0.01169			0.043155	0.01169
												11000	2902	suspended particles undifferentiated by composition	6.889		0.007440	0.00195			0.007440	0.00195
												3004	328	soot								

Table 1.5.9 (continued) Specification of new and renewed sources of pollutant emissions into the atmosphere and parameters thereof

Emission source number	Emission source name	Emission source height, m	Emission source diameter, m	Coordinates of the source					Gas-and-dust flow parameters at the measuring point			Substance code, according to 2-TP air	Inventory code	Pollutant name	Initial data for emission volume determination						Emission rate determination	
				Point or start of a line source; centre of symmetry of a planar source ;		Other end of a line source; width and length of a planar source		Angle of length of a planar source Relative to OX fact.sys. Deg							Maximum estimated mass concentration of the pollutant, mg/nm3	Maximum mass concentration of the pollutant,* mg/nm3	Est.		According to manufacturer's data			
				X1	Y1	X2	Y2		Flow rate, nm³/sec	Velocity, m/s	Temperature, °C						g/sec	tons/year	g/sec	tons/year	g/sec	tons/year
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
217	breathing valve and other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator plant; DF reservoir	7	0.05	630	6969						27.4	5002	333	Hydrogen sulphide			2.8E-11	8.9E-10			2.8E-11	8.9E-10
												11000	2754	Non-methane volatile organic compounds			1.0E-08	3.2E-07			1.0E-08	3.2E-07
												11000	10312	Aromatic hydrocarbons			1.5E-11	4.8E-10			1.5E-11	4.8E-10
218	filler neck inorg. other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator plant; DF reservoir	4	0.5	630	6960						27.4	5002	333	Hydrogen sulphide			3.9E-07	7.6E-10			3.9E-07	7.6E-10
												11000	2754	Non-methane volatile organic compounds			1.4E-04	5.0E-07			1.4E-04	5.0E-07
												11000	10312	Aromatic hydrocarbons			2.1E-07	1.4E-09			2.1E-07	1.4E-09
219	inorg. AC engine test site	2		1267	4096	170	100	-3			27.4	4001	301	Nitrogen dioxide			0.01890	562.2009			0.01890	562.2009
												6000	337	Carbon oxide			0.11671	391.7258			0.11671	391.7258
												11000	2754	Saturated hydrocarbons C12-C19			0.01319	44.5543			0.01319	44.5543
												3000	2902	suspended particles undifferentiated by composition			0.00012	0.55186			0.00012	0.55186
												3004	328	soot								

Table 1.5.9 (continued) Specification of new and renewed sources of pollutant emissions into the atmosphere and parameters thereof

Emission source number	Emission source name	Emission source height, m	Emission source diameter, m	Coordinates of the source					Gas-and-dust flow parameters at the measuring point			Substance code, according to 2-TP air	Inventory code	Pollutant name	Initial data for emission volume determination						Emission rate determination	
				Point or start of a line source; centre of symmetry of a planar source;		Other end of a line source; width and length of a planar source		Angle of length of a planar source Relative to OX fact.sys. Deg							Maximum estimated mass concentration of the pollutant, mg/nm3	Maximum mass concentration of the pollutant,* mg/nm3	Est.		According to manufacturer's data			
				X1	Y1	X2	Y2		Flow rate, nm³/sec	Velocity, m/s	Temperature, °C						g/sec	tons/year	g/sec	tons/year	g/sec	tons/year
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
220	Deflector ERS motor transport garage	8	0.5	1318	6500				0.295	1.5	27.4	4001	301	Nitrogen dioxide	47.603		0.01402	0.00019			0.01402	0.00019
												4002	304	Nitrogen oxide	0.191		0.00006	0.000001			0.00006	0.000001
												5001	330	Sulphur dioxide	6.862		0.00202	0.00003			0.00202	0.00003
												6000	337	Carbon oxide	86.652		0.02552	0.00034			0.02552	0.00034
												12000	410	Methane	0.559		0.00016	0.000002			0.00016	0.000002
												13101	703	Benzo[a]pyrene	0.048		0.00001	0.0000002			0.00001	0.0000002
												11000	2754	Non-methane volatile organic compounds	13.022		0.00384	0.00005			0.00384	0.00005
												3000	2902	suspended particles undifferentiated by composition	11.059		0.00326	0.00004			0.00326	0.00004
												3004	328	soot								
													-	Carbon dioxide	5007.6		1.47486	0.01947			1.47486	0.01947
221	apron S inorg. Mobile motor transport	2		1327	6389	400	360	-3			27.4	4001	301	Nitrogen dioxide			0.02535	0.00676			0.02535	0.00676
												4003	303	Ammonia			0.00000004	0.0000002			0.00000004	0.0000002
												4002	304	Nitrogen oxide			0.00011	0.00003			0.00011	0.00003
												5001	330	Sulphur dioxide			0.00365	0.00091			0.00365	0.00091
												6000	337	Carbon oxide			0.04930	0.02262			0.04930	0.02262
												12000	410	Methane			0.00028	0.00011			0.00028	0.00011
												13101	703	Benzo[a]pyrene			0.00003	0.000001			0.00003	0.000001
												11000	2754	Non-methane volatile organic compounds			0.00705	0.00340			0.00705	0.00340
												3000	2902	suspended particles undifferentiated by composition			0.00586	0.00141			0.00586	0.00141
												3004	328	soot								
													-	Carbon dioxide			2.68613	0.75732			2.68613	0.75732

Assessment of the impact of planned activities on the state of atmospheric air pollution

According to the effective "State sanitary rules of planning and development of settlements" approved by the order of the Ministry of Health of Ukraine of 6/19/1996 No 173, Kyiv 1996, the size of sanitary protection areas for airports is NOT standardized.

According to paragraph 5.4. (DSP 173-96) The sanitary protection area must be established from hazard sources to the borderline of residential buildings, land plots of public institutions, buildings and structures, including childcare, educational, healthcare institutions, social welfare institutions, sports facilities etc, as well as the territory of public parks, gardens and other amenity planting sites, land plots of fitness-and-sports institutions, recreation sites, gardening partnerships and other similar objects.

for enterprises:

- with processes causing atmospheric air pollution by harmful malodorous chemicals and biological agents, the sanitary protection area must be established starting right from the sources of atmospheric pollution by point-source emissions (via stacks, shafts), or fugitive emissions (via building lamps, fuming or steaming surfaces of process plants and other structures etc), and also from sites of unloading of raw materials, intermediate stocks, or outdoor storages
- with processes that are sources of noise, ultrasound, vibrations, static electricity, electromagnetic and ionizing radiation, and other harmful factors, the sanitary protection area must be established starting from buildings, structures and sites where the equipment (assemblies, mechanisms) that create these hazards is installed

According to paragraph 5.21 (ДСП 173-96) Aircraft airways must not cross residential area of urban and rural settlements. Distance from the border of the airdrome (helidrome) airfield, radar and weather radar stations, aircraft engine testing stations and other airdrome facilities, airways of airplanes (helicopters) to the borderline of existing or planned building area and public recreation areas must be such as to ensure that these territories conform to hygienic noise norms according to the sanitary regulations as well as the maximum allowable levels of electromagnetic radiation.

Since the separation of SPA for sources of SE "Boryspil" International Airport" relative to residential buildings, private gardening lands, parks and other similar facilities is not standardized but determined based on results of dispersal calculations, the impact of pollutant emissions from these sources on the state of atmospheric air pollution is assessed based on results of calculations of pollutants dispersal in atmospheric air at control points RP1-RP47, and in the enterprise impact area in its entirety.

Calculations of pollutants dispersion in the surface layer of the atmosphere were made in accordance with the OND-86 "Methodology for calculating atmospheric concentrations of harmful substances contained in enterprise emissions" according to the EOL+ program, version 5.3.8. The software complex was developed by the
TOPAZ system programming design bureau, Kyiv, and approved by GGO named after Voiekov, ref. No. 11-5-68 dated 07.05.98.

Based on calculation results, an analysis of the influence of design solutions on the state of air at the border of residential development in the surface layer is presented ***taking into account all of the enterprise emission sources and the existing background pollution***.

In accordance with the requirement of clause 2.19 of the OND-86, the calculated rectangle size 10000 × 10000 is m with a step of 250 m. The calculation was carried out for 49 pollutants and 14 summation groups.

When calculating air pollution on the maps of pollutant dispersion in the air, the values of surface concentrations at the border of the nearest residential development at a given point were determined:

- c.p. No. 1 (x = 2883; y = 9352) – at a distance of about 350 m – the territory of the Epicentr K shopping centre
  located at 2 Horbatiuka str., Boryspil (northern direction);
- c.p. No. 2 (x = 4333; y = 6544) – at a distance of about 1350 m – residential and public buildings at the intersection of Volodymyra Momota and Yevhena Konovaltsi streets, Boryspil (eastern direction);
- c.p. No. 3 (x = 4540; y = 3970) – at a distance of about 1700 m – private residential building area, Gardens district, Boryspil (eastern direction);
- c.p. No. 4 (x = -82; y = 2587) – at a distance of about 650 m – residential area of the private sector on Boryspilska str., village of Martusivka, Boryspil district (north-western direction);
- c.p. No. 5 (x = -2580; y = 4538) – at a distance of about 3050 m – residential area of the private sector on Polova str., village of Petropavlivske, Boryspil district (western direction);
- c.p. No. 6 (x = 256; y = 8930) – at a distance of about 750 m – residential area of the private sector on Aeroportivska str., village of Hora, Boryspil district (north-western direction).
- c.p. No. 7 (x = 733; y = 9820) – at a distance of about 350 m – residential area of the private sector at the intersection of Boryspilska str. and Tolstoho str., village of Hora, Boryspil district (south-western direction).

The nearest distance from emission sources to the residential development area is 600 m (north direction), that is, the territory of the Epicentr K shopping centre located at 2 Horbatiuka str., Boryspil.

The hygienic criterion for determining the maximum permissible pollutant emissions into the atmosphere is the compliance of their calculated concentrations at the border of the SPA of residential buildings with hygienic standards. Determination of the expediency of pollutants dispersion calculation using a computer is carried out in accordance with the requirements of paragraph 5.21 of the OND-86.

Conducting a dispersion calculation for a given pollutant is considered appropriate if the following condition is met:

$$F = 0.01 \times H \text{ if } H > 10 \text{ m}$$

$$\frac{M}{MPC} \geq F$$

$$F = 0.1 \text{ if } H < 10 \text{ m}$$

where M is the total value of the pollutant emission from all sources of the designed facility (g/sec);

MPC is the maximum permissible concentration of a pollutant (mg/m^3);

H is the average height of the emission source at the facility (m).

Coefficient F, which takes into account the sedimentation rate of harmful substances in the atmosphere, is adopted according to the OND-86:

1 – for gaseous substances;

2 – for solids emitted after purification, the efficiency of which is higher than 90%; 3 – for solids emitted without purification.

Table 1.5.10 Expediency of calculating dispersion for newly formed and renewed sources of pollutant emissions into the atmospheric air

No.	Pollutant name	M, g/sec	MPC mg/m³	M/MPC	Average height of emission sources, m	Parameter F	Calculation expediency
2902	Suspended particles undifferentiated by composition	0.01826	0.50	0.04	<10 m	0.1	NO
328	**Soot**	**0.01826**	**0.15**	**0.12**	**<10 m**	**0.1**	**YES**
301	**Nitrogen dioxide**	**0.25735**	**0.20**	**1.29**	**<10 m**	**0.1**	**YES**
304	Nitrogen oxide	0.00006	0.40	0.0001	<10 m	0.1	NO
330	**Sulphurous anhydride**	**0.12702**	**0.50**	**0.25**	**<10 m**	**0.1**	**YES**
333	Hydrogen sulphide	0.00030	0.08	0.004	<10 m	0.1	NO
2754	**Saturated hydrocarbons C12-C19 (in terms of total organic carbon)**	**0.34844**	**1**	**0.35**	**<10 m**	**0.1**	**YES**
1325	**Formaldehyde**	**1.47486**	**0.035**	**42.14**	**<10 m**	**0.1**	**YES**
410	Methane	0.22538	50	0.0045	<10 m	0.1	NO
703	**Benzo[a]pyrene**	**0.00017**	**0.00001**	**16.74**	**<10 m**	**0.1**	**YES**

Table 1.5.11 shows the expediency of calculating dispersal of emission sources after performing reconstruction, taking into account the existing and mobile emission sources of the enterprise based on the results of the Report on Inventorying Pollutant Emissions at SE
Boryspil International Airport prepared by TOV “Ekotekhservis” in 2018. (Annex 5).

Table 1.5.11 Expediency of calculating dispersal of pollutant emissions into the atmospheric air (prospective state)

No.	Pollutant name	M, g/sec	MPC mg/m³	M/MPC	Average height of emission sources, m	Parameter F	Calculation expediency
150	Sodium hydroxide (lye, caustic soda)	0.00088	0.01	0.088	<10 m	0.1	NO
10226	Titanium dioxide	0.00079	0.5	0.0016	<10 m	0.1	NO
110	Vanadium pentoxide	0.00014	0.5	0.0003	<10 m	0.1	NO
123	**Iron oxide** (in terms of iron)**	**0.02**	**0.04**	**0.489**	**<10 m**	**0.1**	**YES**
143	**Manganese and its compounds (in terms of manganese dioxide)**	**0.0032**	**0.01**	**0.319**	**<10 m**	**0.1**	**YES**
184	Lead and its compounds, except for tetraethyllead (in terms of lead)	0.000006	0.001	0.006000	<10 m	0.1	NO
203	Hexavalent chromium (in terms of chromium trioxide)	0.0006	0.02	0.031	<10 m	0.1	NO
2902	**Suspended particles undifferentiated by composition**	**0.77**	**0.50**	**1.54**	**<10 m**	**0.1**	**YES**
323	**Amorphous silicon dioxide (Aerosil 175)**	**0.0028**	**0.02**	**0.14**	**<10 m**	**0.1**	**YES**
10368	**Dust containing asbestos**	**0.05**	**0.06**	**0.85**	**<10 m**	**0.1**	**YES**
328	**Soot**	**0.04**	**0.15**	**0.30**	**<10 m**	**0.1**	**YES**
301	**Nitrogen dioxide**	**2.58**	**0.20**	**12.91**	**<10 m**	**0.1**	**YES**
304	Nitrogen oxide	0.00	0.40	0.0014	<10 m	0.1	NO
330	**Sulphurous anhydride**	**1.11**	**0.50**	**2.22**	**<10 m**	**0.1**	**YES**
333	Hydrogen sulphide	0.00030	0.08	0.004	<10 m	0.1	NO
322	Sulfuric acid H2SO4	0.01	0.30	0.03	<10 m	0.1	NO
337	**Carbon oxide**	**3.61**	**5.00**	**0.72**	**<10 m**	**0.1**	**YES**
514	2-Methylpropene (isobutylene)	0.000007	0.1	0.0001	<10 m	0.1	NO
1042	**Butanol**	**0.10**	**0.1**	**1.02**	**<10 m**	**0.1**	**YES**
1061	Ethanol	0.15	5	0.03	<10 m	0.1	NO
1319	Dimethoxymethane (methylal, dimethylformal)	0.00096	0.05	0.02	<10 m	0.1	NO
2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	0.07	5	0.01448	<10 m	0.1	NO

2732	**Kerosene**	**0.18**	**1.2**	**0.15**	**<10 m**	**0.1**	**YES**
2735	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	0.001	0.05	0.01	<10 m	0.1	NO
2750	**Solvent oil**	**0.03**	**0.2**	**0.14**	**<10 m**	**0.1**	**YES**
2752	**White spirit**	**0.22**	**1**	**0.22**	**<10 m**	**0.1**	**YES**
2754	**Saturated hydrocarbons C12-C19 (in terms of total organic carbon)**	**3.68**	**1**	**3.68**	**<10 m**	**0.1**	**YES**
2001	Acrylonitrile	0.000002	0.03	0.0001	<10 m	0.1	NO
1401	**Acetone**	**0.048**	**0.35**	**0.14**	**<10 m**	**0.1**	**YES**
1210	**Butyl acetate**	**0.093**	**0.1**	**0.93**	**<10 m**	**0.1**	**YES**
1246	**2-Ethoxyethanol (ethylcellosolve, ethylene glycol ethyl ether)**	**0.086**	**0.7**	**0.12**	**<10 m**	**0.1**	**YES**
1240	**Ethyl acetate**	**0.070**	**0.1**	**0.70**	**<10 m**	**0.1**	**YES**
616	**Xylene**	**0.138**	**0.2**	**0.69**	**<10 m**	**0.1**	**YES**
1052	Methanol	0.001	1	0.001	<10 m	0.1	NO
620	**Styrene**	**0.019**	**0.04**	**0.48**	**<10 m**	**0.1**	**YES**
621	Toluene	0.019	0.6	0.03	<10 m	0.1	NO
1325	**Formaldehyde**	**0.0036**	**0.035**	**0.10**	**<10 m**	**0.1**	**YES**
410	Methane	0.00140	50	0.00003	<10 m	0.1	NO
703	**Benzo[a]pyrene**	**0.00011**	**0.00**	**11.33**	**<10 m**	**0.1**	**YES**
343	**Highly soluble inorganic fluorides (fluoride and sodium fluorosilicate)**	**0.004**	**0.03**	**0.13**	**<10 m**	**0.1**	**YES**
344	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	0.0022	0.20	0.01	<10 m	0.1	NO
342	Fluorides, gaseous compounds (hydrogen fluoride, silicon tetrafluoride)	0.0012	0.02	0.06	<10 m	0.1	NO

Analysis of the results of inventorying and calculating the dispersal of existing stationary sources, as well as newly formed and renewed sources of airport emissions, has established that there are no violations of standards at the calculated points of residential development (table 1.5.12).

Table 1.5.12. The results of calculating the dispersal of pollutants in the atmospheric air *taking into account the background pollution* (newly formed and renewed sources)

No.	**2-TP air code**	**MPC code**	**Pollutant**	**Surface concentration (MPC fraction)**						
				C.P. No. 1 2885 9352	**C.P. No. 2 4333 6544**	**C.P. No. 3 4540 3970**	**C.P. No. 4 -82 2587**	**C.P. No. 5 -2580 4538**	**C.P. No. 6 256 8930**	**C.P. No. 7 733 9820**
9	3000	2902	Suspended particles undifferentiated by composition	0.1262	0.1259	0.1258	0.1261	0.1257	0.1260	0.1259
13	3004	328	Soot	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
14	4001	301	Nitrogen dioxide	0.0659	0.0623	0.0602	0.0756	0.0599	0.0668	0.0637
15	4002	304	Nitrogen oxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
16	4002	11815	Nitrogen (I) oxide (N_20)	-	-	-	-	-	-	-
17	4003	303	Ammonia	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	5001	330	Sulphurous anhydride	0.5007	0.5007	0.5004	0.5020	0.5005	0.5012	0.5008
19	5002	333	Hydrogen sulphide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
21	6000	337	Carbon oxide	0.1020	0.1013	0.1012	0.1024	0.1012	0.1019	0.1016
22	7000	11812	Carbon dioxide	-	-	-	-	-	-	-
32	11000	2754	Saturated hydrocarbons C12-C19 (RPK-26511 solvent, etc.) (in terms of total organic carbon)	0.5000	0.5000	0.5000	0.5000	0.5000	0.5001	0.5000
33	11000	10312	Aromatic hydrocarbons	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

No.	2-TP air code	MPC code	Pollutant	Surface concentration (MPC fraction)						
				C.P. No. 1 2885 9352	C.P. No. 2 4333 6544	C.P. No. 3 4540 3970	C.P. No. 4 -82 2587	C.P. No. 5 -2580 4538	C.P. No. 6 256 8930	C.P. No. 7 733 9820
44	11049	1325	Formaldehyde	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
45	12000	410	Methane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
46	13101	703	Benzo[a]pyrene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 30	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
			Summation group No. 31	0.5402	0.5383	0.5365	0.5471	0.5364	0.5410	0.5389
			Summation group No. 35	0.5028	0.5383	0.5365	0.5471	0.5364	0.5410	0.5389
			Summation group No. 37	0.5403	0.5383	0.6229	0.6181	0.5816	0.6780	0.6461
			Summation group No. 39	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Based on pollutant dispersal in lower surface layer: the pollutant concentration in lower surface layer bordering the closest residential area is within permissible levels. Dispersal calculations are presented in Annex 10.

Table 1.5.13. The results of calculating the dispersal of pollutants in the atmospheric air *without taking into account the background pollution* (newly formed and renewed sources)

No.	2-TP air code	MPC code	Pollutant	Surface concentration (MPC fraction)						
				C.P. No. 1 2885 9352	C.P. No. 2 4333 6544	C.P. No. 3 4540 3970	C.P. No. 4 -82 2587	C.P. No. 5 -2580 4538	C.P. No. 6 256 8930	C.P. No. 7 733 9820
9	3000	2902	Suspended particles undifferentiated by composition	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
13	3004	328	Soot	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
14	4001	301	Nitrogen dioxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
15	4002	304	Nitrogen oxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
16	4002	11815	Nitrogen (I) oxide (N20)	-	-	-	-	-	-	-
17	4003	303	Ammonia	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	5001	330	Sulphurous anhydride	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
19	5002	333	Hydrogen sulphide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
21	6000	337	Carbon oxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
22	7000	11812	Carbon dioxide	-	-	-	-	-	-	-
32	11000	2754	Saturated hydrocarbons C12-C19 (RPK-26511 solvent, etc.) (in terms of total organic carbon)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
33	11000	10312	Aromatic hydrocarbons	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
44	11049	1325	Formaldehyde	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
45	12000	410	Methane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
46	13101	703	Benzo[a]pyrene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 30	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 31	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 35	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 37	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 39	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Based on pollutant dispersal in lower surface layer:

- the pollutant concentration in lower surface layer bordering the closest residential area is within permissible levels. Dispersal calculations are presented in Annex 11.

Having analysed the results of calculating the dispersal of pollutants into the atmospheric air from newly formed and renewed emission sources, it can be concluded that the planned facility has no significant impact on the atmospheric area at its location across the entire list of pollutants emitted thereby.

Analysis of the results of inventorying and calculating the dispersal of all emission sources of the airport (prospective state), taking into account the background pollution, has established that there are no violations of standards at the calculated points of residential development (table 1.5.14).

Table 1.5.14. The results of calculating the dispersal of pollutants in the atmospheric air taking into account the background pollution (prospective state)

No.	2-TP air code	MPC code	Pollutant	Surface concentration (MPC fraction)						
				C.P. No. 1 2885 9352	C.P. No. 2 4333 6544	C.P. No. 3 4540 3970	C.P. No. 4 -82 2587	C.P. No. 5 -2580 4538	C.P. No. 6 256 8930	C.P. No. 7 733 9820
1		150	Sodium hydroxide (lye, caustic soda)	0.5012	0.5020	0.5016	0.5012	0.5010	0.5012	0.5011
2		10226	Titanium dioxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3	1002	110	Vanadium pentoxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4	1003	123	Iron oxide** (in terms of iron)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
5	1104	143	Manganese and its compounds (in terms of manganese dioxide)	0.5033	0.5027	0.5031	0.5024	0.5020	0.5044	0.5036
6	1007	183	Metallic mercury	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7	1009	184	Lead and its compounds, except for tetraethyllead (in terms of lead)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8	1010	203	Hexavalent chromium (in terms of chromium trioxide)	0.3789	0.3813	0.3803	0.3791	0.3781	0.3790	0.3785
9	3000	2902	Suspended particles undifferentiated by composition	0.1442	0.1401	0.1347	0.1337	0.1331	0.1455	0.1419
10	3000	323	Amorphous silicon dioxide (Aerosil 175)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
11	3000	10442	Potassium hydroxide	-	-	-	-	-	-	-
12	3000	10368	Dust containing asbestos	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
13	3004	328	Soot	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
14	4001	301	Nitrogen dioxide	0.3353	0.3553	0.2043	0.1931	0.1354	0.2949	0.2430
15	4002	304	Nitrogen oxide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
16	4002	11815	Nitrogen (I) oxide (N20)	-	-	-	-	-	-	-
17	4003	303	Ammonia	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
18	5001	330	Sulphurous anhydride	0.5021	0.5018	0.5016	0.5033	0.5012	0.5023	0.5021
19	5002	333	Hydrogen sulphide	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
20	5004	322	Sulfuric acid, H2SO4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
21	6000	337	Carbon oxide	0.1051	0.1034	0.1036	0.1050	0.1027	0.1063	0.1059
22	7000	11812	Carbon dioxide	-	-	-	-	-	-	-
23	11000	514	2-Methylpropene (isobutylene)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
24	11000	1042	Butanol	0.5054	0.5043	0.5025	0.5022	0.5022	0.5075	0.5053
25	11000	1061	Ethanol	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

No.	2-TP air code	MPC code	Pollutant	Surface concentration (MPC fraction)						
				C.P. No. 1 2885 9352	C.P. No. 2 4333 6544	C.P. No. 3 4540 3970	C.P. No. 4 -82 2587	C.P. No. 5 -2580 4538	C.P. No. 6 256 8930	C.P. No. 7 733 9820
26	11000	1319	Dimethoxymethane (methylal, dimethylformal)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
27	11000	2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
28	11000	2732	Kerosene	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
29	11000	2735	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
30	11000	2750	Solvent oil	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
31	11000	2752	White spirit	0.5023	0.5018	0.5011	0.5009	0.5009	0.5032	0.5022
32	11000	2754	Saturated hydrocarbons C12-C19 (in terms of total organic carbon)	0.5007	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
33	11000	10312	Aromatic hydrocarbons	-	-	-	-	-	-	-
34	11000	10411	Aliphatic hydrocarbons	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
35	11001	2001	Acrylonitrile	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
36	11007	1401	Acetone	0.1383	0.1381	0.1379	0.1378	0.1378	0.1386	0.1383
37	11009	1210	Butyl acetate	0.5051	0.5039	0.5023	0.5021	0.5020	0.5069	0.5049
38	11020	1246	2-Ethoxyethanol (ethylcellosolve, ethylene glycol ethyl ether)	0.5007	0.5005	0.5003	0.5003	0.5003	0.5009	0.5006
39	11021	1240	Ethyl acetate	0.5038	0.5030	0.5018	0.5016	0.5015	0.5053	0.5037
40	11030	616	Xylene	0.5038	0.5029	0.5017	0.5015	0.5015	0.5052	0.5036
41	11036	1052	Methanol							
42	11037	620	Styrene	0.5026	0.5020	0.5012	0.5011	0.5010	0.5036	0.5025
43	11041	621	Toluene	0.5008	0.5006	0.5003	0.5003	0.5003	0.5011	0.5008
44	11049	1325	Formaldehyde	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
45	12000	410	Methane	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
46	13101	703	Benzo[a]pyrene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
47	16000	343	Highly soluble inorganic fluorides (fluoride and sodium fluorosilicate)	0.5032	0.5031	0.5028	0.5023	0.5021	0.5034	0.5023
48	16000	344	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	0.5017	0.5013	0.5011	0.5012	0.5009	0.5012	0.5022
49	16001	342	Fluorides, gaseous compounds (hydrogen fluoride, silicon tetrafluoride)	0.3788	0.3810	0.3798	0.3790	0.3784	0.3787	0.3793
			Summation group No. 3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 10	0.5034	0.5027	0.5031	0.5024	0.5020	0.5044	0.5037
			Summation group No. 11	0.5021	0.5018	0.5016	0.5033	0.5012	0.5023	0.5021
			Summation group No. 12	0.3790	0.3813	0.3803	0.3791	0.3781	0.3790	0.3784
			Summation group No. 27	0.5021	0.5018	0.5016	0.5033	0.5012	0.5023	0.5021
			Summation group No. 28	0.5029	0.5022	0.5022	0.5043	0.5016	0.5031	0.5027
			Summation group No. 30	0.5000	0.5000	0.5000	0.5001	0.5000	0.5000	0.5000
			Summation group No. 31	0.7029	0.7165	0.6229	0.6186	0.5816	0.6780	0.6461
			Summation group No. 35	0.5028	0.5026	0.5026	0.5039	0.5017	0.5032	0.5027
			Summation group No. 37	0.7029	0.7165	0.6229	0.6181	0.5816	0.6780	0.6461
			Summation group No. 39	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
			Summation group No. 11002	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Based on pollutant dispersal in lower surface layer:
- the pollutant concentration in lower surface layer bordering the closest residential area is within permissible levels. Dispersal calculations are presented in Annex 12.

Presented concentrations indicate that the level of atmosphere pollution from emission sources of SE "Boryspil" International Airport" (prospective state) is permissible (insignificant) and shall not have notable adverse impact on the atmospheric air in the area of planned activities.

The cumulative impact shall also be within permissible range and shall not have notable adverse impact on the atmospheric air in the area of planned activities.

Analysis of compliance of potential pollutant emissions into the atmospheric air from stationary sources with established emission standards

In order to approve standards of maximum permissible emissions of pollutants from stationary newly formed and renewed sources, an analysis of compliance of actual pollutant emissions into the atmospheric air from stationary sources with established emission standards shall be performed.

Table 1.5.15. Comparison of actual pollutant emissions into the air from stationary sources with the established emission standards

Emission source number	Pollutant code	Pollutant name	Potential emission		Maximum permissible emission standard	
			mass concentration in the gas and dust flow, mg/m^3	value of mass flow in exhaust gases, g/h	mass concentration in the gas and dust flow, mg/m^3	value of mass flow in exhaust gases, g/h
1	2	3	4	5	6	7
310503. service stations (including car refuelling)						
201	5002 333	Hydrogen sulphide	-	0.0000071	5	50 or >
	11000 2754	Non-methane volatile organic compounds	-	0.00026	-	-
	11000 10312	Aromatic hydrocarbons	-	0.0000039	-	-
202	5002 333	Hydrogen sulphide	-	0.000001	5	50 or >
	11000 2754	Non-methane volatile organic compounds	-	0.0015	-	-
	11000 10312	Aromatic hydrocarbons	-	0.0000018	-	-
203	5002 333	Hydrogen sulphide	-	0.0000079	5	50 or >
	11000 2754	Non-methane volatile organic compounds	-	0.0028	-	-
	11000 10312	Aromatic hydrocarbons	-	0.0000043	-	-
204	5002 333	Hydrogen sulphide	-	0.0000034	5	50 or >
	11000 2754	Non-methane volatile organic compounds	-	0.0012	-	-
	11000 10312	Aromatic hydrocarbons	-	0.0000018	-	-

120105. stationary engines						
213	03000 2902	Substances in the form of suspended solid particles (microparticles, fibres)			150	≤ 500
	04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	185	720	500	> 5000
	05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	56	216	500	> 5000
	06000 337	Carbon oxide	145	581	250	> 5000
	11000 2754	Non-methane volatile organic compounds	40	155.4	-	-
	11049 1325	Formaldehyde	1.7	6.4	20	Up to 100
	13101 703	Benzo[a]pyrene	0.0002	0.0007	0.1	0.5 or >

Table 1.5.16 (continued). Comparison of actual pollutant emissions into the air from stationary sources with the established emission standards

Emission source number	Pollutant code	Pollutant name	Potential emission		Maximum permissible emission standard	
			mass concentration in the gas and dust flow, mg/m^3	value of mass flow in exhaust gases, g/h	mass concentration in the gas and dust flow, mg/m^3	value of mass flow in exhaust gases, g/h
1	2	3	4	5	6	7
120105. stationary engines						
216	03000 2902	Substances in the form of suspended solid particles (microparticles, fibres)			150	≤ 500
	04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	185	720	500	> 5000
	05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	56	216	500	> 5000
	06000 337	Carbon oxide	145	581	250	> 5000
	11000 2754	Non-methane volatile organic compounds	40	155.4	-	-
	11049 1325	Formaldehyde	1.7	6.4	20	Up to 100
	13101 703	Benzo[a]pyrene	0.0002	0.0007	0.1	0.5 or >
310402. other types of transportation and storage (including pipelines)						
214	5002 333	Hydrogen sulphide	-	0.0000001	5	50 or >
	11000 2754	Non-methane volatile organic compounds	-	0.000036	-	-
	11000 10312	Aromatic hydrocarbons	-	0.0000000054	-	-
217	5002 333	Hydrogen sulphide	-	0.0000001	5	50 or >
	11000 2754	Non-methane volatile organic compounds	-	0.000036	-	-
	11000 10312	Aromatic hydrocarbons	-	0.0000000054	-	-

Compensatory measures

According to Article 9 of the Tax Code of Ukraine, the national taxes and levies include an environmental tax.

Environmental tax is a national obligatory payment levied based on actual volumes of emissions into the atmospheric air, discharges of pollutants into water bodies,

waste dumping, actual volume of radioactive wastes temporarily stored by generators thereof, actual volume of generated radioactive wastes, and actual volume of radioactive wastes accumulated before 1 April 2009; clause 14.1.57 of the Tax Code of Ukraine.

When operating the planned activities facility, payments for environmental pollution are made according to the Tax Code of Ukraine.

Since permanent (final) storage or dumping of wastes on the premises of the planned activities facility is not planned, the rate of tax for wastes storage is not calculated. The payment of the tax for wastes storage shall be included in the cost of waste management contract made with specialized enterprises.

The environmental tax rates are set according to the Tax Code of Ukraine for emissions of certain pollutants into the atmospheric air by stationary pollution sources.

Actions aimed at preventing, avoiding, reducing, and eliminating significant adverse impact on the objects of architectural, archaeological, and cultural heritage

If an archaeological or historical artefact is discovered during any earthworks, the contractor will suspend the works and notify a relevant cultural heritage protection body, in the territory of which the earthworks are carried out, as required by Article 36 of the Law of Ukraine on Cultural Heritage Protection.

The amount of tax levied for emissions of pollutants into the atmospheric air by stationary pollution sources ($П_{вс}$) is calculated by taxpayers by themselves on a quarterly basis based on actual volumes of emissions, tax rates, as follows:

$$П_{вс} = \sum_{i=1}^{n} \sum (M_i \times Нп_i)$$

Where M_i is the actual volume of emissions of the i-th pollutants in tones (t);

$Нп_i$ are the current year tax rates per tone of the i-th pollutant in UAH (with kopiykas)

Table 1.5.17 (continued). The amounts of tax that shall be levied for emissions of pollutants into the atmospheric air after performing the reconstruction (as on 1/1/2020)

Pollutant emissions				Hazard class	MPC	OBR V	Paragraph of the Article in the Tax Code	Rate*, UAH/tone
code		name	emission, tones/year		mg/m^3	mg/m^3		
	150	Sodium hydroxide (lye, caustic soda)	0.010568	-		0.01	para.243.3	2451.84
	10226	Titanium dioxide	0.000253			0.50	para.243.3	92.37
1002	110	Vanadium pentoxide	0.000003	1	0.002		para.243.1	9196.93
1003	123	Iron oxide** (in terms of iron)	0.058297	3	0.04		para.243.1	598.4
1104	143	Manganese and its compounds (in terms of manganese dioxide)	0.002823	2	0.01		para.243.1	19405.92
1007	183	Metallic mercury	0.000029	1	0.00		para.243.1	103931.28
1009	184	Lead and its compounds, except for tetraethyllead (in terms of lead)	0.000001	1	0.00		para.243.1	103931.28
1010	203	Hexavalent chromium (in terms of chromium trioxide)	0.000029	1	0.02		para.243.1	65822.27
3000	2902	Suspended particles undifferentiated by composition	1.423356	3	0.50		para.243.1	92.37
4001	301	Nitrogen dioxide	41.353727	3	0.20	50.00	para.243.1	2451.84
5001	330	Sulphurous anhydride	0.220179	3	0.50		para.243.1	2451.84
5004	322	Sulfuric acid, H2SO4	0.108078	2	0.30		para.243.2	4016.11

5002	333	Hydrogen sulphide	0.000069	2	0.08		para.243.1	7879.65
6000	337	Carbon oxide	1.037311	4	5.00		para.243.2	92.37
7000	11812	Carbon dioxide	15869.420201				para.243.4	10
11000	514	2-Methylpropene (isobutylene)	0.000010	-		0.10	para.243.3	2451.84
11000	1042	Butanol	0.017084	3	0.1		para.243.2	598.4
11000	1061	Ethanol	0.006281	4	5		para.243.2	138.57
11000	1319	Dimethoxymethane (methylal, dimethylformal)	0.001376	4	0.05		para.243.2	138.57
11000	2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	0.895941	4	5		para.243.2	138.57
11000	2732	Kerosene	0.124691	-		1.20	para.243.3	92.37
11000	2735	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	0.000394	-		0.05	para.243.3	2451.84
11000	2750	Solvent oil	0.038261	-		0.20	para.243.3	92.37
11000	2752	White spirit	0.026463	-		1.00	para.243.3	92.37
11000	2754	Saturated hydrocarbons C12- C19 (RPK-26511 solvent, etc.) (in terms of total organic carbon)	0.150950	4	1		para.243.2	138.57
11001	2001	Acrylonitrile	0.000003	2	0.03		para.243.2	4016.11
11007	1401	Acetone	0.001178	4	0.35		para.243.2	138.57
11009	1210	Butyl acetate	0.050784	4	0.1		para.243.2	138.57
11020	1246	2-Ethoxyethanol (ethylcellosolve, ethylene glycol ethyl ether)	0.010937	-		0.70	para.243.3	92.37
11021	1240	Ethyl acetate	0.013590	4	0.1		para.243.2	138.57
11030	616	Xylene	0.058344	3	0.2		para.243.2	598.4
11036	1052	Methanol	0.001430	3	1		para.243.2	598.4
11037	620	Styrene	0.011250	2	0.04		para.243.2	4016.11
11041	621	Toluene	0.006525	3	0.6		para.243.2	598.4
11049	1325	Formaldehyde	0.000974	2	0.04		para.243.1	6070.39
12000	410	Methane	0.293608			50.00	para.243.3	92.37
1301	703	Benzo[a]pyrene	0.000000	1	1E-05		para.243.1	3121217.74
16000	343	Highly soluble inorganic fluorides (fluoride and sodium fluorosilicate)	0.000769	2	0.03		para.243.2	4016.11
16000	344	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	0.000480	2	0.20		para.243.2	4016.11
16001	342	Fluorides, gaseous compounds (hydrogen fluoride, silicon tetrafluoride)	0.000225	2	0.02		para.243.2	4016.11
								261718.96

Assessment of the change of environment state after reconstruction

Ambient air pollution within the airport area is mainly the result of aircraft engine and special vehicle emissions including other associated facilities operated by SE “MA BORYSPIL”.

Output data are calculated based on SE “MA BORYSPIL” departures/arrivals intensity, actual operating fleet profile, SE “MA BORYSPIL” Inventory Report developed by TOV “Ekotekhservis” in 2018.

Based on the projected dynamics of passenger traffic flow growth (from 17.12 million passengers in 2020 to 37.24 million passengers in 2030) (at the time of reconstruction completion), more than a two times increase in the amount of annual aircraft departures is prospectively expected, up to approximately 127.750 thous/year.Considering the July seasonal traffic peak, the prospectively expected amounts of departures shall constitute 350 departures per day. Considering that the departures within 24-hour period are distributed irregularly, the expected amount of departures per hour may comprise 12-16 departures (15 in average).

The departures distribution between each of the runways is adopted to be 50/50, i.e. up to 8 AC per hour (up to 4 ACs per 30 minutes) may depart from each of the runways.

The weight of the pollutants generated by aircraft engines in the process of fuel ignition, and released into the atmosphere depends on:

- engine operation condition and time;
- specific formation of this substance divided by the amount of consumed fuel;
- fuel consumption in the relevant operation mode.

The most complex flight operations are performed in the airdrome area. Under such conditions, the aircraft engines are operated within the maximum operating conditions change range, since they must ensure the propulsion performance required for an AC to perform the LTO operations.

Landing and takeoff cycle. In order to harmonize the way the aircraft engines of different type and design operate when the aircraft operates in the airdrome area, a certain conventional landing and takeoff cycle (LTO) averaged based on data characteristic for international airports of different countries has been developed. Such a cycle is adopted as an “ICAO standard cycle” and is used internationally for different testings, calculations and comparisons related to issues of atmospheric pollutions.

Table 1.5.18. Parameters of ICAO landing and takeoff cycle

FC stage	Relative engine thrust, %	LTO cycle stage duration, min.
Takeoff	100	0,7
900 m height gain	85	2,2
Descent and landing approach from a height, 900 m	30	4,0
Taxiing (ground idle mode)	7	26,0

According to international practices of assessment of impact of civil aviation on environment, generation and subsequent emission of each pollutant into the atmosphere is characterized by specific emission indicator equal to the weight of the substance generated in the aviation engines when combusting one unit of fuel. Unit of measurement of specific emission indicator: one gram of the substance per one kilogram of fuel; notation: EI. The specific emission indicator El of each pollutant is determined for all aviation engines experimentally following the standard technics approved by ICAO, using the specified fuel characteristics, and under certain atmospheric conditions (equivalent to MSA).

According to the effective ICAO requirements, the content of carbon oxide (CO), unburnt hydrocarbons (CnHm), nitrogen oxides (NOX), and a smokiness indicator (number) of exhaust gases are determined. The available data on the specific emission indicators El of regulated pollutants for all certified engines are registered in the “Engines exhaust gases emissions data bank of ICAO”. Doc 9646-AN / 943 "

Based on results of calculation studies, an assessment of pollutants emissions and the dispersal from surface (taxiing, takeoff, landing) operations of AC onto the surroundings of SE “MA “BORYSPIL” has been performed by mapping the polluted atmospheric air of the area of concern. Calculations of emissions dispersal during the surface operations of AC were made in accordance with the OND-86 “Methodology for calculating atmospheric concentrations of harmful substances contained in enterprise emissions” according to the EOL+ program, version 5.3.8. The software complex was developed by the TOPAZ system programming design bureau, Kyiv, and approved by GGO named after Voiekov, ref. No. 11-5-68 dated 07.05.98.

Table 1.5.19. Comparison of existing gross emissions with gross emissions of pollutants after reconstruction

No.	2-TP code	San. code	Item	perspective	current position	difference
				tons/year	tons/year	tons/year
1		150	Sodium hydroxide (lye, caustic soda)	0.010568	0.010568	0.000
2		10226	Titanium dioxide	0.000253	0.000253	0.000
3	1002	110	Vanadium pentoxide	0.000003	0.000003	0.000
4	1003	123	Iron oxide** (in terms of iron)	0.058297	0.058297	0.000
5	1104	143	Manganese and its compounds (in terms of manganese dioxide)	0.002823	0.0028233	0.000
6	1007	183	Metallic mercury	0.000029	0.000029	0.000
7	1009	184	Lead and its compounds, except for tetraethyllead (in terms of lead)	0.000001	0.0000008	0.000
8	1010	203	Hexavalent chromium (in terms of chromium trioxide)	0.000029	0.000029	0.000
9	3000	2902	Suspended particles undifferentiated by composition	1.637247	1.092758182	0.544
10	3000	323	Amorphous silicon dioxide (Aerosil - 175)	0.001080	0.00108	0.000
11	3000	10442	Potassium hydroxide	0.000036	0.000036	0.000
12	3000	10368	Dust containing asbestos	0.024112	0.024112	0.000
13	3004	328	Soot	0.769725	0.225146782	0.545
14	4001	301	Nitrogen dioxide	674.926682	102.5066917	572.420
15	4002	304	Nitrogen oxide	0.000446	0.000440741	0.000
16	4002	11815	Nitrogen (I) oxide (N20)	0.031744	0.031744	0.000
17	5001	330	Sulphurous anhydride	0.229170	0.199451902	0.030
18	5002	333	Hydrogen sulphide	0.000069	0	0.000069
19	5004	322	Sulfuric acid, H2SO4	0.108078	0.108078	0.000
20	6000	337	Carbon oxide	495.123965	115.8376548	379.286
21	7000	11812	Carbon dioxide	15882.004679	15882.00469	0.000
22	11000	514	2-Methylpropene (isobutylene)	0.000010	0.00001	0.000
23	11000	1042	Butanol	0.017084	0.017084	0.000
24	11000	1061	Ethanol	0.006281	0.006281	0.000
25	11000	1319	Dimethoxymethane (methylal, dimethylformal)	0.001376	0.001376	0.000
26	11000	2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	0.895941	0.8959405	0.000
27	11000	2732	Kerosene	0.124691	0.125369937	-0.001
28	11000	2735	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	0.000394	0.000394	0.000
29	11000	2750	Solvent oil	0.038261	0.038261	0.000
30	11000	2752	White spirit	0.026463	0.026463	0.000
31	11000	2754	Saturated hydrocarbons C12-C19 (in	11.962828	13.04012873	-1.077

			terms of total organic carbon)			
32	11000	10312	Aromatic hydrocarbons	0.000037	0	0.000
33	11000	10411	Aliphatic hydrocarbons	0.002092	0.002092	0.000
34	11001	2001	Acrylonitrile	0.000003	0.000003	0.000
35	11007	1401	Acetone	0.001178	0.001178	0.000
36	11009	1210	Butyl acetate	0.050784	0.050784	0.000
37	11020	1246	2-Ethoxyethanol (ethylcellosolve, ethylene glycol ethyl ether)	0.010937	0.010937	0.000
38	11021	1240	Ethyl acetate	0.013590	0.01359	0.000
39	11030	616	Xylene	0.058344	0.058344	0.000
40	11036	1052	Methanol	0.001430	0.00143	0.000
41	11037	620	Styrene	0.011250	0.01125	0.000
42	11041	621	Toluene	0.006525	0.006525	0.000
43	11049	1325	Formaldehyde	0.000974	0	0.001
44	12000	410	Methane	0.295802	0.29590673	0.000
45	1301	703	Benzo[a]pyrene	0.000009	8.43371E-06	0.0000008
46	16000	343	Highly soluble inorganic fluorides (fluoride and sodium fluorosilicate)	0.000769	0.0007689	0.000
47	16000	344	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	0.000480	0.00048	0.000
48	16001	342	Fluorides, gaseous compounds (hydrogen fluoride, silicon tetrafluoride)	0.000225	0.000225	0.000
			TOTAL	**17067.662**	**16116.458**	**951.203**

Considering the planned decommissioning of obsolete models of ACs with high specific pollutant emissions, based on the expected 2.2-time growth in aircraft departures, the growth in total emissions shall constitute approximately 5-10%.

~~Calculations of emissions of pollutants by newly formed and renewed sources of the airport~~

Calculations of emissions of pollutants into the atmosphere by aircraft (ES No 190 and 200)

Ambient air pollution within the airport area is mainly the result of aircraft engine and special vehicle emissions including other associated facilities operated by SE "MA BORYSPIL".

Output data are calculated based on SE "MA BORYSPIL" departures/arrivals intensity, actual operating fleet profile, SE "MA BORYSPIL" Inventory Report developed by TOV "Ekotekhservis" in 2018.

Based on the projected dynamics of passenger traffic flow growth (from 17.12 million passengers in 2020 to 37.24 million passengers in 2030) (at the time of reconstruction completion), more than a two times increase in the amount of annual aircraft departures is prospectively expected, up to approximately 127.750 thous/year. Considering the July seasonal traffic peak, the prospectively expected amounts of departures shall constitute 350 departures per day. Considering that the departures within 24-hour period are distributed irregularly, the expected amount of departures per hour may comprise 12-16 departures (15 in average).

The departures distribution between each of the runways is adopted to be 50/50, i.e. up to 8 AC per hour (up to 4 ACs per 30 minutes) may depart from each of the runways.

The weight of the pollutants generated by aircraft engines in the process of fuel ignition, and released into the atmosphere depends on:

- engine operation condition and time;
- specific formation of this substance divided by the amount of consumed fuel;
- fuel consumption in the relevant operation mode.

The most complex flight operations are performed in the airdrome area. Under such conditions, the aircraft engines are operated within the maximum operating conditions change range, since they must ensure the propulsion performance required for an AC to perform the LTO operations.

Landing and takeoff cycle. In order to harmonize the way the aircraft engines of different type and design operate when the aircraft operates in the airdrome area, a certain conventional landing and takeoff cycle (LTO) averaged based on data characteristic for international airports of different countries has been developed. Such a cycle is adopted as an "ICAO standard cycle" and is used internationally for different testings, calculations and comparisons related to issues of atmospheric pollutions.

Table 1.5.18. Parameters of ICAO landing and takeoff cycle

FC stage	Relative engine thrust, %	LTO cycle stage duration, min.
Takeoff	100	0,7
900 m height gain	85	2,2
Descent and landing approach from a height, 900 m	30	4,0
Taxiing (ground idle mode)	7	26,0

According to international practices of assessment of impact of civil aviation on environment, generation and subsequent emission of each pollutant into the atmosphere is characterized by specific emission indicator equal to the weight of the substance generated in the aviation engines when combusting one unit of fuel. Unit of measurement of specific emission indicator: one gram of the substance per one kilogram of fuel; notation: EI. The specific emission indicator El

of each pollutant is determined for all aviation engines experimentally following the standard technics approved by ICAO, using the specified fuel characteristics, and under certain atmospheric conditions (equivalent to MSA).

According to the effective ICAO requirements, the content of carbon oxide (CO), unburnt hydrocarbons (CnHm), nitrogen oxides (NOX), and a smokiness indicator (number) of exhaust gases are determined. The available data on the specific emission indicators El of regulated pollutants for all certified engines are registered in the "Engines exhaust gases emissions data bank of ICAO". Doc 9646-AN / 943 "

Knowing the emission index and the operation time of one engine, the weight of emissions of pollutants of this type can be calculated. Specifically, for LTO:

$$M_j = \sum_i EI_{ji} G_{mi} \tau_i,$$

Where: G_{mi} is the fuel consumption, kg/sec, and τ_i is the operation time at the i-th stage of the standard cycle (sec).

The weight of emissions of CH is calculated based on the ratio M (CH) = 0.1 (CH),

The weight of emissions of solid particles of SN

using a formula

$$\rho_{v0} = 10^{-6} exp(0{,}07SN)$$

and according to the formula

$$M_\partial = \rho_{v0} \frac{G_\varepsilon}{\rho_\varepsilon} \tau = \rho_{v0} Q_\varepsilon \tau$$

The weight of emissions for each type of the pollutants from this type of AC is determined by summing up the weights of pollutants by flight stage of all engines installed on this type of AC.

When calculating dispersal of pollutants in the atmospheric air at planar sites **ES No 190 and No 200**, the emissions (g/sec) of aircrafts with the highest emissions index El were taken into account, (t/kg) - worst case scenario, in calculation table, they are shown in green.

Calculation results

Aircraft type	Engine type	Number of engines at AC	Number of LTOs	Engine operation mode	Time, min	Fuel consumption, kg/sec	Emission indexes, g/kg				LTO time, sec
							HC	CO	NOx	SN	
A140	CFM56-5A4	2	14	takeoff	0.7	0.897	0.23	1.1	22.64	13.9	42
				height gain	2.2	0.74	0.23	1.1	19.11	11.6	132
				approach	4	0.261	0.5	3.1	8.51	4.2	240
				idle	26	0.095	1.75	20.3	4.04	2.4	1560
				Total weight of emissions in a specific engine operation mode:			0.01733	0.082883	1.705879	0.000789	
							0.044933	0.214896	3.73333	0.002111	
							0.06264	0.388368	1.066133	0.002286	
							0.5187	6.01692	1.197456	0.013102	
				Total weight of emissions, kg per LTO:			**9.01044**	**93.84294**	**107.8392**	**0.25604**	
				Weight of emissions per one plane, kg per LTO			**0.643603**	**6.703067**	**7.702797**	**0.018289**	
				Averaged emission index		**g/sec**	**0.018769**	**0.21772**	**0.04333**	**0.000474**	27636
				takeoff	**for one plane**	**g/sec**	**41.66667**	**483.3333**	**96.19048**	**57.14286**	
				height gain		**g/sec**	**0.131288**	**0.6279**	**12.92332**	**0.005977**	
				landing approach		**g/sec**	**0.18722**	**0.8954**	**15.55554**	**0.008796**	
				idle		**g/sec**	**0.040154**	**0.248954**	**0.683418**	**0.001466**	
A321	CFM56-5B1	2	45	takeoff	0.7	1.359	0.1	0.5	35.1	8.6	42
				height gain	2.2	1.113	0.1	0.5	27.2	10.5	132
				approac h	4	0.364	0.12	1.57	10.8	0	240
				idle	26	0.117	3.21	28.4	4.6	0	1560
				Total weight of emissions in a specific engine operation mode:			0.011416	0.057078	4.006876	0.000544	
							0.029383	0.146916	7.99223	0.001955	
							0.020966	0.27431	1.886976	0.001704	
							1.171778	10.36714	1.679184	0.011076	

Aircraft type	Engine type	Number of engines at AC	Number of LTOs	Engine operation mode	Time, min	Fuel consumption, kg/sec	Emission indexes, g/kg				LTO time, sec
							HC	CO	NOx	SN	
				Total weight of emissions, kg per LTO:			**55.50946**	**488.0448**	**700.437**	**0.687553**	
				Weight of emissions per one plane, kg per LTO			**1.233544**	**10.84544**	**15.56527**	**0.015279**	
				Averaged emission index		**g/sec**	**0.013191**	**0.116708**	**0.018903**	**0.000125**	88830
				takeoff	**for one plane**	**g/sec**	**76.42857**	**676.1905**	**109.5238**	**0**	
				height gain		**g/sec**	**0.086482**	**0.432409**	**30.35512**	**0.004125**	
				approach		**g/sec**	**0.12243**	**0.61215**	**33.30096**	**0.008144**	
				idle		**g/sec**	**0.01344**	**0.17584**	**1.2096**	**0.001092**	
A148/158	D-436-148 F1	2	10	takeoff	0.7	0.548	0.1	0.54	18.93	6.7	
				height gain	2.2	0.468	0.04	0.54	16	0	
				approach	4	0.218	0.07	2.99	7.26	0	
				idle	26	0.093	2.26	23.46	3.64	0	
				Total weight of emissions in a specific engine operation mode:			0.004603	0.024857	0.871386	0.000477	
							0.004942	0.066718	1.976832	0.000937	
							0.007325	0.312874	0.759686	0.001704	
							0.655762	6.807154	1.056182	0.011076	
				Total weight:			**6.726317**	**72.11603**	**46.64087**	**0.141938**	
						g/sec	**0.340746**	**3.653294**	**2.362759**	**0.00719**	19740
B737	CFM56-7B18	2	10	takeoff	0.7	0.854	0.1	0.6	19.2	10.7	
				height gain	2.2	0.714	0.1	0.4	16.6	6.4	
				landing approach	4	0.26	0.1	3.6	9.1	0	
				idle	26	0.097	3.5	28.3	4.3	0	
				Total weight of emissions in a specific engine operation mode:			0.007174	0.043042	1.377331	0.000631	
							0.01885	0.075398	3.129034	0.001467	
							0.01248	0.44928	1.13568	0.001704	
							1.05924	8.564712	1.301352	0.011076	
				Total weight:			**10.97743**	**91.32432**	**69.43397**	**0.148775**	
						g/sec	**0.556101**	**4.626359**	**3.517425**	**0.007537**	19740
B738	CFM56-7B18	2	30	takeoff	0.7	0.854	0.1	0.6	19.2	10.7	
				height gain	2.2	0.714	0.1	0.4	16.6	6.4	
				approach	4	0.26	0.1	3.6	9.1	0	
				idle	26	0.097	3.5	28.3	4.3	0	
				Total weight of emissions in a specific engine operation mode:			0.007174	0.043042	1.377331	0.000631	
							0.01885	0.075398	3.129034	0.001467	
							0.01248	0.44928	1.13568	0.001704	
							1.05924	8.564712	1.301352	0.011076	
				Total weight:			**32.9323**	**273.973**	**208.3019**	**0.446326**	
						g/sec	**0.556101**	**4.626359**	**3.517425**	**0.007537**	59220
B739	CFM56-7B18	2	56	takeoff	0.7	0.854	0.1	0.6	19.2	10.7	
				height gain	2.2	0.714	0.1	0.4	16.6	6.4	
				approach	4	0.26	0.1	3.6	9.1	0	
				idle	26	0.097	3.5	28.3	4.3	0	
				Total weight of emissions in a specific engine operation mode:			0.007174	0.043042	1.377331	0.000631	
							0.01885	0.075398	3.129034	0.001467	
							0.01248	0.44928	1.13568	0.001704	
							1.05924	8.564712	1.301352	0.011076	
				Total weight:			**61.47362**	**511.4162**	**388.8302**	**0.833142**	
						g/sec	**0.556101**	**4.626359**	**3.517425**	**0.007537**	110544
C130J	AE3007A1/3	2	15	takeoff	0.7	0.3589	0.233	0.83	18.55	1	
				height gain	2.2	0.2999	0.269	1.03	15.81	0.01	
				approach	4	0.1077	0.689	4.21	6.83	0.01	
				idle	26	0.0449	4.64	25.58	3.39	0.01	
				Total weight of emissions in a specific engine operation mode:			0.007024	0.025023	0.559238	0.00032	
							0.021298	0.081549	1.251735	0.000938	
							0.035619	0.21764	0.353084	0.001705	
							0.650008	3.583451	0.474898	0.011084	
				Total weight:			**10.70923**	**58.61494**	**39.58432**	**0.210699**	
						g/sec	**0.361676**	**2.969348**	**2.005285**	**0.010674**	29610
C560XL	PW306B	2	10	takeoff	0.7	0.3171	0	2.27	20.08	2.6	
				height gain	2.2	0.2641	0	2.51	19.26	0.8	
				approach	4	0.0974	0	7.11	11.87	0	
				idle	26	0.0422	4.36	36.35	4.26	0.2	

Aircraft type	Engine type	Number of engines at AC	Number of LTOs	Engine operation mode	Time, min	Fuel consumption, kg/sec	Emission indexes, g/kg				LTO time, sec
							HC	CO	NOx	SN	
				Total weight of emissions in a specific engine operation mode:			0	0.060465	0.534859	0.000358	
							0	0.175003	1.342853	0.000991	
							0	0.332407	0.554946	0.001704	
							0.574055	4.785986	0.560889	0.011232	
				Total weight:			**5.74055**	**53.53861**	**29.93547**	**0.142851**	
						g/sec	**0.290808**	**2.712189**	**1.516488**	**0.007237**	19740
CL 35	HTF7000 (AS907-1-1A)	2	10	takeoff	0.7	0.347	0.05	0.56	17.9	13.6	
				height gain	2.2	0.288	0.06	0.63	16.17	10.6	
				approach	4	0.104	0.12	6.28	8.81	0.7	
				idle	26	0.048	1.26	33.24	3.91	1.7	
				Total weight of emissions in a specific engine operation mode:			0.001457	0.016323	0.521749	0.000773	
							0.004562	0.0479	1.229437	0.001968	
							0.00599	0.313498	0.439795	0.00179	
							0.188698	4.978022	0.585562	0.012476	
				Total weight:			**2.007073**	**53.55743**	**27.76543**	**0.170061**	
						g/sec	**0.101675**	**2.713142**	**1.406557**	**0.008615**	19740
CRJ9-ER	CF34-8C5	**2**	**10**	takeoff	0.7	0.6481	0.02	0.064	14.69	8.32	
				height gain	2.2	0.5297	0.02	0.57	12.6	2.52	
				landing approach	4	0.1793	0.06	4.24	10.75	0	
				idle	26	0.0643	0.13	18.25	4.6	0	
				Total weight of emissions in a specific engine operation mode:			0.001089	0.003484	0.799729	0.000534	
							0.002797	0.079709	1.761994	0.001118	
							0.005164	0.364911	0.925188	0.001704	
							0.02608	3.661242	0.922834	0.011076	
				Total weight:			**0.351295**	**41.09347**	**44.09745**	**0.144319**	
						g/sec	**0.017796**	**2.081736**	**2.233913**	**0.007311**	19740
DH8D	PW 150A	2	10	takeoff	0.7	0.3171	0	2.27	20.8	2.6	
				height gain	2.2	0.2641	0	2.51	19.26	0.8	
				approach	4	0.0974	0	7.11	11.87	0	
				idle	26	0.0422	4.36	36.35	4.26	0.2	
				Total weight of emissions in a specific engine operation mode:			0	0.060465	0.554037	0.000358	
							0	0.175003	1.342853	0.000991	
							0	0.332407	0.554946	0.001704	
							0.574055	4.785986	0.560889	0.011232	
				Total weight:			**5.74055**	**53.53861**	**30.12725**	**0.142851**	
						g/sec	**0.290808**	**2.712189**	**1.526203**	**0.007237**	19740
DA42	Thielert centurion	2	25	takeoff	0.7	1.056	0.036	0.9	19.4	6	
				height gain	2.2	0.878	0.047	0.9	16.7	3	
				approach	4	0.314	0.073	3.4	8.7	2.5	
				idle	26	0.119	1.75	30.1	4.1	2.2	
				Total weight of emissions in a specific engine operation mode:			0.003193	0.079834	1.720858	0.000454	
							0.010894	0.208613	3.870926	0.001156	
							0.011003	0.512448	1.311264	0.00203	
							0.64974	11.17553	1.522248	0.01292	
				Total weight:			**16.87075**	**299.4106**	**210.6324**	**0.414**	
						g/sec	**0.341859**	**6.067083**	**4.268134**	**0.008389**	49350
E145	AE3007A1/3	2	20	takeoff	0.7	0.3589	0.233	0.83	18.55	1	
				height gain	2.2	0.2999	0.269	1.03	15.81	0.01	
				approach	4	0.1077	0.689	4.21	6.83	0.01	
				idle	26	0.0449	4.64	25.58	3.39	0.01	
				Total weight of emissions in a specific engine operation mode:			0.007024	0.025023	0.559238	0.00032	
							0.021298	0.081549	1.251735	0.000938	
							0.035619	0.21764	0.353084	0.001705	
							0.650008	3.583451	0.474898	0.011084	
				Total weight:			**14.27898**	**78.15325**	**52.77909**	**0.280933**	
						g/sec	**0.361676**	**1.979566**	**1.336856**	**0.007116**	39480
E170	CF34-8E2	2	15	takeoff	0.7	0.591	0.02	0.59	13.6	4.58	
				height gain	2.2	0.485	0.03	0.58	11.82	0.87	
				approach	4	0.168	0.07	4.52	10.29	0	
				idle	26	0.062	0.16	20.01	4.45	0	
				Total weight of emissions in a specific engine operation mode:			0.000993	0.02929	0.675158	0.000411	
							0.003841	0.074263	1.513433	0.000996	
							0.005645	0.364493	0.829786	0.001704	
							0.03095	3.870734	0.860808	0.011076	
				Total weight:			**0.621439**	**65.08171**	**58.18777**	**0.212804**	
						g/sec	**0.020987**	**2.197964**	**1.965139**	**0.007187**	29610

Aircraft type	Engine type	Number of engines at AC	Number of LTOs	Engine operation mode	Time, min	Fuel consumption kg/sec	Emission indexes, g/kg				LTO time, sec
							HC	CO	NOx	SN	
E195	CF34-10E5	2	30	takeoff	0.7	0.591	0.047	0.59	18.66	11.33	
				height gain	2.2	0.485	0.08	0.35	15.54	5.22	
				landing approach	4	0.168	0.136	3.77	8.08	0.11	
				idle	26	0.062	6.391	49.98	3.51	0.39	
				Total weight of emissions in a specific engine operation mode:			0.002333	0.02929	0.926357	0.000659	
							0.010243	0.044814	1.989742	0.001351	
							0.010967	0.304013	0.651571	0.001717	
							1.236275	9.668131	0.678974	0.011383	
				Total weight:			**37.79456**	**301.3874**	**127.3993**	**0.453282**	
						g/sec	**0.638206**	**15.26785**	**6.453867**	**0.022963**	59220
LJ35	TFE731-2-2B	2	10	takeoff	0.7	0.205	0.114	1.394	15.25	0	
				height gain	2.2	0.173	0.128	2.03	13.08	0	
				landing approach	4	0.067	4.26	22.38	5.9	0	
				idle	26	0.024	20.04	58.6	2.82	0	
				Total weight of emissions in a specific engine operation mode:			0.001963	0.024005	0.262605	0	
							0.005846	0.092714	0.59739	0	
							0.137002	0.719741	0.189744	0	
							1.500595	4.387968	0.211162	0	
				Total weight:			**16.45406**	**52.24428**	**12.609**	**0**	
						g/sec	**0.833539**	**2.64662**	**0.638754**	**0**	19740
SAAB340	CT75A2	2	15	takeoff	0.7	0.205	0.114	1.394	15.25	0	
				height gain	2.2	0.173	0.128	2.03	13.08	0	
				approach	4	0.067	4.26	22.38	5.9	0	
				idle	26	0.024	20.04	58.6	2.82	0	
				Total weight of emissions in a specific engine operation mode:			0.001963	0.024005	0.262605	0	
							0.005846	0.092714	0.59739	0	
							0.137002	0.719741	0.189744	0	
							1.500595	4.387968	0.211162	0	
				Total weight:			**24.68109**	**78.36641**	**18.91351**	**0**	
						g/sec	**0.833539**	**2.64662**	**0.638754**	**0**	29610
BD500	PW1519G	2	15	takeoff	0.7	0.62	0.1	0.1	20.2	2.7	
				height gain	2.2	0.52	0.1	0	16.7	2.4	
				landing approach	4	0.19	0.1	2.6	10.7	2.4	
				idle	26	0.07	0.2	16	5.3	2.5	
				Total weight of emissions in a specific engine operation mode:			0.005208	0.005208	1.052016	0.00036	
							0.013728	0	2.292576	0.001109	
							0.00912	0.23712	0.97584	0.002016	
							0.04368	3.4944	1.15752	0.013194	
				Total weight:			**1.07604**	**56.05092**	**82.16928**	**0.250183**	
						g/sec	**0.03634**	**1.892973**	**2.775052**	**0.008449**	29610
Total:			350				**258.6793**	**2244.555**	**1570.812**	**4.263483**	**694806**
						TOTAL	***g/sec***	***0.372304***	***3.230478***	***2.260792***	***0.006136***	
						TOTAL	***tons/year***	***11.74099***	***101.8764***	***71.29633***	***0.193512***	

Calculation of emissions of pollutants into the atmosphere from the parking stand for aircraft engines testing (ES No 219)

The operation of testing engines in stationary ground conditions is a mandatory technical procedure after completion of repair work or work according to routine maintenance forms and is carried out in accordance with the schedule (test program).

Number of LTOs per year – 104 (according to the

customer's data) Schedule (test program)

FC stage	Relative engine thrust, %	LTO cycle stage duration, min.
Takeoff	100	0,7
900 m height gain	85	2,2
Descent and landing approach from a height, 900 m	30	4,0
Taxiing (ground idle mode)	7	26,0

"Simple" assessment of emissions of j-th pollutant per hour τ_i (min) of operation of VSU in the i-th mode (nominal or idle) is calculated as follows:

$$M_j = \sum_i M_{ji}\tau_i /60, \text{ kg}$$

When calculating the pollutant dispersal in the atmospheric air at the planar site **ES No 219** he emissions (g/sec) of aircrafts with the highest emissions index El were taken into account, (t/kg) - worst case scenario.

Calculation results

Aircraft type	**Engine type**	**Number of engines at AC**	**Number of LTOs**	**Engine operation mode**	**Time, min**	**Fuel consumption, kg/sec**	**Emission indexes, g/kg**				**LTO time, sec**
							HC	**CO**	**NOx**	**SN**	
A321	CFM56-5B1	2	45	takeoff	0.7	1.359	0.1	0.5	35.1	8.6	42
				height gain	2.2	1.113	0.1	0.5	27.2	10.5	132
				approach	4	0.364	0.12	1.57	10.8	0	240
				idle	26	0.117	3.21	28.4	4.6	0	1560
				Total weight of emissions in a specific engine operation mode:			0.011416	0.057078	4.006876	0.000544	
							0.029383	0.146916	7.99223	0.001955	
							0.020966	0.27431	1.886976	0.001704	
							1.171778	10.36714	1.679184	0.011076	
				Total weight of emissions, kg per LTO:			**55.50946**	**488.0448**	**700.437**	**0.687553**	
				Weight of emissions per one plane, kg per LTO			**1.233544**	**10.84544**	**15.56527**	**0.015279**	
				Averaged emission index		**g/sec**	**0.013191**	**0.116708**	**0.018903**	**0.000125**	88830
				takeoff	**for one plane**	**g/sec**	**76.42857**	**676.1905**	**109.5238**	**0**	
				height gain		**g/sec**	**0.086482**	**0.432409**	**30.35512**	**0.004125**	
				landing in approach		**g/sec**	**0.12243**	**0.61215**	**33.30096**	**0.008144**	
				idle		**g/sec**	**0.01344**	**0.17584**	**1.2096**	**0.001092**	
Total:			45				**1.233544**	**10.84544**	**15.56527**	**0.015279**	**90804**
						g/sec	0.013585	0.119438	0.171416	0.000168	
						t/year 1 LTO cycle	0.428407	3.766594	5.405778	0.005306	
						number of LTO cycles		104	52	number of weeks in a year	
						tons/year	**44.55428**	**391.7258**	**562.2009**	**0.55186**	

Calculations of emissions of pollutants into the atmosphere by aircraft at FFS (ES No 201, 202, 203, 204)

Calculations was performed using the technique set out in the "Pollutant Calculation Practices for Unorganised Air Pollution Sources, Donetsk 1994, OAO "UkrNTEK", NTI department.

The rate of emissions of pollutants (kg/h) from reservoirs due to evaporation is calculated as follows:

$$Пр = 2{,}52 \times V_{рж} \times P_{s(38)} \times M_{п} \times (K_{5х} + K_{5т}) \times K_{6} \times K_{7} \times (1 - \eta) \times 10^{-9}$$

Where: $V_{рж}$ is the volume of liquid poured into the reservoir over the the year, m^3/h; $M_{п}$is the molecular mass of liquid vapour;

η - coefficient of efficiency of gas-entrapment device of the reservoir, η=0;

$K_{5х}$, $K_{5т}$ are the correction factors depending on the saturated steam pressure $P_{s(38)}$ and the temperature of the gas space of reservoirs during cold and warm seasons respectively.

For above-ground metal and underground reinforced concrete unheated reservoirs, temperature (ºC) of the gas space for six coldest months is determined as follows:

$$t_{ргх} = K_{1х} + K_{2х} \times t_{ах} + K_{3х} \times t_{ржх}$$

For six hottest months:

$$t_{ргт} = K_{4} \times (K_{1т} + K_{2т} \times t_{ат} + K_{3т} \times t_{ржт})$$

Where: tат, tax is an arithmetic mean value of atmospheric air temperatures for six coldest and six hottest months respectively (ºC);

$K_{1т}$, $K_{2т}$, $K_{3т}$, and $K_{1х}$, $K_{2х}$, $K_{3х}$ are the coefficients for six hottest and six coldest months (taken from the table). Para. 3.1, p. 137;

K_{4} - for underground reservoirs, is equal to one; for above-ground unheated metal reservoirs, is taken from the table. Para. 3.2 p. 138 depending on the painting of the reservoir surface and the climate zone;

$t_{ржх}$, $t_{ржт}$ – average temperatures of petroleum products in reservoirs for six warm and six cold months (ºC).

K_{7} – correction factor depending on the technical equipment and the operation conditions, taken from the table. Para. 5.1, p. 150;

K_{6} – correction factor depending on the saturated steam pressure and the annual reservoir turnover, n, take from the table P. K_{6}4.1, p. 147;

$$n = V_{ж} / V_{р}$$

Where: $V_{р}$ is a tank volume, m^3;

$V_{ж}$ is the volume of liquid entering the reservoir over the year (m^3/year).

$P_{s(38)}$pressure of saturated steam of the liquid at a temperature of 38 ºC (hPa).

The saturated steam pressure value $P_{s(38)}$ is taken from table P. 6.1, p.153 depending on the liquid bubble point temperature (текв., ºC), determined as follows:

$$t_{екв.} = t_{нк} + (t_{кк} - t_{нк}) / 8{,}8$$

Where: $t_{кк}$, $t_{нк}$ is the temperature of the initial and the end boiling point of the liquid respectively (ºC).

In case of pouring the petroleum products through fuel dispenser units, the average amount of total emissions (kg/h) into the atmosphere is calculated as follows:

$$П_{нал.} = 2{,}52 \times V_{ж} \times P_{s(38)} \times M_{п} \times (K_{5х} + K_{5т}) \times K_{8} \times (1 - \eta) \times 10^{-9}$$

Where: K_{8} is the coefficient depending on the saturated steam pressure $P_{s(38)}$ and climate zone (taken from the table). 2.7, p. 58.

The results of pollutant calculations are presented in the table.

Average monthly temperature of petroleum products

Capacity, petroleum products	Temperature during the coldest months, °C						Average temperature, $t_{ж}$, °C	Temperature during the coldest months, °C						Average temperature, $t_{ж}$, °C
	1	2	3	4	11	12		5	6	7	8	9	10	
Above-ground reservoirs														
Kyiv region	-4.7	-0.4	1.0	9.0	1.9	-2.5	**0.72**	15.2	18.3	19.8	19.0	13.9	1.9	**14.68**

Determination of petroleum products saturated steam pressure

Petroleum product name	Molecular mass, Mn, g/mol	Temperature			Saturated steam pressure, $P_{s(38)}$, hPa
		initial boiling point $t_{нк}$, ^0C	end boiling point $t_{нк}$, 0^C	equivalent $t_{екв}$, ^0C	
Diesel fuel	159	200	360	218.2	**0.45**
JET-A1 (kerosene)	142.50	175.00	280.00	186.93	**2.33**

Determination of coefficients $K_{5т}$ and $K_{5х}$

Process	Petroleum product name	Pressure of saturated steam	For warm season								For cold season						
			Temperature, ^0C			Coefficient					Temperature, ^0C			Coefficient			
		$P_{s(38)}$, hPa	$t_{ат}$	$t_{жт}$	$t_{гт}$	K_4	$K_{1т}$	$K_{2т}$	$K_{3т}$	**$K_{5т}$**	$t_{ах}$	$t_{жх}$	$t_{гх}$	$K_{1х}$	$K_{2х}$	$K_{3х}$	**$K_{5х}$**
Storage	Diesel fuel	0.45	15.87	15.87	16.78	0.81	6.12	0.41	0.51	**0.169**	0.03	0.03	0.33	0.30	0.37	0.62	**0.032**
	JET-A1 (kerosene)	2.33	15.87	15.87	16.78	0.81	6.12	0.41	0.51	**0.169**	0.03	0.03	0.33	0.30	0.37	0.62	**0.032**

Determination of coefficients K_6 and K_7

Saturated steam pressure, Ps(38), hPa	Petroleum products volume, m3/year	Reservoir volume, m3	Annual turnover of the reservoir	Technical equipment of reservoir	Coefficient	
					K6	**K7**
0.45	4.01	0.39	10	breathing valve	**1.25**	**0.2**
2.33	41.60	10.00	4	breathing valve	**1.26**	**0.2**

Calculations of emissions of pollutants into the atmosphere during petroleum products storage

Breathing valve. Source No 201			
INPUT CALCULATIONS DATA			
Liquid stored in the reservoir			DF
Volume of liquid poured into the reservoir over the year, m^3/year			287.50
Reservoir volume, m^3			20.00
Storage type (above-ground, underground)			above-ground
Coefficient values, value acquisition method, and calculation result are summarized in the table			
Value name	**Notation**	**Method of determination**	**Values**
Volume of liquid poured into the reservoir over the year, m^3/year	**Vжр**	Client reference	287.50
Saturated liquid steam pressure at a temperature of T=38°C, hPa	**Ps38**	Annex 6 “Collection of techniques…”	0.45
Molecular mass of the liquid vapor, kg/kmol	**Mn**	"Petroleum refiner guide" L. "Khimiia" 1989	159.00
Correction coefficients depending on the saturated steam pressure and the gas space temperature during cold and warm seasons respectively	**K5х**	Annex 3 “Collection of techniques…”	0.0320
	K5т		0.1690
Correction coefficient depending on Ps38 and the climate zone	**K6**	Annex 4 “Collection of techniques…”	1.25
Correction coefficient depending on the technical equipment and the operation mode of the reservoir	**K7**	Annex 5 “Collection of techniques…”	0.20
Coefficient of efficiency of gas-scrubber device of the reservoir	**n**	Actual data	0.00
Pollutant emission	**Пзгод, кг/год**	Calculation formula (1)	**0.0000026**
Storage time reserve, hours	**Фз**	Client reference	8760
CALCULATION RESULTS			
second, g/sec	**Псек**	Пзгод х 1000 / 3600	**0.0000007**
annual, tones/year	**Пік**	Пзгод х Фз / 1000	**0.000023**

Breathing valve. Source No 202			
INPUT CALCULATIONS DATA			
Liquid stored in the reservoir			JET-A1 (kerosene)
Volume of liquid poured into the reservoir over the year, m^3/year			41.60
Reservoir volume, m^3			10.00
Storage type (above-ground, underground)			above-ground
Coefficient values, value acquisition method, and calculation result are summarized in the table			
Value name	**Notation**	**Method of determination**	**Values**
Volume of liquid poured into the reservoir over the year, m^3/year	**Vжр**	Client reference	41.60
Saturated liquid steam pressure at a temperature of T=38°C, hPa	**Ps38**	Annex 6 “Collection of techniques…»	2.33
Molecular mass of the liquid vapor, kg/kmol	**Mn**	"Petroleum refiner guide" L. "Khimiia" 1989	142.50
Correction coefficients depending on the saturated steam pressure and the gas space temperature during cold and warm seasons respectively	**K5x**	Annex 3 “Collection of techniques…”	0.0320
	K5т		0.1690
Correction coefficient depending on Ps38 and the climate zone	**K6**	Annex 4 “Collection of techniques…”	1.26
Correction coefficient depending on the technical equipment and the operation mode of the reservoir	**K7**	Annex 5 “Collection of techniques…”	0.20
Coefficient of efficiency of gas-scrubber device of the reservoir	**n**	Actual data	0.00
Pollutant emission	**Пзгод, кг/год**	Calculation formula (1)	**0.0000018**
Storage time reserve, hours	**Фз**	Client reference	8760
CALCULATION RESULTS			
second, g/sec	**Псек**	Пзгод x 1000 / 3600	**0.0000005**
annual, tones/year	**Прік**	Пзгод x Фз / 1000	**0.000015**

Breathing valve. Source No 203			
INPUT CALCULATIONS DATA			
Liquid stored in the reservoir			DF
Volume of liquid poured into the reservoir over the year, m^3/year			308.80
Reservoir volume, m^3			20.00
Storage type (above-ground, underground)			above-ground
Coefficient values, value acquisition method, and calculation result are summarized in the table			
Value name	**Notation**	**Method of determination**	**Values**
Volume of liquid poured into the reservoir over the year, m^3/year	**Vжр**	Client reference	308.80
Saturated liquid steam pressure at a temperature of T=38°C, hPa	**Ps38**	Annex 6 “Collection of techniques…»	0.45
Molecular mass of the liquid vapor, kg/kmol	**Mn**	"Petroleum refiner guide" L. "Khimiia" 1989	159.00
Correction coefficients depending on the saturated steam pressure and the gas space temperature during cold and warm seasons respectively	**K5x**	Annex 3 “Collection of techniques…”	0.0320
	K5т		0.1690
Correction coefficient depending on Ps38 and the climate zone	**K6**	Annex 4 “Collection of techniques…”	1.25
Correction coefficient depending on the technical equipment and the operation mode of the reservoir	**K7**	Annex 5 “Collection of techniques…”	0.20
Coefficient of efficiency of gas-scrubber device of the reservoir	**n**	Actual data	0.00
Pollutant emission	**Пзгод, кг/год**	Calculation formula (1)	**0.0000028**
Storage time reserve, hours	**Фз**	Client reference	8760
CALCULATION RESULTS			
second, g/sec	**Псек**	Пзгод x 1000 / 3600	**0.0000008**
annual, tones/year	**Прік**	Пзгод x Фз / 1000	**0.000025**

Breathing valve. Source No 204			
INPUT CALCULATIONS DATA			
Liquid stored in the reservoir			DF
Volume of liquid poured into the reservoir over the year, m^3/year			134.70
Reservoir volume, m^3			10.00
Storage type (above-ground, underground)			above-ground
Coefficient values, value acquisition method, and calculation result are summarized in the table			
Value name	**Notation**	**Method of determination**	**Values**
Volume of liquid poured into the reservoir over the year, m^3/year	**Vжр**	Client reference	134.70
Saturated liquid steam pressure at a temperature of T=38°C, hPa	**Ps38**	Annex 6 “Collection of techniques…»	0.45
Molecular mass of the liquid vapor, kg/kmol	**Mn**	"Petroleum refiner guide" L. "Khimiia" 1989	159.00
Correction coefficients depending on the saturated steam pressure and the gas space temperature during cold and warm seasons respectively	**К5х**	Annex 3 “Collection of techniques…”	0.0320
	К5т		0.1690
Correction coefficient depending on Ps38 and the climate zone	**К6**	Annex 4 “Collection of techniques…”	1.25
Correction coefficient depending on the technical equipment and the operation mode of the reservoir	**К7**	Annex 5 “Collection of techniques…”	0.20
Coefficient of efficiency of gas-scrubber device of the reservoir	**n**	Actual data	0.00
Pollutant emission	**Пзгод, кг/год**	Calculation formula (1)	**0.0000012**
Storage time reserve, hours	**Фз**	Client reference	8760
CALCULATION RESULTS			
second, g/sec	**Псек**	Пзгод х 1000 / 3600	**0.0000003**
annual, tones/year	**Прік**	Пзгод х Фз / 1000	**0.000011**

Calculation of composition of pollutants emitted into the atmosphere at FFS during petroleum products storage period

Source No	Process	Petroleum product name	Total pollutants emission							
			Benzine		Saturated hydrocarbons C_{12}- C_{19}		Aromatic hydrocarbons		Hydrogen sulphide	
			g/sec	tons/ year	g/sec	tons/year	g/sec	tons/year	g/sec	tons/year
201	Storage	Diesel fuel	-	-	**0.000000720**	**0.000023**	**0.0000000011**	**0.00000003**	**0.000000002**	**0.00000006**
202		JET-A1			**0.000000490**	**0.000015**	**0.0000000005**	**0.00000002**	**0.0000000003**	**0.00000001**
203		Diesel fuel	-	-	**0.000000774**	**0.000024**	**0.0000000012**	**0.00000004**	**0.000000002**	**0.00000007**
204		Diesel fuel			**0.000000338**	**0.000011**	**0.0000000005**	**0.00000002**	**0.000000001**	**0.00000003**

Calculations of pollutant emissions into the atmosphere when draining the petroleum products

Calculation performed according to the “Emission values (specific emissions) for air pollutants emitted by different industries”, Donetsk, UkrNTEK, 2004, t.2, table X-94, p.212

Breathing valve. Source No 205			
INPUT CALCULATIONS DATA			
Liquid stored in the reservoir			DF
Volume of fuel drained over the year (V), m^3			287.50
Number or tanker drained over the year (N)			14.38
Total time of draining liquid over the year (T), hours			9
One-second emission (M sec) of petroleum vapours is determined according to the calculation technique and comprises			0.00014
Coefficient values, value acquisition method, and calculation result are summarized in the table			
CALCULATION RESULTS			
second, g/sec	**Псек**	Пзгод х 1000 / 3600	0.00014
annual, tones/year	**Прік**	Пзгод х Фз / 1000	0.0000045

Breathing valve. Source No 206			
INPUT CALCULATIONS DATA			
Liquid stored in the reservoir			JET-A1
Volume of fuel drained over the year (V), m^3			41.60
Number or tanker drained over the year (N)			4.16
Total time of draining liquid over the year (T), hours			3
One-second emission (M sec) of petroleum vapours is determined according to the calculation technique and comprises			0.0073
Coefficient values, value acquisition method, and calculation result are summarized in the table			
CALCULATION RESULTS			
second, g/sec	**Псек**	Пзгод х 1000 / 3600	0.00730
annual, tones/year	**Прік**	Пзгод х Фз / 1000	0.0000788

Breathing valve. Source No 207			
INPUT CALCULATIONS DATA			
Liquid stored in the reservoir			DF
Volume of fuel drained over the year (V), m^3			308.80
Number or tanker drained over the year (N)			15.44
Total time of draining liquid over the year (T), hours			11
One-second emission (M sec) of petroleum vapours is determined according to the calculation technique and comprises			0.00014
Coefficient values, value acquisition method, and calculation result are summarized in the table			
CALCULATION RESULTS			
second, g/sec	**Псек**	Пзгод х 1000 / 3600	0.00014
annual, tones/year	**Прік**	Пзгод х Фз / 1000	0.0000055

Breathing valve. Source No 208			
INPUT CALCULATIONS DATA			
Liquid stored in the reservoir			DF
Volume of fuel drained over the year (V), m^3			134.70
Number or tanker drained over the year (N)			13.47
Total time of draining liquid over the year (T), hours			9
One-second emission (M sec) of petroleum vapours is determined according to the calculation technique and comprises			0.00014
Coefficient values, value acquisition method, and calculation result are summarized in the table			
CALCULATION RESULTS			
second, g/sec	**Псек**	Пзгод х 1000 / 3600	0.00014
annual, tones/year	**Прік**	Пзгод х Фз / 1000	0.0000045

Calculation of pollutants emitted into the atmosphere when draining petroleum products

Source No	Process	Petroleum product name	Total pollutants emission							
			Benzine		Saturated hydrocarbons C_{12}- C_{19}		Aromatic hydrocarbons		Hydrogen sulphide	
			g/sec	tons/year	g/sec	tons/year	g/sec	tons/year	g/sec	tons/year
205	when draining petroleum products into	Diesel fuel	-	-	**0.000139398**	**0.000005**	**0.0000002100**	**0.00000001**	**0.000000392**	**0.00000001**
206		JET-A1			**0.007288**	**0.000079**	**0.000007**	**0.00000008**	**0.0000044**	**0.00000005**
207		Diesel fuel	-	-	**0.000139398**	**0.000006**	**0.0000002100**	**0.00000001**	**0.000000392**	**0.00000002**
208		Diesel fuel			**0.000139398**	**0.000005**	**0.0000002100**	**0.000000007**	**0.000000392**	**0.00000001**

Calculations of emissions of pollutants into the atmosphere when fuelling a vehicle (dispensing gun)

Calculation performed according to the “Emission values (specific emissions) for air pollutants emitted by different industries”, Donetsk, UkrNTEK, 2004, t.2, table X-94, p.212

Breathing valve. Source No 209			
INPUT CALCULATIONS DATA			
Liquid stored in the reservoir			DF
Dispenser unit performance, m3/h			5.40
Amount of fuel filled over the year, m3/year			287.50
Coefficient values, value acquisition method, and calculation result are summarized in the table			
Value name	**Notation**	**Method of determination**	**Values**
Dispenser unit performance, m3/h	**Q**	Client reference	5.4000
Coefficient depending on concentration of fuel vapours	**K**	"Specific emissions…" section "Fuelling the transport"	0.000036
Fuel density, кг/м3	**g**	Specific emissions … section "Fuelling the transport"	930.0000
Amount of fuel filled over the year, m3	**Прік**	Client reference	287.5000
Pollutant emission, kg/year	**Мгод**	Formula (1)	0.18079
One-second emission, g/sec, incl.:	**Мсек**	Мгод х 1000 / 3600	**0.0502**

Annual emission, tons/year, incl.:	**Мрік**	Мгод х (Прік / Q) / 1000	**0.0096**
Dispenser unit performance, m3/h	**Q**	Client reference	5.4000

Breathing valve. Source No 211			
INPUT CALCULATIONS DATA			
Liquid stored in the reservoir			DF
Dispenser unit performance, m3/h			3.00
Amount of fuel filled over the year, m3/year			308.80
Coefficient values, value acquisition method, and calculation result are summarized in the table			
Value name	**Notation**	**Method of determination**	**Values**
Dispenser unit performance, m3/h	**Q**	Client reference	3.0000
Coefficient depending on concentration of fuel vapours	**K**	“Specific emissions…” section "Fuelling the transport"	0.000036
Fuel density, кг/м3	**g**	"Specific emissions…" section "Fuelling the transport"	930.0000
Amount of fuel filled over the year, m3	**Прік**	Client reference	308.8000
Pollutant emission, kg/year	**Мгод**	Formula (1)	0.10044
One-second emission, g/sec, incl.:	**Мсек**	Мгод х 1000 / 3600	**0.0279**
Annual emission, tons/year, incl.:	**Мрік**	Мгод х (Прік / Q) / 1000	**0.0103**
Dispenser unit performance, m3/h	**Q**	Client reference	3.0000

Breathing valve. Source No 212			
INPUT CALCULATIONS DATA			
Liquid stored in the reservoir			DF
Dispenser unit performance, m3/h			3.00
Amount of fuel filled over the year, m3/year			134.70
Coefficient values, value acquisition method, and calculation result are summarized in the table			
Value name	**Notation**	**Method of determination**	**Values**
Dispenser unit performance, m3/h	**Q**	Client reference	3.0000
Coefficient depending on concentration of fuel vapours	**K**	"Specific emissions…" section "Fuelling the transport"	0.000036
Fuel density, кг/м3	**g**	"Specific emissions…" section "Fuelling the transport"	930.0000
Amount of fuel filled over the year, m3	**Прік**	Client reference	134.7000
Pollutant emission, kg/year	**Мгод**	Formula (1)	0.10044
One-second emission, g/sec, incl.:	**Мсек**	Мгод х 1000 / 3600	**0.0279**
Annual emission, tons/year, incl.:	**Мрік**	Мгод х (Прік / Q) / 1000	**0.0045**
Dispenser unit performance, m3/h	**Q**	Client reference	3.0000

Calculations of composition of pollutants emitted into the atmosphere at FFS when fuelling a vehicle (dispensing gun)

Source No	Process	Petroleum product name	Total pollutants emission							
			Benzine		Saturated hydrocarbons C_{12}- C_{19}		Aromatic hydrocarbons		Hydrogen sulphide	
			g/sec	tons/year	g/sec	tons/year	g/sec	tons/year	g/sec	tons/year
209	dispensing gun	Diesel fuel	-	-	**0.050004**	**0.009584**	**0.000075**	**0.000014**	**0.000141**	**0.000027**
211		Diesel fuel	-	-	**0.027780**	**0.010294**	**0.000042**	**0.000016**	**0.000078**	**0.000029**
212		Diesel fuel			**0.027780**	**0.004490**	**0.000042**	**0.000007**	**0.000078**	**0.000013**

Calculations for ES No 210, due to the lack of data in the previous technique, was performed using the technique set out in the “Pollutant Calculation Practices for Unorganised Air Pollution Sources, Donetsk 1994, OAO “UkrNTEK”, NTI department.

Process	**Petroleum product name**	**Petroleum products volume, m3/year**	**Saturated steam pressure $P_{s(38)}$, hPa**	**Molecular mass, Mn, g/mol**	**Operation time, h/year**	**Coefficient**						**Total pollutants emission**		
						K_{5x}	**K_{5r}**	**K_6**	**K_7**	**K_8**	**η**	**kg/h**	**g/sec**	**tons/year**
ES-210 (dispenser unit)	JET-A1 (kerosene)	41.60	2.33	142.50	24.0	0.032	0.169	1.26	0.20	-	0	0.000001	0.0000002	0.000000017

Calculations of composition of pollutants emitted into the atmosphere at FFS when fuelling a vehicle (dispensing gun)

Source No	Process	Petroleum product name	Total pollutants emission							
			Benzine		Saturated hydrocarbons C_{12}- C_{19}		Aromatic hydrocarbons		Hydrogen sulphide	
			g/sec	tons/year	g/sec	tons/year	g/sec	tons/year	g/sec	tons/year
210	Dispensing gun	JET-A1 (kerosene)	-	-	**0.000000192**	**0.00000002**	**0.000000000**	**0.000000000**	**0.000000000**	**0.000000000**

Calculations of emissions of pollutants into the atmosphere from DG

In the capacity of a reserve power supply it is planned to use a complete diesel-generator unit if SDMO type (France), type J275K, 275 kW.

In order for the DG to operate effectively, the minimum voltage of the diesel-generator unit must be no less than 40% of the maximum. Considering that the electric power generated by the DG is not consumed uniformly, on average, the diesel generator unit operates at 75% of the maximum power

DG operates on diesel oil, grade L as per DSTU 3868-99.

Input data

Parameter	**legend**	**units of measurements**	**value**
Rated power	$N_э$	kW	250
Operating power	$P_э$	kW	187.5
Fuel consumption, at Nэ	$g_{Nэ}$	l/hour	53.5
Fuel consumption, Pэ	$g_{Pэ}$	l/hour	40.1
Fuel density, at 20^0C	$r_{20\,0C}$	kr/m^3	850
Air excess coefficient	a		1.8
Blowdown coefficient	f		1.18
Theor.requir. amount of air	L_0	kg/kg	14.3
Specific weight of exhaust gases at 0^0C	$g_{0\,0C}$	kg/nm^3	1.31
Exhaust gas temperature	Tг	^{0}C	630
Engine operation hours per year	nгод	h/year	100

Diesel fuel composition

Diesel fuel composition							
C^r, %	H^r, %	S^r, %	O^r, %	N^r, %	A^r, %	W^r, %	Q^r_i, Mj/kg
0,1	0,01	0,20	86,7	12,6	0,1	0,3	42,62

According to the Explanation regarding HKD 34.02.305-2002 “Emissions of pollutants into the atmosphere from energy plants. Determination technique», Kyiv 2002, (table 2. Composition of certain fuel types).

Assessment of a flow rate and temperature of exhaust gases

The calculation is performed according to the “Technique of calculating emissions of pollutants into the atmosphere from stationary diesel plants”.

The flow rate of exhaust gases from the stationary diesel plant is determined as follows:

$$G_{вг} = G_п \times (1 + 1/(\varphi \times \alpha \times L_0)$$

where $G_п$ is the air flow rate determined as follows:

$$G_п = \left(\frac{1}{1000}\right) \times \left(\frac{1}{3600}\right) \times (b_e \times P_e \times \varphi \times \alpha \times L_0) \qquad (П2)$$

where: b_e is a specific fuel consumption in the backup operation mode of the engine,

$b_e = 125.6/1000 \times 850/560 \times 1000 = 190.6$

g/kW·h. Where: 125.6 is a mass hourly fuel consumption $G_{пал}$, kg/hour.

$$G_п = \left(\frac{1}{1000}\right) \times \left(\frac{1}{3600}\right) \times (212.3 \times 560 \times 1.18 \times 1.8 \times 14.3) = 0.901$$

$$G_{вг} = 0.901 \times \left(1 + \frac{1}{1.18 \times 1.8 \times 14.3}\right) = 0.930$$

850 – fuel density, kg/m^3.

$\varphi \approx 1{,}18$ - blowdown coefficient;

$\alpha \approx 1{,}8$ - air excess coefficient;

$L_0 \approx 14{,}3$ kg of air / kg of fuel - theoretically required amount of kgs of air for burning one kg of fuel;

$P_e = 560$ (kW) - operating power of a stationary diesel plant the value of which is taken from the technical documentation of manufacturer (Annex No 11). If the technical

documentation does not specify the operating power value, then the rated power value of a stationary diesel plant (N_e) is taken as P_e

Volume flow rate of exhaust gases is determined as follows:

$$Q_{вг} = G_{вг}/y_{вг}, \text{ m}^3/\text{sec}, \qquad (П4)$$

where: $y_{вг}$ is the specific weight of exhaust gases calculated as follows:

$$y_{вг} = \{y_{вг}\ (\text{при } t = 0°C)\}/(1 + T_{вг}/273) = 0{,}433, \text{ kg/m}^3, \qquad (П5)$$

where $= \{y_{вг}\ (\text{при } t = 0°C)\}$ is the specific weight of exhaust gases at a temperature of 0°C; can be taken as equal to 1.31 kg/m^3;

$T_{вг} = 553$ is the temperature of exhaust gases, ^{0}C,

thus:

$$Q_{вг} = \frac{0.930}{0{,}433} = 2.149 \frac{м^3}{c}$$

Let's bring the DG exhaust gases flow to normal conditions using Mendeleev-Clapeyron formula for isobaric process (Gay-Lussac's law):

$$V_н = \frac{V_2 \times T_н}{T_2} = \frac{2.149 \times 273}{273 + 553} = 0.710 \frac{нм^3}{c}$$

Let's bring the exhaust gases flow to 15% of oxygen.

$$V_{н15\%} = V_{н11\%} \times \frac{21\% - 15\%}{21\% - 11\%} = 0.710 \times \frac{21-15}{21-11} = 0.426 \text{mg/nm}^3$$

Calculations of emissions of pollutants into the atmosphere from diesel power plants

The calculation is performed according to the "Technique of calculating emissions of pollutants into the atmosphere from stationary diesel plants".

Calculations of emissions are performed for the following harmful substances entering the atmosphere with exhaust gases of stationary diesel plants:

- carbon oxide
- nitrogen oxides NOx (in terms of nitrogen dioxide) [NO2]
- hydrocarbons (HMSOL)[1];
- substances in the form of suspended solid particles non-differentiated by composition;
- sulphur dioxide
- formaldehyde
- benzo[a]pyrene

According to basic classification characteristics of power, speed, number of cylinders of diesel engines determining the method of organization of an operating process and thus the toxicological properties of released substances, the stationary diesel plants are nominally divided into four groups (N_e- rated power, n - rpm, i - number of cylinders):

According to datasheet of diesel generator R700-1
$N_e = 560$ кВт, $n = 1500$, $i = 6$ шт. Thus, the diesel generator R700-1 may be included in group B - average power, average speed and high speed unites.

Maximum emissions of the i-th substance (g/sec) by the diesel plant is determined as follows:

$$M_i = (\frac{1}{3600}) \times e_{Mi} \times P_e \qquad (1)$$

e_{Mi} (g/kW·h) - the emissions of the i-th pollutant per unit of effective power of a stationary diesel plant in the rated power mode determined as per table D 4.2;

[1] for stationary diesel plants, when calculating the atmospheric pollution, the gas MPC is used (code 2732)

P_e, к(kW) - operating power of a stationary diesel plant the value of which is taken from the technical documentation of manufacturer (Annex No 8). If the technical documentation does not specify the operating power value, then the rated power value of a stationary diesel plant (N_e) is taken as P_e

U For stationary foreign-made diesel plants that meet the requirements of environment protection laws of the states of European Economic Cooperation, USA, Japan, values as per table 1, 2, 3, 4 may be respectively reduced in terms of CO by 2 times; NO_x by 2.5 times; CH, C, CH_2O and BP by 3.5 times.

Emission values (g/kW·h) for different groups of stationary diesel plants prior to overhaul

Group	Emission, g/kW·h						
	CO	NOx	CH	C	SO_2	CH_2O	BP
A	7,2	10,3	3,6	0,7	1,1	0,15	$1,3 \cdot 10^{-5}$
B	**6,2**	**9,6**	**2,9**	**0,5**	**1,2**	**0,12**	$\mathbf{1,2 \cdot 10^{-5}}$
B	5,3	8,4	2,4	0,35	1,4	0,1	$1,1 \cdot 10^{-5}$
D	7,2	10,8	3,6	0,6	1,2	0,15	$1,3 \cdot 10^{-5}$

Maximum emissions of the i-th substance (g/sec) by the diesel plant

Group	Maximum emission of the i-th substance (g/sec)						
	CO	NOx	CH	C	SO_2	CH_2O	BP
B	0.161	0.20	0.043	0.007	0.063	0.002	0.0000002

Total emissions of the i-th substance (tons/year) by the diesel plant is determined as follows:

$$W_{ei} = (\frac{1}{1000}) \times q_{ei} \times G_T \qquad (2)$$

q_{ei} (g/kg of fuel) - emission of the i-th substance per one kg of diesel fuel when operating the stationary diesel plant, taking into account the combination of modes comprising the operating cycle determined as per table 19;

G_T (т) - fuel consumption of the stationary diesel plant per year.

Emission values (g/kg of fuel) for different groups of stationary diesel plants prior to overhaul

Group	Emission, g/kg of fuel						
	CO	NOx	CH	C	SO_2	CH_2O	BP
A	30	43	15,0	3,0	4,5	0,6	$5,5 \cdot 10^{-5}$
B	**26**	**40**	**12,0**	**2,0**	**5,0**	**0,5**	$\mathbf{5,5 \cdot 10^{-5}}$
B	22	35	10,0	1,5	6,0	0,4	$4,5 \cdot 10^{-5}$
D	30	45	15,0	2,5	5,0	0,6	$5,5 \cdot 10^{-5}$

Total emissions of the i-th substance (tons/year) by the diesel plant

Group	Maximum emission of the i-th substance (g/sec)						
	CO	NOx	CH	C	SO_2	CH_2O	BP
B	0.044	0.055	0.012	0.002	0.017	0.0005	0.0000001

Pollution shall be temporary since, on average, the electric grid power supply in case of an emergency is restored within 1-2 hours.

General table of emissions from DG emission source No 213, 216

Pollutant		Total parking emissions volume	
Code	Item	tons/year	g/sec
301	Nitrogen dioxide	0.2	0.054536
330	Sulphur dioxide	0.0625	0.017043
337	Carbon oxide	0.161458333	0.044311
703	Benzo[a]pyrene	1.78571E-07	5.36E-08
1325	Formaldehyde	0.001785714	0.000487
2732	Non-methane volatile organic compounds	0.043154762	0.011686
2902	Substances in the form of suspended solid particles	0.007440476	0.001948

Each DG plant is equipped with a fuel (diesel fuel) tank. Emissions occurring during storage and fuelling by the diesel fuel are calculated same as calculating emission from FFS.

Calculations of emissions of pollutants into the atmosphere during petroleum products storage

Breathing valve. Source No 214, 217			
INPUT CALCULATIONS DATA			
Liquid stored in the reservoir			DF
Volume of liquid poured into the reservoir over the year, m^3/year			4.01
Reservoir volume, m^3			0.39
Storage type (above-ground, underground)			above-ground
Coefficient values, value acquisition method, and calculation result are summarized in the table			
Value name	**Notation**	**Method of determination**	**Values**
Volume of liquid poured into the reservoir over the year, m^3/year	**Vжр**	Client reference	4.01
Saturated liquid steam pressure at a temperature of T=38°C, hPa	**Ps38**	Annex 6 “Collection of techniques…”	0.45
Molecular mass of the liquid vapor, kg/kmol	**Mn**	"Petroleum refiner guide" L. "Khimiia" 1989	159.00
Correction coefficients depending on the saturated steam pressure and the gas space temperature during cold and warm seasons respectively	**K5x**	Annex 3 “Collection of techniques…”	0.0320
	K5т		0.1690
Correction coefficient depending on Ps38 and the climate zone	**K6**	Annex 4 “Collection of techniques…”	1.25
Correction coefficient depending on the technical equipment and the operation mode of the reservoir	**K7**	Annex 5 “Collection of techniques…”	0.20
Coefficient of efficiency of gas-scrubber device of the reservoir	**n**	Actual data	0.00
Pollutant emission	**Пзгод, кг/год**	Calculation formula (1)	**0.0000000**
Storage time reserve, hours	**Фз**	Client reference	8760
CALCULATION RESULTS			
second, g/sec	**Псек**	Пзгод x 1000 / 3600	**0.00000001**
annual, tones/year	**Прік**	Пзгод x Фз / 1000	**0.0000003**

Calculation of composition of pollutants emitted into the atmosphere at FFS during petroleum products storage period

Source No	Process	Petroleum product name	Total pollutants emission							
			Benzine		Saturated hydrocarbons C_{12}- C_{19}		Aromatic hydrocarbons		Hydrogen sulphide	
			g/sec	tons/year	g/sec	tons/year	g/sec	tons/year	g/sec	tons/year
214	Storage	Diesel fuel	-	-	**1.00E-08**	**3.17E-07**	**1.51E-11**	**4.77E-10**	**2.83E-11**	**8.91E-10**
217		Diesel fuel			**1.00E-08**	**3.17E-07**	**1.51E-11**	**4.77E-10**	**2.83E-11**	**8.91E-10**

Calculations of emissions of pollutants into the atmosphere when draining the petroleum products

Breathing valve. Source No 215, 217			
INPUT CALCULATIONS DATA			
Liquid stored in the reservoir			4.01
Volume of fuel drained over the year (V), m^3			10
Number or tanker drained over the year (N)			1
Total time of draining liquid over the year (T), hours			0.00014
One-second emission (M sec) of petroleum vapours is determined according to the calculation technique and comprises			4.01
Coefficient values, value acquisition method, and calculation result are summarized in the table			
CALCULATION RESULTS			
second, g/sec	**Псек**	Пзгод x 1000 / 3600	0.00014
annual, tones/year	**Прік**	Пзгод x Фз / 1000	0.0000005

Calculation of pollutants emitted into the atmosphere when draining petroleum products

Source No	Process	Petroleum product name	Total pollutants emission							
			Benzine		Saturated hydrocarbons C_{12}- C_{19}		Aromatic hydrocarbons		Hydrogen sulphide	
			g/sec	tons/year	g/sec	tons/year	g/sec	tons/year	g/sec	tons/year
215	when draining petroleum products	Diesel fuel	-	-	**1.39E-04**	**5.02E-07**	**2.10E-07**	**7.56E-10**	**3.92E-07**	**1.41E-09**
217		Diesel fuel			**1.39E-04**	**5.02E-07**	**2.10E-07**	**7.56E-10**	**3.92E-07**	**1.41E-09**

Determination of the impact of pollutant emissions from motor transport

The pollutants are generated by the motor car ICE wherein, in the process of combustion of corresponding fuel type (DF, benzene or PG), the pollutants are generated. The pollutants emission volume depends on many parameters and characteristics: the time the motor cars stay at the parking site, the ICE operation mode (incl. the cold season), the distance the car travelled at the parking lot etc.

The amount of harmful substances generated during the motor transport operation is calculated based on the "Technique for calculating of pollutants emission by mobile sources, UkrNTEK, 1999.

The harmful substances emissions shall be calculated considering, for the purpose of higher certainty and representativity of the content of suspended particles in the emissions, that 30% of cars are using diesel fuel, and 70% of cars are using benzine. Trucks and buses are using diesel fuel

Atmospheric air quality criteria values for harmful (pollutant) substances present in the motor transport emissions

Pollutant			Criterium	Criterium value, mg/cu m	Hazard class
notation	code	name			
NO_x	301	Nitrogen oxide	$MPC_{m.r.}$	0.2	2
SO_2	330	Sulphur dioxide	$MPC_{m.r.}$	0.5	3
CO	337	Carbon oxide	$MPC_{m.r.}$	5.0	4
$C_{20}H_{12}$	703	Benzo[a]pyrene [3,4-Benzpyrene]	$MPC_{s.s.}$	1.0×10^{-5}	1
PM	2902	Suspended substances	$MPC_{s.s.}$	0.5	
C_nH_{2n+2}	2754	Saturated hydrocarbons2	$MPC_{s.s.}$	0.5	

Emissions of pollutants and greenhouse gases into the atmospheric air (except for lead) caused by motor transport operation are calculated using specific indicators as follows:

$$B = \Pi \times K_{нві} \times K_{вт}, \text{ кг}$$

Where: B is the volume of the *i*-th pollutant from consumed fuel, kg;

Π is the annual volume of consumed fuel, tones;

$K_{нві}$ is the specific emission of the i-th pollutant, kg/tones;

$K_{вт}$ is the coefficient of impact of the technical state on specific pollutant emissions.

Specific emissions of pollutants and greenhouse gases and coefficients of the technical state of vehicles

Pollutants and greenhouse gases	Fuel types (kg/tones)				Coefficient of impact of the technical state of vehicles on specific emissions (kts)			
	benzine	Gasoil (diesel fuel)	liquified gas	compressed gas	benzine	Gasoil (diesel fuel)	liquified gas	compressed gas
1	2	3	4	5	6	7	8	9
Carbon oxide	201.8	36.2	201.8	87.7	1.5	1.5	1.5	1.7
Nitrogen dioxide	21.0	31.4	21.0	27.4	0.9	0.95	0.9	0.9
Sulphur dioxide	1.0	4.3	1.0	-	1.0	1.0	1.0	1.0
Non-methane volatile organic compounds	53.0	3.08	25.7	22.7	1.0	1.0	1.0	1.0
Methane	0.94	0.083	0.96	-	1.5	1.4	1.5	1.8
Nitrogen oxide	0.188	0.165	-	-	1.0	1.0	1.0	1.0
Ammonia	0.004	-	-	-	1.0	1.0	1.0	1.0
Soot	-	3.85	-	-	1.0	1.8	1.0	1.0
Carbon dioxide	3 183	3 138	-	-	1.0	1.0	1.0	1.0
Benzo[a]pyrene	-	0.03	-	-	1.0	1.0	1.0	1.0
Lead	0.013	-	-	-	1.0	1.0	1.0	

[2] when calculating the atmosphere pollution for cars with benzine engines, MPC m.r. is used in terms of benzine (code 2704); for diesel engine cars - in terms of kerosene (code 2732); for liquified gas cars - in terms of hydrocarbons $_1$-C_5 (code 415)

Specific pollutant emissions (g/km) for different groups of motor cars

Motor cars group, *k*	Emission volume, *g/km*						
	CO	NO_x	C_nH_{2n+2}	C	SO_2	HCHO	$C_{20}H_{12}$
1	3	4	5	6	7	8	9

Light motor vehicles	5.0	1.3	1.1	0.03	0.03	0.005	$0.4 \cdot 10^{-6}$

The annual fuel amount consumed when entering and exiting the premises is calculated as follows:

$$\Pi = L \times Q \times p \times A \times 10^{-3} \text{ , tons/year,}$$

Where: L is the average distance travelled by a vehicle in the territory of a motor car parking lot, km; taken according to the general layout of the outdoors site.
Q is a standard fuel consumption of a single car (limit amount) per km of travel, l; linear fuel consumption - 0.10 l/km, linear diesel fuel consumption - 0.06 l/km
p is the fuel density, kg/l; benzine density - 0.74 kg/l, diesel fuel density - 0.85 kg/l.
A is the number of cars per year.

For the purpose of calculations

the following values are taken:

- amount of vehicles operating on benzine: 70%
- amount of vehicles operating on diesel fuel: 30%

Apron of terminal D (light motor vehicles)

Taken as an average: entering and manoeuvring when parking the vehicle - 1 min.; warming up the engine and leaving the parking lot - 1 min. Maximum one-time emission is calculated for 5 cars simultaneously entering, warming up, and leaving the territory of the parking lot

The average distance travelled by a vehicle in the territory of a motor car parking lot, km, is taken according to the general layout - 2.0 km

Calculation of emissions from benzine ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 5475 vehicles per yea (365 work days).

$$\Pi = 2.0 \times 0.1 \times 0.74 \times 5475 \times 10^{-3} \times 0.7 = 0.567 \text{ tones/year}$$

Run time of all engines (running simultaneously) - 10 min, fuel consumption - 0.000074 tones.

Calculation of emissions from DF ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 5475 vehicles per yea (365 work days).

$$\Pi = 2.0 \times 0.06 \times 0.85 \times 5475 \times 10^{-3} \times 0.3 = 0.223 \text{ tones/year}$$

Run time of all engines (running simultaneously) - 10 min. Fuel consumption - 0,000083 tones.

Apron of terminal D (specialized trucks)

Maximum one-time emission is calculated for 5 cars simultaneously entering, warming up, and leaving the territory of the parking lot

The average distance travelled by a vehicle in the territory of a motor car parking lot, km, is taken according to the general layout - 0.8 km

Calculation of emissions from DF ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 7300 vehicles per year (365 work days).

$$\Pi = 0.8 \times 0.06 \times 0.85 \times 1095 \times 10^{-3} = 0.397 \text{ tones/year}$$

Run time of all engines (running simultaneously) - 10 min. Fuel consumption - 0,000083 tones.

Apron of terminal D (buses)

Maximum one-time emission is calculated for 5 cars simultaneously entering, warming up, and leaving the territory of the parking lot.

The average distance travelled by a vehicle in the territory of a motor car parking lot, km, is taken according to the general layout - 1.4 km.

Calculation of emissions from DF ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 7300 vehicles per year (365 work days).

$$П = 1.4 \times 0.06 \times 0.85 \times 7300 = 0.695 \text{ tones/year}$$

Run time of all engines (running simultaneously) - 10 min. Fuel consumption - 0,000083 tones. General table of emissions from terminal D

Pollutant		Total parking emissions volume	
Code	**Item**	**tons/year**	**g/sec**
337	Carbon oxide	0.08156	0.24437
2754	Non-methane volatile organic compounds	0.01150	0.03683
410	Methane	0.00045	0.00108
301	Nitrogen dioxide	0.03961	0.04970
2902	Substances in the form of suspended solid particles	0.00912	0.00912
304	Nitrogen oxide	0.0001725	0.00021
303	Ammonia	0.0000001	0.0000023
-	Carbon dioxide (CO_2)	4.22375	5.90782
330	Sulphur dioxide	0.00569	0.00622
703	Benzo[a]pyrene	0.0000395	0.0000039

Apron of terminal B (light motor vehicles)

Taken as an average: entering and manoeuvring when parking the vehicle - 1 min.; warming up the engine and leaving the parking lot - 1 min. Maximum one-time emission is calculated for 5 cars simultaneously entering, warming up, and leaving the territory of the parking lot.

The average distance travelled by a vehicle in the territory of a motor car parking lot, km, is taken according to the general layout - 2.6 km.

Calculation of emissions from benzine ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 1095 vehicles per year (365 work days).

$$П = 2.6 \times 0.1 \times 0.74 \times 1095 \times 10^{-3} \times 0.7 = 0.147 \text{ tones/year}$$

Run time of all engines (running simultaneously) - 10 min, fuel consumption - 0.000074 tones.

Calculation of emissions from DF ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 1095 vehicles per year (365 work days).

$$П = 2.6 \times 0.06 \times 0.85 \times 1095 \times 10^{-3} \times 0.3 = 0.058 \text{ tones/year}$$

Run time of all engines (running simultaneously) - 10 min. Fuel consumption - 0,000083 tones.

Apron of terminal B (specialized trucks)

Maximum one-time emission is calculated for 5 cars simultaneously entering, warming up, and leaving the territory of the parking lot.

The average distance travelled by a vehicle in the territory of a motor car parking lot, km, is taken according to the general layout - 2.2 km.

Calculation of emissions from DF ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 1095 vehicles per year (365 work days).

$$П = 2.2 \times 0.06 \times 0.85 \times 1095 \times 10^{-3} = 0.164 \text{ tones/year}$$

Run time of all engines (running simultaneously) - 10 min. Fuel consumption - 0,000083 tones.

Apron of terminal B (buses)

Maximum one-time emission is calculated for 5 cars simultaneously entering, warming up, and leaving the territory of the parking lot.

The average distance travelled by a vehicle in the territory of a motor car parking lot, km, is taken according to the general layout - 1.4 km.

Calculation of emissions from DF ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 1460 vehicles per year (365 work days).

$$П = 1.4 \times 0.06 \times 0.85 \times 1460 = 0.139 \text{ tones/year}$$

Run time of all engines (running simultaneously) - 10 min. Fuel consumption - 0,000083 tones. General table of emissions from terminal B

Pollutant		Total parking emissions volume	
Code	**Item**	**tons/year**	**g/sec**
337	Carbon oxide	0.03702	0.06449
2754	Non-methane volatile organic compounds	0.00522	0.00973
410	Methane	0.00020	0.00029
301	Nitrogen dioxide	0.01713	0.01350
2902	Substances in the form of suspended solid particles	0.00391	0.00250
304	Nitrogen oxide	0.00007525	0.00006
303	Ammonia	0.00000008	0.0000006
-	Carbon dioxide (CO_2)	1.83259	1.59523
330	Sulphur dioxide	0.01713	0.00170
703	Benzo[a]pyrene	0.0000028	0.0000011

Apron of terminal F (light motor vehicles)

Taken as an average: entering and manoeuvring when parking the vehicle - 1 min.; warming up the engine and leaving the parking lot - 1 min. Maximum one-time emission is calculated for 5 cars simultaneously entering, warming up, and leaving the territory of the parking lot.

The average distance travelled by a vehicle in the territory of a motor car parking lot, km, is taken according to the general layout - 1.1 km.

Calculation of emissions from benzine ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 5475 vehicles per yea (365 work days).

$$П = 1.1 \times 0.1 \times 0.74 \times 5475 \times 10^{-3} \times 0.7 = 0.312 \text{ tones/year}$$

Run time of all engines (running simultaneously) - 10 min, fuel consumption - 0.000074 tones.

Calculation of emissions from DF ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 5475 vehicles per yea (365 work days).

$$П = 1.1 \times 0.06 \times 0.85 \times 5475 \times 10^{-3} \times 0.3 = 0.123 \text{ tones/year}$$

Run time of all engines (running simultaneously) - 10 min. Fuel consumption - 0,000083 tones.

Apron of terminal F (specialized trucks)

Maximum one-time emission is calculated for 5 cars simultaneously entering, warming up, and leaving the territory of the parking lot.

The average distance travelled by a vehicle in the territory of a motor car parking lot, km, is taken according to the general layout - 1.1 km.

Calculation of emissions from DF ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 7300 vehicles per year (365 work days).

$$П = 1.1 \times 0.06 \times 0.85 \times 7300 \times 10^{-3} = 0.546 \text{ tones/year}$$

Run time of all engines (running simultaneously) - 10 min. Fuel consumption - 0,000083 tones.

Apron of terminal F (buses)

Maximum one-time emission is calculated for 5 cars simultaneously entering, warming up, and leaving the territory of the parking lot.

The average distance travelled by a vehicle in the territory of a motor car parking lot, km, is taken according to the general layout - 0.8 km.

Calculation of emissions from DF ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 7300 vehicles per year (365 work days).

$$П = 0.8 \times 0.06 \times 0.85 \times 7300 = 0.139 \text{ т/рік.}$$

Run time of all engines (running simultaneously) - 10 min. Fuel consumption - 0,000083 tones. General table of emissions from terminal F

Pollutant		Total parking emissions volume	
Code	**Item**	**tons/year**	**g/sec**
337	Carbon oxide	0.06288	0.15303
2754	Non-methane volatile organic compounds	0.00839	0.02305
410	Methane	0.00031	0.00071
301	Nitrogen dioxide	0.03108	0.03754
2902	Substances in the form of suspended solid particles	0.00717	0.00739
304	Nitrogen oxide	0.00014444	0.00015
303	Ammonia	0.00000008	0.0000012
-	Carbon dioxide (CO_2)	3.30745	4.32412
330	Sulphur dioxide	0.00447	0.00490
703	Benzo[a]pyrene	0.0000310	0.0000032

Apron S (light motor vehicles)

Taken as an average: entering and manoeuvring when parking the vehicle - 1 min.; warming up the engine and leaving the parking lot - 1 min. Maximum one-time emission is calculated for 5 cars simultaneously entering, warming up, and leaving the territory of the parking lot.

The average distance travelled by a vehicle in the territory of a motor car parking lot, km, is taken according to the general layout - 2.0 km.

Calculation of emissions from benzine ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 365 vehicles per year (365 work days).

$$П = 2.0 \times 0.1 \times 0.74 \times 365 \times 10^{-3} \times 0.7 = 0.038 \text{ tones/year}$$

Run time of all engines (running simultaneously) - 10 min, fuel consumption - 0.000074 tones.

Calculation of emissions from DF ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 5475 vehicles per yea (365 work days).

$$П = 2.0 \times 0.06 \times 0.85 \times 365 \times 10^{-3} \times 0.3 = 0.015 \text{ tones/year}$$

Run time of all engines (running simultaneously) - 10 min. Fuel consumption - 0,000083 tones.

Apron S (specialized trucks)

Maximum one-time emission is calculated for 5 cars simultaneously entering, warming up, and leaving the territory of the parking lot.

The average distance travelled by a vehicle in the territory of a motor car parking lot, km, is taken according to the general layout - 0.8 km

Calculation of emissions from DF ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 21.90 vehicles per year (365 work days).

$$П = 0.8 \times 0.06 \times 0.85 \times 2190 \times 10^{-3} = 0.119 \text{ tones/year}$$

Run time of all engines (running simultaneously) - 10 min. Fuel consumption - 0,000083 tones.

Apron S (buses)

Maximum one-time emission is calculated for 5 cars simultaneously entering, warming up, and leaving the territory of the parking lot.

The average distance travelled by a vehicle in the territory of a motor car parking lot, km, is taken according to the general layout - 1.4 km.

Calculation of emissions from DF ICE:

Amount of light motor vehicles entering/leaving the site shall be taken as 730 vehicles per year (365 work days).

$$П = 1.4 \times 0.06 \times 0.85 \times 730 = 0.069 \text{ tones/year}$$

Run time of all engines (running simultaneously) - 10 min. Fuel consumption - 0,000083 tones.
General table of emissions from apron S

Pollutant		Total parking emissions volume	
Code	**Item**	**tons/year**	**g/sec**
337	Carbon oxide	0.04930	0.02262
2754	Non-methane volatile organic compounds	0.00705	0.00340
410	Methane	0.00028	0.00011
301	Nitrogen dioxide	0.02535	0.00676
2902	Substances in the form of suspended solid particles	0.00586	0.00141
304	Nitrogen oxide	0.0001085	0.00003
303	Ammonia	0.000000040	0.0000002
-	Carbon dioxide (CO_2)	2.68613	0.75732
330	Sulphur dioxide	0.00365	0.00091
703	Benzo[a]pyrene	0.04930	0.02262

Summary table of emissions from mobile motor transport of the airport

Pollutant		Total parking emissions volume	
Code	**Item**	**tons/year**	**g/sec**
337	Carbon oxide	0.23075	0.48452
2754	Non-methane volatile organic compounds	0.03216	0.07302
410	Methane	0.00123	0.00219
301	Nitrogen dioxide	0.11317	0.10750
2902	Substances in the form of suspended solid particles	0.02606	0.02041
304	Nitrogen oxide	0.00050	0.00044
303	Ammonia	0.00000	0.00000
-	Carbon dioxide (CO_2)	12.04992	12.58448
330	Sulphur dioxide	0.03093	0.01373
703	Benzo[a]pyrene	0.00010	0.000009

AUTOMATED SYSTEM FOR ATMOSPHERE
POLLUTION CALCULATION

EOL-PLIUS

(Version 5.23)

GENERAL REPORT ON CALCULATION RESULTS
DISPERSAL OF ATMOSPHERE POLLUTION FROM EMISSION SOURCES
ДП «МА «БОРИСПІЛЬ» (current state)

Kyiv HIIACC Derzhbud Ukrainy
+38 (044) 249-34-25

"EOL-PLIUS" unlimited validity period
realize OND-86 technique ref. 26/861 of 3/27/92

Program recommended for use by Ministry of Environmental Protection and Nuclear Safety of Ukraine (ref. 11-5-68 of 5/7/98)

Ukraine, Kyiv, 2020

ToR for calculation

TABLE 1. List of production sites

Code of production site	Production site name
1	Production site

ToR for calculation TABLE 2. List of

substances.

Substance code	Substance name
- ------- 150	Sodium hydroxide (lye, caustic soda)
- ------- 10226	Titanium dioxide
01002 ------- 110	Vanadium and its compounds (in terms of vanadium pentoxide)
01003 ------- 123	Iron and its compounds (in terms of iron)
01009 ------- 184	Lead and its compounds (in terms of lead)
01010 ------- 203	Chromium and its compounds (in terms of chromium trioxide)
01104 ------- 143	Mangan and its compounds (in terms of mangan)
03000 ------- 323	Substances in the form of suspended solid particles (microparticles and fibres)
03000 ------- 2902	Substances in the form of suspended solid particles (microparticles and fibres)
03000 ------- 10368	Substances in the form of suspended solid particles (microparticles and fibres)
03000 ------- 10442	Substances in the form of suspended solid particles (microparticles and fibres)
03004 ------- 328	Soot
04001 ------- 301	Nitrogen oxides (in terms of nitrogen dioxide ($NO + NO_2$))
04002 ------- 304	Nitrogen (1) oxide (N20)
04002 ------- 11815	Nitrogen (1) oxide (N20)
04003 ------- 303	Ammonia
05001 ------- 330	Sulphur dioxide
05004	Sulfuric acid (H2S04) (sulphuric acid)
06000 ------- 337	Carbon oxide
07000 ------- 11812	Carbon dioxide
11000 -------	Non-methane volatile organic compounds (NMVOC):

514	
11000 ------- 1042	Non-methane volatile organic compounds (NMVOC):
11000 ------- 1056	Non-methane volatile organic compounds (NMVOC):
11000 ------- 1061	Non-methane volatile organic compounds (NMVOC):
11000 ------- 1319	Non-methane volatile organic compounds (NMVOC):
11000 ------- 2704	Non-methane volatile organic compounds (NMVOC):
11000 ------- 2732	Non-methane volatile organic compounds (NMVOC):
11000 ------- 2735	Non-methane volatile organic compounds (NMVOC):
11000 ------- 2750	Non-methane volatile organic compounds (NMVOC):
11000 ------- 2752	Non-methane volatile organic compounds (NMVOC):
11000 ------- 2754	Non-methane volatile organic compounds (NMVOC):
11000 ------- 10411	Non-methane volatile organic compounds (NMVOC):
11001 ------- 2001	Acrylonitrile
11007 ------- 1401	Acetone
11009 ------- 1210	Butyl acetate
11020 ------- 1246	Ethylcellosolve
11021 ------- 1240	Ethyl acetate
11030 ------- 616	Xylene
11037 ------- 620	Styrene
11041 ------- 621	Toluene
12000 ------- 410	Methane
13101 ------- 703	Benzo[a]pyrene
16000 -------	Fluor and its compounds (in terms of fluor)

343	
16000 ------- 344	Fluor and its compounds (in terms of fluor)
16001 ------- 342	Hydrogen fluoride

ToR for calculation

TABLE 3. List of summation groups.

Group code	Substances comprising the summation groups (codes)										Coefficient potent.
	1	2	3	4	5	6	7	8	9	10	
10	01002 ------- 110	01104 ------- 143									1
11	01002 ------- 110	05001 ------- 330									1
12	01002 ------- 110	01010 ------- 203									1
27	01009 ------- 184	05001 ------- 330									1
28	05004 ------- 322	05001 ------- 330									1
31	04001 ------- 301	05001 ------- 330									1
35	05001 ------- 330	16001 ------- 342									1
37	04001 ------- 301	04003 ------- 303	04002 ------- 304	05001 ------- 330							1
11002	16001 ------- 342	16000 ------- 344									1

ToR for calculation

TABLE 4. Calculation sites parameters.

N	Coord. of centre of symm.		Length, m	Width, m	Grid step		Angle of rotation of calc. site relative to OX axis of general coord.	Area characteristic
No	X, m	Y, m			OX axis, m	OY axis, m	sys., deg.	
1	1525	5000	10000	10000	250	250	0	1

TABLE 5. ToR for calculation

City name	Wind speed, m/sec					Wind speed, fractions (Umc)					Step of enumeration of dangerous wind direct.	Fix. wind direct.	Qty, max.	Max.concent.	Characteristic of calc. background
	1	2	3	4	5	1	2	3	4	5					
1. Boryspil											10		5	10	1

Input data

TABLE 1. Description of meteorological conditions and geographic reference

City code	City name	Average air temperature		Maximum wind speed, m/sec	Regional coeff. of strat. atmosphere	Angle between northern direction and OX axis, deg.	City area, sq.km	Required conc. level at the point (fractions of MPC)
		the hottest month, deg. C	the coldest month, deg. C					
1	Boryspil	27.4	-6.8		180			

TABLE 2. Description of production sites (geographical reference)

City code	Production site code	Production site name	Basic coordinate system reference		
			X orig.,m	Y orig.,m	Angle of rotation, deg.
1	1	Production site			

TABLE 3. Description of harmful substances emission sources

City code	Production site code	Source code	Source name	Angle of the model or an angle between OX axis and the length of a planar source	Terrain code	Coordinate of a point source, or a beginning of a line source, or a centre of symmetry of a planar source		Coordinate of an end of a line source, or length and width of a planar source, or a point source with a rect. neck		Source height, m	Diameter of a point source or a planar source of type 2, or PGVS(Wo) release rate for a linear, (for a planar source of type 1 - 0)	PGVS flow rate, (for a planar source of type 1 - 0)	PGVS temperature (deg. C)	Hazard class
						X1, m	Y1, m	X2, m	Y2, m					
1	1	1	Source 1 RCS, woodworking shop; woodworking machines – 6 units	444	1	1669	7423			10	0.63	1.9	15	
		3	Source 3 RCS; welding shop; welding station	444	1	1696	7395			8	0.25	0.557	17	
		4	Source 4 FFS; welding shop; welding station - 2 units	444	1	1704	7392			7.3	0.25	0.671	17	
		5	Source 5 RCS, welding shop; welding station - 3 units	444	1	1704	7389			7.4	0.2	0.218	17	
		6	Source 106 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	2303	8206			1	0.1	0	27.8	
		7	Source 7 RCS; warehouse of rubble with 5–20 fraction	444	1	1726	7455			2	0.5	0.294	27.8	
		8	Source 8 RCS; warehouse of rubble with 20–40 fraction	444	1	1726	7442			2	0.5	0.294	27.8	
		9	Source 9 RCS; sand storage	444	1	1708	7448			2	0.5	0.294	27.8	
		10	Source 10 RCS; chippings storage	444	1	1725	7434			2	0.5	0.294	27.8	

11	Source 11 EVS, assembly shop; grinding machine; drilling machine	444	1	1595	7445			8	0.25	0.159	17	
12	Source 12 EVS, fuel shop; bath — 2 units	444	1	1581	7420			10	0.15	0.552	20	
13	Source 13 EVS, repair shop; internal combustion engine – 1 unit	444	1	1580	7430			8	0.2	0.103	18	
14	Source 14 EVS, repair shop; internal combustion engine – 1 unit	444	1	1580	7436			8	0.2	0.101	18	
15	Source 15 EVS, repair shop; internal combustion engine – 4 units	444	1	1558	7438			8	0.35	0.427	18	
16	Source 16 EVS, turning shop; grinding machine, drum lathe	444	1	1575	7447			9	0.31	0.201	19	
17	Source 17 EVS, turning shop; bath	444	1	1581	7456			8	0.15	0.568	19	
		444						10	0.5	0.877	18	

18	Source 18 EVS, motor shop; internal combustion engine, component degreasing site		1	1568	7439							
19	Source 19 EVS, welding shop; grinding machine	444	1	1569	7451			9.5	0.1	0.186	17	
20	Source 20 EVS, welding shop; welding station - 2 units	444	1	1534	7443			9.2	0.4	0.779	18	
22	Source 22 EVS, curing department; grinding machine	444	1	1561	7442			10	0.315	0.217	18	
23	Source 23 EVS, copper shop; soldering station	444	1	1558	7442			10	0.5	0.794	18	
24	Source 24 EVS, accumulator shop; accumulator charging station - 8 units	444	1	1550	7437			10	0.315	0.211	18	
25	Source 25 EVS, bus maintenance shop; internal combustion engine - 2	444	1	1548	7438			10	0.32	0.346	21	

	units											
26	Source 26 EVS, diagnostics shop; internal combustion engine	444	1	1535	7451			1.5	0.14	0.101	20	
27	Source 27 EVS, woodworking shop; woodworking machine US-2M	444	1	1535	7433			6.3	0.19	0.526	17	
28	Source 28 EVS, KM and F, wash station; internal combustion engine - 2 units	444	1	1517	7425			8.7	1.2	4.92	19	
29	Source 29 EVS, KM and F, wash station; internal combustion engine - 2 units	444	1	1519	7434			7.5	0.82	0.433	19	
30	Source 30 EVS, KM and F, painting station; spray booth	444	1	1503	7424			9.1	1.9	6.25	21	
31	Source 31 EVS, KM and F, painting station; spray booth	444	1	1503	7433			9.1	1.9	6.63	21	
32	Source 32 EVS, KM and F, painting station;	444	1	1503	7429			9.9	0.24	0.097	118	

	Heat generator Blowterm MKFL											
33	Source 33 EVS, KM and F, painting station; heat generator Blowterm MKFL	444	1	1503	7431			9.9	0.24	0.097	131	
34	Source 34 EVS, KM and F, spray preparation site; spray preparation station	444	1	1503	7440			9.1	1.9	6.75	19	
35	Source 35 EVS, KM and F, spray preparation site; spray preparation station	444	1	1503	7446			9.1	1.9	6.84	19	
36	Source 36 EVS, KM and F, express laboratory, paint preparation machine	444	1	1503	7451			9.1	0.18	0.243	19	
37	Source 37 EVS, KM and F, express laboratory, paint storage cabinet	444	1	1502	7453			9.1	0.11	0.215	19	
38	Source 38 EVS, KM and F, express	444	1	1503	7452			8.3	0.25	0.543	19	

	laboratory, paint preparation machine											
39	Source 39 HPB No 2; boiler unit "HWK 10000" No 1	444	1	1690	7640			25	0.92	5.59	119.5	
40	Source 40 HPB No 2; boiler unit "HWK 10000" No 2	444	1	1690	7646			25	0.92	5.53	121.4	
41	Source 41 HPB No 2; boiler unit "HWK 10000" No. 3 (if operated on natural gas)	444	1	1690	7652			25	0.92	5.59	115.3	
42	Source 42 EVS, stationary heating of special motor transport engines; thermal machine UMP-350	444	1	2196	5555			1.5	0.15	0.189	345	
43	Source 43 EVS, stationary heating of special motor transport engines; kerosene container filler neck	444	1	2224	5554			3	0.05	0	27.8	
44	Source 44 EVS, stationary heating of special motor transport engines;	444	1	2233	5554			3	0.05	0	27.8	

	kerosene reservoir											
45	Source 45 EVS, stationary heating of special motor transport engines; thermal machine UMP-350	444	1	1603	5085			1.5	0.15	0.138	278	
46	Source 46 EVS, stationary heating of special motor transport engines; kerosene container filler neck	444	1	1600	5068			1	0.1	0	27.8	
47	Source 47 EVS, stationary heating of special motor transport engines; kerosene reservoir	444	1	1608	5068			3	0.05	0	27.8	
48	Source 48 HPB No 2; DF reservoir	444	1	1735	7679			3	0.05	0	27.8	
49	Source 49 HOB No 2; (DF reservoir filler neck)	444	1	1734	7679			1	0.1	0	27.8	
51	Source 51 EVS, MS on apron; internal combustion engine - 2 units	444	1	1684	5452			5	0.3	0.065	18	
		444						5	0.3	0.065	18	

52	Source 52 EVS, MS on apron; internal combustion engine - 2 units		1	1684	5442							
53	Source 53 FFS 1; filler neck HST 25 No 5	444	1	1514	7305			1	0.1	0	27.8	
54	Source 54 FFS 1; reservoir HST 25 No 5	444	1	1516	7298			3	0.05	0	27.8	
55	Source 55 FFS 1; dispensing gun	444	1	1507	7306			1	0.1	0	27.8	
56	Source 53 FFS 1; filler neck HST 25 No 5	444	1	1519	7305			1	0.1	0	27.8	
57	Source 57 FFS 1; reservoir HST 25 No 4	444	1	1518	7298			3	0.05	0	27.8	
58	Source 58 FFS 1; dispensing gun	444	1	1525	7306			1	0.1	0	27.8	
59	Source 59 FFS 1; filler neck HST 25 No 53	444	1	1520	7302			3	0.05	0	27.8	
60	Source 60 FFS 1; reservoir HST 25 No 3	444	1	1502	7326			3	0.05	0	27.8	
61	Source 61 FFS 1; dispensing	444	1	1525	7319			1	0.1	0	27.8	

	gun											
62	Source 62 FFS 1; filler neck HST 25 No 2	444	1	1514	7322			3	0.05	0	27.8	
63	Source 63 FFS 1; reservoir HST 25 No 2	444	1	1500	7325			1	0.1	0	27.8	
64	Source 64 FFS 1; dispensing gun	444	1	1508	7319			1	0.1	0	27.8	
65	Source 65 FFS 1; filler neck HST 25 No 1	444	1	1496	7321			1	0.1	0	27.8	
66	Source 66 FFS 1; reservoir HST 25 No 1	444	1	1498	7325			3	0.05	0	27.8	
67	Source 67 FFS 1; dispensing gun	444	1	1491	7318			1	0.1	0	27.8	
68	Source 68 FFS 2; filler neck of checkpoint No 7	444	1	1619	5579			1	0.1	0	27.8	
69	Source 69 FFS 2; checkpoint No 7	444	1	1612	5579			3	0.05	0	27.8	
70	Source 70 FFS 2; dispensing gun	444	1	1626	5579			1	0.1	0	27.8	
71	Source 71 FFS 2; filler neck	444	1	1619	5571			1	0.1	0	27.8	

	of checkpoint No 6											
72	Source 72 FFS 2; checkpoint No 6	444	1	1612	5571			1	0.1	0	27.8	
73	Source 73 FFS 2; dispensing gun	444	1	1626	5571			1	0.1	0	27.8	
74	Source 74 HPB No 1; boiler unit UWM-1000 st. No 3, boiler unit Vitomax-200 st. No 2	444	1	1560	6384			30	1	4.52	134	
75	Source 75 HPB No 1; boiler unit Vitomax-300 st. No 1	444	1	1568	6380			12	0.45	0.643	136	
76	Source 76 HPB No 1; boiler unit Vitomax-300 st. No 2	444	1	1576	6379			12	0.45	0.644	138	
77	Source 77 BPM, MSSA, OCS No 1, alkaline accumulator unit; accumulator charging station - 6 units	444	1	2135	5586			7.5	0.56	1.59	16	
78	Source 78 BPM, MSSA, OCS No 1, acid accumulator unit; accumulator charging station - 8 units	444	1	2141	5580			7.5	0.29	0.596	19	
79	Source 79 BPM, MSSA, welding	444	1	2139	5544			7.5	0.89	0.989	16	

	shop; welding station											
80	Source 80 BPM, MSSA, welding shop; welding station	444	1	2143	5540			2	0.5	0.294	27.8	
81	Source 81 BPM, MSSA, OCS No 1, acid accumulator unit; accumulator charging station - 28 units	444	1	2144	5565			2	0.5	0.294	27.8	
82	Source 82 BPM, MSSA, OCS No 1, alkaline accumulator unit; accumulator charging station - 9 units	444	1	2119	5590			2	0.5	0.294	27.8	
83	Source 83 BPM, MSSA, OCS No 2, acid accumulator unit; accumulator charging station - 19 units	444	1	1538	6204			2	0.5	0.294	27.8	
84	Source 84 BPM, MSSA, OCS No 2, acid accumulator unit; accumulator charging station - 26 units	444	1	1524	6178			2	0.5	0.294	27.8	
85	Source 85 BPM, MAU PJSC (MAU-M-Boryspil), alkaline accumulator unit;	444	1	2139	5555			7.5	0.72	0.371	19	

	accumulator charging station - 2 units											
86	Source 86 BPM, MAU PJSC (MAU-M-Boryspil), alkaline accumulator unit; accumulator charging station - 6 units	444	1	2138	5560			7.5	0.72	0.508	19	
94	Source 94 CFS, FOMS, FLM laboratory FLM No 1; exhaust hood - 4 units	444	1	1689	5013			5.5	0.37	0.308	19	
95	Source 95 CFS, FOMS, special fluid laboratory No 2; exhaust hood - 2 units	444	1	1695	5004			5.5	0.26	0.221	19	
96	Source 96 FRLES, CMS, welding area; welding station	444	1	1729	7085			2	0.5	0.294	27.8	
97	Source 97 FRLES, CMS, acid accumulator unit; accumulator charging station - 3 units	444	1	1702	7078			11	0.42	0.906	19	
101	Source 101 FRLES, CMS, diesel-generator plant; diesel generator 8041 Iveko	444	1	2385	9190			2.3	0.055	0.044	120	
		444						1	0.1	0		

102	Source 102 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck		1	2399	9199						27.8	
103	Source 103 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	2390	9200			3	0.05	0	27.8	
104	Source 104 FRLES, CMS, diesel-generator plant; diesel generator Scania SC-4096	444	1	2309	8222			2.3	0.16	0.164	133	
105	Source 105 FRLES, CMS, diesel generator plant; DF reservoir filler neck	444	1	2293	8205			2	0.051	0.007	27.8	
107	Source 107 FRLES, CMS, diesel-generator plant; diesel generator DGA-24	444	1	900	8357			3	0.06	0.04	129	
108	Source 108 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	901	8324			1	0.1	0	27.8	
109	Source 109 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	900	8313			3	0.05	0	27.8	
		444						2.5	0.05	0.033	72	

110	Source 110 FRLES, CMS, diesel-generator plant; diesel generator AD-10		1	887	8357							
111	Source 111 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 1	444	1	1284	7293			5.5	0.095	0.103	119	
112	Source 112 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 1	444	1	1284	7287			5.5	0.095	0.149	122	
113	Source 114 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 1	444	1	1283	7281			5.5	0.095	0.134	97	
114	Source 114 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 2	444	1	1283	7276			5.5	0.095	0.109	74	
115	Source 115 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	1288	7301			1	0.1	0	27.8	
116	Source 116 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	1295	7301			3	0.05	0	27.8	

117	Source 117 FRLES, CMS, diesel-generator plant; diesel generator DGA-24	444	1	743	6942			4	0.09	0.043	128	
118	Source 118 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	745	6926			1	0.1	0	27.8	
119	Source 119 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	746	6918			3	0.05	0	27.8	
120	Source 120 FRLES, CMS, diesel-generator plant; diesel generator Perkins No 1	444	1	2190	5852			4.5	0.07	0.092	165	
121	Source 121 FRLES, CMS, diesel-generator plant; diesel generator Perkins No 2	444	1	2193	5846			4.5	0.07	0.092	162	
122	Source 122 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	2201	5846			1	0.1	0	27.8	
123	Source 123 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	2209	5846			3	0.05	0	27.8	
		444						4	0.095	0.122	88	

124	Source 124 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 1		1	2193	5825							
125	Source 125 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 1	444	1	2193	5819			4	0.095	0.14	91	
126	Source 126 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 2	444	1	2193	5813			4	0.095	0.136	89	
127	Source 127 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 2	444	1	2193	5807			4	0.095	0.146	87	
128	Source 128 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	2203	5819			1	0.1	0	27.8	
129	Source 129 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	2205	5825			3	0.05	0	27.8	
130	Source 130 FRLES, CMS, diesel-generator plant; diesel generator Scania SC-	444	1	2364	3939			2.3	0.16	0.165	139	

	4096											
131	Source 131 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	2351	3925			1	0.1	0	27.8	
132	Source 132 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	2359	3925			3	0.05	0	27.8	
133	Source 133 FRLES, CMS, diesel-generator plant; diesel generator DGA-24	444	1	702	3844			4	0.06	0.041	99	
134	Source 134 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	698	3863			1	0.05	0	27.8	
135	Source 135 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	699	3872			3	0.05	0	27.8	
136	Source 136 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200	444	1	1294	3283			5.5	0.095	0.143	79	
137	Source 137 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200	444	1	1286	3283			5.5	0.095	0.153	91	

138	Source 138 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	1321	3283			1	0.1	0	27.8	
139	Source 139 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	1310	3283			3	0.05	0	27.8	
140	Source 140 FRLES, CMS, diesel-generator plant; diesel generator 8041 Iveko	444	1	2564	2914			2.3	0.055	0.045	122	
141	Source 141 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	2574	2925			1	0.1	0	27.8	
142	Source 142 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	2583	2925			3	0.05	0	27.8	
143	Source 143 FRLES, CMS, diesel-generator plant; diesel generator 8041 Iveko	444	1	2541	2339			2.3	0.055	0.044	119	
144	Source 144 (DF reservoir filler neck)	444	1	2561	2348			1	0.1	0	27.8	
145	Source 145 SRSTZM, CMS, diesel generator plant;	444	1	2552	2348			3	0.05	0	27.8	

	generator unit; DF reservoir											
146	Source 146 FRLES, CMS, diesel-generator plant; diesel generator DGA-24	444	1	917	2446			4	0.075	0.05	93	
147	Source 147 FRLES, CMS, diesel-generator plant; diesel generator AD-10	444	1	931	2446			4.4	0.055	0.034	60	
148	Source 148 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	904	2472			1	0.05	0	27.8	
149	Source 149 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	904	2481			3	0.05	0	27.8	
150	Source 150 FRLES, CMS, diesel-generator plant; diesel generator ASDA-12 No 1	444	1	949	1988			3.5	0.055	0.028	77	
151	Source 151 FRLES, CMS, diesel-generator plant; diesel generator ASDA-12 No 2	444	1	948	1997			3.5	0.055	0.031	65	
152	Source 152 FRLES, CMS, diesel-generator plant;	444	1	2825	11215			4	0.055	0.03	68	

	Diesel generator “ASDA-12” No. 1											
153	Source 153 FRLES, CMS, diesel-generator plant; diesel generator ASDA-12 No 2	444	1	2825	11214			4	0.055	0.029	69	
154	Source 154 diesel-generator unit P40P1	444	1	1721	7015			1.5	0.065	0.078	173	
156	Source 156 storage hangar, mechanical area; welding station	444	1	1398	7273			10	0.15	0.559	20	
157	Source 157 storage hangar, maintenance site; internal combustion engine	444	1	1386	7248			8	0.12	0.089	22	
158	Source 158 storage hangar, washing station; washing machine Kärcher	444	1	1388	7227			3.5	0.12	0.029	158	
159	Source 159 HPB No 1; boiler unit "HWK 10000" st. No 1	444	1	1560	6393			30	1	4.521	128	
166	Source 166 terminal D; diesel-generator unit; diesel-generator	444	1	2212	6945			15.4	0.5	6.8	500	

	SDMO X2800 №1											
167	Source 167 terminal D; diesel-generator unit; diesel-generator SDMC X2800 No 2	444	1	2212	6958			15.4	0.5	6.8	500	
168	Source 168 terminal D, diesel generator plant; supply tank - 4 units	444	1	2224	6952			3	0.05	0	27.8	
169	Source 169 terminal D, DF reservoir	444	1	2200	6877			3	0.05	0	27.8	
170	Source 170 terminal D, DF reservoir filler neck	444	1	2200	6888			1	0.1	0	27.8	
174	Source 174, FRLES, TP-1023, welding station	444	1	1234	7300			2.7	0.1	0.077	16	
175	Source 175 FOMS, FOMP and SR, CFS, laboratories FOM No 1 and of special fluid No 2; analysis sites - 4 units	444	1	1696	5008			5.5	0.26	0.242	19	
176	Source 176 FFS 2; (modular FFS-30); HST-20	444	1	1623	5606			1	0.1	0	27.4	

177	Source 177 FFS 2; (modular FFS-30); filler neck HST-20	444	1	1623	5607			1	0.1	0	27.4	
178	Source 178 FFS 2; (modular FFS-30); HST-10	444	1	1627	5606			3	0.05	0	27.4	
179	Source 179 FFS 2; (modular FFS-30); filler neck HST-10	444	1	1627	5607			1	0.1	0	27.4	
180	Source 180 FFS 2; (modular FFS-30); dispensing gun; (car tank)	444	1	1630	5607			1	0.1	0	27.4	
181	Source 181 FFS 3; (modular FFS-30); HST-20	444	1	2213	7650			3	0.05	0	27.4	
182	Source 182 FFS 3; (modular FFS-30); filler neck HST-20	444	1	2213	6751			1	0.1	0	27.4	
183	Source 183 FFS 3; (modular FFS-30); HST-10	444	1	2217	7650			3	0.05	0	27.4	
184	Source 30 FFS 3;	444	1	2217	7651			1	0.1	0	27.4	

	(modular FFS-30); filler neck HST-10											
185	Source 185 FFS 3; (modular FFS-30); dispensing gun; (car tank)	444	1	2220	7651			1	0.1	0	27.4	
186	Source 186 EVS, repair shop; internal combustion engine – 3 units	444	1	1596	7430			9.2	0.63	2.56	18	
187	Source 187 EVS, repair shop; internal combustion engine – 3 units	444	1	1537	7435			9.2	0.63	2.52	18	
188	Source 188 EVS, repair shop; internal combustion engine – 3 units	444	1	1534	7445			9.2	0.63	2.51	18	
189	Source 189 EVS, diagnostics shop; internal combustion engine - 1 unit	444	1	1534	7446			9.2	0.4	0.696	18	
190	RW-1 (runway (aircraft)	-3	1	2501	6118	560	4600	2		0	27.4	
191	apron of terminal D (mobile,	-3	1	2281	7166	200	800	2		0	27.4	

			motor transport))										
		192	apron of terminal B (mobile, motor transport)	-3	1	1912	5506	225	620	2		0	27.4	
		193	apron of terminal F (mobile, motor transport)	-3	1	1318	6500	225	1500	2		0	27.4	
		200	RW-2 (runway (aircraft)	-3	1	1092	5402	650	4000	2		0	27.4	

TABLE 4. Specification of emission composition of the source

City code	Production site code	Source code	Substance code	Total emissions, tons/year	Coefficient of ordered sedimentation of the substance	Maximum emissions (g/sec), at a wind speed of									
						0.5 m/sec	1 m/sec	2 m/sec	4 m/sec	6 m/sec	8 m/sec	10 m/sec	12 m/sec	14 m/sec	16 m/sec
1	1	1	03000 ---- 2902	0.02073	1	0.04									
		3	01003 ---- 123	0.000607	1	0.00201									
			01104 ---- 143	5.3E-5	1	0.000148									
			04001 ---- 301	0.001523	1	0.007334									
			06000 ---- 337	0.00012	1	0.000666									
		4	01003 ---- 123	0.000433	1	0.00138									
			01104 ---- 143	4.7E-5	1	0.000134									
		5	01003 ---- 123	0.00026	1	0.0004									
			01104 ---- 143	2.6E-5	1	3.7E-5									
			04001 ---- 301	0.000381	1	0.001833									
			06000 ---- 337	3E-5	1	0.000167									
		6	11000 ---- 2754	4E-8	1	1E-8									
		7	03000 ---- 2902	0.12649	1	0.03798									
		8	03000 ---- 2902	0.10521	1	0.03165									
		9	03000 ---- 2902	0.22639	1	0.09207									
		10	03000	0.07367	1	0.04199									

		11	03000-------2902	3.4E-5	1	0.00221									
			03000-------10368	2.2E-5	1	0.000134									
		12	11000-------1042	0.001305	1	0.0123									
			11000-------1061	0.001958	1	0.0081									
			11000-------2732	0.020256	1	0.0348									
			11007-------1401	0.000914	1	0.00361									
			11009-------1210	0.001305	1	0.0083									
			11020-------1246	0.001044	1	0.0052									
			11041-------621	0.006525	1	0.0188									
		13	04001-------301	2E-6	1	0.00427									
			06000-------337	0.000237	1	0.065									
			11000-------2754	4E-7	1	0.00034									
		14	04001-------301	2E-6	1	0.00439									
			06000-------337	0.000237	1	0.064									
			11000-------2754	4E-7	1	0.00034									
		15	04001-------301	2.9E-5	1	0.0184									
			06000-------337	0.001123	1	0.188									
			11000	4.2E-	1										

	------- 2754	6		0.000544									
16	03000 ------- 2902	0.00082	1	0.00332									
17	11000 ------- 2732	0.00844	1	0.131									
18	11000 ------- 1061	0.001376	1	0.000956									
	11000 ------- 1319	0.001376	1	0.000956									
	11000 ------- 2732	0.006423	1	0.00446									
	11000 ------- 2735	1.1E-5	1	0.0003									
19	03000 ------- 2902	0.000513	1	0.0027									
20	- ------- 10226	1.5E-5	1	0.000131									
	01003 ------- 123	0.000937	1	0.00153									
	01010 ------- 203	2E-6	1	3E-6									
	01104 ------- 143	9.93E-5	1	0.0005									
	03000 ------- 323	5.3E-5	1	0.000472									
	04001 ------- 301	0.0001614	1	0.009167									
	06000 ------- 337	0.000293	1	0.000411									
22	03000 ------- 2902	0.0032	1	0.0089									
23	01009 ------- 184	8E-7	1	6E-6									
	05001 -------	3E-7	1	2E-7									

			330												
			06000 ------- 337	4E-7	1	3E-7									
			11000 ------- 514	1E-5	1	7E-6									
			11000 ------- 2704	0.03075	1	0.0214									
			11000 ------- 2754	2.3E-5	1	1.6E-5									
			11001 ------- 2001	3E-6	1	2E-6									
		24	05004 ------- 322	0.000843	1	0.000378									
		25	04001 ------- 301	0.000737	1	0.00332									
			06000 ------- 337	0.001032	1	0.00433									
			11000 ------- 2754	0.000103	1	0.000478									
		26	04001 ------- 301	1.3E-5	1	0.00428									
			06000 ------- 337	0.002089	1	0.064									
			11000 ------- 2754	1.8E-6	1	0.00034									
		27	03000 ------- 2902	0.00336	1	0.0106									
		28	04001 ------- 301	0.004124	1	0.001256									
			06000 ------- 337	0.018454	1	0.037684									
			11000 ------- 2754	0.000577	1	0.000176									
		29	04001 ------- 301	0.000336	1	0.00011									

			06000 ------- 337	0.001624	1	0.003316									
			11000 ------- 2754	5.1E-5	1	1.5E-5									
		30	03000 ------- 2902	0.000458	1	0.0235									
			11000 ------- 1042	0.007407	1	0.043									
			11000 ------- 1061	0.001384	1	0.066									
			11000 ------- 2750	0.006645	1	0.005171									
			11000 ------- 2752	0.023394	1	0.204									
			11000 ------- 10411	0.00735	1	0.005719									
			11007 ------- 1401	0.000553	1	0.0221									
			11009 ------- 1210	0.023228	1	0.041									
			11020 ------- 1246	0.003255	1	0.0381									
			11021 ------- 1240	0.00638	1	0.0338									
			11030 ------- 616	0.027389	1	0.066									
			11041 ------- 621	0.015264	1	0.0325									
		31	03000 ------- 2902	0.000485	1	0.0248									
			11000 ------- 1042	0.007858	1	0.045									
			11000 ------- 1061	0.001467	1	0.069									
			11000		1										

	------- 2750	0.00705		0.005485									
	11000 ------- 2752	0.024816	1	0.217									
	11000 ------- 10411	0.007797	1	0.006067									
	11007 ------- 1401	0.000587	1	0.0227									
	11009 ------- 1210	0.02464	1	0.042									
	11020 ------- 1246	0.003453	1	0.04									
	11021 ------- 1240	0.006767	1	0.0351									
	11030 ------- 616	0.029054	1	0.07									
	11041 ------- 621	0.016193	1	0.0345									
32	03000 ------- 2902	0.000651	1	0.00362									
	04001 ------- 301	0.015358	1	0.01271									
	04002 ------- 11815	0.000277	1	8.78E-6									
	05001 ------- 330	0.02604	1	0.00378									
	06000 ------- 337	0.126294	1	0.10185									
	07000 ------- 11812	20.507	1	0.65									
	12000 ------- 410	0.000832	1	2.6E-5									
33	03000 ------- 2902	0.000651	1	0.0034									
	04001 -------	0.016683	1	0.01426									

			301											
			04002 ------- 11815	0.000277	1	8.78E-6								
			05001 ------- 330	0.02604	1	0.00427								
			06000 ------- 337	0.116627	1	0.09719								
			07000 ------- 11812	20.507	1	0.65								
			12000 ------- 410	0.000832	1	9.5E-5								
		34	03000 ------- 2902	0.000168	1	0.029								
			11037 ------- 620	0.005588	1	0.0096								
		35	03000 ------- 2902	0.00017	1	0.0308								
			11037 ------- 620	0.005662	1	0.0097								
		36	11000 ------- 1042	0.000218	1	0.000303								
			11000 ------- 1061	4.1E-5	1	5.7E-5								
			11000 ------- 2750	0.000196	1	0.000272								
			11000 ------- 2752	0.000689	1	0.000957								
			11000 ------- 10411	0.000216	1	0.0003								
			11007 ------- 1401	1.6E-5	1	2.2E-5								
			11009 ------- 1210	0.000684	1	0.00095								
			11020 ------- 1246	9.6E-5	1	0.000133								

			11021 ------- 1240	0.000188	1	0.000261									
			11030 ------- 616	0.000807	1	0.001121									
			11041 ------- 621	0.000449	1	0.000624									
		37	11000 ------- 1042	0.000193	1	0.00083									
			11000 ------- 1061	3.6E-5	1	0.0014									
			11000 ------- 2750	0.000173	1	0.0014									
			11000 ------- 2752	0.00061	1	0.0014									
			11000 ------- 10411	0.000192	1	0.00083									
			11007 ------- 1401	1.4E-5	1	0.0027									
			11009 ------- 1210	0.000605	1	0.00055									
			11020 ------- 1246	8.4E-5	1	0.00055									
			11021 ------- 1240	0.000166	1	0.00083									
			11030 ------- 616	0.000714	1	0.00083									
			11041 ------- 621	0.000398	1	0.0014									
		38	11000 ------- 1042	0.000103	1	0.000143									
			11000 ------- 1061	1.9E-5	1	2.3E-5									
			11000 ------- 2750	9.2E-5	1	0.000128									
			11000		1										

			------- 2752	0.000325		0.000451									
			11000 ------- 10411	0.000102	1	0.000142									
			11007 ------- 1401	8E-6	1	1.1E-5									
			11009 ------- 1210	0.000322	1	0.000447									
			11020 ------- 1246	4.5E-5	1	6.3E-5									
			11021 ------- 1240	8.9E-5	1	0.000124									
			11030 ------- 616	0.00038	1	0.000528									
			11041 ------- 621	0.000212	1	0.000294									
		39	04001 ------- 301	1.234292	1	0.2153									
			06000 ------- 337	0.023956	1	0.0041									
		40	04001 ------- 301	0.110445	1	0.2108									
			06000 ------- 337	0.0027	1	0.004									
		41	04001 ------- 301	1.993778	1	0.2014									
			06000 ------- 337	0.037157	1	0.0041									
		42	03000 ------- 2902	3.2E-5	1	0.0075									
			04001 ------- 301	0.004321	1	0.03667									
			05001 ------- 330	0.002124	1	0.01229									
			06000 -------	0.20289	1	0.165									

	337												
43	11000 ------- 2732	2E-10	1	1E-6									
44	11000 ------- 2732	2E-10	1	1E-7									
45	03000 ------- 2902	0.000172	1	0.0048									
	04001 ------- 301	0.020198	1	0.0218									
	05001 ------- 330	0.011439	1	0.01035									
	06000 ------- 337	0.162544	1	0.1718									
46	11000 ------- 2732	7E-9	1	5E-6									
47	11000 ------- 2732	4.3E-5	1	3E-6									
48	11000 ------- 2754	1.8E-5	1	6E-7									
49	11000 ------- 2754	6E-9	1	6E-7									
51	04001 ------- 301	0.002792	1	0.003102									
	06000 ------- 337	0.105159	1	0.116843									
	11000 ------- 2754	0.000391	1	0.000435									
52	04001 ------- 301	0.002792	1	0.003102									
	06000 ------- 337	0.105159	1	0.116843									
	11000 ------- 2754	0.000391	1	0.000435									
53	11000 ------- 2704	0.000203	1	0.006773									

54	11000 ------- 2704	0.41511	1	0.013163									
55	11000 ------- 2704	0.000834	1	0.003483									
56	11000 ------- 2704	8.5E-6	1	0.001391									
57	11000 ------- 2704	0.085226	1	0.002703									
58	11000 ------- 2704	3.5E-5	1	0.000709									
59	11000 ------- 2754	4E-7	1	5E-6									
60	11000 ------- 2754	9.6E-5	1	3E-6									
61	11000 ------- 2754	1.6E-6	1	2.5E-6									
62	11000 ------- 2704	0.000154	1	0.005911									
63	11000 ------- 2704	0.362287	1	0.011488									
64	11000 ------- 2704	0.000635	1	0.00304									
65	11000 ------- 2754	1.6E-7	1	3E-6									
66	11000 ------- 2754	6.6E-5	1	2.1E-6									
67	11000 ------- 2754	1.7E-6	1	2E-6									
68	11000 ------- 2732	7.6E-7	1	6.3E-5									
	11000 ------- 2754	2E-8	1	1E-6									
69	11000 ------- 2732	0.000675	1	4.3E-5									
	11000	1.5E-	1										

			------- 2754	5		9.4E-7									
		70	11000 ------- 2732	3E-6	1	3.2E-5									
			11000 ------- 2754	1E-7	1	8E-7									
		71	11000 ------- 2754	4E-7	1	6E-6									
		72	11000 ------- 2754	0.000123	1	4E-6									
		73	11000 ------- 2754	2E-6	1	3E-6									
		74	04001 ------- 301	1.484105	1	0.48892									
			06000 ------- 337	0.071406	1	0.02705									
		75	04001 ------- 301	0.283522	1	0.035									
			06000 ------- 337	0.018927	1	0.0017									
		76	04001 ------- 301	0.290267	1	0.0325									
			06000 ------- 337	0.020315	1	0.0017									
		77	- ------- 150	0.000346	1	0.000333									
		78	05004 ------- 322	0.001019	1	0.000261									
		79	- ------- 10226	0.000123	1	0.000131									
			01002 ------- 110	3E-6	1	0.000114									
			01003 ------- 123	0.004435	1	0.0039									
			01010 -------	1.2E-5	1	0.000307									

			203											
			01104 ------- 143	0.000511	1	0.00053								
			03000 ------- 323	0.000451	1	0.000472								
			04001 ------- 301	0.001312	1	0.009167								
			06000 ------- 337	0.000615	1	0.00355								
			16000 ------- 343	2.44E-5	1	0.00128								
			16000 ------- 344	3.5E-5	1	0.00072								
			16001 ------- 342	2.2E-5	1	0.000499								
		80	- ------- 10226	8.3E-5	1	0.000131								
			01003 ------- 123	0.048626	1	0.003973								
			01010 ------- 203	1.4E-5	1	0.000307								
			01104 ------- 143	0.001792	1	0.00052								
			03000 ------- 323	0.000311	1	0.000472								
			04001 ------- 301	0.00909	1	0.009167								
			06000 ------- 337	0.009922	1	0.00355								
			16000 ------- 343	2.45E-5	1	0.00128								
			16000 ------- 344	4E-5	1	0.00072								
			16001 ------- 342	1.4E-5	1	0.000336								

81	05004 ------- 322	0.021913	1	0.002739									
82	- ------- 150	0.00131	1	0.0005									
83	05004 ------- 322	0.01867	1	0.002331									
84	05004 ------- 322	0.066263	1	0.004014									
85	- ------- 150	0.005776	1	1.8E-5									
86	- ------- 150	0.003136	1	3.3E-5									
94	11000 ------- 2732	0.0894	1	0.0096									
	11000 ------- 2735	0.000383	1	0.000222									
95	11000 ------- 1056	0.00143	1	0.000917									
	11020 ------- 1246	0.00296	1	0.0019									
96	- ------- 10226	1E-5	1	0.000131									
	01003 ------- 123	0.00012	1	0.0016									
	01104 ------- 143	3.3E-5	1	0.000435									
	03000 ------- 323	3.5E-5	1	0.000472									
97	05004 ------- 322	0.000266	1	0.000188									
101	03000 ------- 2902	2E-5	1	0.000646									
	05001 ------- 330	1E-5	1	0.000396									
	06000		1										

		------- 337	0.0009		0.033396									
		11000 ------- 2754	0.001	1	0.0333									
102		11000 ------- 2754	4.2E-13	1	2.3E-10									
103		11000 ------- 2754	6E-8	1	2E-9									
104		03000 ------- 2902	6E-5	1	0.002352									
		04001 ------- 301	0.0013	1	0.047724									
		05001 ------- 330	4E-5	1	0.00164									
		06000 ------- 337	0.0004	1	0.016072									
		11000 ------- 2754	0.0069	1	0.24									
105		11000 ------- 2754	3E-12	1	2E-9									
107		03000 ------- 2902	4.24E-5	1	0.00162									
		04001 ------- 301	0.0003	1	0.00928									
		05001 ------- 330	4.24E-5	1	0.00164									
		06000 ------- 337	0.0028	1	0.10432									
		11000 ------- 2754	0.0008	1	0.0267									
108		11000 ------- 2754	3.3E-13	1	1.9E-10									
109		11000 ------- 2754	4E-8	1	1E-9									
110		03000 -------	2.02E-5	1	0.000752									

	2902												
	04001 ------- 301	0.0001	1	0.005181									
	05001 ------- 330	2.15E-5	1	0.000858									
	06000 ------- 337	0.0011	1	0.044451									
	11000 ------- 2754	0.0005	1	0.016									
111	03000 ------- 2902	2.73E-5	1	0.001091									
	04001 ------- 301	0.0005	1	0.018334									
	05001 ------- 330	2.85E-5	1	0.001133									
	06000 ------- 337	0.0006	1	0.020394									
	11000 ------- 2754	0.0052	1	0.18									
112	03000 ------- 2902	3.91E-5	1	0.001518									
	04001 ------- 301	0.0006	1	0.022201									
	05001 ------- 330	3.78E-5	1	0.00149									
	06000 ------- 337	0.0008	1	0.027714									
	11000 ------- 2754	0.0052	1	0.18									
113	03000 ------- 2902	3.56E-5	1	0.001357									
	04001 ------- 301	0.0007	1	0.023852									
	05001 ------- 330	3.09E-5	1	0.001206									

			06000 ------- 337	0.0006	1	0.021172									
			11000 ------- 2754	0.0052	1	0.18									
		114	03000 ------- 2902	2.86E-5	1	0.00108									
			04001 ------- 301	0.0004	1	0.015478									
			05001 ------- 330	2.64E-5	1	0.000981									
			06000 ------- 337	0.0006	1	0.020928									
			11000 ------- 2754	0.0052	1	0.18									
		115	11000 ------- 2754	2.3E-12	1	1E-9									
		116	11000 ------- 2754	3E-7	1	1E-8									
		117	03000 ------- 2902	2.75E-5	1	0.001034									
			04001 ------- 301	0.0002	1	0.008729									
			05001 ------- 330	2.5E-5	1	0.001032									
			06000 ------- 337	0.0013	1	0.047472									
			11000 ------- 2754	0.0008	1	0.0267									
		118	11000 ------- 2754	3.3E-13	1	1.9E-10									
		119	11000 ------- 2754	4E-8	1	1E-9									
		120	03000 ------- 2902	3E-5	1	0.001123									
			04001		1										

			------- 301	0.0006		0.022448									
			05001 ------- 330	2E-5	1	0.00092									
			06000 ------- 337	0.0016	1	0.058972									
			11000 ------- 2754	0.0016	1	0.0567									
		121	03000 ------- 2902	2E-5	1	0.001267									
			04001 ------- 301	0.0006	1	0.021344									
			05001 ------- 330	3E-5	1	0.001012									
			06000 ------- 337	0.0017	1	0.060168									
			11000 ------- 2754	0.0016	1	0.0567									
		122	11000 ------- 2754	7.1E-13	1	3.9E-10									
		123	11000 ------- 2754	9E-8	1	3E-9									
		124	03000 ------- 2902	5.66E-5	1	0.002081									
			04001 ------- 301	0.0005	1	0.019886									
			05001 ------- 330	3.44E-5	1	0.001342									
			06000 ------- 337	0.0008	1	0.02806									
			11000 ------- 2754	0.0052	1	0.18									
		125	03000 ------- 2902	6.02E-5	1	0.002314									
			04001 -------	0.0006	1	0.0217									

			301											
			05001 ------- 330	4.76E-5	1	0.00182								
			06000 ------- 337	0.0009	1	0.03136								
			11000 ------- 2754	0.0052	1	0.18								
		126	03000 ------- 2902	5.97E-5	1	0.002248								
			04001 ------- 301	0.0005	1	0.019176								
			05001 ------- 330	4.86E-5	1	0.001904								
			06000 ------- 337	0.0009	1	0.031416								
			11000 ------- 2754	0.0052	1	0.18								
		127	03000 ------- 2902	6.57E-5	1	0.002451								
			04001 ------- 301	0.0006	1	0.022922								
			05001 ------- 330	5.47E-5	1	0.00219								
			06000 ------- 337	0.001	1	0.035332								
			11000 ------- 2754	0.0052	1	0.18								
		128	11000 ------- 2754	2.3E-12	1	1E-9								
		129	11000 ------- 2754	3E-7	1	1E-8								
		130	03000 ------- 2902	6E-5	1	0.002437								
			04001 ------- 301	0.0061	1	0.056265								

			05001 ------- 330	4E-5	1	0.001485									
			06000 ------- 337	0.0003	1	0.011385									
			11000 ------- 2754	0.0069	1	0.24									
		131	11000 ------- 2754	3E-12	1	2E-9									
		132	11000 ------- 2754	4E-7	1	1E-8									
		133	03000 ------- 2902	2.89E-5	1	0.001143									
			04001 ------- 301	0.0003	1	0.012833									
			05001 ------- 330	3.38E-5	1	0.001271									
			06000 ------- 337	0.0027	1	0.099261									
			11000 ------- 2754	0.0008	1	0.0267									
		134	11000 ------- 2754	3.3E-13	1	1.9E-10									
		135	11000 ------- 2754	4E-8	1	1E-9									
		136	03000 ------- 2902	7.81E-5	1	0.002863									
			04001 ------- 301	0.0004	1	0.014872									
			05001 ------- 330	6.18E-5	1	0.002431									
			06000 ------- 337	0.0052	1	0.190905									
			11000 ------- 2754	0.0052	1	0.18									
			03000		1										

137	------- 2902	7.77E-5		0.002928										
	04001 ------- 301	0.0006	1	0.023562										
	05001 ------- 330	5.11E-5	1	0.001989										
	06000 ------- 337	0.0036	1	0.128673										
	11000 ------- 2754	0.0052	1	0.18										
138	11000 ------- 2754	2.3E-12	1	1E-9										
139	11000 ------- 2754	3E-7	1	1E-8										
140	03000 ------- 2902	2E-5	1	0.000704										
	04001 ------- 301	0.0004	1	0.013635										
	05001 ------- 330	1E-5	1	0.00045										
	06000 ------- 337	0.0009	1	0.032805										
	11000 ------- 2754	0.001	1	0.0333										
141	11000 ------- 2754	4.2E-13	1	2.3E-10										
142	11000 ------- 2754	6E-8	1	2E-9										
143	03000 ------- 2902	2E-5	1	0.000766										
	04001 ------- 301	0.0003	1	0.012056										
	05001 ------- 330	1E-5	1	0.000528										
	06000 -------	0.0009	1	0.03146										

	337													
	11000 ------- 2754	0.001	1	0.0333										
144	11000 ------- 2754	4.2E-13	1	2.3E-10										
145	11000 ------- 2754	6E-8	1	2E-9										
146	03000 ------- 2902	1.94E-5	1	0.00075										
	04001 ------- 301	0.0005	1	0.0196										
	05001 ------- 330	1.87E-5	1	0.00075										
	06000 ------- 337	0.0018	1	0.06205										
	11000 ------- 2754	0.0008	1	0.0267										
147	03000 ------- 2902	1.35E-5	1	0.000506										
	04001 ------- 301	0.000123	1	0.004658										
	05001 ------- 330	1.31E-5	1	0.000544										
	06000 ------- 337	0.0012	1	0.044744										
	11000 ------- 2754	0.0005	1	0.016										
148	11000 ------- 2754	3.3E-13	1	1.9E-10										
149	11000 ------- 2754	4E-8	1	1E-9										
150	03000 ------- 2902	1.36E-5	1	0.000508										
	04001 ------- 301	0.0001	1	0.003976										

			05001 ------- 330	1.61E-5	1	0.000616								
			06000 ------- 337	0.0009	1	0.032228								
			11000 ------- 2754	0.0005	1	0.016								
		151	03000 ------- 2902	1.5E-5	1	0.000562								
			04001 ------- 301	0.0001	1	0.004123								
			05001 ------- 330	1.37E-5	1	0.000558								
			06000 ------- 337	0.001	1	0.038161								
			11000 ------- 2754	0.0005	1	0.016								
		152	03000 ------- 2902	1.19E-5	1	0.000462								
			04001 ------- 301	1.19E-5	1	0.00426								
			05001 ------- 330	9.5E-6	1	0.00039								
			06000 ------- 337	0.0009	1	0.03342								
			11000 ------- 2754	0.0005	1	0.016								
		153	03000 ------- 2902	1.24E-5	1	0.000474								
			04001 ------- 301	0.0001	1	0.004379								
			05001 ------- 330	9.86E-6	1	0.000406								
			06000 ------- 337	0.0008	1	0.027347								
			11000		1									

			------- 2754	0.0005		0.016									
		154	03000 ------- 2902	3E-5	1	0.000776									
			04001 ------- 301	0.001	1	0.024804									
			05001 ------- 330	2E-5	1	0.000624									
			06000 ------- 337	0.0024	1	0.057798									
			11000 ------- 2754	0.0013	1	0.0293									
		156	- ------- 10226	1.5E-5	1	0.000131									
			01003 ------- 123	0.002789	1	0.004									
			01010 ------- 203	1E-6	1	3E-6									
			01104 ------- 143	0.000238	1	0.00061									
			03000 ------- 323	0.000203	1	0.000472									
			04001 ------- 301	0.00044	1	0.00072									
			06000 ------- 337	0.00214	1	0.003547									
			16000 ------- 343	0.00072	1	0.00128									
			16000 ------- 344	0.000405	1	0.00072									
			16001 ------- 342	0.000189	1	0.000336									
		157	04001 ------- 301	0.004897	1	0.0081									
			06000 -------	0.006856	1	0.0195									

			337												
			11000 ------- 2754	0.000685	1	0.000522									
		158	03000 ------- 2902	2.5E-5	1	0.00086									
			04001 ------- 301	0.000679	1	0.004785									
			05001 ------- 330	0.000999	1	0.001508									
			06000 ------- 337	0.000541	1	0.003944									
		159	04001 ------- 301	1.677046	1	0.35042									
			06000 ------- 337	0.150304	1	0.03878									
		166	03000 ------- 2902	0.000321	1	0.022292									
			04001 ------- 301	0.005783	1	4.0125									
			05001 ------- 330	0.000643	1	0.044583									
			06000 ------- 337	0.001606	1	0.111458									
			11000 ------- 2754	0.000771	1	0.0535									
		167	03000 ------- 2902	0.000321	1	0.022292									
			04001 ------- 301	0.005783	1	4.0125									
			05001 ------- 330	0.000643	1	0.044583									
			06000 ------- 337	0.001606	1	0.111458									
			11000 ------- 2754	0.000771	1	0.0535									

168	11000 ------- 2754	8.2E-6	1	2.6E-7									
169	11000 ------- 2754	4.8E-6	1	1.5E-7									
170	11000 ------- 2754	1E-9	1	2E-7									
174	- ------- 10226	7E-6	1	0.000131									
	01003 ------- 123	9E-5	1	0.00078									
	01104 ------- 143	2.4E-5	1	0.000273									
	03000 ------- 323	2.7E-5	1	0.000472									
175	03000 ------- 10442	3.6E-5	1	1E-5									
176	11000 ------- 2754	0.00055	1	1.7E-5									
177	11000 ------- 2754	1E-6	1	2.6E-5									
178	11000 ------- 2732	0.000122	1	8E-6									
	11000 ------- 2754	8.8E-5	1	5E-6									
179	11000 ------- 2732	8E-8	1	1.1E-5									
	11000 ------- 2754	1E-7	1	8E-6									
180	11000 ------- 2732	9E-8	1	6E-6									
	11000 ------- 2754	1.1E-6	1	1.3E-5									
181	11000 ------- 2754	0.000552	1	1E-5									
	11000	5E-7	1										

182	------- 2754			1.5E-5										
183	11000 ------- 2754	0.000489	1	1.5E-5										
184	11000 ------- 2754	1E-6	1	2.3E-5										
185	11000 ------- 2754	1.6E-6	1	6E-7										
186	04001 ------- 301	1.35E-6	1	0.0011										
	06000 ------- 337	5.7E-5	1	0.030356										
	11000 ------- 2754	3.4E-6	1	0.000283										
187	04001 ------- 301	1.33E-6	1	0.001083										
	06000 ------- 337	5.7E-5	1	0.029881										
	11000 ------- 2754	3.3E-6	1	0.000279										
188	04001 ------- 301	1.32E-6	1	0.001078										
	06000 ------- 337	5.6E-5	1	0.029763										
	11000 ------- 2754	3.3E-6	1	0.000278										
189	04001 ------- 301	1.3E-6	1	0.00068										
	06000 ------- 337	0.0002235	1	0.03										
	11000 ------- 2754	4E-7	1	0.000175										
190	03000 ------- 2902		1	0.0007										
	03004 -------		1	0.0007										

			328											
			04001 ------- 301		1	0.095591								
			06000 ------- 337		1	0.335367								
			11000 ------- 2754		1	0.0924051								
		191	03000 ------- 2902		1	0.010423								
			03004 ------- 328		1	0.010423								
			04001 ------- 301		1	0.045406								
			04002 ------- 304		1	0.0002002								
			04003 ------- 303		1	2E-7								
			05001 ------- 330		1	0.006507								
			06000 ------- 337		1	0.09479								
			11000 ------- 2754		1	0.013176								
			12000 ------- 410		1	0.000492								
			13101 ------- 703		1	4.5E-5								
		192	03000 ------- 2902		1	0.003909								
			03004 ------- 328		1	0.003909								
			04001 ------- 301		1	0.017131								
			04002 ------- 304		1	7.525E-5								

			04003 ------- 303		1	8E-8									
			06000 ------- 337		1	0.037018									
			11000 ------- 2754		1	0.0052194									
			12000 ------- 410		1	0.000196									
			13101 ------- 703		1	3E-6									
		193	03000 ------- 2902		1	0.00456									
			03004 ------- 328		1	0.00456									
			04001 ------- 301		1	0.019935									
			04002 ------- 304		1	0.00087									
			04003 ------- 303		1	8E-8									
			05001 ------- 330		1	0.002849									
			06000 ------- 337		1	0.042122									
			11000 ------- 2754		1	0.0059864									
			12000 ------- 410		1	0.000229									
			13101 ------- 703		1	2E-5									
		200	03000 ------- 2902		1	0.000473									
			03004 ------- 328		1	0.000473									
			04001		1										

			------- 301			0.13598										
			06000 ------- 337		1	0.161769										
			11000 ------- 2754		1	0.0105502										

TABLE 5. Description of harmful substances

Substance code	Substance name	MPC	Coefficient of ordered sedimentation
- ------- 150	Sodium hydroxide (lye, caustic soda)	0.01	1
- ------- 10226	Titanium dioxide	0.5	1
01002 ------- 110	Vanadium and its compounds (in terms of vanadium pentoxide)	0.02	1
01003 ------- 123	Iron and its compounds (in terms of iron)	0.4	1
01009 ------- 184	Lead and its compounds (in terms of lead)	0.001	1
01010 ------- 203	Chromium and its compounds (in terms of chromium trioxide)	0.002	1
01104 ------- 143	Mangan and its compounds (in terms of mangan)	0.01	1
03000 ------- 323	Substances in the form of suspended solid particles (microparticles and fibres)	0.02	1
03000 ------- 2902	Substances in the form of suspended solid particles (microparticles and fibres)	0.5	1
03000 ------- 10368	Substances in the form of suspended solid particles (microparticles and fibres)	0.6	1
03000 ------- 10442	Substances in the form of suspended solid particles (microparticles and fibres)	0	1
03004	Soot	0.15	1
05004 ------- 322	Sulfuric acid (H2S04) (sulphuric acid)	0.3	1
06000 ------- 337	Carbon oxide	5	1
07000 ------- 11812	Carbon dioxide	0	1
11000 ------- 514	Non-methane volatile organic compounds (NMVOC):	0.1	1
11000 ------- 1042	Non-methane volatile organic compounds (NMVOC):	0.1	1
11000 ------- 1056	Non-methane volatile organic compounds (NMVOC):	0.05	1
11000 ------- 1061	Non-methane volatile organic compounds (NMVOC):	5	1
11000 ------- 1319	Non-methane volatile organic compounds (NMVOC):	0.05	1

11000 ------- 2704	Non-methane volatile organic compounds (NMVOC):	5	1
11000 ------- 2732	Non-methane volatile organic compounds (NMVOC):	1.2	1
11000 ------- 2735	Non-methane volatile organic compounds (NMVOC):	0.05	1
11000 ------- 2750	Non-methane volatile organic compounds (NMVOC):	0.2	1
11000 ------- 2752	Non-methane volatile organic compounds (NMVOC):	1	1
11000 ------- 2754	Non-methane volatile organic compounds (NMVOC):	1	1
11000 ------- 10411	Non-methane volatile organic compounds (NMVOC):	0	1
11001 ------- 2001	Acrylonitrile	0.3	1
11007 ------- 1401	Acetone	0.35	1
11009 ------- 1210	Butyl acetate	0.1	1
11020 ------- 1246	Ethylcellosolve	0.7	1
11021 ------- 1240	Ethyl acetate	0.1	1
11030 ------- 616	Xylene	0.2	1
11037 ------- 620	Styrene	0.04	1
11041 ------- 621	Toluene	0.6	1
12000 ------- 410	Methane	50	1
13101 ------- 703	Benzo[a]pyrene	0.0001	1
16000 ------- 343	Fluor and its compounds (in terms of fluor)	0.03	1
16000 ------- 344	Fluor and its compounds (in terms of fluor)	0.2	1
16001 ------- 342	Hydrogen fluoride	0.02	1

TABLE 6. Description of harmful substances summation groups

Group code	Substances comprising the summation groups (codes)										Coefficient potent.
	1	2	3	4	5	6	7	8	9	10	
10	01002 / 110	01104 / 143									1
11	01002 / 110	05001 / 330									1
12	01002 / 110	01010 / 203									1
27	01009 / 184	05001 / 330									1
28	05004 / 322	05001 / 330									1
31	04001 / 301	05001 / 330									1
35	05001 / 330	16001 / 342									1
37	04001 / 301	04003 / 303	04002 / 304	05001 / 330							1
11002	16001 / 342	16000 / 344									1

Production suites and summation groups for calculation

City code	Production site code	Production site name	Summation group code	Codes of substances included in the summation group	Emission rate (g/sec)
1	1	Production site	10	1002 / 110 1104 / 143	0.003301
			11	1002 / 110 5001 / 330	0.1624402
			12	1002 / 110 1010 / 203	0.000734
			27	1009 / 184 5001 / 330	0.1623322
			28	5004 / 322 5001 / 330	0.1722372
			31	4001 / 301 5001 / 330	10.6948712
			35	5001 / 330 16001 / 342	0.1634972
			37	4001 / 301 4003 / 303 4002 / 304 5001 / 330	10.69601701
			11002	16001 / 342 16000 / 344	0.003331

List of sources emissions of which comprise substances from summation groups for calculation

City code	Summation group code	Codes of substance included in the summation group	Production site code	Source code	Emission g/sec	Emission tones/year	Hazard class.	Coordinate of a point source, or a beginning of a line source, or a centre of symmetry of a planar source		Coordinate of an end of a line source, or length and width of a planar source, or a point source with a rectangular neck		Source height, m	Diameter of a point source, or a planar source, or velocity of PGVS for a line source,	Flow rate of PGVS, m3/stc	Temperature of PGCS (deg.) C)
								X1, m	Y1, m	X2, m	Y2, m				
1	10	1002 / 110 1104 / 143	1	3	0.000148	5.3E-5		1696	7395			8	0.25	0.557	17
			1	4	0.000134	4.7E-5		1704	7392			7.3	0.25	0.671	17
			1	5	3.7E-5	2.6E-5		1704	7389			7.4	0.2	0.218	17
			1	20	0.0005	9.93E-5		1534	7443			9.2	0.4	0.779	18
			1	79	0.000644	0.000514		2139	5544			7.5	0.89	0.989	16
			1	80	0.00052	0.001792		2143	5540			2	0.5	0.294	27.8
			1	96	0.000435	3.3E-5		1729	7085			2	0.5	0.294	27.8
			1	156	0.00061	0.000238		1398	7273			10	0.15	0.559	20
			1	174	0.000273	2.4E-5		1234	7300			2.7	0.1	0.077	16
	11	1002 / 110 5001 / 330	1	23	2E-7	3E-7		1558	7442			10	0.5	0.794	18
			1	32	0.00378	0.02604		1503	7429			9.9	0.24	0.097	118
			1	33	0.00427	0.02604		1503	7431			9.9	0.24	0.097	131
			1	42	0.01229	0.002124		2196	5555			1.5	0.15	0.189	345
			1	45	0.01035	0.011439		1603	5085			1.5	0.15	0.138	278
			1	79	0.000114	3E-6		2139	5544			7.5	0.89	0.989	16
			1	101	0.000396	1E-5		2385	9190			2.3	0.055	0.044	120
			1	104	0.00164	4E-5		2309	8222			2.3	0.16	0.164	133
			1	107	0.00164	4.24E-5		900	8357			3	0.06	0.04	129
			1	110	0.000858	2.15E-5		887	8357			2.5	0.05	0.033	72
			1	111	0.001133	2.85E-5		1284	7293			5.5	0.095	0.103	119
			1	112	0.00149	3.78E-5		1284	7287			5.5	0.095	0.149	122
			1	113	0.001206	3.09E-5		1283	7281			5.5	0.095	0.134	97
			1	114	0.000981	2.64E-5		1283	7276			5.5	0.095	0.109	74
			1	117	0.001032	2.5E-5		743	6942			4	0.09	0.043	128
			1	120	0.00092	2E-5		2190	5852			4.5	0.07	0.092	165
			1	121	0.001012	3E-5		2193	5846			4.5	0.07	0.092	162
			1	124	0.001342	3.44E-5		2193	5825			4	0.095	0.122	88
			1	125	0.00182	4.76E-5		2193	5819			4	0.095	0.14	91
			1	126	0.001904	4.86E-5		2193	5813			4	0.095	0.136	89
			1	127	0.00219	5.47E-5		2193	5807			4	0.095	0.146	87
			1	130	0.001485	4E-5		2364	3939			2.3	0.16	0.165	139
			1	133	0.001271	3.38E-5		702	3844			4	0.06	0.041	99
			1	136	0.002431	6.18E-5		1294	3283			5.5	0.095	0.143	79
			1	137	0.001989	5.11E-5		1286	3283			5.5	0.095	0.153	91
			1	140	0.00045	1E-5		2564	2914			2.3	0.055	0.045	122
			1	143	0.000528	1E-5		2541	2339			2.3	0.055	0.044	119
			1	146	0.00075	1.87E-5		917	2446			4	0.075	0.05	93
			1	147	0.000544	1.31E-5		931	2446			4.4	0.055	0.034	60
			1	150	0.000616	1.61E-5		949	1988			3.5	0.055	0.028	77
			1	151	0.000558	1.37E-5		948	1997			3.5	0.055	0.031	65

			1	152	0.00039	9.5E-6		2825	11215			4	0.055	0.03	68
			1	153	0.000406	9.86E-6		2825	11214			4	0.055	0.029	69
			1	154	0.000624	2E-5		1721	7015			1.5	0.065	0.078	173
			1	158	0.001508	0.000999		1388	7227			3.5	0.12	0.029	158
			1	166	0.044583	0.000643		2212	6945			15.4	0.5	6.8	500
			1	167	0.044583	0.000643		2212	6958			15.4	0.5	6.8	500
			1	191	0.006507			2281	7166	200	800	2		0	27.4
			1	193	0.002849			1318	6500	225	1500	2		0	27.4
	12	1002 / 110 1010 / 203	1	20	3E-6	2E-6		1534	7443			9.2	0.4	0.779	18
			1	79	0.000421	1.5E-5		2139	5544			7.5	0.89	0.989	16
			1	80	0.000307	1.4E-5		2143	5540			2	0.5	0.294	27.8
			1	156	3E-6	1E-6		1398	7273			10	0.15	0.559	20
	27	1009 / 184 5001 / 330	1	23	6.2E-6	1.1E-6		1558	7442			10	0.5	0.794	18
			1	32	0.00378	0.02604		1503	7429			9.9	0.24	0.097	118
			1	33	0.00427	0.02604		1503	7431			9.9	0.24	0.097	131
			1	42	0.01229	0.002124		2196	5555			1.5	0.15	0.189	345
			1	45	0.01035	0.011439		1603	5085			1.5	0.15	0.138	278
			1	101	0.000396	1E-5		2385	9190			2.3	0.055	0.044	120
			1	104	0.00164	4E-5		2309	8222			2.3	0.16	0.164	133
			1	107	0.00164	4.24E-5		900	8357			3	0.06	0.04	129
			1	110	0.000858	2.15E-5		887	8357			2.5	0.05	0.033	72
			1	111	0.001133	2.85E-5		1284	7293			5.5	0.095	0.103	119
			1	112	0.00149	3.78E-5		1284	7287			5.5	0.095	0.149	122
			1	113	0.001206	3.09E-5		1283	7281			5.5	0.095	0.134	97
			1	114	0.000981	2.64E-5		1283	7276			5.5	0.095	0.109	74
												4			

			1	117	0.001032	2.5E-5		743	6942				0.09	0.043	128
			1	120	0.00092	2E-5		2190	5852			4.5	0.07	0.092	165
			1	121	0.001012	3E-5		2193	5846			4.5	0.07	0.092	162
			1	124	0.001342	3.44E-5		2193	5825			4	0.095	0.122	88
			1	125	0.00182	4.76E-5		2193	5819			4	0.095	0.14	91
			1	126	0.001904	4.86E-5		2193	5813			4	0.095	0.136	89
			1	127	0.00219	5.47E-5		2193	5807			4	0.095	0.146	87
			1	130	0.001485	4E-5		2364	3939			2.3	0.16	0.165	139
			1	133	0.001271	3.38E-5		702	3844			4	0.06	0.041	99
			1	136	0.002431	6.18E-5		1294	3283			5.5	0.095	0.143	79
			1	137	0.001989	5.11E-5		1286	3283			5.5	0.095	0.153	91
			1	140	0.00045	1E-5		2564	2914			2.3	0.055	0.045	122
			1	143	0.000528	1E-5		2541	2339			2.3	0.055	0.044	119
			1	146	0.00075	1.87E-5		917	2446			4	0.075	0.05	93
			1	147	0.000544	1.31E-5		931	2446			4.4	0.055	0.034	60
			1	150	0.000616	1.61E-5		949	1988			3.5	0.055	0.028	77
			1	151	0.000558	1.37E-5		948	1997			3.5	0.055	0.031	65
			1	152	0.00039	9.5E-6		2825	11215			4	0.055	0.03	68
			1	153	0.000406	9.86E-6		2825	11214			4	0.055	0.029	69
			1	154	0.000624	2E-5		1721	7015			1.5	0.065	0.078	173
			1	158	0.001508	0.000999		1388	7227			3.5	0.12	0.029	158
			1	166	0.044583	0.000643		2212	6945			15.4	0.5	6.8	500
			1	167	0.044583	0.000643		2212	6958			15.4	0.5	6.8	500
			1	191	0.006507			2281	7166	200	800	2		0	27.4
			1	193	0.002849			1318	6500	225	1500	2		0	27.4
	28	5004 / 322 5001 / 330	1	23	2E-7	3E-7		1558	7442			10	0.5	0.794	18

1	24	0.000378	0.000843		1550	7437			10	0.315	0.211	18
1	32	0.00378	0.02604		1503	7429			9.9	0.24	0.097	118
1	33	0.00427	0.02604		1503	7431			9.9	0.24	0.097	131
1	42	0.01229	0.002124		2196	5555			1.5	0.15	0.189	345
1	45	0.01035	0.011439		1603	5085			1.5	0.15	0.138	278
1	78	0.000261	0.001019		2141	5580			7.5	0.29	0.596	19
1	81	0.002739	0.021913		2144	5565			2	0.5	0.294	27.8
1	83	0.002331	0.01867		1538	6204			2	0.5	0.294	27.8
1	84	0.004014	0.066263		1524	6178			2	0.5	0.294	27.8
1	97	0.000188	0.000266		1702	7078			11	0.42	0.906	19
1	101	0.000396	1E-5		2385	9190			2.3	0.055	0.044	120
1	104	0.00164	4E-5		2309	8222			2.3	0.16	0.164	133
1	107	0.00164	4.24E-5		900	8357			3	0.06	0.04	129
1	110	0.000858	2.15E-5		887	8357			2.5	0.05	0.033	72
1	111	0.001133	2.85E-5		1284	7293			5.5	0.095	0.103	119
1	112	0.00149	3.78E-5		1284	7287			5.5	0.095	0.149	122
1	113	0.001206	3.09E-5		1283	7281			5.5	0.095	0.134	97
1	114	0.000981	2.64E-5		1283	7276			5.5	0.095	0.109	74
1	117	0.001032	2.5E-5		743	6942			4	0.09	0.043	128
1	120	0.00092	2E-5		2190	5852			4.5	0.07	0.092	165
1	121	0.001012	3E-5		2193	5846			4.5	0.07	0.092	162
1	124	0.001342	3.44E-5		2193	5825			4	0.095	0.122	88
1	125	0.00182	4.76E-5		2193	5819			4	0.095	0.14	91
1	126	0.001904	4.86E-5		2193	5813			4	0.095	0.136	89
1	127	0.00219	5.47E-5		2193	5807			4	0.095	0.146	87
			4E-									

			1	130	0.001485	5		2364	3939			2.3	0.16	0.165	139
			1	133	0.001271	3.38E-5		702	3844			4	0.06	0.041	99
			1	136	0.002431	6.18E-5		1294	3283			5.5	0.095	0.143	79
			1	137	0.001989	5.11E-5		1286	3283			5.5	0.095	0.153	91
			1	140	0.00045	1E-5		2564	2914			2.3	0.055	0.045	122
			1	143	0.000528	1E-5		2541	2339			2.3	0.055	0.044	119
			1	146	0.00075	1.87E-5		917	2446			4	0.075	0.05	93
			1	147	0.000544	1.31E-5		931	2446			4.4	0.055	0.034	60
			1	150	0.000616	1.61E-5		949	1988			3.5	0.055	0.028	77
			1	151	0.000558	1.37E-5		948	1997			3.5	0.055	0.031	65
			1	152	0.00039	9.5E-6		2825	11215			4	0.055	0.03	68
			1	153	0.000406	9.86E-6		2825	11214			4	0.055	0.029	69
			1	154	0.000624	2E-5		1721	7015			1.5	0.065	0.078	173
			1	158	0.001508	0.000999		1388	7227			3.5	0.12	0.029	158
			1	166	0.044583	0.000643		2212	6945			15.4	0.5	6.8	500
			1	167	0.044583	0.000643		2212	6958			15.4	0.5	6.8	500
			1	191	0.006507			2281	7166	200	800	2		0	27.4
			1	193	0.002849			1318	6500	225	1500	2		0	27.4
	31	4001 / 301 5001 / 330	1	3	0.007334	0.001523		1696	7395			8	0.25	0.557	17
			1	5	0.001833	0.000381		1704	7389			7.4	0.2	0.218	17
			1	13	0.00427	2E-6		1580	7430			8	0.2	0.103	18
			1	14	0.00439	2E-6		1580	7436			8	0.2	0.101	18
			1	15	0.0184	2.9E-5		1558	7438			8	0.35	0.427	18
			1	20	0.009167	0.0001614		1534	7443			9.2	0.4	0.779	18
			1	23	2E-7	3E-7		1558	7442			10	0.5	0.794	18
			1	25	0.00332	0.000737		1548	7438			10	0.32	0.346	21

1	26	0.00428	1.3E-5		1535	7451			1.5	0.14	0.101	20
1	28	0.001256	0.004124		1517	7425			8.7	1.2	4.92	19
1	29	0.00011	0.000336		1519	7434			7.5	0.82	0.433	19
1	32	0.01649	0.041398		1503	7429			9.9	0.24	0.097	118
1	33	0.01853	0.042723		1503	7431			9.9	0.24	0.097	131
1	39	0.2153	1.234292		1690	7640			25	0.92	5.59	119.5
1	40	0.2108	0.110445		1690	7646			25	0.92	5.53	121.4
1	41	0.2014	1.993778		1690	7652			25	0.92	5.59	115.3
1	42	0.04896	0.006445		2196	5555			1.5	0.15	0.189	345
1	45	0.03215	0.031637		1603	5085			1.5	0.15	0.138	278
1	51	0.003102	0.002792		1684	5452			5	0.3	0.065	18
1	52	0.003102	0.002792		1684	5442			5	0.3	0.065	18
1	74	0.48892	1.484105		1560	6384			30	1	4.52	134
1	75	0.035	0.283522		1568	6380			12	0.45	0.643	136
1	76	0.0325	0.290267		1576	6379			12	0.45	0.644	138
1	79	0.009167	0.001312		2139	5544			7.5	0.89	0.989	16
1	80	0.009167	0.00909		2143	5540			2	0.5	0.294	27.8
1	101	0.000396	1E-5		2385	9190			2.3	0.055	0.044	120
1	104	0.049364	0.00134		2309	8222			2.3	0.16	0.164	133
1	107	0.01092	0.0003424		900	8357			3	0.06	0.04	129
1	110	0.006039	0.0001215		887	8357			2.5	0.05	0.033	72
1	111	0.019467	0.0005285		1284	7293			5.5	0.095	0.103	119
1	112	0.023691	0.0006378		1284	7287			5.5	0.095	0.149	122
1	113	0.025058	0.0007309		1283	7281			5.5	0.095	0.134	97
1	114	0.016459	0.0004264		1283	7276			5.5	0.095	0.109	74
									4			

1	117	0.009761	0.000225		743	6942				0.09	0.043	128
1	120	0.023368	0.00062		2190	5852			4.5	0.07	0.092	165
1	121	0.022356	0.00063		2193	5846			4.5	0.07	0.092	162
1	124	0.021228	0.0005344		2193	5825			4	0.095	0.122	88
1	125	0.02352	0.0006476		2193	5819			4	0.095	0.14	91
1	126	0.02108	0.0005486		2193	5813			4	0.095	0.136	89
1	127	0.025112	0.0006547		2193	5807			4	0.095	0.146	87
1	130	0.05775	0.00614		2364	3939			2.3	0.16	0.165	139
1	133	0.014104	0.0003338		702	3844			4	0.06	0.041	99
1	136	0.017303	0.0004618		1294	3283			5.5	0.095	0.143	79
1	137	0.025551	0.0006511		1286	3283			5.5	0.095	0.153	91
1	140	0.014085	0.00041		2564	2914			2.3	0.055	0.045	122
1	143	0.012584	0.00031		2541	2339			2.3	0.055	0.044	119
1	146	0.02035	0.0005187		917	2446			4	0.075	0.05	93
1	147	0.005202	0.0001361		931	2446			4.4	0.055	0.034	60
1	150	0.004592	0.0001161		949	1988			3.5	0.055	0.028	77
1	151	0.004681	0.0001137		948	1997			3.5	0.055	0.031	65
1	152	0.00465	2.14E-5		2825	11215			4	0.055	0.03	68
1	153	0.004785	0.00010986		2825	11214			4	0.055	0.029	69
1	154	0.025428	0.00102		1721	7015			1.5	0.065	0.078	173
1	156	0.00072	0.00044		1398	7273			10	0.15	0.559	20
1	157	0.0081	0.004897		1386	7248			8	0.12	0.089	22
1	158	0.006293	0.001678		1388	7227			3.5	0.12	0.029	158
1	159	0.35042	1.677046		1560	6393			30	1	4.521	128
1	166	4.057083	0.006426		2212	6945			15.4	0.5	6.8	500
1	167	4.057083	0.006426		2212	6958			15.4	0.5	6.8	500

			1	186	0.0011	1.35E-6		1596	7430			9.2	0.63	2.56	18
			1	187	0.001083	1.33E-6		1537	7435			9.2	0.63	2.52	18
			1	188	0.001078	1.32E-6		1534	7445			9.2	0.63	2.51	18
			1	189	0.00068	1.3E-6		1534	7446			9.2	0.4	0.696	18
			1	190	0.095591			2501	6118	560	4600	2		0	27.4
			1	191	0.051913			2281	7166	200	800	2		0	27.4
			1	192	0.017131			1912	5506	225	620	2		0	27.4
			1	193	0.022784			1318	6500	225	1500	2		0	27.4
			1	200	0.13598			1092	5402	650	4000	2		0	27.4
	35	5001 / 330 16001 / 342	1	23	2E-7	3E-7		1558	7442			10	0.5	0.794	18
			1	32	0.00378	0.02604		1503	7429			9.9	0.24	0.097	118
			1	33	0.00427	0.02604		1503	7431			9.9	0.24	0.097	131
			1	42	0.01229	0.002124		2196	5555			1.5	0.15	0.189	345
			1	45	0.01035	0.011439		1603	5085			1.5	0.15	0.138	278
			1	79	0.000499	2.2E-5		2139	5544			7.5	0.89	0.989	16
			1	80	0.000336	1.4E-5		2143	5540			2	0.5	0.294	27.8
			1	101	0.000396	1E-5		2385	9190			2.3	0.055	0.044	120
			1	104	0.00164	4E-5		2309	8222			2.3	0.16	0.164	133
			1	107	0.00164	4.24E-5		900	8357			3	0.06	0.04	129
			1	110	0.000858	2.15E-5		887	8357			2.5	0.05	0.033	72
			1	111	0.001133	2.85E-5		1284	7293			5.5	0.095	0.103	119
			1	112	0.00149	3.78E-5		1284	7287			5.5	0.095	0.149	122
			1	113	0.001206	3.09E-5		1283	7281			5.5	0.095	0.134	97
			1	114	0.000981	2.64E-5		1283	7276			5.5	0.095	0.109	74
			1	117	0.001032	2.5E-5		743	6942			4	0.09	0.043	128
						2E-									

			1	120	0.00092	5		2190	5852			4.5	0.07	0.092	165
			1	121	0.001012	3E-5		2193	5846			4.5	0.07	0.092	162
			1	124	0.001342	3.44E-5		2193	5825			4	0.095	0.122	88
			1	125	0.00182	4.76E-5		2193	5819			4	0.095	0.14	91
			1	126	0.001904	4.86E-5		2193	5813			4	0.095	0.136	89
			1	127	0.00219	5.47E-5		2193	5807			4	0.095	0.146	87
			1	130	0.001485	4E-5		2364	3939			2.3	0.16	0.165	139
			1	133	0.001271	3.38E-5		702	3844			4	0.06	0.041	99
			1	136	0.002431	6.18E-5		1294	3283			5.5	0.095	0.143	79
			1	137	0.001989	5.11E-5		1286	3283			5.5	0.095	0.153	91
			1	140	0.00045	1E-5		2564	2914			2.3	0.055	0.045	122
			1	143	0.000528	1E-5		2541	2339			2.3	0.055	0.044	119
			1	146	0.00075	1.87E-5		917	2446			4	0.075	0.05	93
			1	147	0.000544	1.31E-5		931	2446			4.4	0.055	0.034	60
			1	150	0.000616	1.61E-5		949	1988			3.5	0.055	0.028	77
			1	151	0.000558	1.37E-5		948	1997			3.5	0.055	0.031	65
			1	152	0.00039	9.5E-6		2825	11215			4	0.055	0.03	68
			1	153	0.000406	9.86E-6		2825	11214			4	0.055	0.029	69
			1	154	0.000624	2E-5		1721	7015			1.5	0.065	0.078	173
			1	156	0.000336	0.000189		1398	7273			10	0.15	0.559	20
			1	158	0.001508	0.000999		1388	7227			3.5	0.12	0.029	158
			1	166	0.044583	0.000643		2212	6945			15.4	0.5	6.8	500
			1	167	0.044583	0.000643		2212	6958			15.4	0.5	6.8	500
			1	191	0.006507			2281	7166	200	800	2		0	27.4
			1	193	0.002849			1318	6500	225	1500	2		0	27.4
	37	4001 / 301 4003 / 303	1	3	0.007334	0.001523		1696	7395			8	0.25	0.557	17

		4002 / 304 5001 / 330												
			1	5	0.001833	0.000381		1704	7389			7.4	0.2	0.218	17
			1	13	0.00427	2E-6		1580	7430			8	0.2	0.103	18
			1	14	0.00439	2E-6		1580	7436			8	0.2	0.101	18
			1	15	0.0184	2.9E-5		1558	7438			8	0.35	0.427	18
			1	20	0.009167	0.0001614		1534	7443			9.2	0.4	0.779	18
			1	23	2E-7	3E-7		1558	7442			10	0.5	0.794	18
			1	25	0.00332	0.000737		1548	7438			10	0.32	0.346	21
			1	26	0.00428	1.3E-5		1535	7451			1.5	0.14	0.101	20
			1	28	0.001256	0.004124		1517	7425			8.7	1.2	4.92	19
			1	29	0.00011	0.000336		1519	7434			7.5	0.82	0.433	19
			1	32	0.01649	0.041398		1503	7429			9.9	0.24	0.097	118
			1	33	0.01853	0.042723		1503	7431			9.9	0.24	0.097	131
			1	39	0.2153	1.234292		1690	7640			25	0.92	5.59	119.5
			1	40	0.2108	0.110445		1690	7646			25	0.92	5.53	121.4
			1	41	0.2014	1.993778		1690	7652			25	0.92	5.59	115.3
			1	42	0.04896	0.006445		2196	5555			1.5	0.15	0.189	345
			1	45	0.03215	0.031637		1603	5085			1.5	0.15	0.138	278
			1	51	0.003102	0.002792		1684	5452			5	0.3	0.065	18
			1	52	0.003102	0.002792		1684	5442			5	0.3	0.065	18
			1	74	0.48892	1.484105		1560	6384			30	1	4.52	134
			1	75	0.035	0.283522		1568	6380			12	0.45	0.643	136
			1	76	0.0325	0.290267		1576	6379			12	0.45	0.644	138
			1	79	0.009167	0.001312		2139	5544			7.5	0.89	0.989	16
			1	80	0.009167	0.00909		2143	5540			2	0.5	0.294	27.8
						1E-									

1	101	0.000396	5		2385	9190			2.3	0.055	0.044	120
1	104	0.049364	0.00134		2309	8222			2.3	0.16	0.164	133
1	107	0.01092	0.0003424		900	8357			3	0.06	0.04	129
1	110	0.006039	0.0001215		887	8357			2.5	0.05	0.033	72
1	111	0.019467	0.0005285		1284	7293			5.5	0.095	0.103	119
1	112	0.023691	0.0006378		1284	7287			5.5	0.095	0.149	122
1	113	0.025058	0.0007309		1283	7281			5.5	0.095	0.134	97
1	114	0.016459	0.0004264		1283	7276			5.5	0.095	0.109	74
1	117	0.009761	0.000225		743	6942			4	0.09	0.043	128
1	120	0.023368	0.00062		2190	5852			4.5	0.07	0.092	165
1	121	0.022356	0.00063		2193	5846			4.5	0.07	0.092	162
1	124	0.021228	0.0005344		2193	5825			4	0.095	0.122	88
1	125	0.02352	0.0006476		2193	5819			4	0.095	0.14	91
1	126	0.02108	0.0005486		2193	5813			4	0.095	0.136	89
1	127	0.025112	0.0006547		2193	5807			4	0.095	0.146	87
1	130	0.05775	0.00614		2364	3939			2.3	0.16	0.165	139
1	133	0.014104	0.0003338		702	3844			4	0.06	0.041	99
1	136	0.017303	0.0004618		1294	3283			5.5	0.095	0.143	79
1	137	0.025551	0.0006511		1286	3283			5.5	0.095	0.153	91
1	140	0.014085	0.00041		2564	2914			2.3	0.055	0.045	122
1	143	0.012584	0.00031		2541	2339			2.3	0.055	0.044	119
1	146	0.02035	0.0005187		917	2446			4	0.075	0.05	93
1	147	0.005202	0.0001361		931	2446			4.4	0.055	0.034	60
1	150	0.004592	0.0001161		949	1988			3.5	0.055	0.028	77
1	151	0.004681	0.0001137		948	1997			3.5	0.055	0.031	65
1	152	0.00465	2.14E-5		2825	11215			4	0.055	0.03	68

			1	153	0.004785	0.00010986		2825	11214			4	0.055	0.029	69
			1	154	0.025428	0.00102		1721	7015			1.5	0.065	0.078	173
			1	156	0.00072	0.00044		1398	7273			10	0.15	0.559	20
			1	157	0.0081	0.004897		1386	7248			8	0.12	0.089	22
			1	158	0.006293	0.001678		1388	7227			3.5	0.12	0.029	158
			1	159	0.35042	1.677046		1560	6393			30	1	4.521	128
			1	166	4.057083	0.006426		2212	6945			15.4	0.5	6.8	500
			1	167	4.057083	0.006426		2212	6958			15.4	0.5	6.8	500
			1	186	0.0011	1.35E-6		1596	7430			9.2	0.63	2.56	18
			1	187	0.001083	1.33E-6		1537	7435			9.2	0.63	2.52	18
			1	188	0.001078	1.32E-6		1534	7445			9.2	0.63	2.51	18
			1	189	0.00068	1.3E-6		1534	7446			9.2	0.4	0.696	18
			1	190	0.095591			2501	6118	560	4600	2		0	27.4
			1	191	0.0521134			2281	7166	200	800	2		0	27.4
			1	192	0.0172063			1912	5506	225	620	2		0	27.4
			1	193	0.0236540			1318	6500	225	1500	2		0	27.4
			1	200	0.13598			1092	5402	650	4000	2		0	27.4
	11002	16001 / 342 16000 / 344	1	79	0.001219	5.7E-5		2139	5544			7.5	0.89	0.989	16
			1	80	0.001056	5.4E-5		2143	5540			2	0.5	0.294	27.8
			1	156	0.001056	0.000594		1398	7273			10	0.15	0.559	20

TABLE 7. Description of background concentrations distribution (U - wind speed m/sec)

City code	Substance code	Background ToR	Coordinate of observation post		Conc. (fractions of MPC), at U<=2	Concentration (fractions of MPC), at 2<U<U*, by direction							
			X, m	Y, m		N	NE	E	SE	S	SW	W	NW
1	- ---- 150	b			0.4								
	01010 ---- 203	b			0.3								
	01104 ---- 143	b			0.4								
	03000 ---- 2902	b			0.1								
	04001 ---- 301	b			0.04								
	05001 ---- 330	b			0.4								
	06000 ---- 337	b			0.08								
	11000 ---- 1042	b			0.4								
	11000 ---- 2732	b			0.4								
	11000 ---- 2752	b			0.4								
	11000 ---- 2754	b			0.4								
	11007 ---- 1401	b			0.11								
	11009 ---- 1210	b			0.4								
	11020 ---- 1246	b			0.4								
	11021 ---- 1240	b			0.4								
	11030	b			0.4								

	11041----621	b			0.4								
	16000----343				0.4								

CALCULATION OF CONCENTRATION AT THE BORDER OF RESIDENTIAL AREA:

Concentration at the set points

4002 / 11815 Nitrogen (1) oxide (N2O)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
4540	3970	NAN	INF	140.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
-2580	4538	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
4333	6544	NAN	INF	110.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
256	8930	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
2883	9352	NAN	INF	40.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
733	9820	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00

Concentration at the set points

7000 / 11812 Carbon dioxide

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
4540	3970	NAN	INF	140.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
-2580	4538	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
4333	6544	NAN	INF	110.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
256	8930	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
2883	9352	NAN	INF	40.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
733	9820	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00

Concentration at the set points

Summation group No. 11002

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.000979	310.00	0.75	80	42.18	79	11.18	156	1.18	0	0.00	0	0.00
4540	3970	0.00E+000	0.001295	210.00	0.75	80	41.46	79	11.30	156	1.76	0	0.00	0	0.00
-2580	4538	0.00E+000	0.000749	350.00	0.75	80	42.35	79	10.97	156	1.22	0	0.00	0	0.00
4333	6544	0.00E+000	0.001483	160.00	0.75	80	42.40	79	11.91	156	0.20	0	0.00	0	0.00
256	8930	0.00E+000	0.001134	60.00	0.75	80	35.29	156	9.96	79	9.33	0	0.00	0	0.00
2883	9352	0.00E+000	0.000958	100.00	0.75	80	41.69	79	11.01	156	1.83	0	0.00	0	0.00
733	9820	0.00E+000	0.000930	70.00	0.75	80	36.70	79	9.57	156	8.31	0	0.00	0	0.00

Concentration at the set points

3000 / 10442 Substances in the form of suspended solid particles (microparticles and fibres)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	NAN	INF	0.00	0.50	175	NAN	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	NAN	INF	120.00	0.50	175	NAN	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	NAN	INF	0.00	0.50	175	NAN	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	NAN	INF	60.00	0.50	175	NAN	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	NAN	INF	0.00	0.50	175	NAN	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	NAN	INF	20.00	0.50	175	NAN	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	NAN	INF	0.00	0.50	175	NAN	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

11000 / 10411 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	NAN	INF	0.00	0.50	38	NAN	37	NAN	36	NAN	31	NAN	30	NAN
4540	3970	NAN	INF	140.00	0.50	38	NAN	37	NAN	36	NAN	31	NAN	30	NAN
-2580	4538	NAN	INF	0.00	0.50	38	NAN	37	NAN	36	NAN	31	NAN	30	NAN
4333	6544	NAN	INF	110.00	0.50	38	NAN	37	NAN	36	NAN	31	NAN	30	NAN
256	8930	NAN	INF	0.00	0.50	38	NAN	37	NAN	36	NAN	31	NAN	30	NAN
2883	9352	NAN	INF	40.00	0.50	38	NAN	37	NAN	36	NAN	31	NAN	30	NAN
733	9820	NAN	INF	0.00	0.50	38	NAN	37	NAN	36	NAN	31	NAN	30	NAN

Concentration at the set points

3000 / 10368 Substances in the form of suspended solid particles (microparticles and fibres)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	4.91E-007	0.000001	290.00	0.75	11	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.000001	0.000001	230.00	0.75	11	100.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	4.73E-007	0.000001	330.00	0.75	11	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.000001	0.000002	200.00	0.75	11	100.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	0.000001	0.000003	50.00	0.75	11	100.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	0.000001	0.000003	120.00	0.75	11	100.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.000001	0.000002	70.00	0.75	11	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

0 / 10226 Titanium dioxide

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000009	0.000022	300.00	0.50	80	40.12	96	29.69	174	16.16	79	7.52	20	3.61
4540	3970	0.000011	0.000028	220.00	0.75	80	41.23	96	26.73	174	17.43	79	8.05	20	3.38
-2580	4538	0.000007	0.000019	330.00	0.50	96	37.08	174	25.43	80	23.83	20	5.04	79	4.40
4333	6544	0.000010	0.000026	180.00	0.50	96	42.58	174	22.22	80	22.13	79	4.44	20	4.44
256	8930	0.000017	0.000044	60.00	0.75	174	31.39	96	30.99	80	21.61	156	6.10	20	5.83
2883	9352	0.000013	0.000032	120.00	0.50	96	42.74	174	25.53	80	16.31	20	7.13	156	5.23
733	9820	0.000014	0.000035	70.00	0.75	96	36.55	174	24.09	80	23.08	20	6.76	156	5.22

Concentration at the set points

3000 / 2902 Substances in the form of suspended solid particles (microparticles and fibres)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.053338	0.133345	290.00	0.81	9	35.15	10	16.05	7	14.46	8	12.08	191	2.70
4540	3970	0.053829	0.134573	230.00	0.81	9	35.48	10	16.26	7	14.64	8	12.24	191	3.37
-2580	4538	0.053136	0.132840	330.00	0.81	9	35.94	10	16.44	7	14.79	8	12.37	191	2.99
4333	6544	0.056036	0.140089	200.00	0.81	9	37.03	10	17.01	7	15.37	8	12.82	191	3.87
256	8930	0.058132	0.145331	50.00	0.81	9	35.83	10	16.14	7	14.57	8	12.15	1	2.46
2883	9352	0.057549	0.143873	120.00	0.81	9	37.01	10	16.92	7	15.41	8	12.79	1	2.35
733	9820	0.056654	0.141634	70.00	0.81	9	36.13	10	16.30	7	14.83	8	12.31	1	2.29

Concentration at the set points

11000 / 2754 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.400000	0.500000	100.00	0.50	150	57.07	151	42.93	200	0.00	193	0.00	192	0.00
4540	3970	0.400000	0.500000	0.00	0.50	200	NAN	193	NAN	192	NAN	191	NAN	190	NAN
-2580	4538	0.400000	0.500000	130.00	0.50	200	NAN	193	NAN	192	NAN	191	NAN	190	NAN
4333	6544	0.400000	0.500000	330.00	0.50	153	50.12	152	49.88	200	0.00	193	0.00	192	0.00
256	8930	0.400000	0.500000	260.00	0.50	153	50.09	152	49.91	200	0.00	193	0.00	192	0.00
2883	9352	0.400593	0.500741	270.00	0.50	153	50.26	152	49.74	200	0.00	193	0.00	192	0.00
733	9820	0.400037	0.500046	290.00	0.50	153	50.17	152	49.83	200	0.00	193	0.00	192	0.00

Concentration at the set points

11000 / 2752 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.400753	0.500941	290.00	0.92	31	50.72	30	48.58	37	0.34	36	0.23	38	0.12
4540	3970	0.400851	0.501064	230.00	0.92	31	50.76	30	48.54	37	0.34	36	0.23	38	0.12
-2580	4538	0.400732	0.500915	320.00	0.92	31	50.80	30	48.50	37	0.34	36	0.23	38	0.12
4333	6544	0.401429	0.501787	200.00	0.92	31	50.91	30	48.40	37	0.34	36	0.23	38	0.12
256	8930	0.402539	0.503174	50.00	0.92	31	51.14	30	48.18	37	0.34	36	0.23	38	0.12
2883	9352	0.401856	0.502320	130.00	0.92	31	51.11	30	48.19	37	0.34	36	0.23	38	0.12
733	9820	0.401780	0.502225	70.00	0.92	31	51.05	30	48.26	37	0.34	36	0.23	38	0.12

Concentration at the set points

11000 / 2750 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000037	0.000232	290.00	0.89	31	43.32	30	41.68	37	11.57	36	2.25	38	1.18
4540	3970	0.000042	0.000262	230.00	0.89	31	43.35	30	41.64	37	11.58	36	2.25	38	1.18
-2580	4538	0.000036	0.000226	320.00	0.89	31	43.34	30	41.56	37	11.65	36	2.26	38	1.19
4333	6544	0.000070	0.000440	200.00	0.89	31	43.51	30	41.56	37	11.53	36	2.24	38	1.17
256	8930	0.000125	0.000778	50.00	0.89	31	43.74	30	41.40	37	11.48	36	2.23	38	1.15
2883	9352	0.000091	0.000572	130.00	0.89	31	43.64	30	41.33	37	11.61	36	2.25	38	1.17
733	9820	0.000088	0.000548	70.00	0.89	31	43.60	30	41.40	37	11.59	36	2.25	38	1.17

Concentration at the set points

11000 / 2735 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000003	0.000070	300.00	0.75	94	77.13	18	22.87	0	0.00	0	0.00	0	0.00
4540	3970	0.000002	0.000060	210.00	0.50	94	78.62	18	21.38	0	0.00	0	0.00	0	0.00
-2580	4538	0.000002	0.000044	350.00	0.50	94	82.88	18	17.12	0	0.00	0	0.00	0	0.00
4333	6544	0.000002	0.000057	150.00	0.75	94	99.97	18	0.03	0	0.00	0	0.00	0	0.00
256	8930	0.000003	0.000085	60.00	0.50	18	60.49	94	39.51	0	0.00	0	0.00	0	0.00
2883	9352	0.000003	0.000076	120.00	0.75	18	69.20	94	30.80	0	0.00	0	0.00	0	0.00
733	9820	0.000003	0.000078	70.00	0.75	18	62.85	94	37.15	0	0.00	0	0.00	0	0.00

Concentration at the set points

11000 / 2732 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.480000	0.500000	40.00	0.50	180	NAN	179	NAN	178	NAN	94	NAN	70	NAN
4540	3970	0.480000	0.500000	310.00	0.50	17	84.76	12	13.48	18	1.75	180	0.00	179	0.00
-2580	4538	0.480000	0.500000	250.00	0.50	17	82.54	12	14.87	18	2.58	180	0.00	179	0.00
4333	6544	0.480000	0.500000	260.00	0.50	17	83.41	12	14.36	18	2.24	180	0.00	179	0.00
256	8930	0.480000	0.500000	170.00	0.50	180	NAN	179	NAN	178	NAN	94	NAN	70	NAN
2883	9352	0.480000	0.500000	200.00	0.50	17	85.36	12	12.01	18	2.63	180	0.00	179	0.00
733	9820	0.480000	0.500000	170.00	0.50	180	NAN	179	NAN	178	NAN	94	NAN	70	NAN

Concentration at the set points

11000 / 2704 Non-methane volatile organic compounds (NMVOC)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	2.16E-030	5.41E-031	320.00	0.50	23	100.00	64	0.00	63	0.00	62	0.00	58	0.00
2883	9352	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

11001 / 2001 Acrylonitrile

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	5.59E-009	2.33E-008	290.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	6.38E-009	2.66E-008	230.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	5.41E-009	2.26E-008	320.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	1.08E-008	4.51E-008	200.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	1.80E-008	7.50E-008	50.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	1.39E-008	5.78E-008	120.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	1.31E-008	5.46E-008	70.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

11007 / 1401 Acetone

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.038590	0.137823	290.00	0.91	31	44.20	30	43.86	12	6.39	37	5.48	36	0.04
4540	3970	0.038602	0.137865	230.00	0.91	31	44.18	30	43.78	12	6.49	37	5.48	36	0.04
-2580	4538	0.038588	0.137814	320.00	0.91	31	44.33	30	43.86	12	6.20	37	5.53	36	0.05
4333	6544	0.038672	0.138114	200.00	0.91	31	44.24	30	43.58	12	6.67	37	5.44	36	0.04
256	8930	0.038804	0.138585	50.00	0.91	31	44.65	30	43.59	12	6.25	37	5.44	36	0.04
2883	9352	0.038723	0.138295	130.00	0.91	31	44.56	30	43.54	12	6.33	37	5.50	36	0.04
733	9820	0.038714	0.138263	70.00	0.91	31	44.46	30	43.56	12	6.43	37	5.49	36	0.04

Concentration at the set points

11000 / 1319 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000003	0.000067	290.00	0.75	18	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.000003	0.000076	230.00	0.75	18	100.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	0.000003	0.000065	330.00	0.75	18	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.000005	0.000130	200.00	0.75	18	100.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	0.000009	0.000214	50.00	0.75	18	100.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	0.000007	0.000167	120.00	0.75	18	100.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.000006	0.000156	70.00	0.75	18	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

11020 / 1246 Ethylcellosolve

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.280154	0.500275	290.00	0.91	31	45.66	30	44.35	12	5.40	95	3.69	37	0.66
4540	3970	0.280169	0.500301	230.00	0.91	31	47.22	30	45.79	12	5.67	37	0.68	95	0.40
-2580	4538	0.280144	0.500258	320.00	0.91	31	47.51	30	46.00	12	5.43	37	0.69	36	0.17
4333	6544	0.280282	0.500504	200.00	0.91	31	47.46	30	45.76	12	5.85	37	0.68	36	0.16
256	8930	0.280502	0.500896	50.00	0.91	31	47.61	30	45.49	12	5.45	37	0.67	95	0.53
2883	9352	0.280367	0.500655	130.00	0.91	31	47.64	30	45.56	12	5.54	37	0.68	95	0.33
733	9820	0.280356	0.500636	70.00	0.91	31	46.95	30	45.01	12	5.55	95	1.57	37	0.67

Concentration at the set points

11021 / 1240 Ethyl acetate

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.040125	0.501558	290.00	0.92	31	49.56	30	48.63	37	1.22	36	0.38	38	0.20
4540	3970	0.040141	0.501761	230.00	0.92	31	49.60	30	48.59	37	1.22	36	0.38	38	0.20
-2580	4538	0.040121	0.501515	320.00	0.92	31	49.63	30	48.54	37	1.23	36	0.39	38	0.21
4333	6544	0.040237	0.502957	200.00	0.92	31	49.75	30	48.46	37	1.21	36	0.38	38	0.20
256	8930	0.040420	0.505252	50.00	0.92	31	49.98	30	48.24	37	1.21	36	0.38	38	0.20
2883	9352	0.040307	0.503839	130.00	0.92	31	49.95	30	48.24	37	1.22	36	0.38	38	0.20
733	9820	0.040295	0.503683	70.00	0.92	31	49.88	30	48.31	37	1.22	36	0.38	38	0.20

Concentration at the set points

11009 / 1210 Butyl acetate

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.040164	0.502055	290.00	0.92	31	44.96	30	44.73	12	8.08	36	1.06	37	0.61
4540	3970	0.040186	0.502326	230.00	0.92	31	44.94	30	44.63	12	8.21	36	1.06	37	0.61
-2580	4538	0.040159	0.501994	320.00	0.92	31	45.14	30	44.76	12	7.84	36	1.07	37	0.62
4333	6544	0.040313	0.503914	200.00	0.92	31	44.96	30	44.40	12	8.42	36	1.05	37	0.61
256	8930	0.040553	0.506910	50.00	0.92	31	45.44	30	44.46	12	7.90	36	1.05	37	0.61
2883	9352	0.040405	0.505059	130.00	0.92	31	45.35	30	44.41	12	8.01	36	1.06	37	0.62
733	9820	0.040389	0.504859	70.00	0.92	31	45.24	30	44.42	12	8.12	36	1.06	37	0.61

Concentration at the set points

11000 / 1061 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000428	0.000107	290.00	0.92	31	47.24	30	46.05	12	5.04	37	1.00	18	0.61
4540	3970	0.000485	0.000121	230.00	0.92	31	47.24	30	45.97	12	5.12	37	1.00	18	0.62
-2580	4538	0.000416	0.000104	320.00	0.92	31	47.40	30	46.04	12	4.89	37	1.01	18	0.60
4333	6544	0.000815	0.000204	200.00	0.92	31	47.30	30	45.76	12	5.26	37	0.99	18	0.63
256	8930	0.001442	0.000361	50.00	0.92	31	47.70	30	45.73	12	4.93	37	0.99	18	0.59
2883	9352	0.001055	0.000264	130.00	0.92	31	47.63	30	45.70	12	5.00	37	1.00	18	0.61
733	9820	0.001013	0.000253	70.00	0.92	31	47.53	30	45.73	12	5.07	37	1.00	18	0.61

Concentration at the set points

11000 / 1056 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000009	0.000235	310.00	0.75	95	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.000010	0.000240	200.00	0.75	95	100.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	0.000006	0.000158	350.00	0.75	95	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.000009	0.000237	150.00	0.75	95	100.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	0.000007	0.000168	70.00	0.75	95	100.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	0.000006	0.000147	110.00	0.75	95	100.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.000006	0.000140	80.00	0.75	95	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

11000 / 1042 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.040178	0.502230	290.00	0.92	31	44.40	30	43.23	12	11.03	37	0.85	36	0.31
4540	3970	0.040202	0.502525	230.00	0.92	31	44.35	30	43.12	12	11.20	37	0.85	36	0.31
-2580	4538	0.040173	0.502160	320.00	0.92	31	44.62	30	43.31	12	10.73	37	0.86	36	0.31
4333	6544	0.040340	0.504253	200.00	0.92	31	44.34	30	42.86	12	11.49	37	0.84	36	0.31
256	8930	0.040600	0.507495	50.00	0.92	31	44.89	30	42.99	12	10.80	37	0.85	36	0.31
2883	9352	0.040439	0.505488	130.00	0.92	31	44.79	30	42.94	12	10.94	37	0.86	36	0.31
733	9820	0.040422	0.505274	70.00	0.92	31	44.66	30	42.92	12	11.09	37	0.85	36	0.31

Concentration at the set points

13101 / 703 Benzo[a]pyrene

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000001	0.011330	300.00	0.50	191	62.92	193	30.97	192	6.11	0	0.00	0	0.00
4540	3970	0.000001	0.012938	230.00	0.50	191	71.78	193	24.63	192	3.58	0	0.00	0	0.00
-2580	4538	0.000001	0.010576	330.00	0.50	191	62.69	193	34.12	192	3.19	0	0.00	0	0.00
4333	6544	0.000002	0.021020	190.00	0.50	191	78.23	193	21.04	192	0.73	0	0.00	0	0.00
256	8930	0.000001	0.017667	50.00	0.50	191	70.68	193	26.51	192	2.81	0	0.00	0	0.00
2883	9352	0.000002	0.022080	110.00	0.50	191	76.58	193	20.68	192	2.73	0	0.00	0	0.00
733	9820	0.000001	0.015623	60.00	0.50	191	79.00	193	18.38	192	2.62	0	0.00	0	0.00

Concentration at the set points

11041 / 621 Toluene

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.240153	0.500320	290.00	0.92	31	39.58	30	38.00	12	19.61	37	1.67	36	0.75
4540	3970	0.240174	0.500362	230.00	0.92	31	39.48	30	37.84	12	19.88	37	1.67	36	0.74
-2580	4538	0.240148	0.500309	320.00	0.92	31	39.88	30	38.16	12	19.11	37	1.70	36	0.76
4333	6544	0.240294	0.500612	200.00	0.92	31	39.37	30	37.52	12	20.34	37	1.65	36	0.74
256	8930	0.240514	0.501072	50.00	0.92	31	40.10	30	37.87	12	19.23	37	1.67	36	0.74
2883	9352	0.240377	0.500786	130.00	0.92	31	39.96	30	37.77	12	19.46	37	1.68	36	0.75
733	9820	0.240363	0.500756	70.00	0.92	31	39.79	30	37.70	12	19.70	37	1.67	36	0.75

Concentration at the set points

11037 / 620 Styrene

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.016034	0.501050	290.00	0.98	35	50.12	34	49.88	0	0.00	0	0.00	0	0.00
4540	3970	0.016038	0.501190	230.00	0.98	35	50.14	34	49.86	0	0.00	0	0.00	0	0.00
-2580	4538	0.016033	0.501023	320.00	0.98	35	50.18	34	49.82	0	0.00	0	0.00	0	0.00
4333	6544	0.016064	0.502015	200.00	0.98	35	50.20	34	49.80	0	0.00	0	0.00	0	0.00
256	8930	0.016116	0.503638	50.00	0.98	35	50.30	34	49.70	0	0.00	0	0.00	0	0.00
2883	9352	0.016085	0.502647	130.00	0.98	35	50.32	34	49.68	0	0.00	0	0.00	0	0.00
733	9820	0.016081	0.502535	70.00	0.98	35	50.28	34	49.72	0	0.00	0	0.00	0	0.00

Concentration at the set points

11030 / 616 Xylene

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.080246	0.501539	290.00	0.92	31	50.04	30	48.07	36	0.83	37	0.62	38	0.44
4540	3970	0.080278	0.501739	230.00	0.92	31	50.08	30	48.03	36	0.83	37	0.62	38	0.44
-2580	4538	0.080239	0.501496	320.00	0.92	31	50.11	30	47.99	36	0.84	37	0.62	38	0.44
4333	6544	0.080467	0.502920	200.00	0.92	31	50.22	30	47.90	36	0.83	37	0.61	38	0.43
256	8930	0.080830	0.505187	50.00	0.92	31	50.46	30	47.68	36	0.83	37	0.61	38	0.43
2883	9352	0.080607	0.503792	130.00	0.92	31	50.42	30	47.69	36	0.84	37	0.62	38	0.43
733	9820	0.080582	0.503638	70.00	0.92	31	50.36	30	47.75	36	0.83	37	0.62	38	0.43

Concentration at the set points

11000 / 514 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	1.96E-008	2.45E-007	290.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	2.23E-008	2.79E-007	230.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	1.90E-008	2.37E-007	320.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	3.79E-008	4.73E-007	200.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	6.30E-008	0.000001	50.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	4.86E-008	0.000001	120.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	4.59E-008	0.000001	70.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

12000 / 410 Methane

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000017	4.24E-007	300.00	0.97	191	48.51	192	27.57	193	21.84	33	1.63	32	0.45
4540	3970	0.000016	3.99E-007	230.00	0.97	191	65.46	193	19.54	192	11.32	33	2.88	32	0.80
-2580	4538	0.000014	3.45E-007	330.00	0.97	191	55.47	193	30.36	192	10.56	33	2.83	32	0.78
4333	6544	0.000023	0.000001	190.00	0.97	191	75.90	193	19.66	33	2.82	192	0.84	32	0.78
256	8930	0.000021	0.000001	50.00	0.97	191	60.49	193	19.75	192	12.24	33	5.90	32	1.62
2883	9352	0.000029	0.000001	110.00	0.97	191	66.90	193	16.97	192	14.00	33	1.67	32	0.46
733	9820	0.000020	0.000001	70.00	0.97	191	52.30	193	23.72	192	18.21	33	4.52	32	1.25

Concentration at the set points

16000 / 344 Fluor and its compounds (in terms of fluor)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000026	0.000163	310.00	0.75	80	82.15	79	15.55	156	2.30	0	0.00	0	0.00
4540	3970	0.000034	0.000215	210.00	0.75	80	80.83	79	15.75	156	3.43	0	0.00	0	0.00
-2580	4538	0.000020	0.000125	350.00	0.75	80	82.38	79	15.25	156	2.37	0	0.00	0	0.00
4333	6544	0.000039	0.000245	160.00	0.75	80	82.97	79	16.65	156	0.38	0	0.00	0	0.00
256	8930	0.000030	0.000190	60.00	0.75	80	67.97	156	19.18	79	12.84	0	0.00	0	0.00
2883	9352	0.000025	0.000159	100.00	0.75	80	81.13	79	15.31	156	3.56	0	0.00	0	0.00
733	9820	0.000025	0.000156	70.00	0.75	80	70.79	156	16.02	79	13.19	0	0.00	0	0.00

Concentration at the set points

16000 / 343 Fluor and its compounds (in terms of fluor)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000046	0.001928	310.00	0.75	80	82.15	79	15.55	156	2.30	0	0.00	0	0.00
4540	3970	0.000061	0.002548	210.00	0.75	80	80.83	79	15.75	156	3.43	0	0.00	0	0.00
-2580	4538	0.000035	0.001476	350.00	0.75	80	82.38	79	15.25	156	2.37	0	0.00	0	0.00
4333	6544	0.000070	0.002908	160.00	0.75	80	82.97	79	16.65	156	0.38	0	0.00	0	0.00
256	8930	0.000054	0.002256	60.00	0.75	80	67.97	156	19.18	79	12.84	0	0.00	0	0.00
2883	9352	0.000045	0.001888	100.00	0.75	80	81.13	79	15.31	156	3.56	0	0.00	0	0.00
733	9820	0.000044	0.001848	70.00	0.75	80	70.79	156	16.02	79	13.19	0	0.00	0	0.00

Concentration at the set points

16001 / 342 Hydrogen fluoride

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000013	0.000817	310.00	0.75	80	76.39	79	21.48	156	2.14	0	0.00	0	0.00
4540	3970	0.000017	0.001080	210.00	0.75	80	75.09	79	21.73	156	3.18	0	0.00	0	0.00
-2580	4538	0.000010	0.000624	350.00	0.75	80	76.70	79	21.09	156	2.20	0	0.00	0	0.00
4333	6544	0.000020	0.001238	160.00	0.75	80	76.77	79	22.88	156	0.35	0	0.00	0	0.00
256	8930	0.000015	0.000944	60.00	0.75	80	63.99	156	18.06	79	17.95	0	0.00	0	0.00
2883	9352	0.000013	0.000799	100.00	0.75	80	75.52	79	21.17	156	3.31	0	0.00	0	0.00
733	9820	0.000012	0.000774	70.00	0.75	80	66.53	79	18.41	156	15.06	0	0.00	0	0.00

Concentration at the set points

6000 / 337 Carbon oxide

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.418621	0.104655	300.00	0.89	190	14.41	200	13.30	133	12.56	45	9.29	42	6.66
4540	3970	0.415449	0.103862	220.00	0.89	190	18.86	42	12.04	200	6.24	191	4.66	26	4.51
-2580	4538	0.411061	0.102765	340.00	0.89	190	19.30	200	11.06	42	8.01	45	7.44	191	6.65
4333	6544	0.414069	0.103517	170.00	0.45	190	18.46	45	9.61	200	8.80	42	8.46	191	4.86
256	8930	0.426563	0.106641	50.00	0.89	107	18.96	190	11.40	110	9.92	26	8.05	191	5.55
2883	9352	0.422071	0.105518	110.00	0.89	190	22.70	191	9.88	200	7.51	45	5.19	42	4.89
733	9820	0.422587	0.105647	80.00	0.89	107	13.76	200	8.59	190	7.78	110	6.97	26	5.98

Concentration at the set points

5001 / 330 Sulphur dioxide

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.200520	0.501300	300.00	1.36	45	24.00	42	14.45	191	12.42	166	10.23	167	10.17
4540	3970	0.200482	0.501205	220.00	0.68	42	29.11	191	10.82	45	10.36	193	6.54	166	6.45
-2580	4538	0.200333	0.500832	340.00	0.68	42	19.76	45	16.95	191	14.58	193	8.35	166	6.74
4333	6544	0.200587	0.501467	190.00	1.36	166	27.15	167	27.05	191	22.16	193	5.14	158	3.69
256	8930	0.200723	0.501807	50.00	1.36	166	15.52	167	15.47	191	12.65	107	9.95	42	8.23
2883	9352	0.200755	0.501887	110.00	1.36	191	19.77	167	17.03	166	16.89	45	11.10	42	8.21
733	9820	0.200618	0.501544	70.00	1.36	166	13.32	167	13.30	42	12.36	191	11.81	45	8.97

Concentration at the set points

3004 / 328 Soot

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000287	0.002392	300.00	0.50	191	46.01	192	25.13	193	22.30	200	3.67	190	2.89
4540	3970	0.000292	0.002431	220.00	0.50	191	44.91	192	25.81	193	24.40	190	3.39	200	1.49
-2580	4538	0.000239	0.001995	340.00	0.50	191	46.84	193	26.61	192	21.48	190	2.78	200	2.30
4333	6544	0.000414	0.003447	190.00	0.50	191	73.66	193	19.50	192	3.84	190	2.07	200	0.93
256	8930	0.000383	0.003189	50.00	0.50	191	60.46	193	22.32	192	13.53	190	2.51	200	1.18
2883	9352	0.000482	0.004015	110.00	0.50	191	65.03	193	17.29	192	13.05	190	3.22	200	1.41
733	9820	0.000349	0.002905	70.00	0.50	191	56.27	193	23.31	192	16.15	190	2.62	200	1.64

Concentration at the set points

5004 / 322 Sulfuric acid (H2S04) (sulphuric acid)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000244	0.001017	300.00	0.75	84	43.34	81	30.61	83	24.99	78	0.55	24	0.33
4540	3970	0.000287	0.001195	220.00	0.75	84	40.65	81	34.43	83	23.74	78	0.64	24	0.35
-2580	4538	0.000216	0.000899	340.00	0.75	84	46.57	83	26.85	81	25.64	78	0.46	24	0.30
4333	6544	0.000336	0.001401	170.00	0.75	84	47.04	83	27.33	81	24.95	78	0.49	97	0.11
256	8930	0.000309	0.001285	60.00	0.75	84	45.68	83	26.95	81	25.70	24	0.86	78	0.46
2883	9352	0.000273	0.001138	110.00	0.75	84	46.75	83	27.41	81	24.42	24	0.62	78	0.44
733	9820	0.000251	0.001047	80.00	0.75	84	47.49	83	27.67	81	23.29	24	0.83	78	0.41

Concentration at the set points

4002 / 304 Nitrogen (1) oxide (N2O)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000017	0.000055	290.00	0.50	193	80.31	191	13.61	192	6.07	0	0.00	0	0.00
4540	3970	0.000018	0.000055	220.00	0.50	193	77.39	191	14.34	192	8.26	0	0.00	0	0.00
-2580	4538	0.000016	0.000049	330.00	0.50	193	80.53	191	15.13	192	4.34	0	0.00	0	0.00
4333	6544	0.000023	0.000072	180.00	0.50	193	77.54	191	18.65	192	3.81	0	0.00	0	0.00
256	8930	0.000026	0.000081	60.00	0.50	193	83.67	191	11.33	192	5.01	0	0.00	0	0.00
2883	9352	0.000024	0.000073	120.00	0.50	193	76.62	191	19.62	192	3.76	0	0.00	0	0.00
733	9820	0.000021	0.000066	80.00	0.50	193	83.71	191	11.19	192	5.11	0	0.00	0	0.00

Concentration at the set points

4003 / 303 Ammonia

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	5.13E-009	3.21E-008	300.00	0.50	191	49.37	192	28.76	193	21.87	0	0.00	0	0.00
4540	3970	5.31E-009	3.32E-008	230.00	0.50	191	62.17	193	19.20	192	18.62	0	0.00	0	0.00
-2580	4538	4.32E-009	2.70E-008	340.00	0.50	191	49.79	193	25.86	192	24.35	0	0.00	0	0.00
4333	6544	7.59E-009	4.74E-008	190.00	0.50	191	77.06	193	18.66	192	4.29	0	0.00	0	0.00
256	8930	7.00E-009	4.37E-008	50.00	0.50	191	63.44	193	21.42	192	15.14	0	0.00	0	0.00
2883	9352	8.76E-009	5.48E-008	110.00	0.50	191	68.63	193	16.68	192	14.69	0	0.00	0	0.00
733	9820	6.34E-009	3.96E-008	70.00	0.50	191	59.35	193	22.48	192	18.17	0	0.00	0	0.00

Concentration at the set points

4001 / 301 Nitrogen oxides (in terms of nitrogen dioxide ($NO + NO_2$))

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.029784	0.186150	300.00	1.23	166	30.11	167	29.97	200	11.64	190	4.24	191	2.70
4540	3970	0.034744	0.217149	230.00	1.23	166	37.87	167	37.67	190	3.95	191	2.89	200	1.98
-2580	4538	0.023040	0.144000	330.00	1.23	167	33.89	166	33.85	200	6.00	190	3.53	191	3.31
4333	6544	0.056585	0.353655	190.00	1.23	166	42.39	167	42.26	191	2.83	200	1.92	190	1.85
256	8930	0.049113	0.306958	50.00	1.23	166	35.87	167	35.77	190	2.78	191	2.33	200	1.64
2883	9352	0.055996	0.349978	110.00	1.23	167	35.40	166	35.14	104	4.21	200	4.09	190	4.00
733	9820	0.041268	0.257925	60.00	1.23	167	38.33	166	38.09	190	3.95	191	3.35	104	1.59

Concentration at the set points

1010 / 203 Chromium and its compounds (in terms of chromium trioxide)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000607	0.379070	310.00	0.75	80	84.04	79	15.91	20	0.03	156	0.02	0	0.00
4540	3970	0.000609	0.380316	210.00	0.75	80	83.64	79	16.29	156	0.03	20	0.03	0	0.00
-2580	4538	0.000605	0.378114	350.00	0.75	80	84.34	79	15.62	20	0.02	156	0.02	0	0.00
4333	6544	0.000610	0.381256	160.00	0.75	80	83.29	79	16.71	156	0.00	20	0.00	0	0.00
256	8930	0.000606	0.378955	60.00	0.75	80	83.73	79	15.82	156	0.23	20	0.22	0	0.00
2883	9352	0.000606	0.378935	100.00	0.75	80	84.05	79	15.86	20	0.05	156	0.04	0	0.00
733	9820	0.000605	0.378364	70.00	0.75	80	83.94	79	15.64	20	0.24	156	0.19	0	0.00

Concentration at the set points

1009 / 184 Lead and its compounds (in terms of lead)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	1.68E-008	0.000021	290.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	1.91E-008	0.000024	230.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	1.62E-008	0.000020	320.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	3.24E-008	0.000041	200.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	5.40E-008	0.000067	50.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	4.16E-008	0.000052	120.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	3.93E-008	0.000049	70.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

1007 / 183 Mercury and its compounds (in terms of mercury)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-293	2579	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4830	3813	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2042	4447	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4592	4606	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-910	8272	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
815	8887	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3282	9306	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

0 / 150 Sodium hydroxide (lye, caustic soda)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.004010	0.501243	310.00	0.75	82	87.96	77	10.32	86	1.11	85	0.61	0	0.00
4540	3970	0.004013	0.501611	210.00	0.75	82	87.57	77	10.66	86	1.15	85	0.63	0	0.00
-2580	4538	0.004008	0.500965	350.00	0.75	82	88.30	77	10.03	86	1.08	85	0.59	0	0.00
4333	6544	0.004016	0.501986	160.00	0.75	82	87.27	77	10.97	86	1.14	85	0.62	0	0.00
256	8930	0.004010	0.501243	60.00	0.75	82	88.08	77	10.25	86	1.09	85	0.59	0	0.00
2883	9352	0.004010	0.501235	100.00	0.75	82	88.04	77	10.28	86	1.09	85	0.59	0	0.00
733	9820	0.004008	0.501055	70.00	0.75	82	88.22	77	10.11	86	1.08	85	0.59	0	0.00

Concentration at the set points

1104 / 143 Mangan and its compounds (in terms of mangan)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.004019	0.502383	300.00	0.50	80	44.20	96	27.36	174	9.34	79	8.44	20	3.82
4540	3970	0.004024	0.503058	220.00	0.75	80	45.60	96	24.73	174	10.12	79	9.07	156	4.11
-2580	4538	0.004016	0.501964	340.00	0.50	80	39.88	96	30.04	174	10.99	79	7.47	156	4.28
4333	6544	0.004021	0.502669	180.00	0.25	96	34.06	80	32.16	174	11.64	79	6.80	156	6.17
256	8930	0.004035	0.504376	60.00	0.75	96	30.74	80	25.63	174	19.54	156	8.48	20	6.65
2883	9352	0.004027	0.503341	120.00	0.50	96	41.07	80	18.72	174	15.39	20	7.87	156	7.05
733	9820	0.004029	0.503648	70.00	0.75	96	34.73	80	26.21	174	14.36	20	7.38	156	6.96

Concentration at the set points

1003 / 123 Iron and its compounds (in terms of iron)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000191	0.000596	300.00	0.75	80	56.71	96	16.67	79	10.59	156	4.10	174	3.94
4540	3970	0.000247	0.000772	220.00	0.75	80	57.52	96	15.02	79	11.02	174	4.78	156	4.45
-2580	4538	0.000152	0.000475	340.00	0.50	80	52.47	96	19.02	79	9.46	174	5.41	156	4.84
4333	6544	0.000226	0.000705	160.00	0.50	80	77.13	79	14.85	96	5.00	174	1.02	156	1.00
256	8930	0.000306	0.000956	60.00	0.75	80	37.33	96	21.55	174	10.64	156	10.61	79	6.92
2883	9352	0.000243	0.000761	110.00	0.50	80	40.04	96	26.18	79	7.34	156	6.28	3	6.05
733	9820	0.000261	0.000817	70.00	0.75	80	37.26	96	23.76	156	8.49	174	7.63	79	6.81

Concentration at the set points

1002 / 110 Vanadium and its compounds (in terms of vanadium pentoxide)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000001	0.000040	310.00	0.75	79	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.000001	0.000054	210.00	0.75	79	100.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	4.81E-007	0.000030	350.00	0.75	79	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.000001	0.000065	160.00	0.75	79	100.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	0.000001	0.000039	60.00	0.75	79	100.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	0.000001	0.000039	100.00	0.75	79	100.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.000001	0.000033	70.00	0.75	79	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

Summation group No. 37

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.612675	300.00	1.25	166	7.22	167	7.19	200	2.78	190	1.01	191	0.69
4540	3970	0.00E+000	0.631144	230.00	1.25	166	9.16	167	9.11	190	0.95	191	0.74	200	0.48
-2580	4538	0.00E+000	0.586883	330.00	1.25	167	8.03	166	8.02	200	1.42	190	0.83	191	0.83
4333	6544	0.00E+000	0.714144	190.00	1.25	166	10.41	167	10.38	191	0.73	200	0.47	190	0.45
256	8930	0.00E+000	0.685923	50.00	1.25	166	8.77	167	8.74	190	0.67	191	0.60	39	0.40
2883	9352	0.00E+000	0.711960	110.00	1.25	167	8.69	166	8.62	104	1.04	200	1.00	190	0.97
733	9820	0.00E+000	0.655785	60.00	1.25	167	9.33	166	9.27	190	0.95	191	0.86	104	0.39

Concentration at the set points

Summation group No. 35

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.501996	300.00	0.67	80	0.12	45	0.09	42	0.08	191	0.05	79	0.03
4540	3970	0.00E+000	0.502233	220.00	0.67	80	0.15	42	0.11	79	0.04	191	0.04	45	0.04
-2580	4538	0.00E+000	0.501411	340.00	0.67	80	0.09	42	0.05	45	0.05	191	0.04	79	0.02
4333	6544	0.00E+000	0.502325	160.00	0.67	80	0.19	42	0.15	45	0.08	79	0.06	193	0.02
256	8930	0.00E+000	0.502541	60.00	0.67	80	0.12	42	0.08	45	0.05	191	0.05	193	0.04
2883	9352	0.00E+000	0.502435	110.00	1.34	191	0.12	167	0.11	166	0.11	80	0.08	45	0.07
733	9820	0.00E+000	0.502241	70.00	1.34	80	0.09	166	0.07	167	0.07	42	0.06	191	0.06

Concentration at the set points

Summation group No. 31

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.612640	300.00	1.25	166	14.60	167	14.53	200	5.62	190	2.05	191	1.38
4540	3970	0.00E+000	0.631115	230.00	1.25	166	18.49	167	18.39	190	1.92	191	1.49	200	0.96
-2580	4538	0.00E+000	0.586847	330.00	1.25	167	16.31	166	16.29	200	2.88	190	1.70	191	1.68
4333	6544	0.00E+000	0.714101	190.00	1.25	166	20.93	167	20.87	191	1.46	200	0.94	190	0.90
256	8930	0.00E+000	0.685887	50.00	1.25	166	17.64	167	17.59	190	1.35	191	1.20	39	0.80
2883	9352	0.00E+000	0.711910	110.00	1.25	167	17.46	166	17.33	104	2.09	200	2.00	190	1.95
733	9820	0.00E+000	0.655763	60.00	1.25	167	18.80	166	18.68	190	1.92	191	1.73	104	0.78

Concentration at the set points

Summation group No. 28

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.501847	300.00	1.01	45	11.08	84	10.15	42	9.03	81	7.10	191	6.80
4540	3970	0.00E+000	0.501879	220.00	1.01	42	12.75	84	10.75	81	8.93	83	6.29	191	4.60
-2580	4538	0.00E+000	0.501359	340.00	1.01	84	12.77	42	8.38	83	7.35	191	6.75	81	6.71
4333	6544	0.00E+000	0.501874	170.00	0.51	84	13.98	42	9.10	81	8.60	83	8.14	45	6.83
256	8930	0.00E+000	0.502312	60.00	1.01	84	10.81	42	8.07	83	6.40	81	6.21	45	4.73
2883	9352	0.00E+000	0.502453	110.00	1.01	191	12.33	84	9.75	167	8.22	166	8.16	42	6.05
733	9820	0.00E+000	0.502125	70.00	1.01	84	8.96	191	7.69	42	7.68	166	6.48	167	6.48

Concentration at the set points

Summation group No. 27

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.501307	300.00	1.36	45	23.76	42	14.31	191	12.29	166	10.12	167	10.07
4540	3970	0.00E+000	0.501218	220.00	0.68	42	28.54	191	10.60	45	10.15	193	6.41	166	6.32
-2580	4538	0.00E+000	0.500840	340.00	0.68	42	19.38	45	16.63	191	14.30	193	8.19	166	6.61
4333	6544	0.00E+000	0.501485	190.00	1.36	166	26.50	167	26.41	191	21.64	193	5.02	158	3.60
256	8930	0.00E+000	0.501846	50.00	1.36	166	14.88	167	14.83	191	12.12	107	9.53	42	7.89
2883	9352	0.00E+000	0.501900	110.00	1.36	191	19.51	167	16.81	166	16.67	45	10.95	42	8.10
733	9820	0.00E+000	0.501572	70.00	1.36	166	12.85	167	12.83	42	11.93	191	11.40	45	8.66

Concentration at the set points

Summation group No. 12

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.379094	310.00	0.75	80	83.06	79	16.31	20	0.03	156	0.02	0	0.00
4540	3970	0.00E+000	0.380348	210.00	0.75	80	82.64	79	16.69	156	0.03	20	0.03	0	0.00
-2580	4538	0.00E+000	0.378132	350.00	0.75	80	83.37	79	16.01	20	0.02	156	0.02	0	0.00
4333	6544	0.00E+000	0.381295	160.00	0.75	80	82.26	79	17.12	156	0.00	20	0.00	0	0.00
256	8930	0.00E+000	0.378978	60.00	0.75	80	82.76	79	16.21	156	0.23	20	0.22	0	0.00
2883	9352	0.00E+000	0.378958	100.00	0.75	80	83.07	79	16.26	20	0.05	156	0.04	0	0.00
733	9820	0.00E+000	0.378384	70.00	0.75	80	82.97	79	16.03	20	0.24	156	0.18	0	0.00

Concentration at the set points

Summation group No. 11

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.501319	300.00	1.36	45	23.34	42	14.06	191	12.08	166	9.95	167	9.90
4540	3970	0.00E+000	0.501235	220.00	0.68	42	27.73	191	10.30	45	9.87	193	6.23	166	6.14
-2580	4538	0.00E+000	0.500848	340.00	0.68	42	19.02	45	16.32	191	14.03	193	8.04	166	6.49
4333	6544	0.00E+000	0.501467	190.00	1.36	166	27.14	167	27.05	191	22.16	193	5.14	158	3.69
256	8930	0.00E+000	0.501820	50.00	1.36	166	15.30	167	15.26	191	12.47	107	9.81	42	8.12
2883	9352	0.00E+000	0.501902	110.00	1.36	191	19.46	167	16.76	166	16.63	45	10.92	42	8.08
733	9820	0.00E+000	0.501562	70.00	1.36	166	13.02	167	13.00	42	12.09	191	11.55	45	8.77

Concentration at the set points

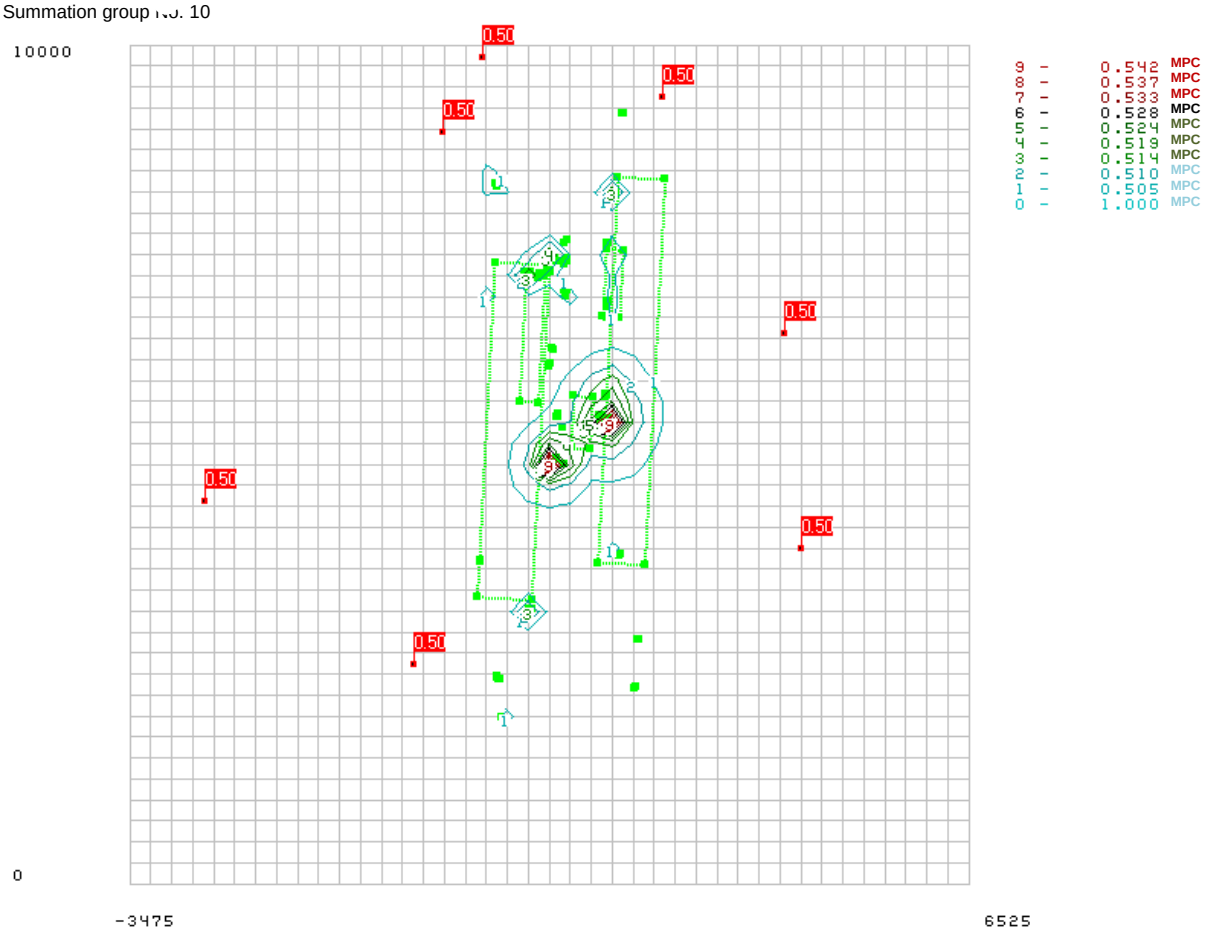
Summation group No. 10

Calculation site 1

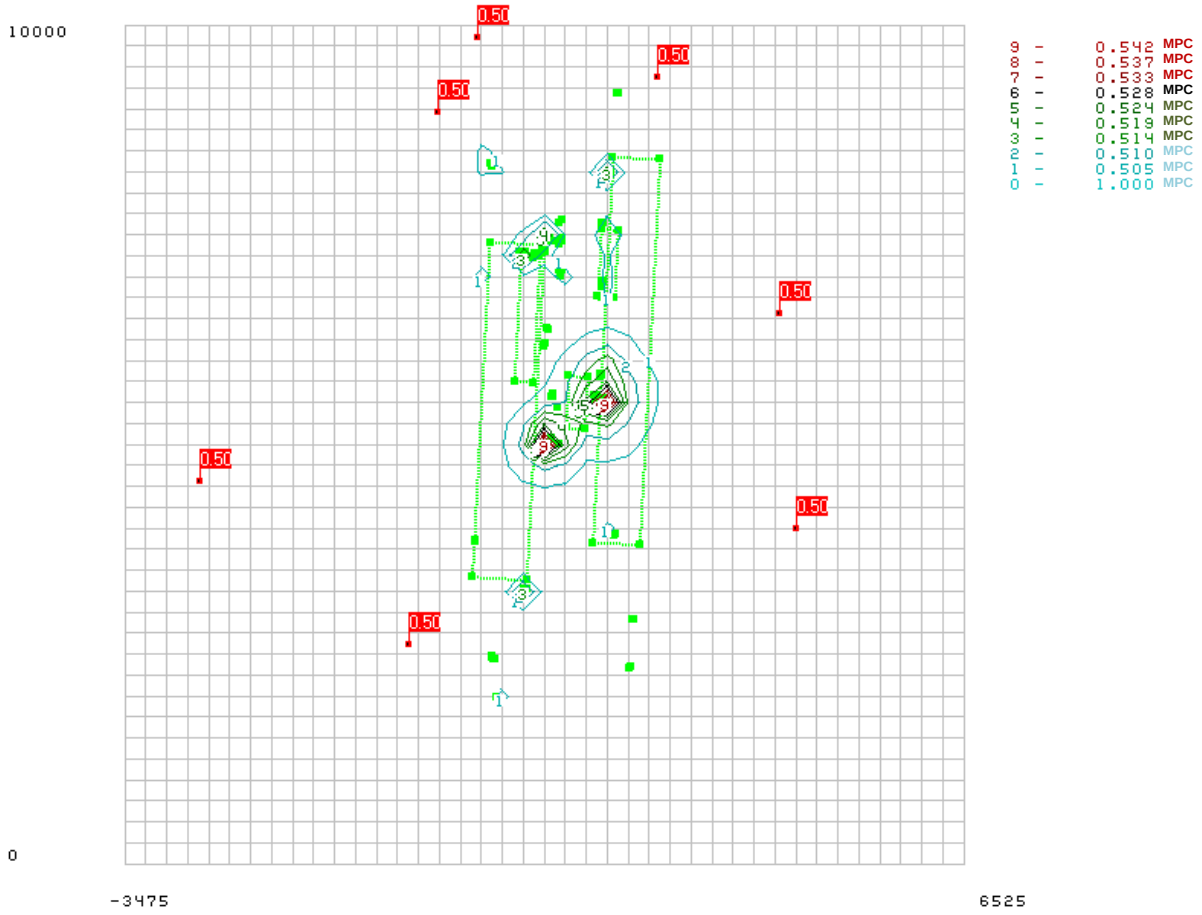
Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.502404	300.00	0.50	80	43.41	96	26.87	79	9.18	174	9.17	20	3.75
4540	3970	0.00E+000	0.503088	220.00	0.75	80	44.73	96	24.26	174	9.93	79	9.85	156	4.03
-2580	4538	0.00E+000	0.501980	340.00	0.50	80	39.25	96	29.56	174	10.82	79	8.14	156	4.21
4333	6544	0.00E+000	0.502688	180.00	0.25	96	33.57	80	31.70	174	11.47	79	7.42	156	6.09
256	8930	0.00E+000	0.504399	60.00	0.75	96	30.41	80	25.36	174	19.34	156	8.40	20	6.58
2883	9352	0.00E+000	0.503354	120.00	0.50	96	40.76	80	18.58	174	15.27	20	7.81	156	6.99
733	9820	0.00E+000	0.503668	70.00	0.75	96	34.36	80	25.94	174	14.21	20	7.30	156	6.89

CONCENTRATION DISTRIBUTION MAPS

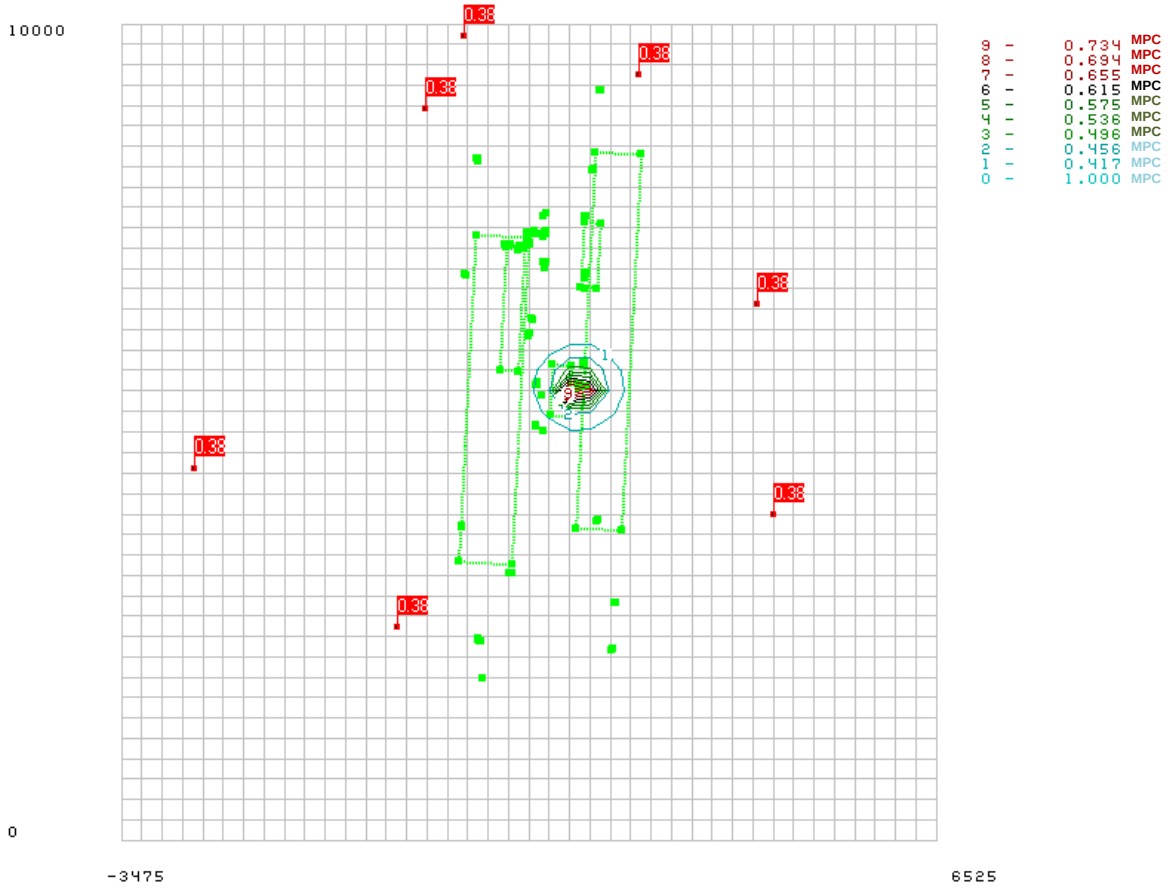
Summation group No. 10



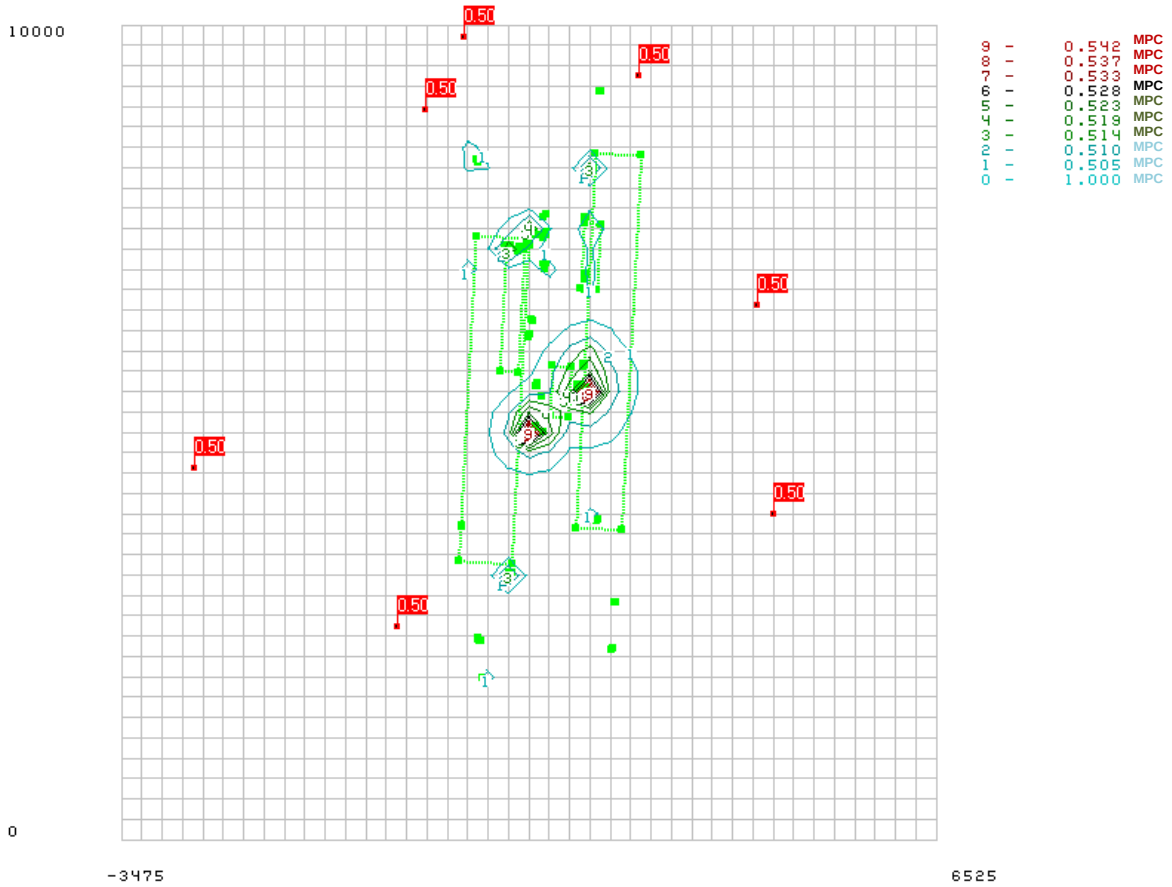
Summation group No. 11



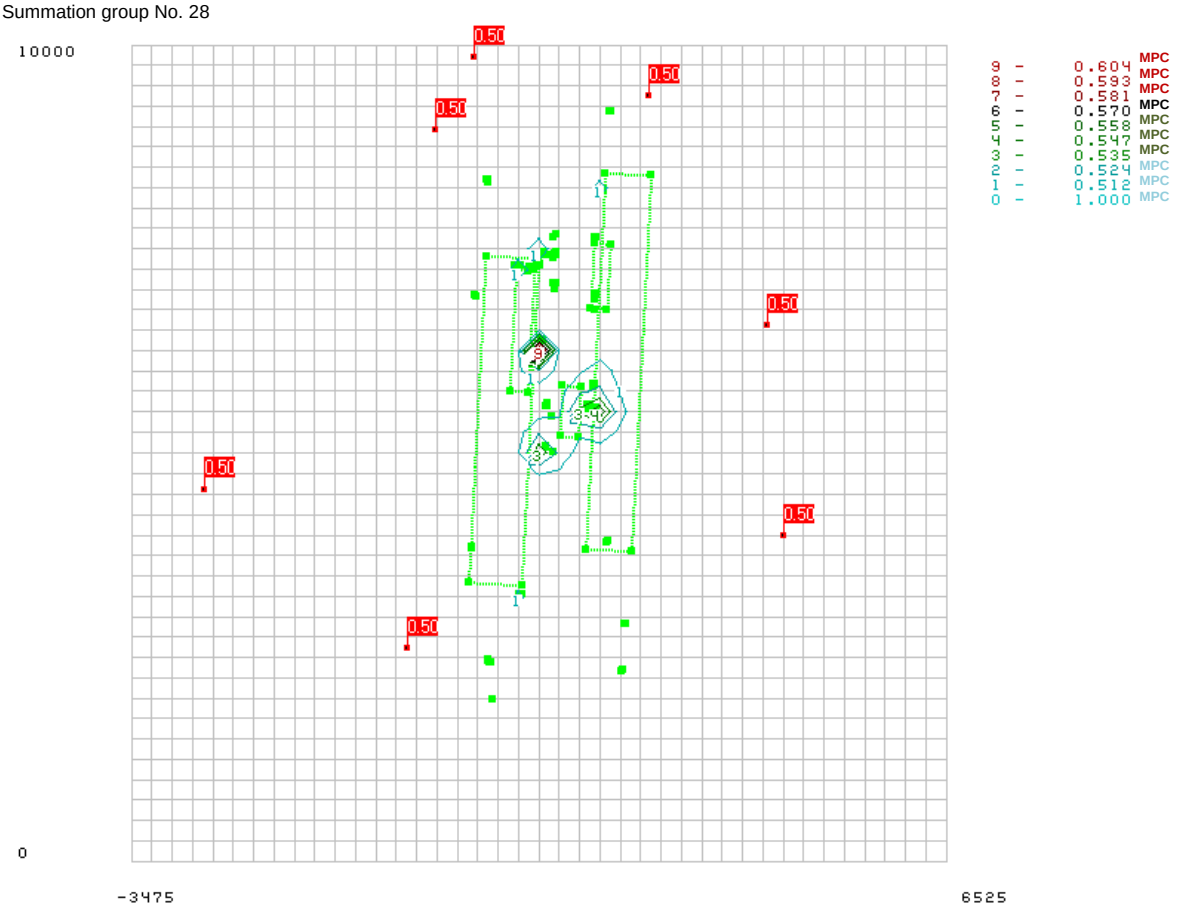
Summation group No. 12



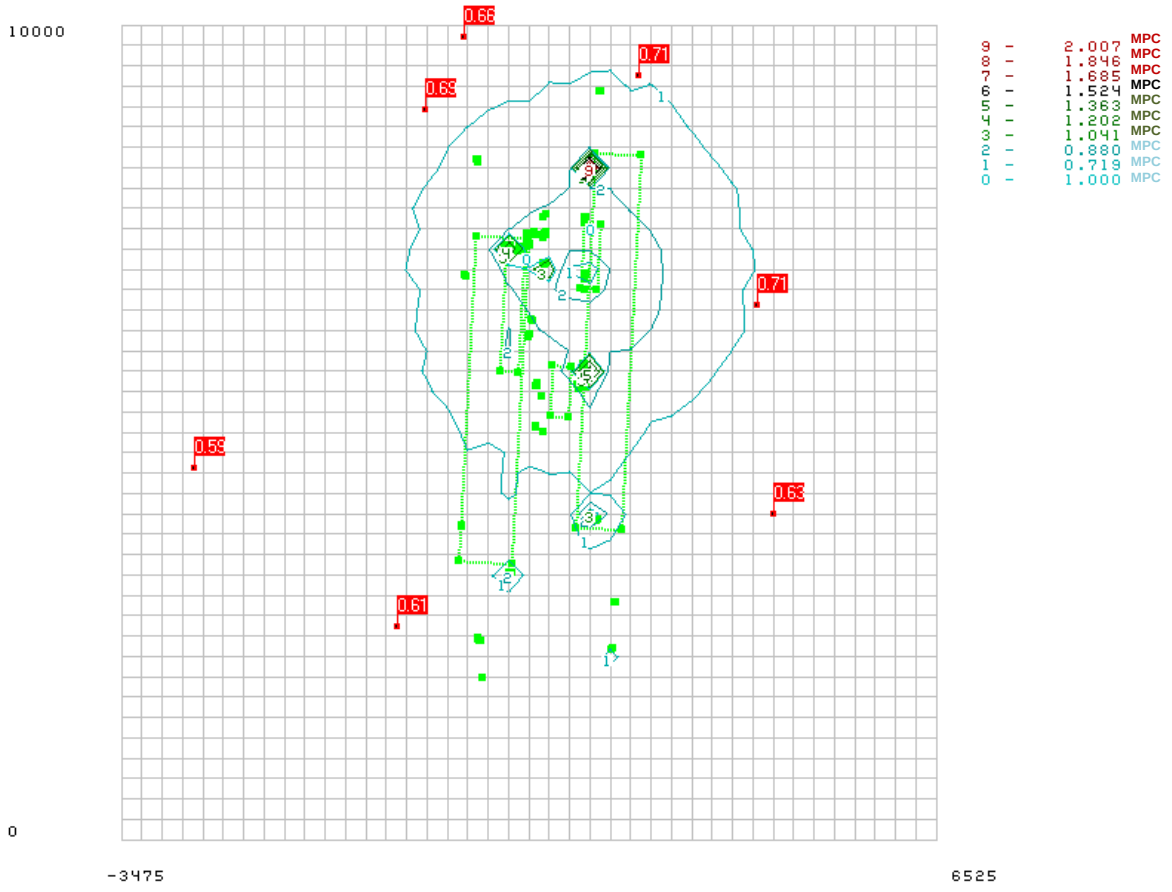
Summation group No. 27



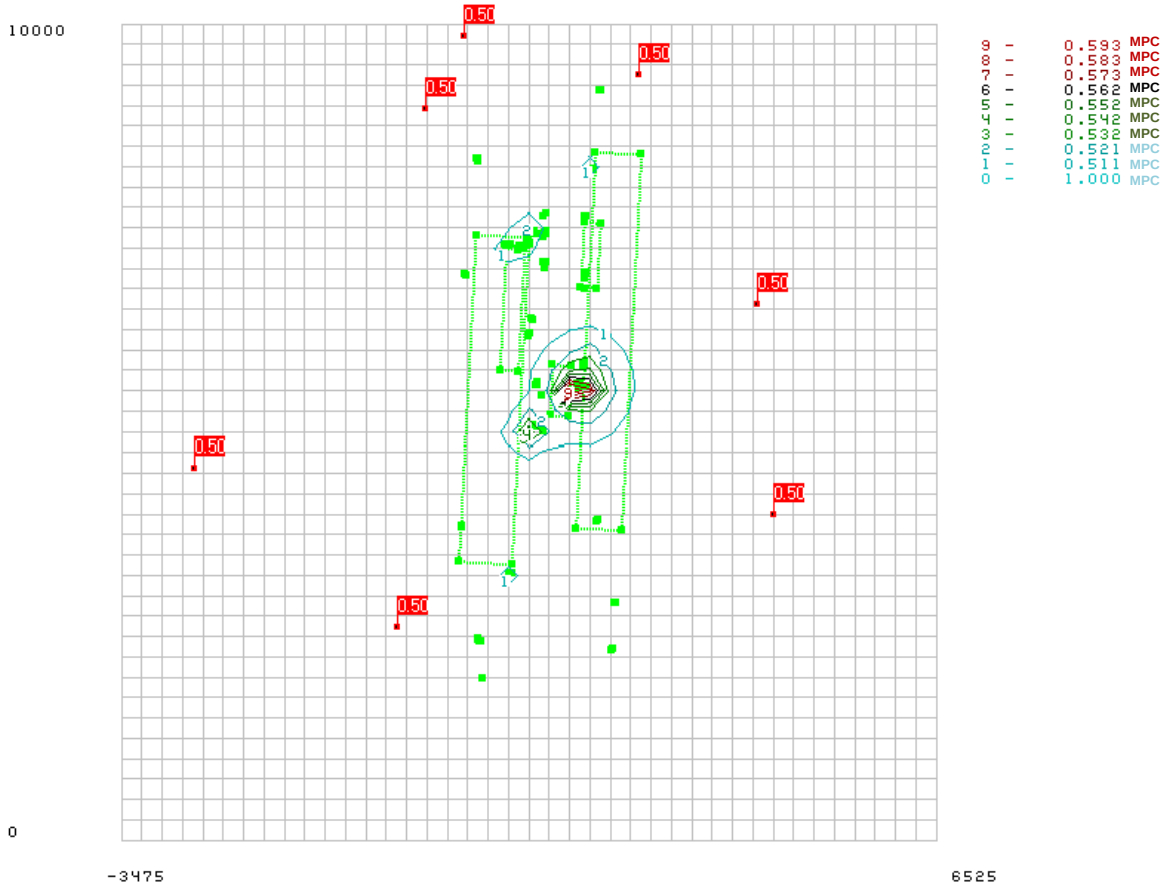
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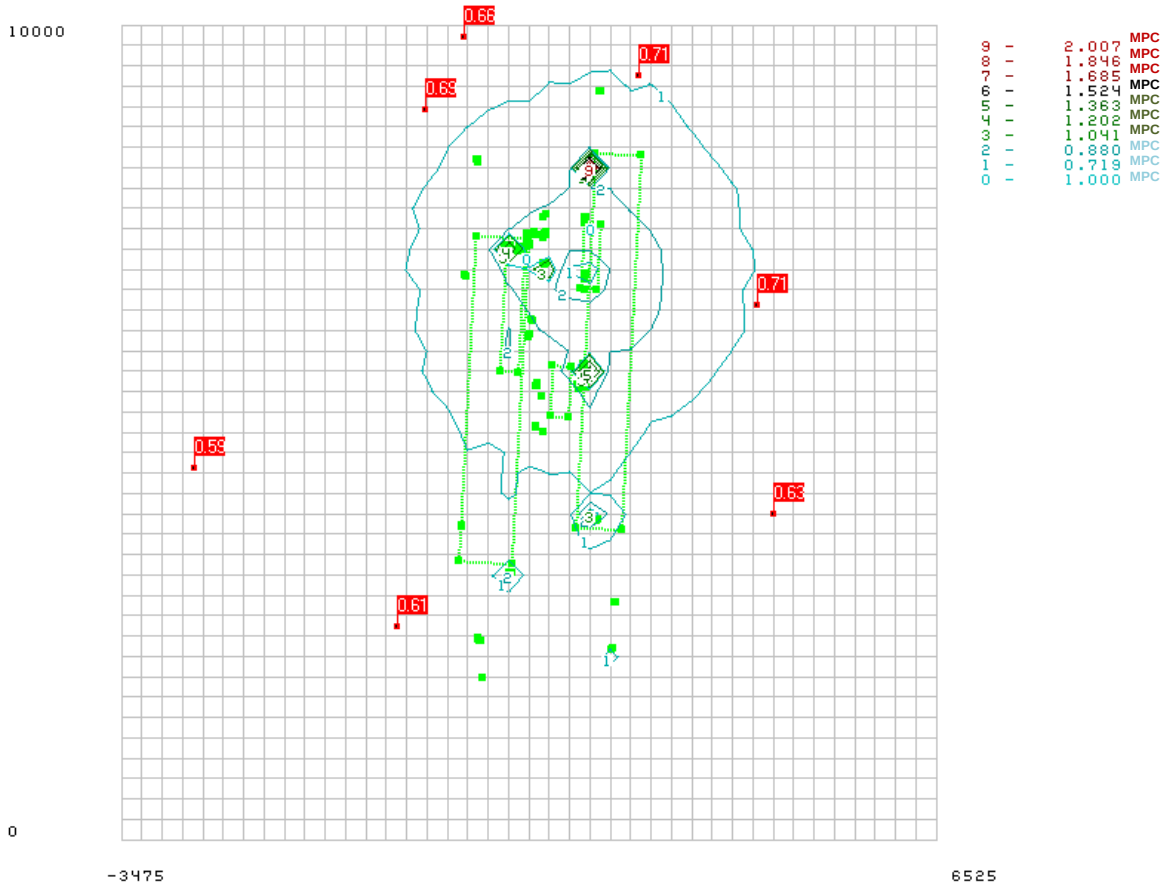
Summation group No. 31



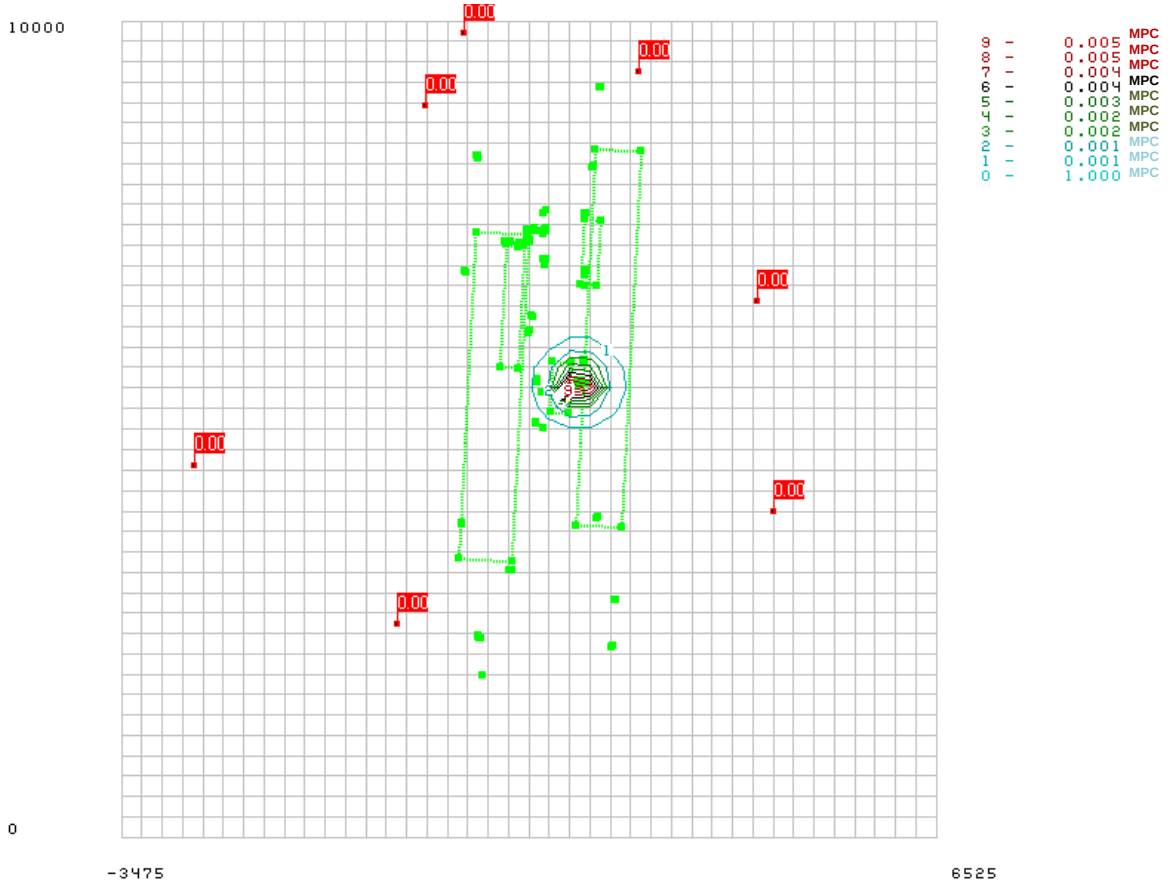
Summation group No. 35



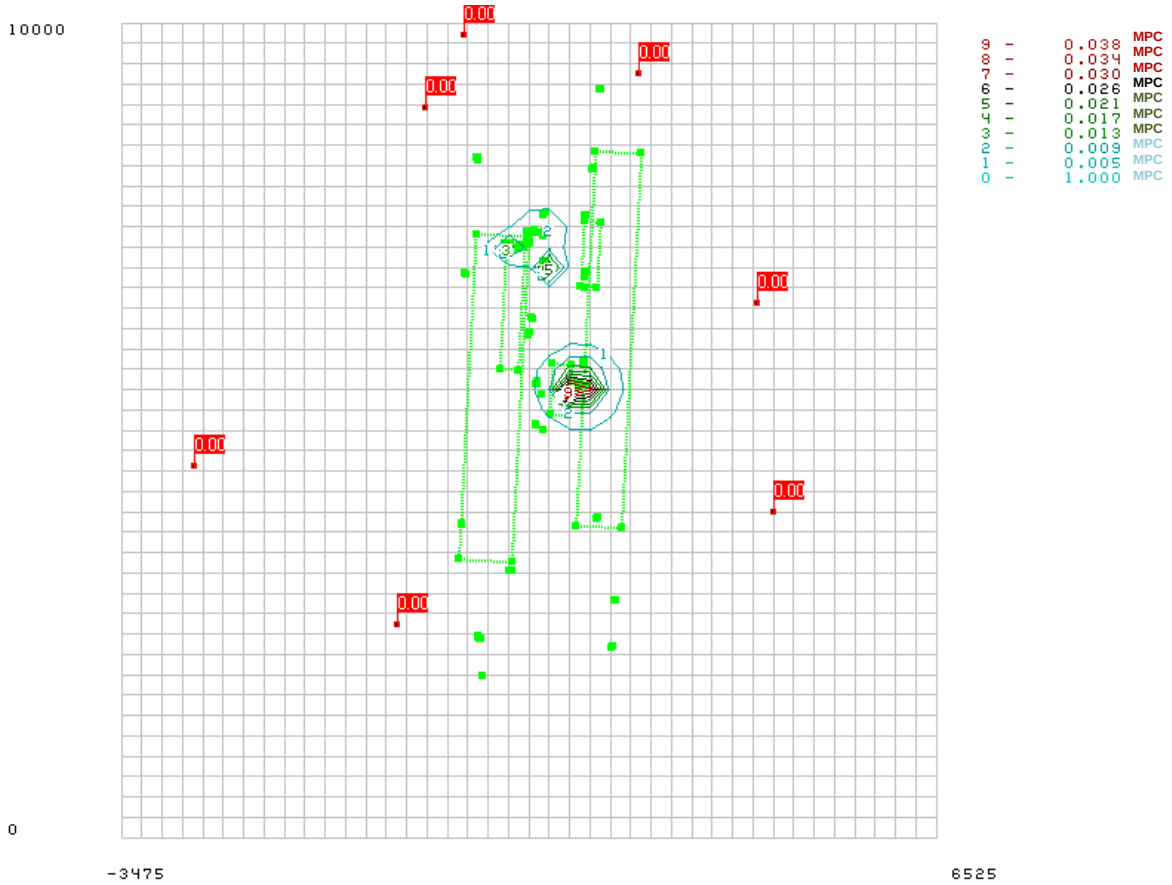
Summation group No. 37



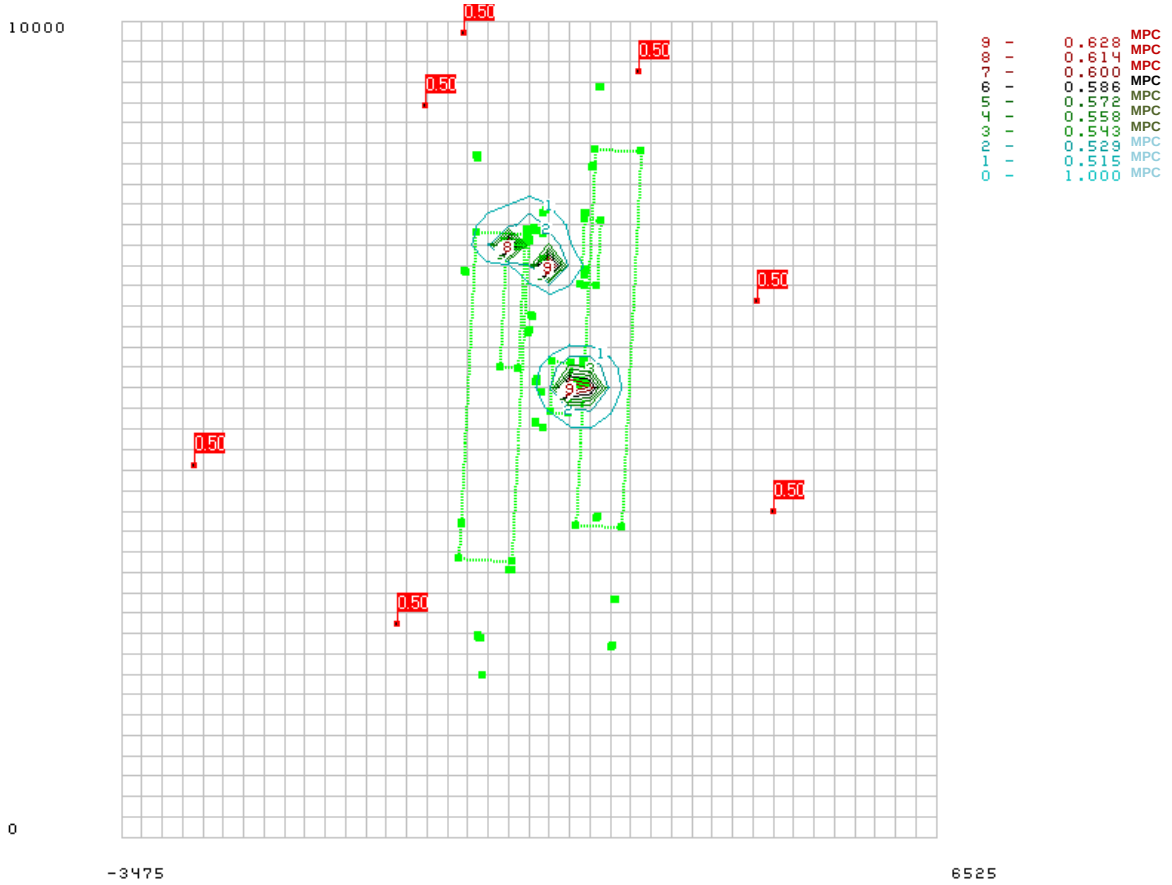
Substance 01002 / 110 Vanadium and its compounds (in terms of vanadium pentoxide)



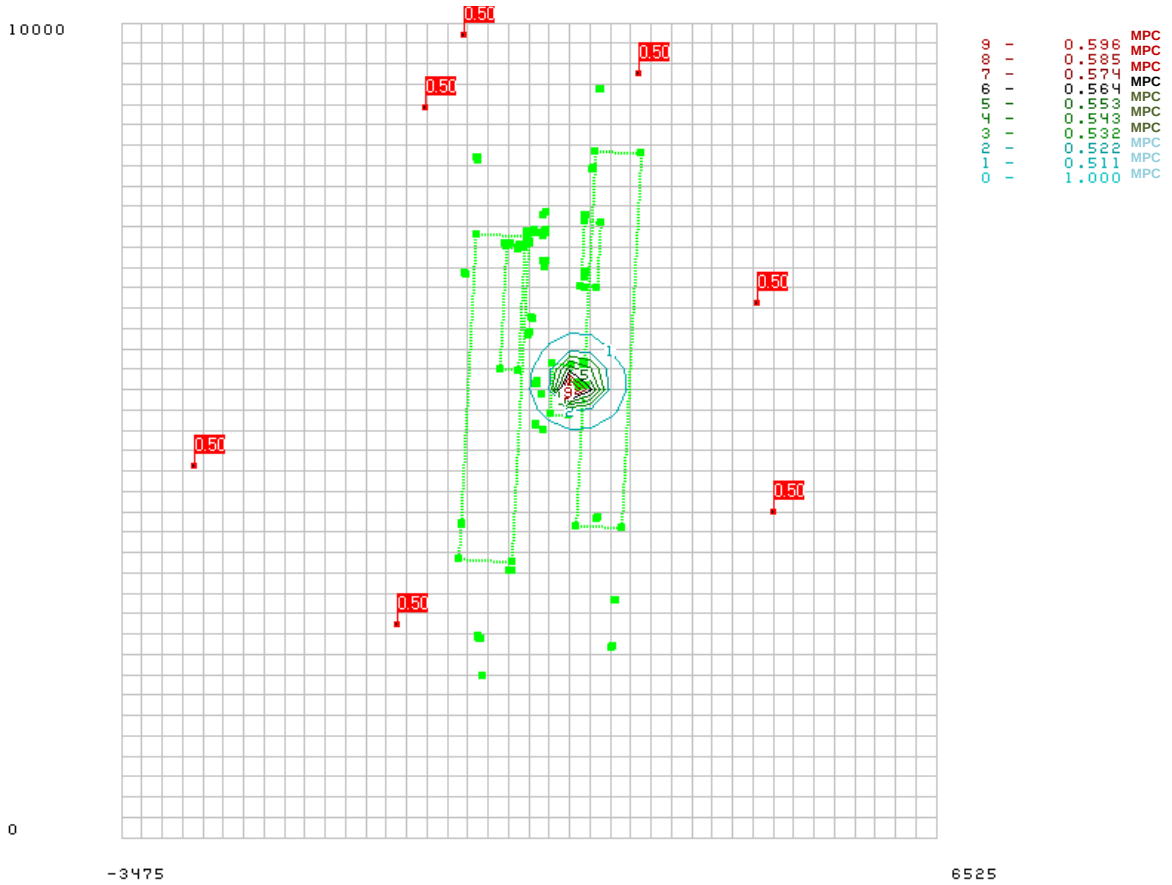
Substance 01003 / 123 iron and its compounds (in terms of iron)



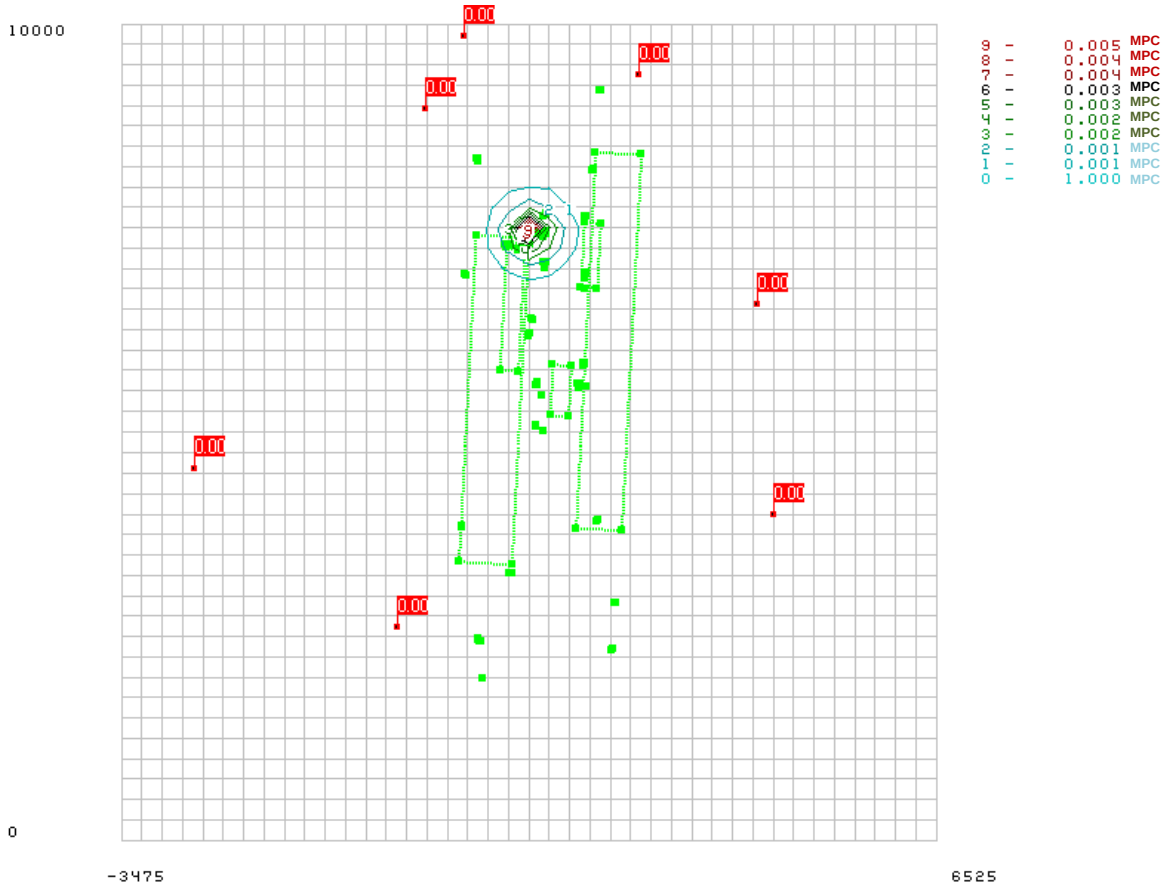
Substance 01104 / 143 Mangan and its compounds (in terms of mangan)



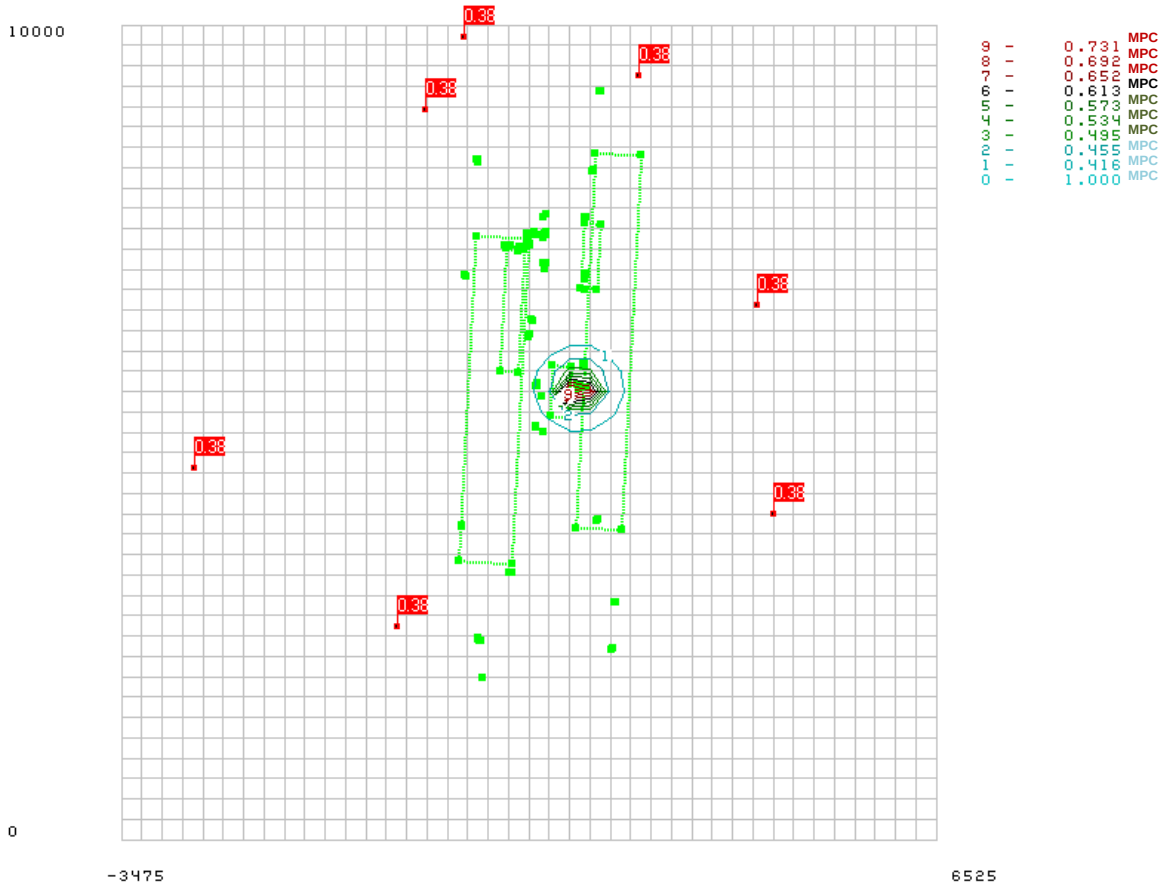
Substance / 150 Sodium hydroxide (lye, caustic soda)



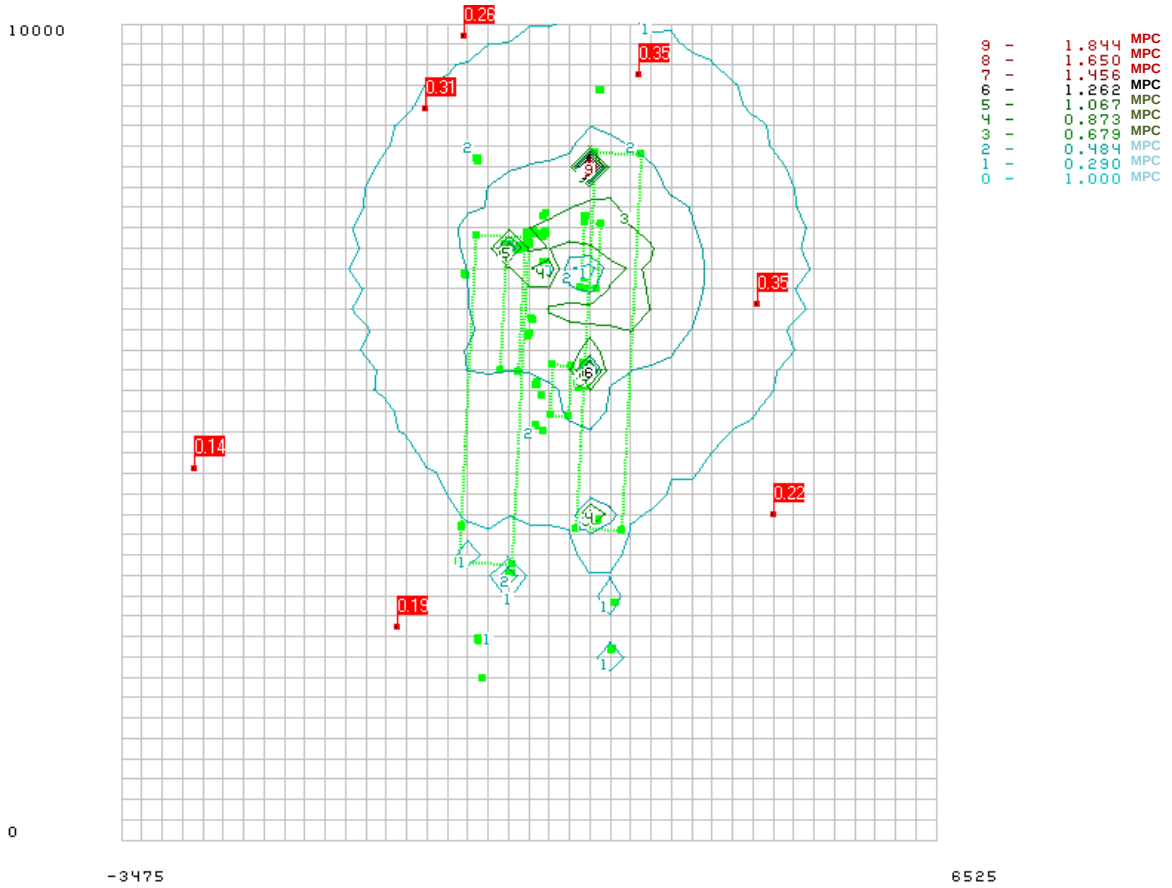
Substance 01009/ 184 Lead and its compounds (in terms of lead)



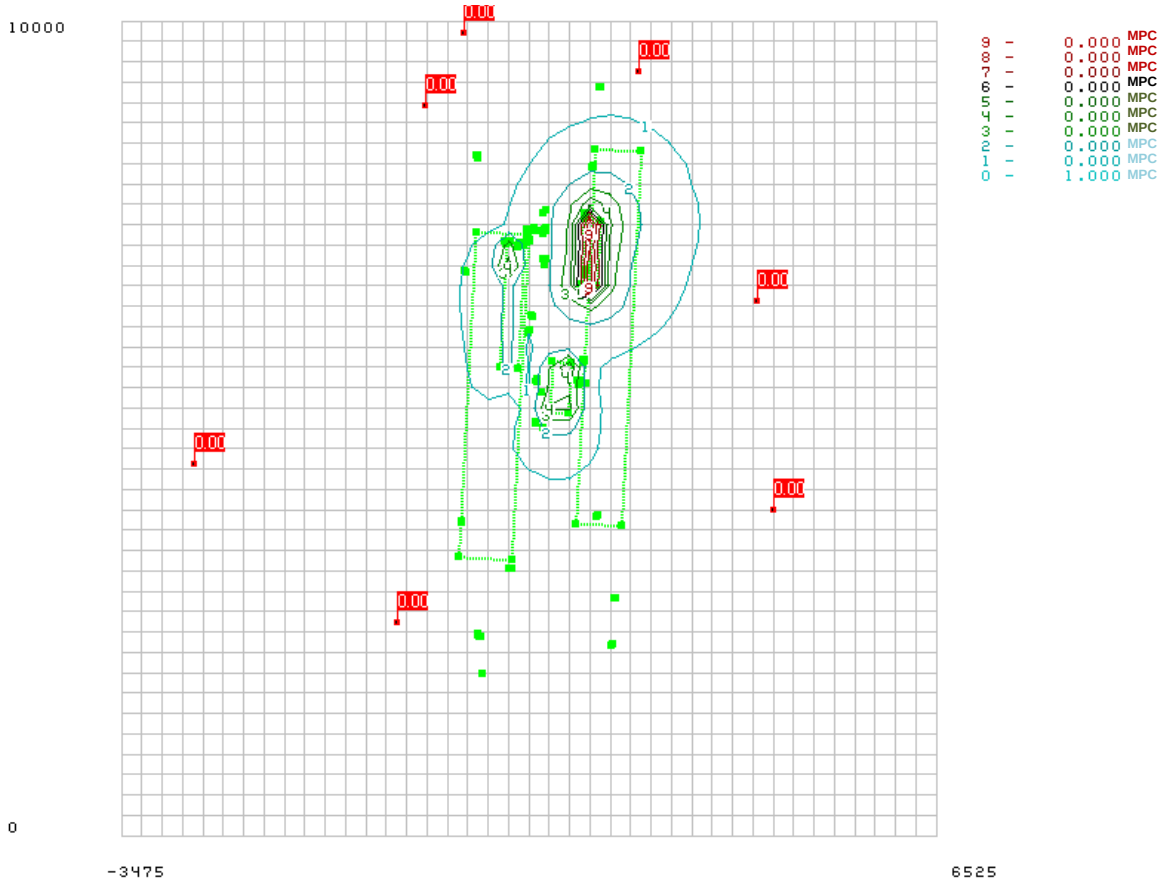
Substance 01010 / 203 Chromium and its compounds (in terms of chromium trioxide)



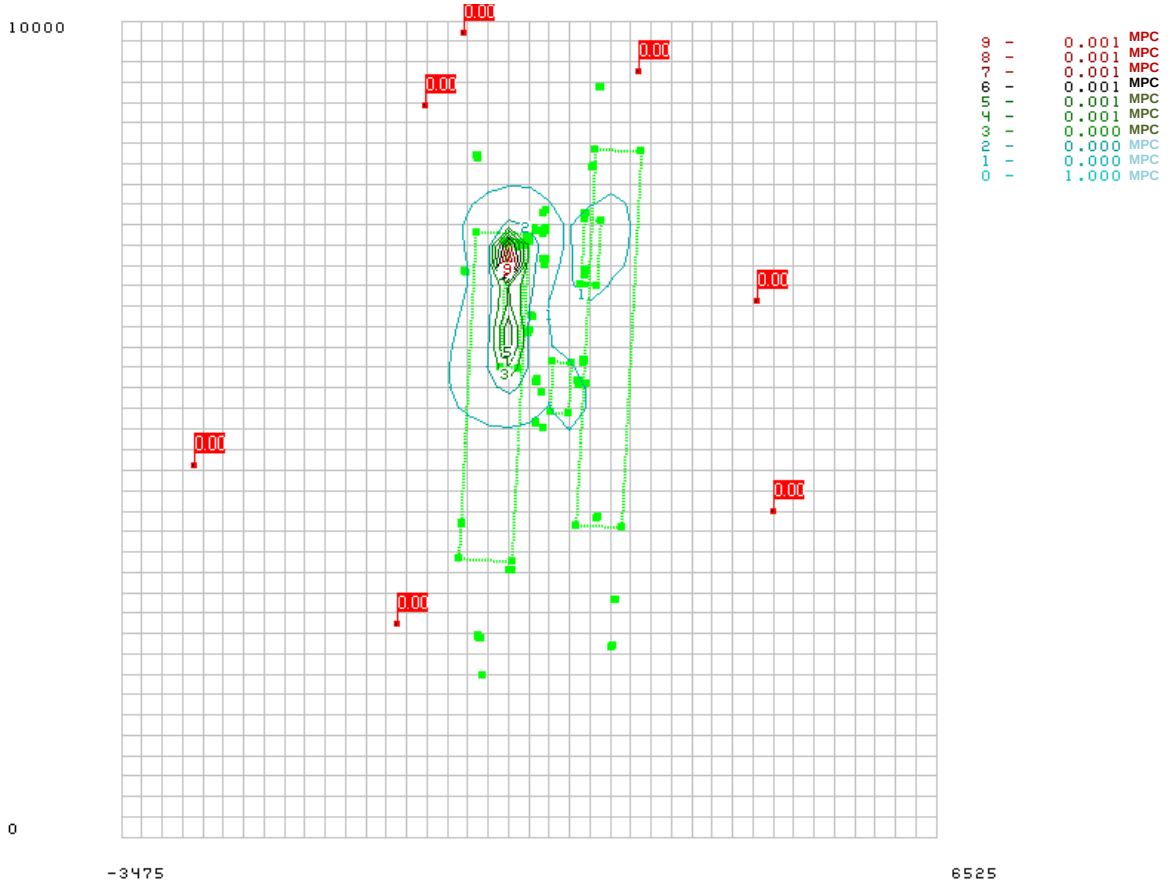
Substance 04001 / 301 Nitrogen oxides (in terms of nitrogen dioxide (NO + NO2))



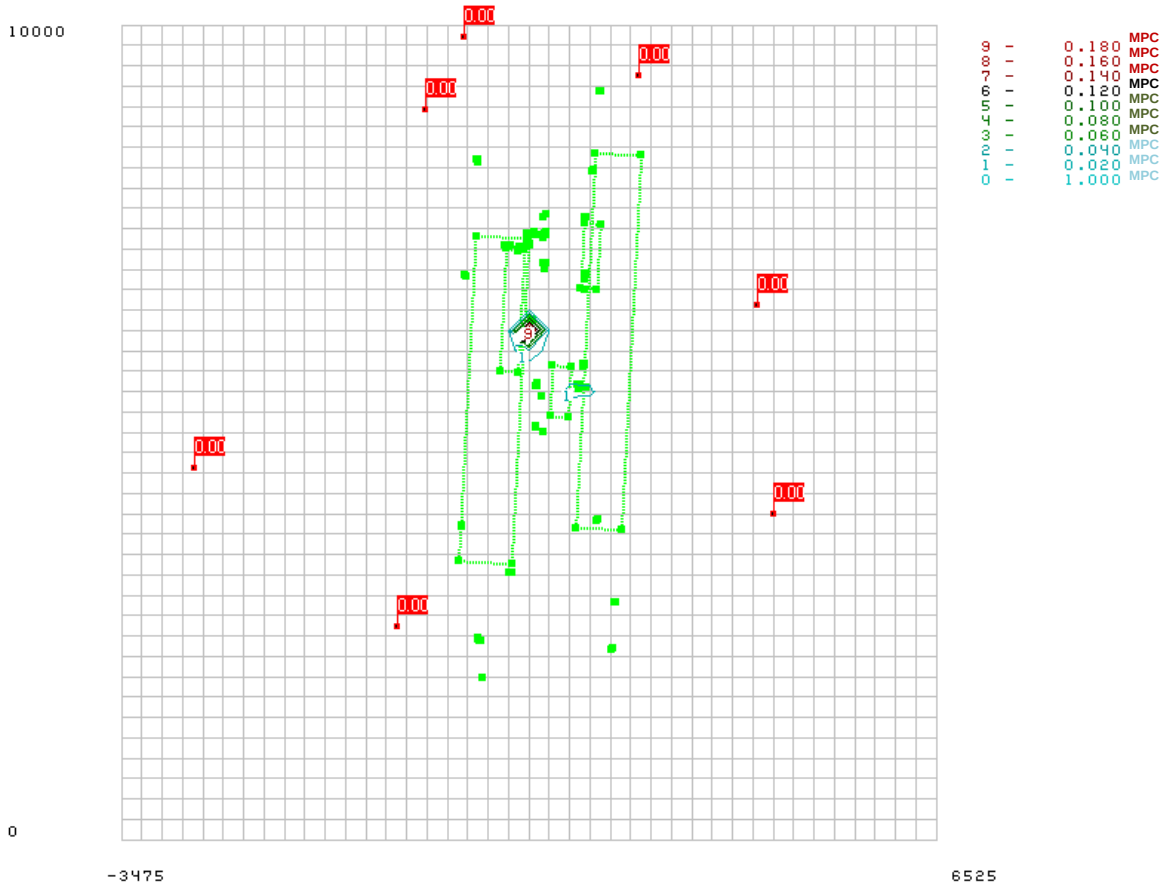
Substance 04003 / 303 Ammonia



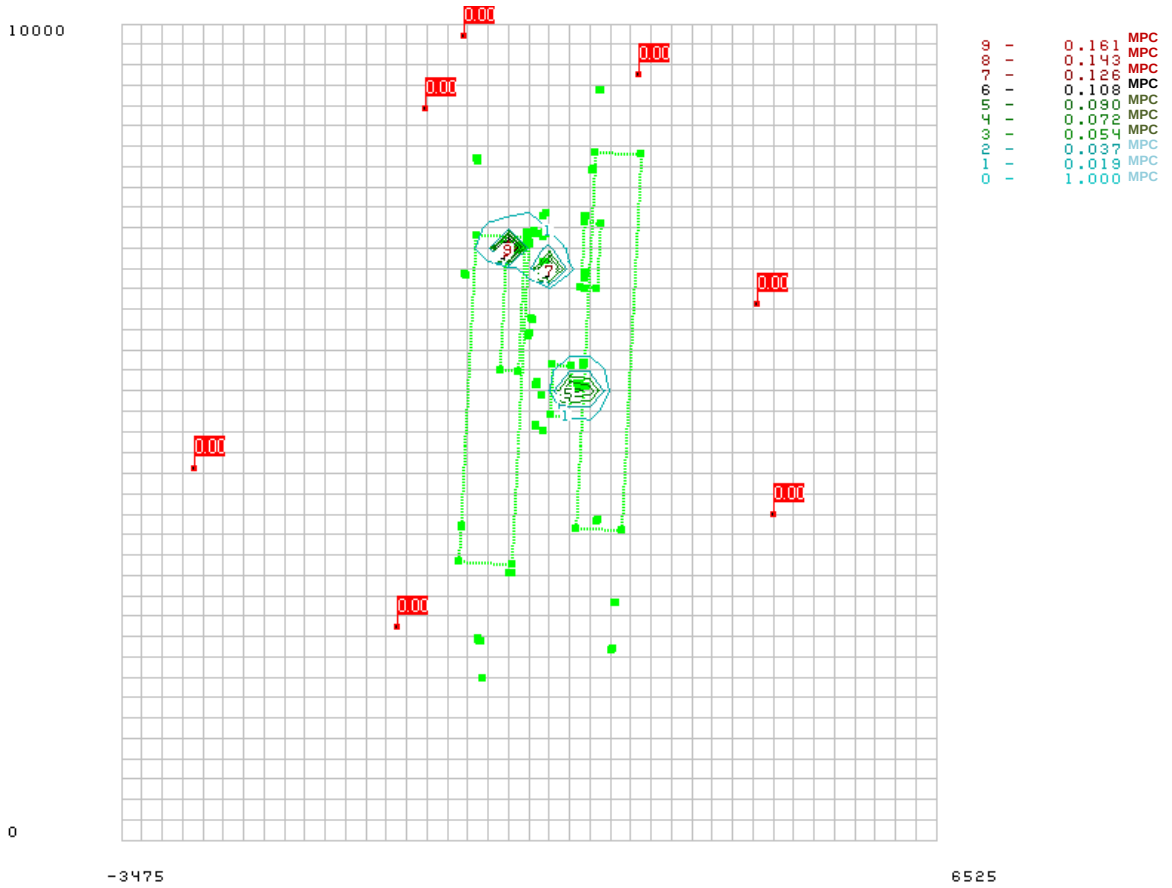
Substance 04002 / 304 Nitrogen(1) oxide (N2O)



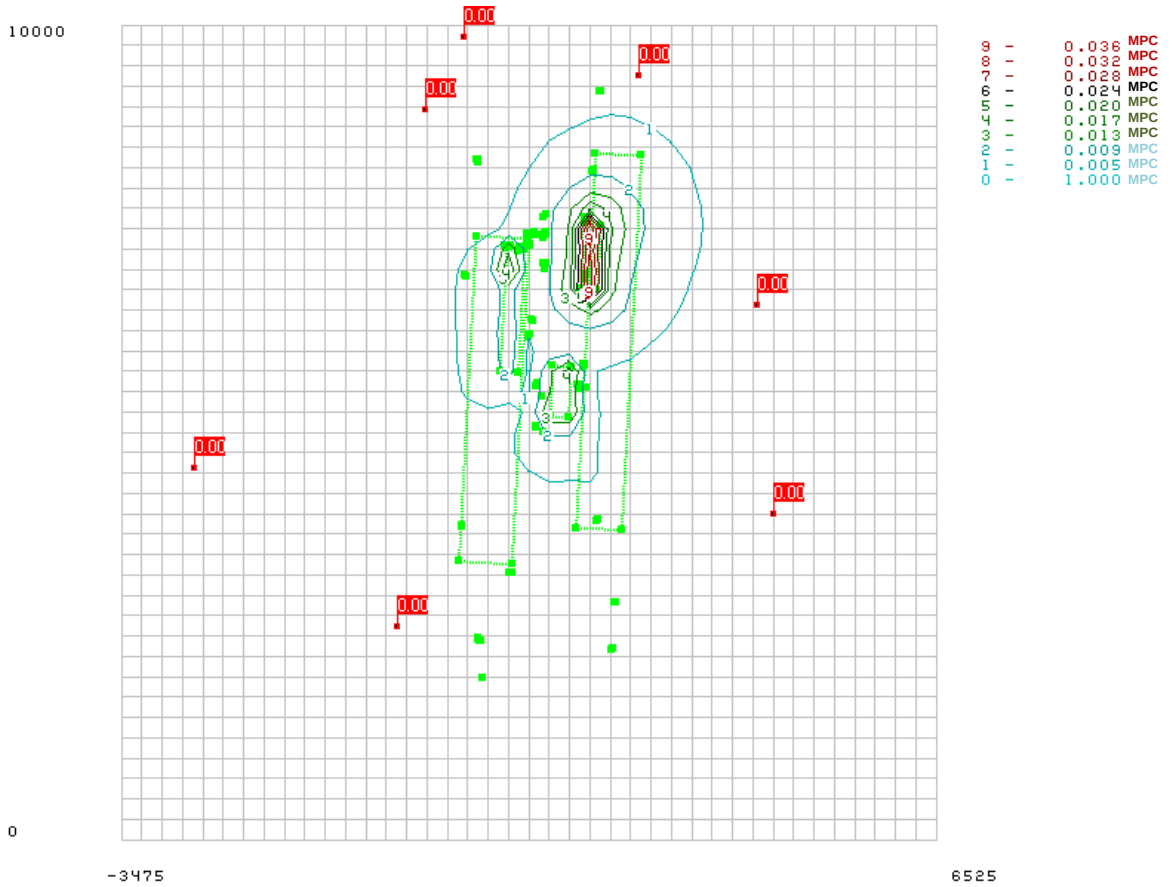
Substance 05004/ 322 Sulfuric acid (H2S04) (sulphuric acid)



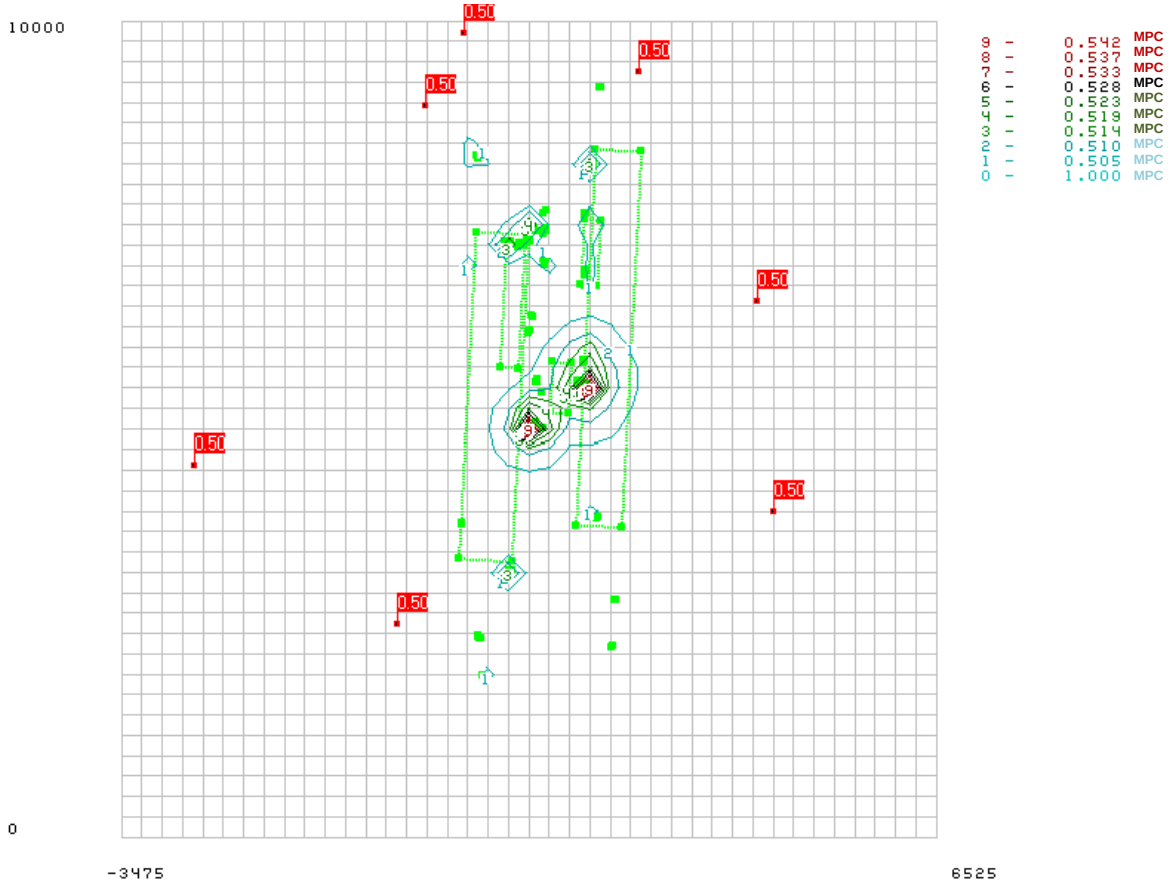
Substance 03000 / 323 Substances in the form of suspended solid particles (microparticles and fibres)



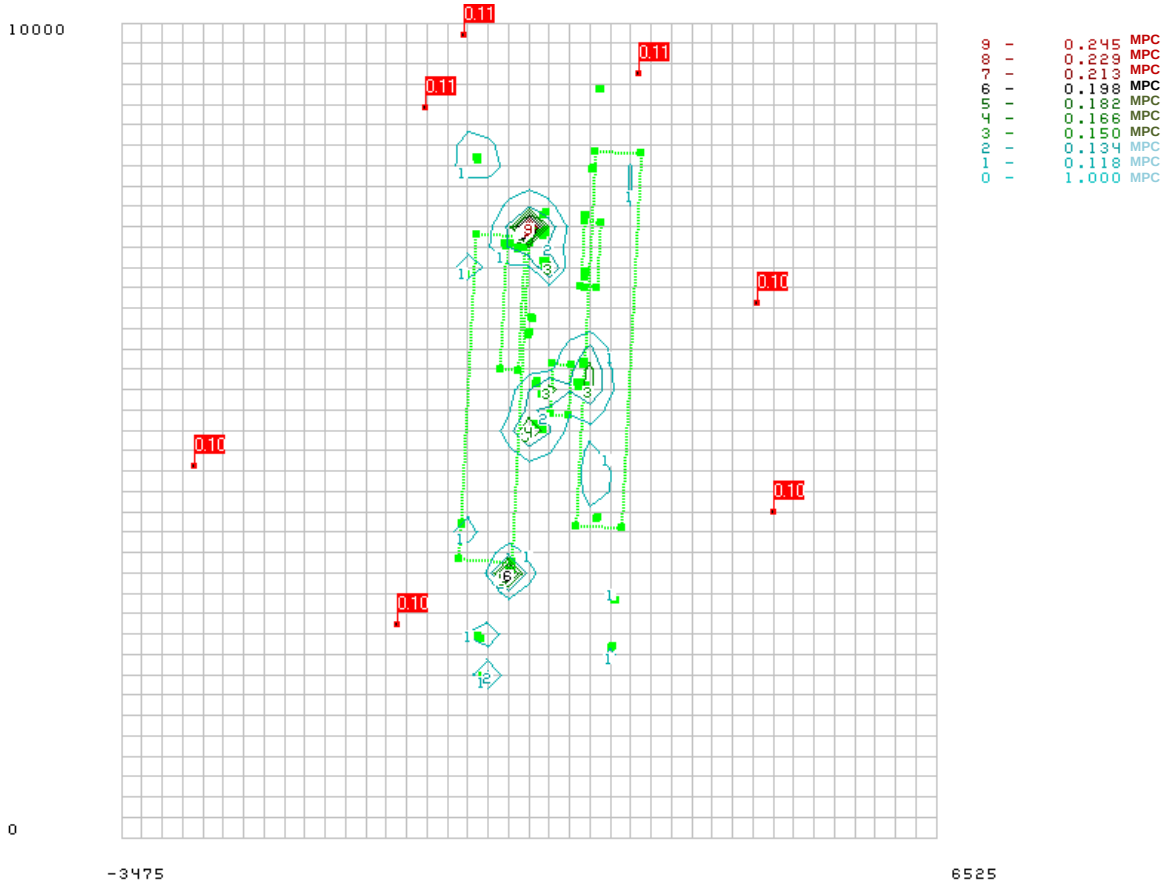
Substance 03004 / 328 Soot



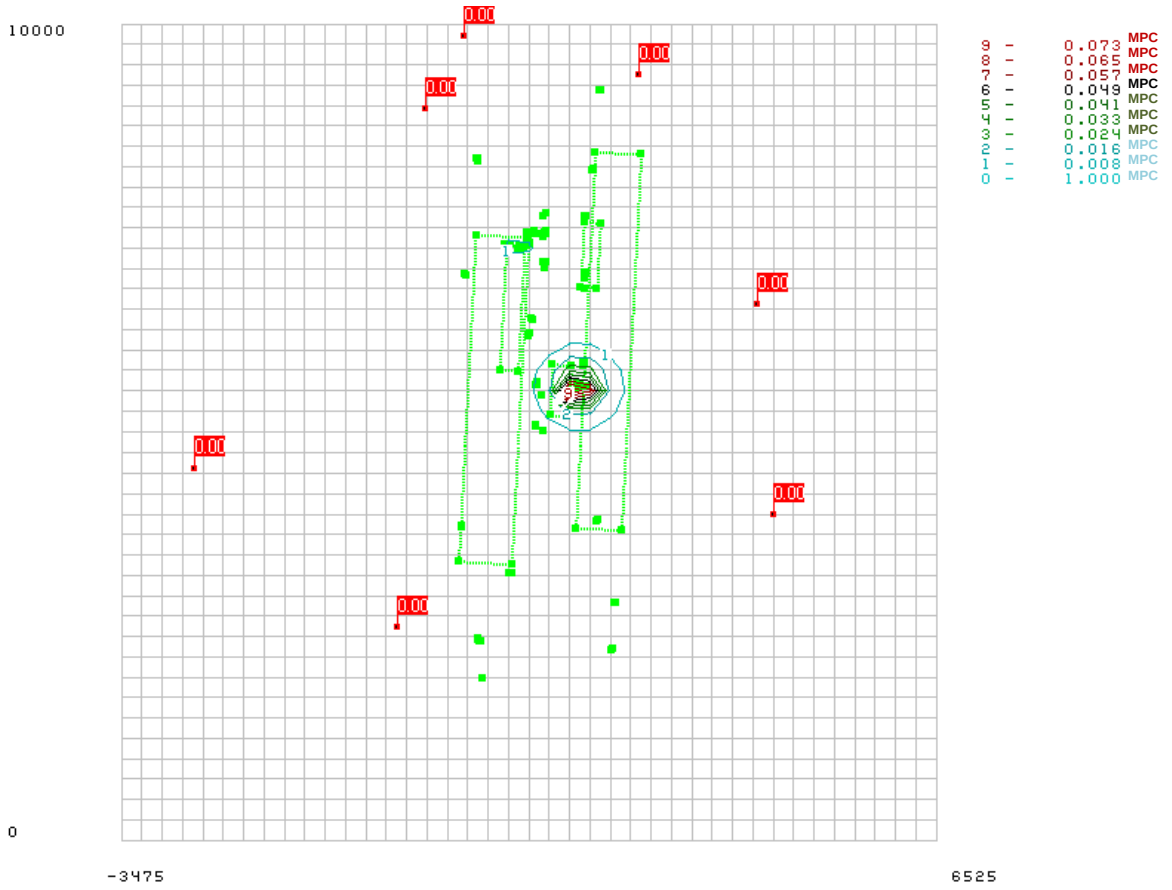
Substance 05001 / 330 Sulphur dioxide



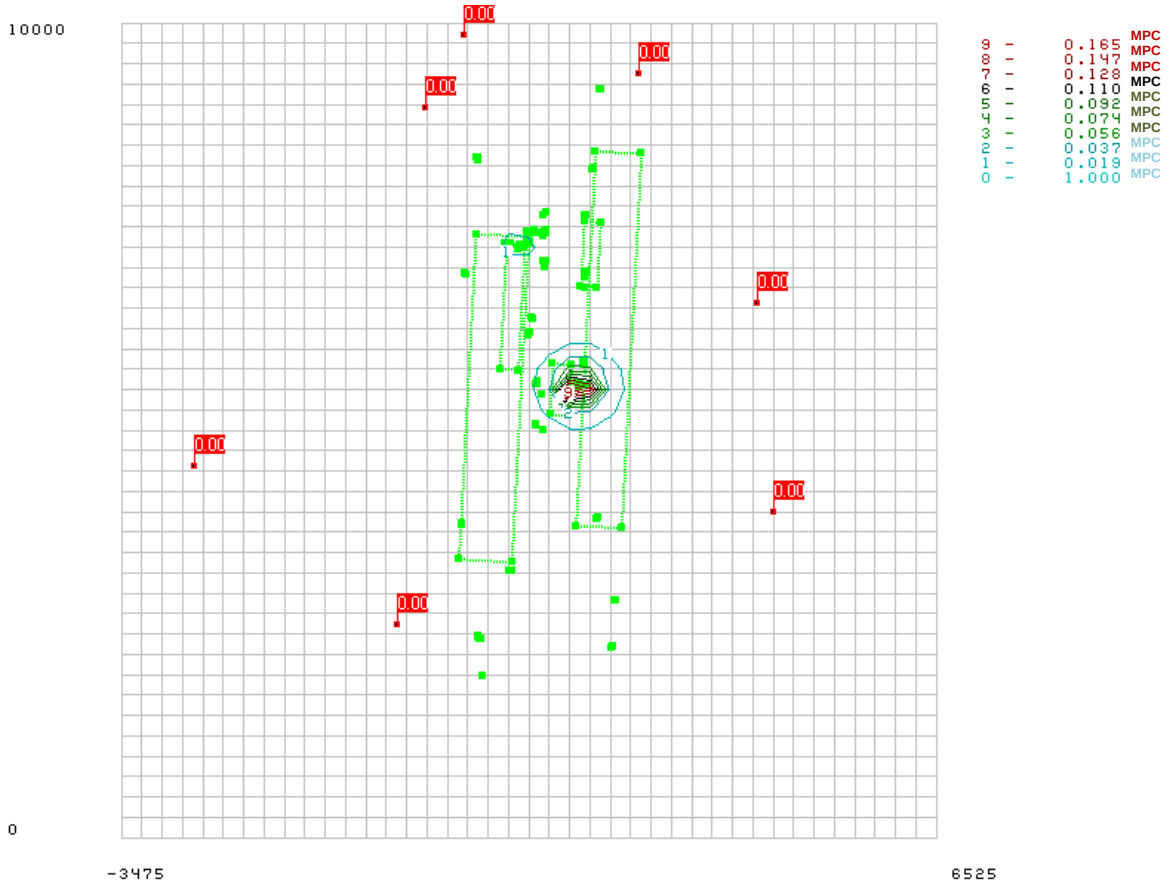
Substance 06000 / 337 Carbon oxide



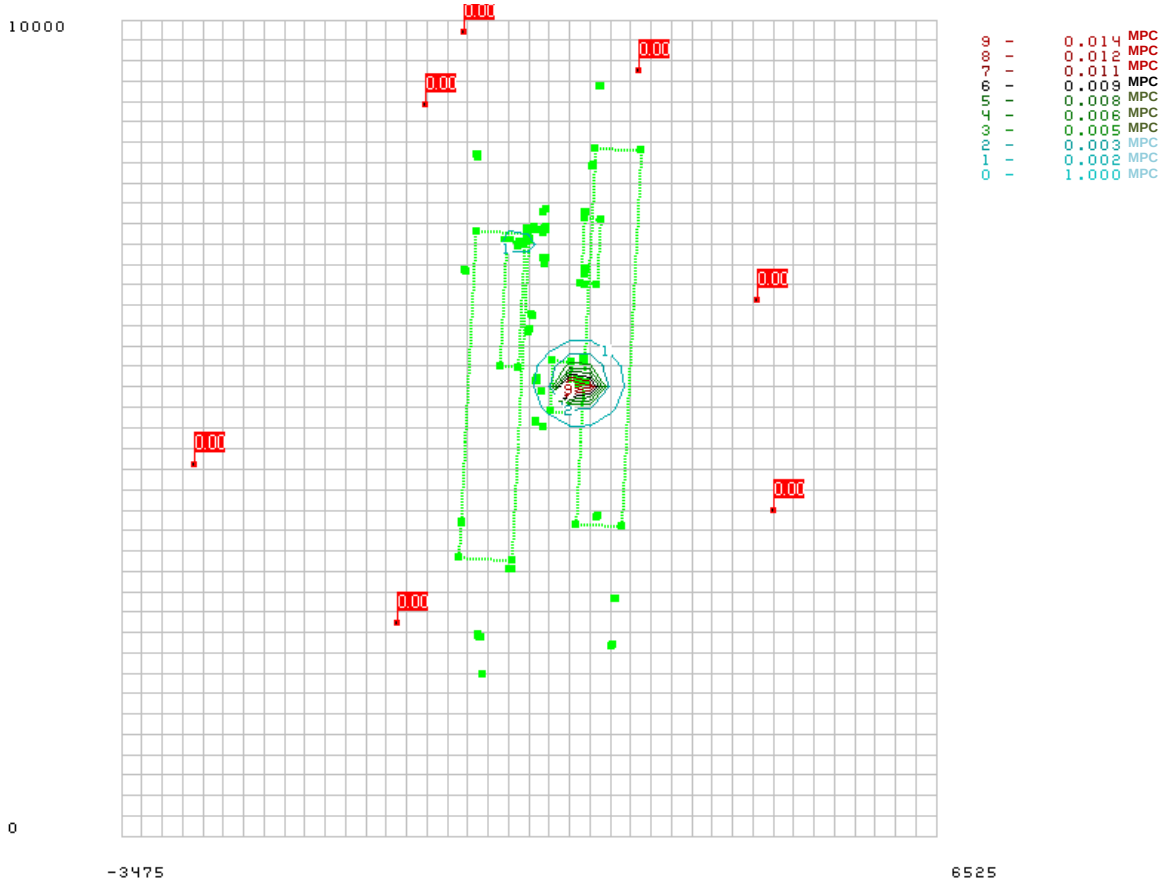
Substance 16001 / 342 Hydrogen fluoride



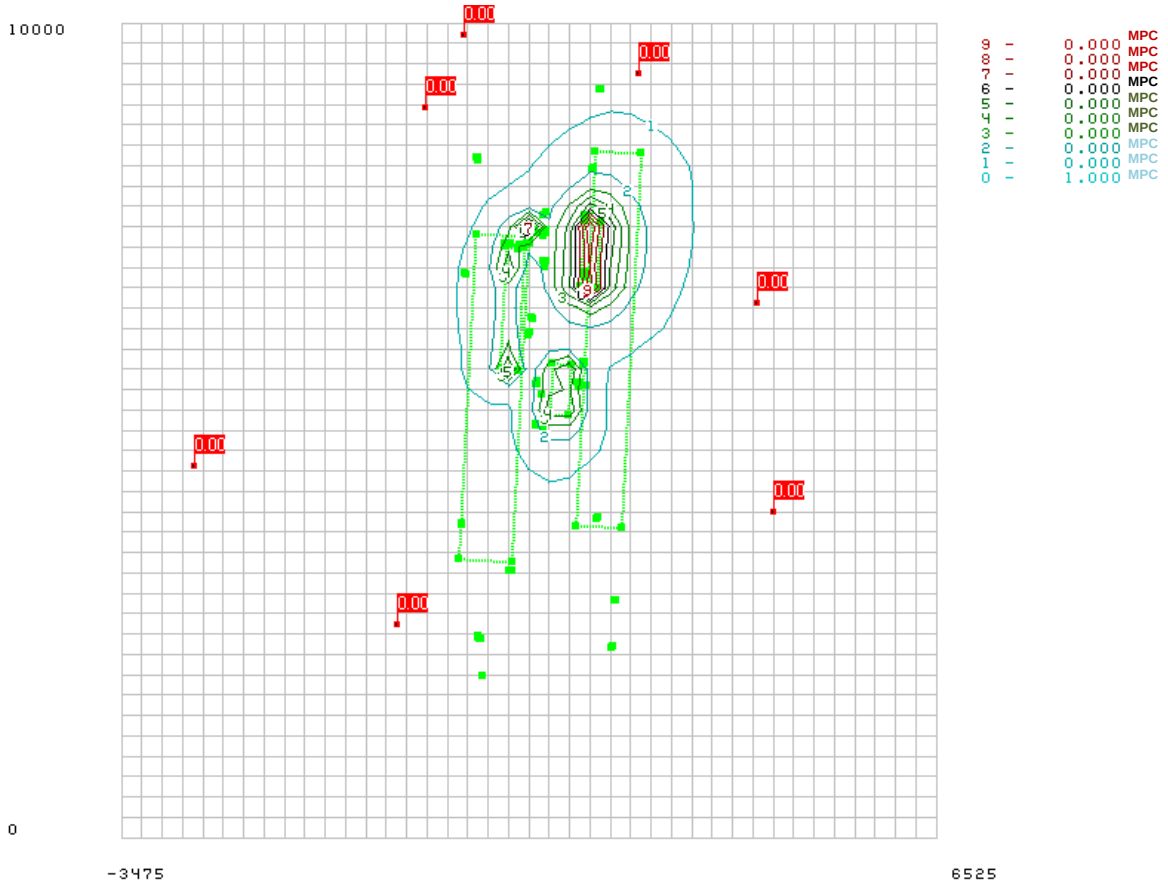
Substance 16000/ 343 Fluor and its compounds (in terms of fluor)



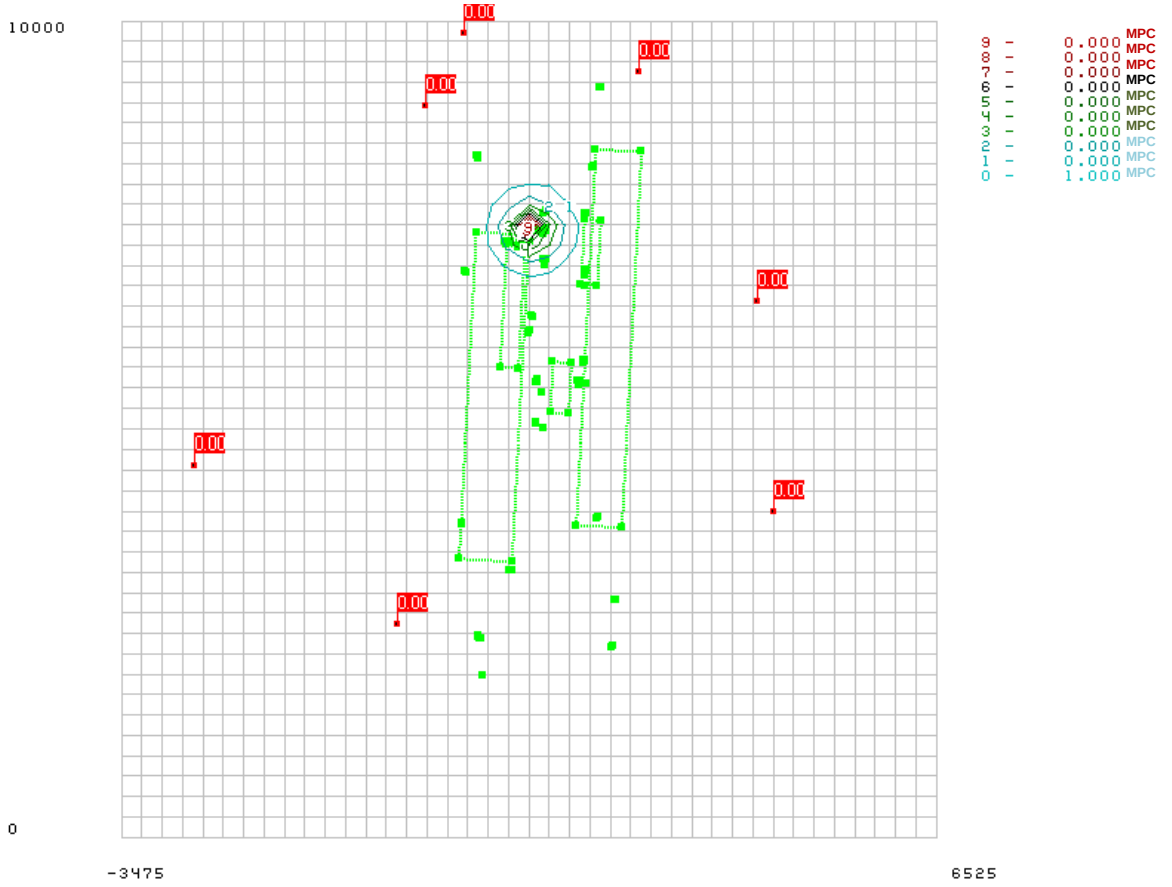
Substance 16000/ 344 Fluor and its compounds (in terms of fluor)



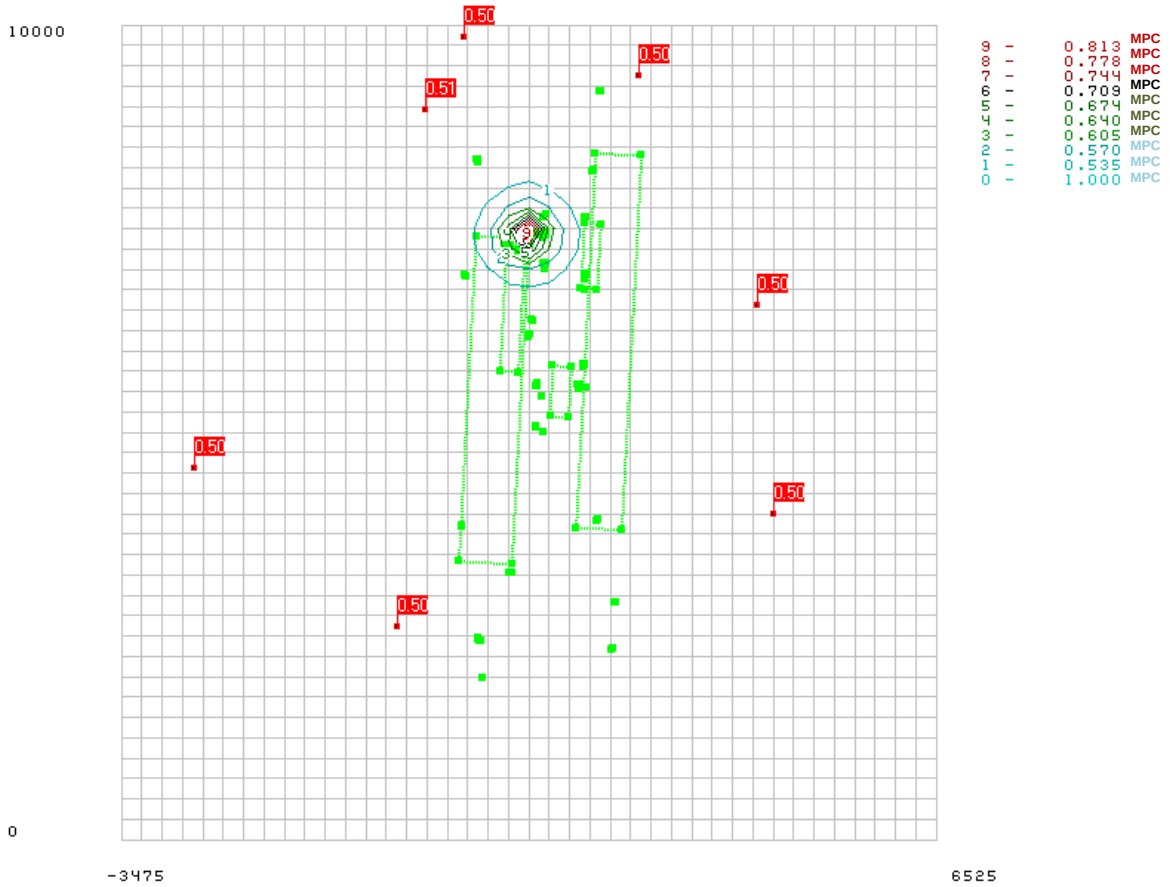
Substance 12000 / 410 Methane



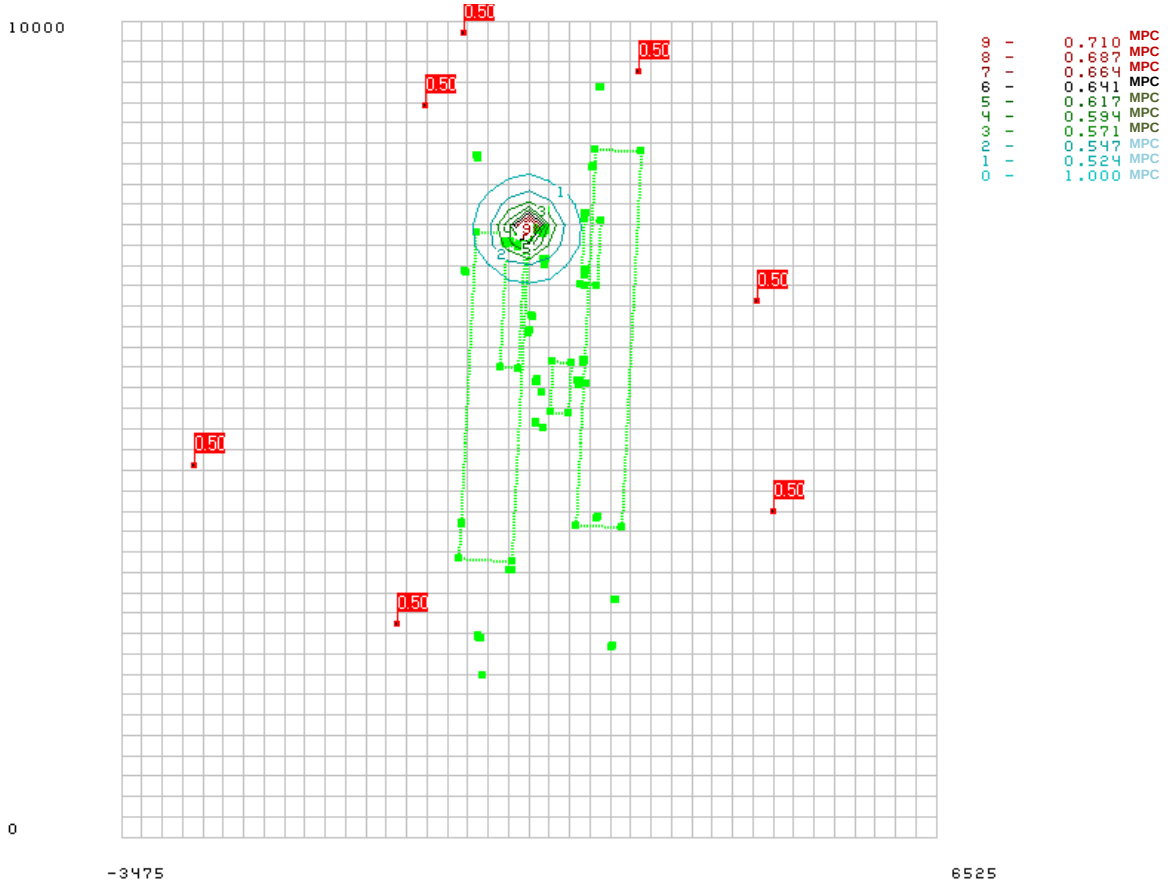
Substance 11000 / 514 Non-methane volatile organic compounds (NMVOC)



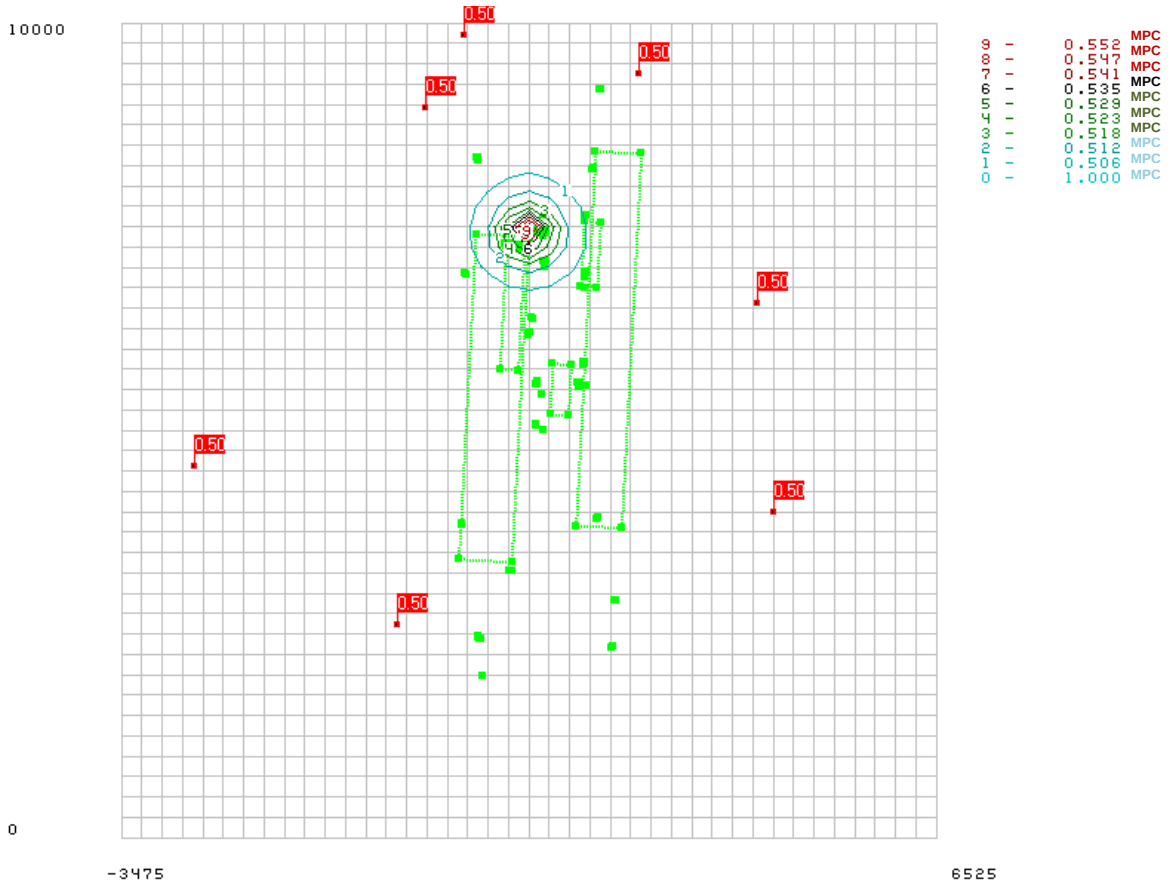
Substance 11030 / 616 Xylene



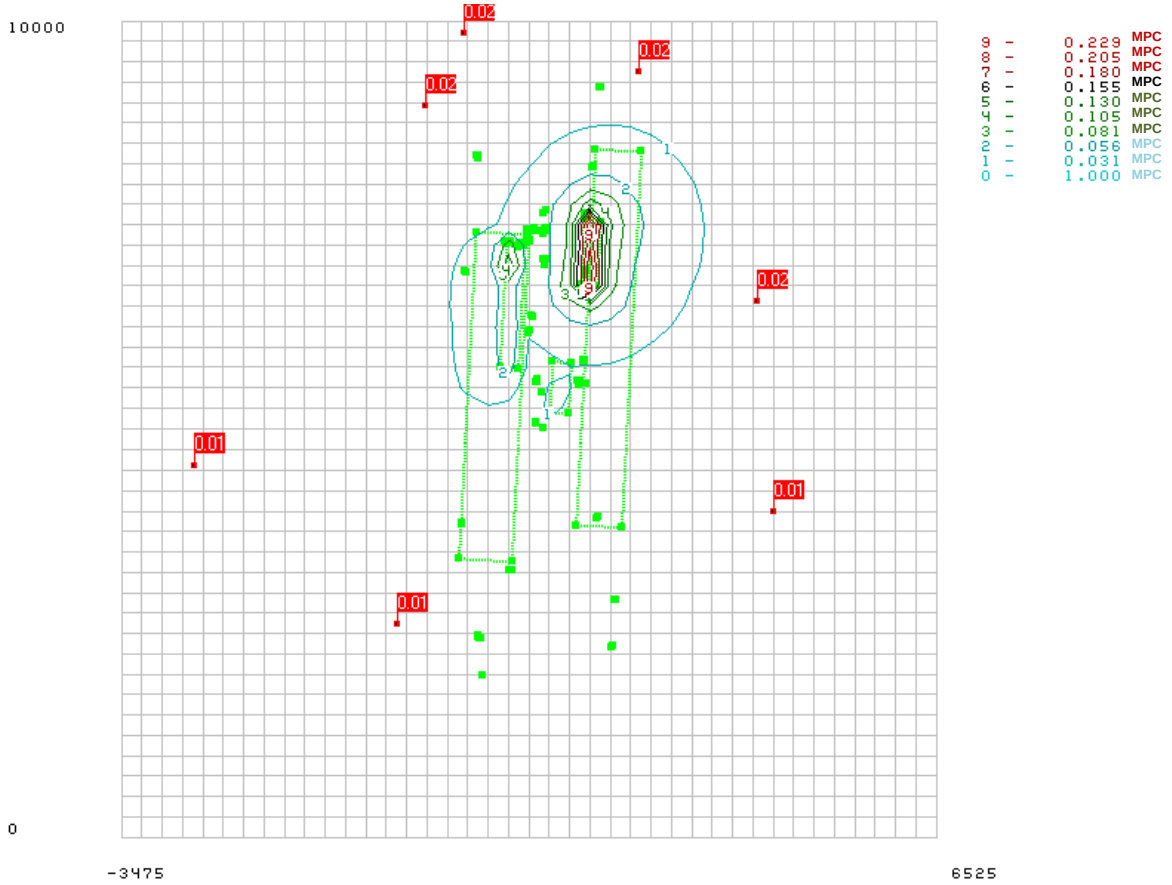
Substance 11037 / 620 Styrene



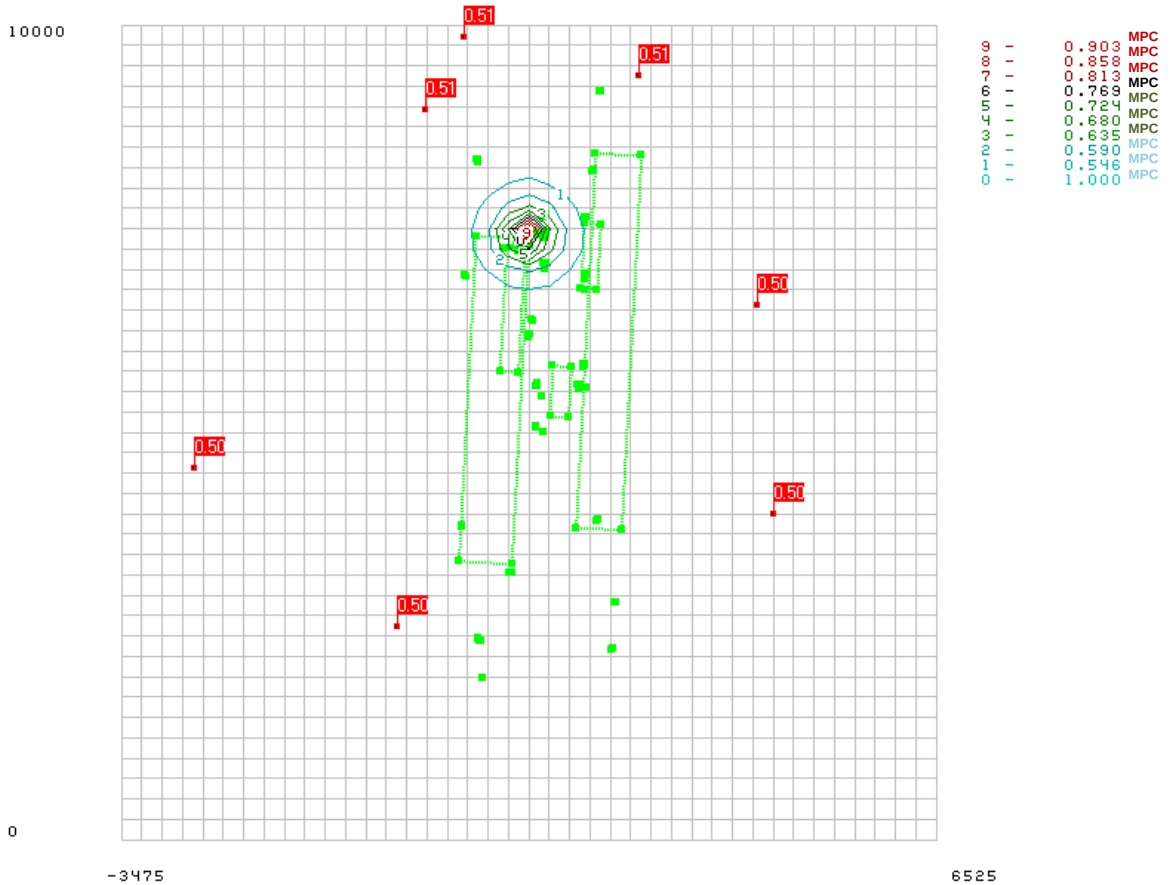
Substance 11041 / 621 Toluene



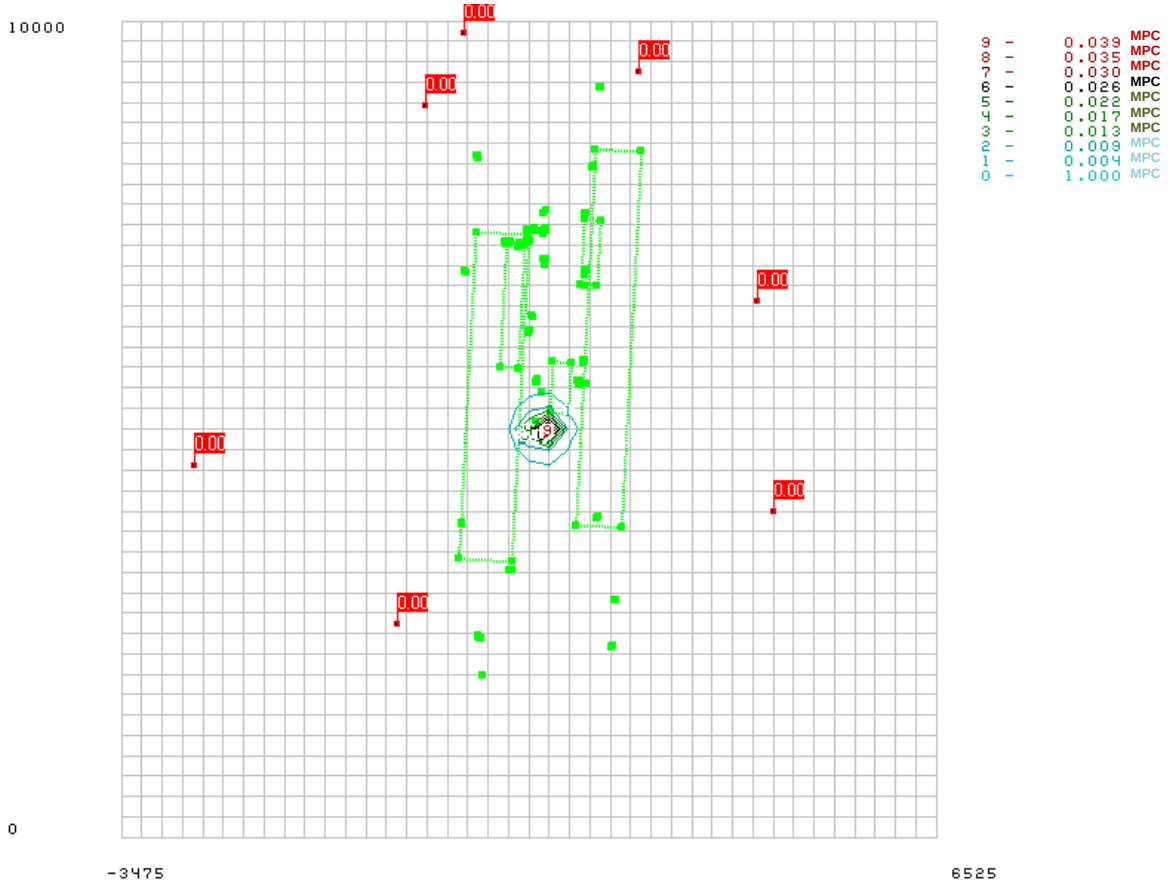
Substance 13101 / 703 Benzo[a]pyrene



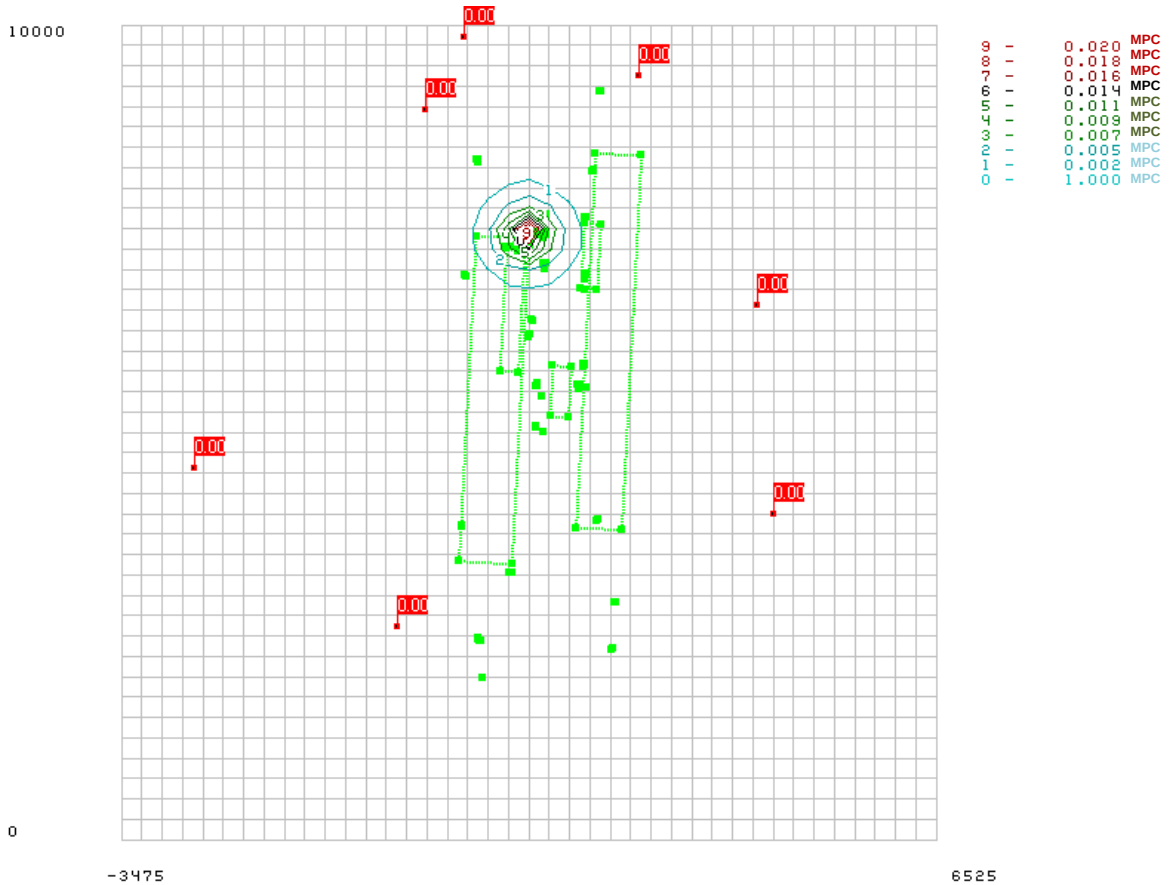
Substance 11000 / 1042 Non-methane volatile organic compounds (NMVOC)



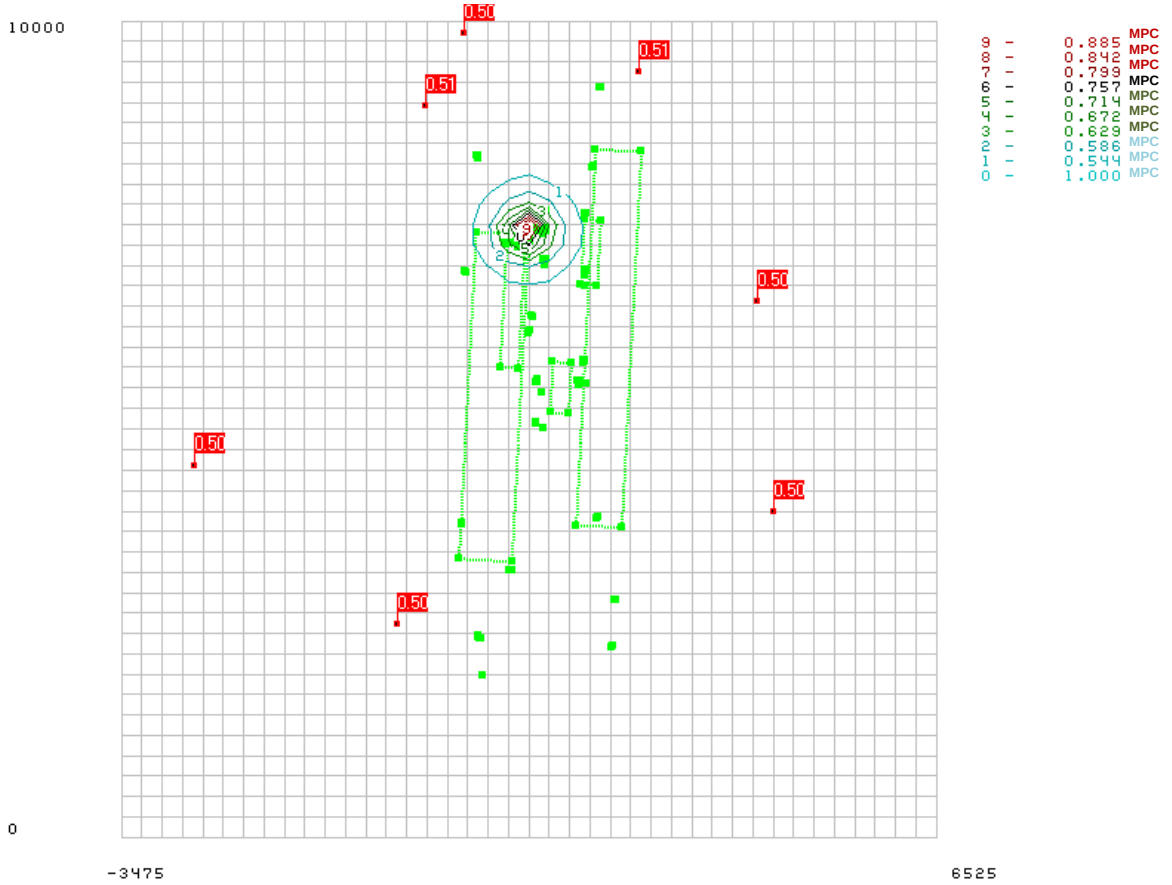
Substance 11000 / 1056 Non-methane volatile organic compounds (NMVOC)



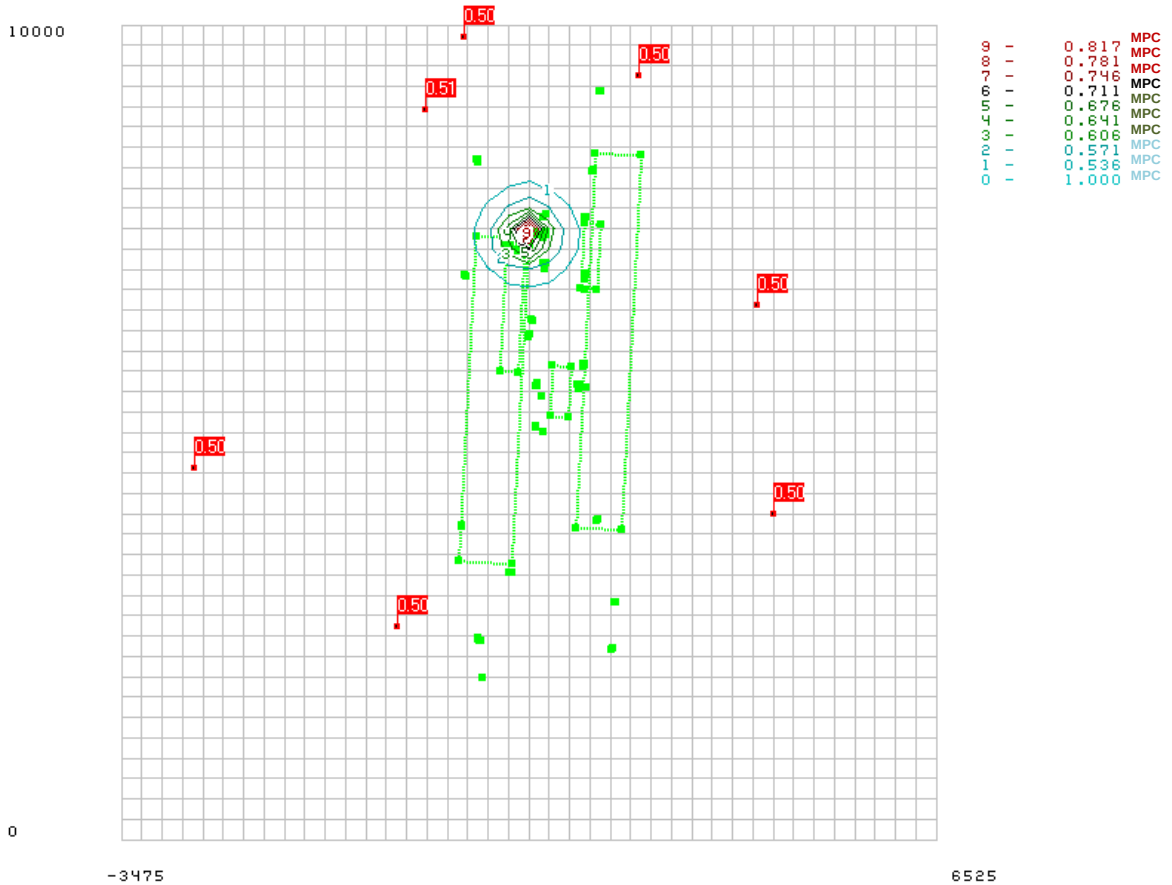
Substance 11000 / 1061 Non-methane volatile organic compounds (NMVOC)



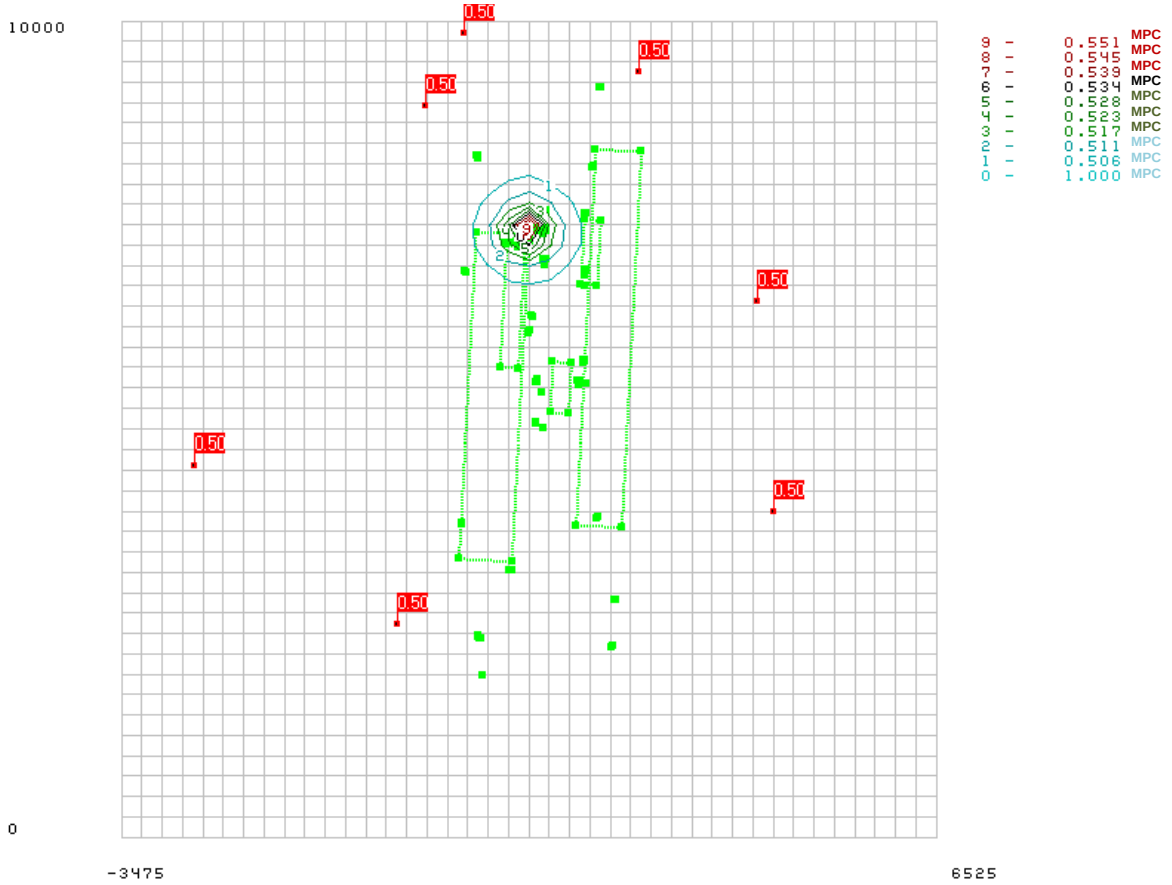
Substance 11009 / 1210 Butyl acetate



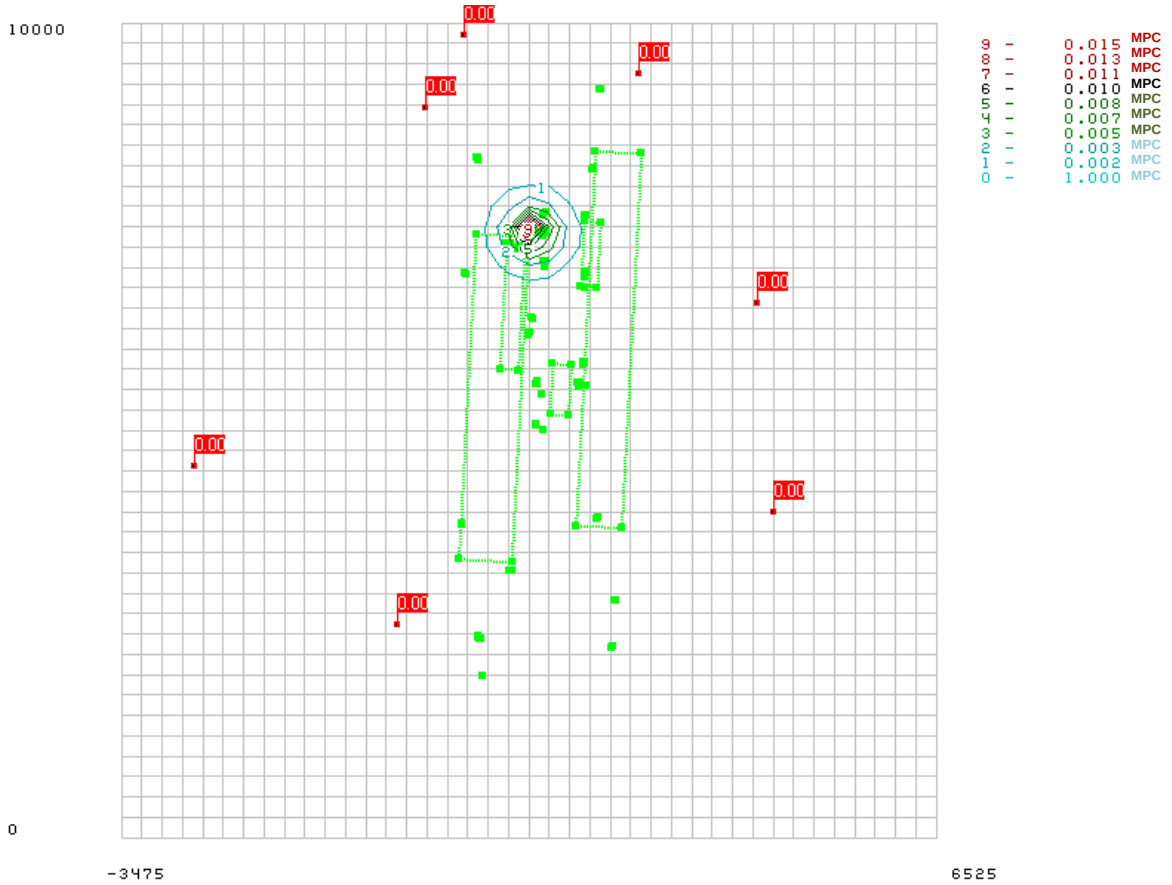
Substance 11021 / 1240 Ethyl acetate



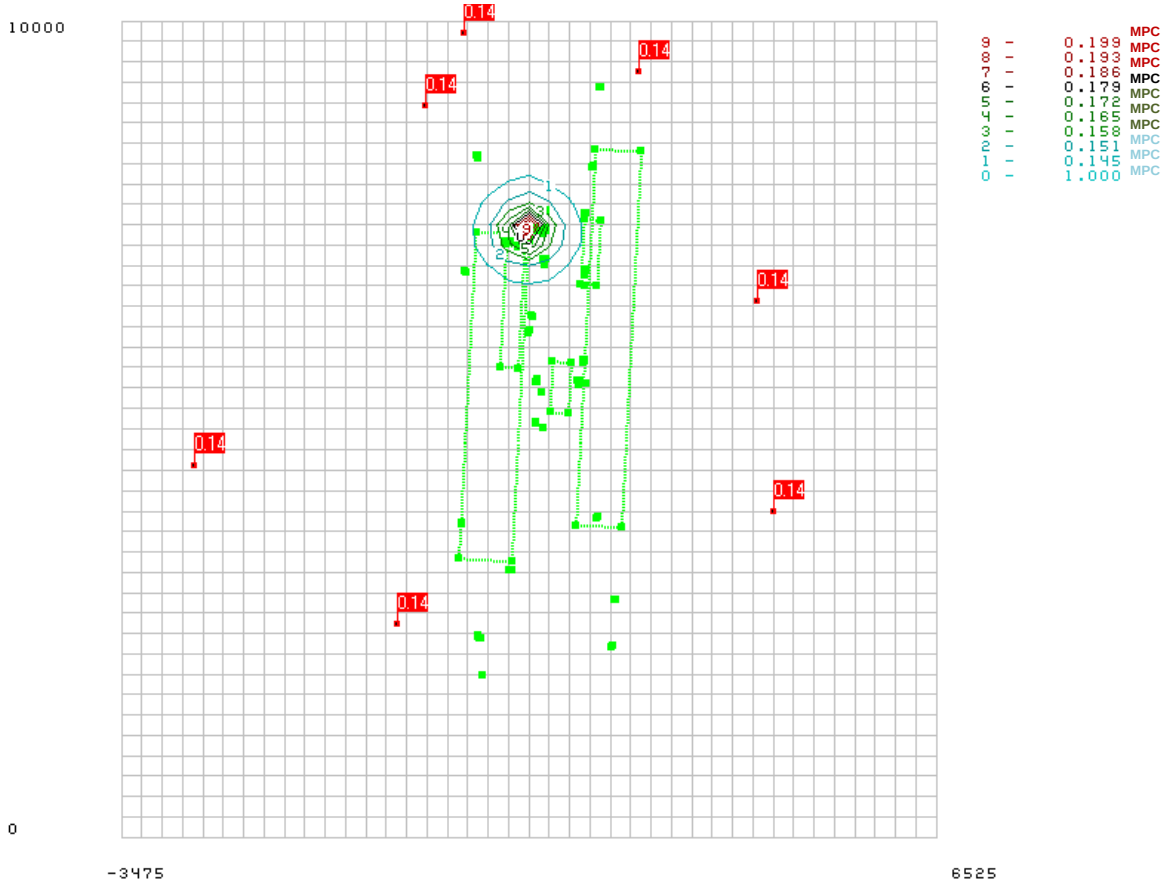
Substance 11020 / 1246 Ethylcellosolve



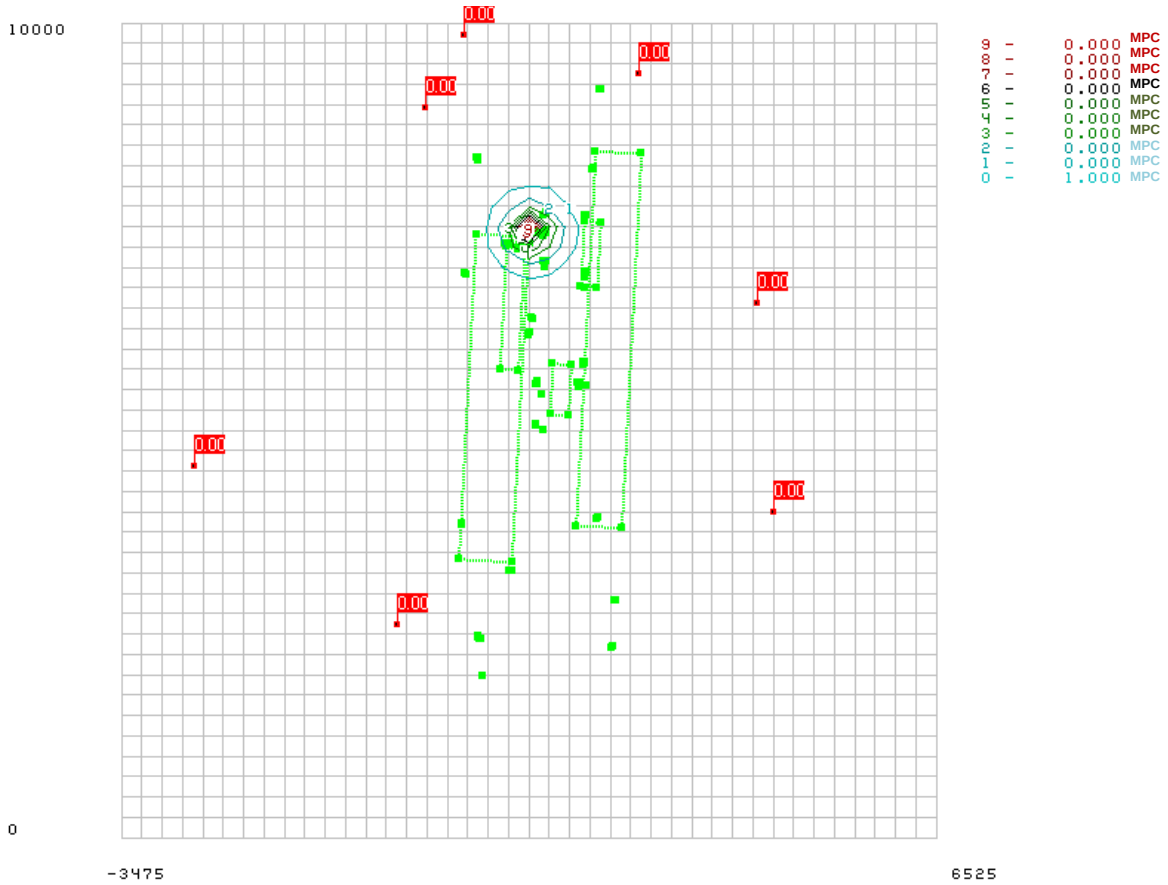
Substance 11000 / 1319 Non-methane volatile organic compounds (NMVOC)



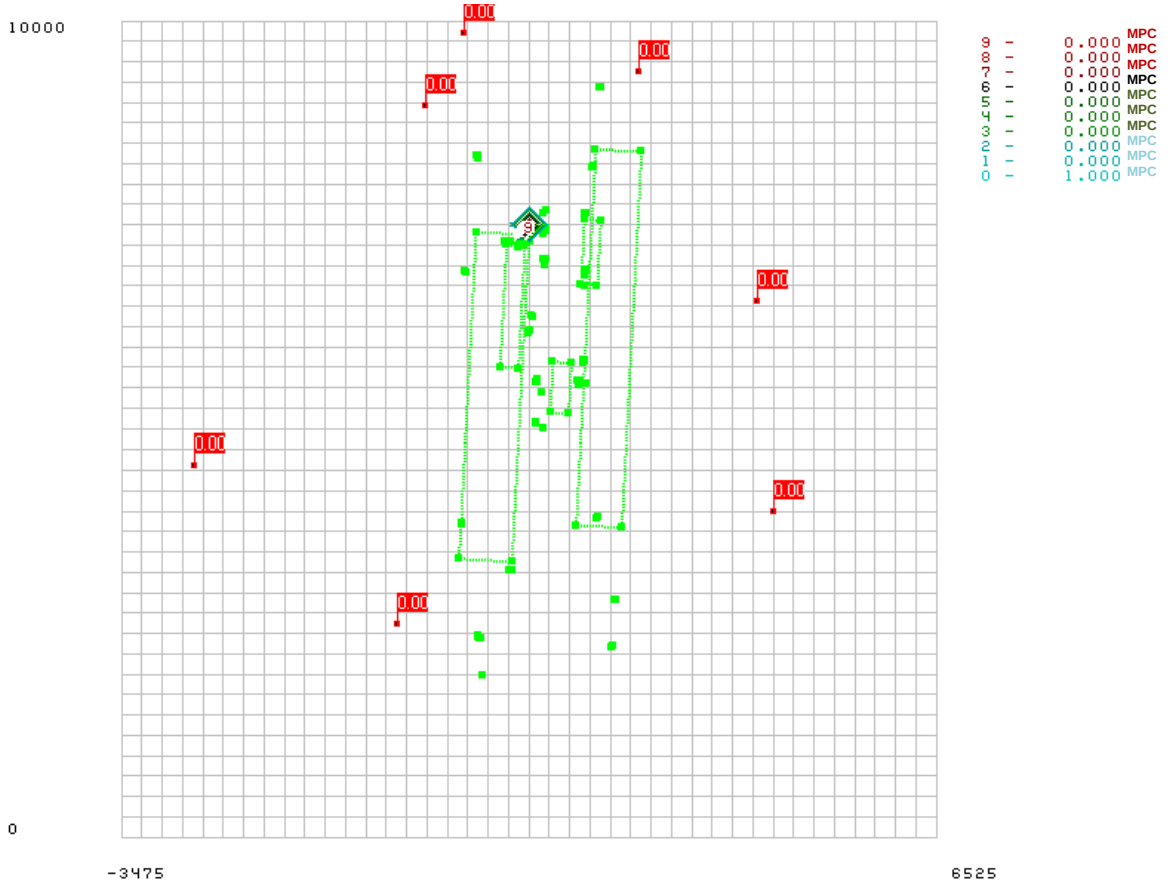
Substance 11007 / 1401 Acetone



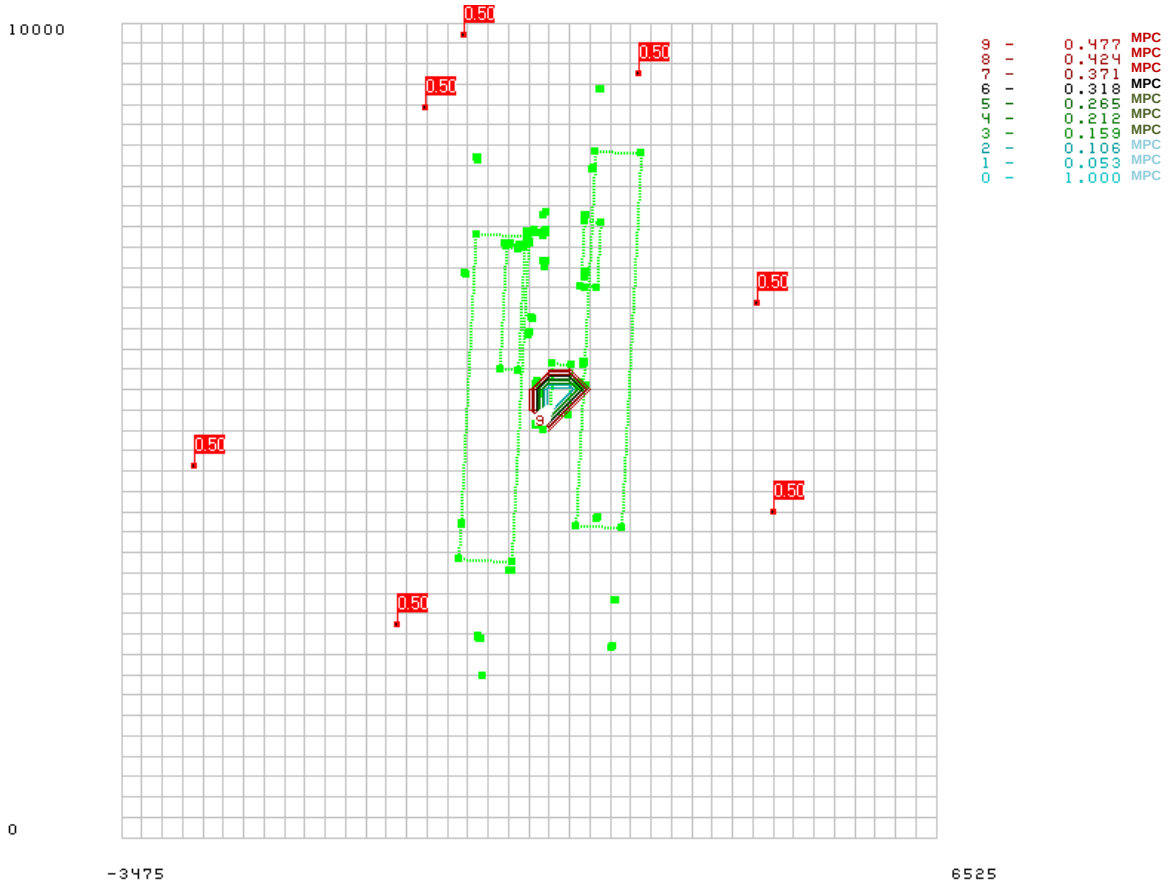
Substance 11001 / 2001 Acrylonitrile



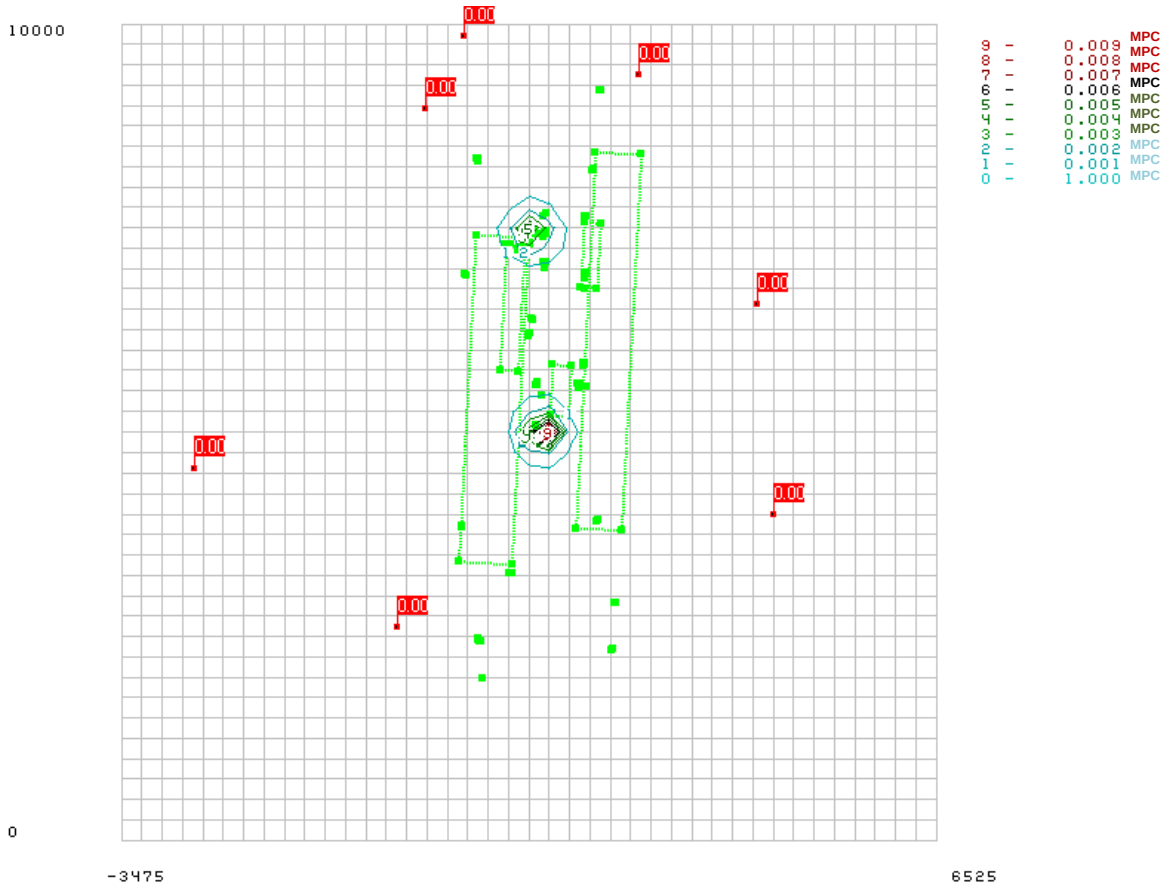
Substance 11000 / 2704 Non-methane volatile organic compounds (NMVOC)



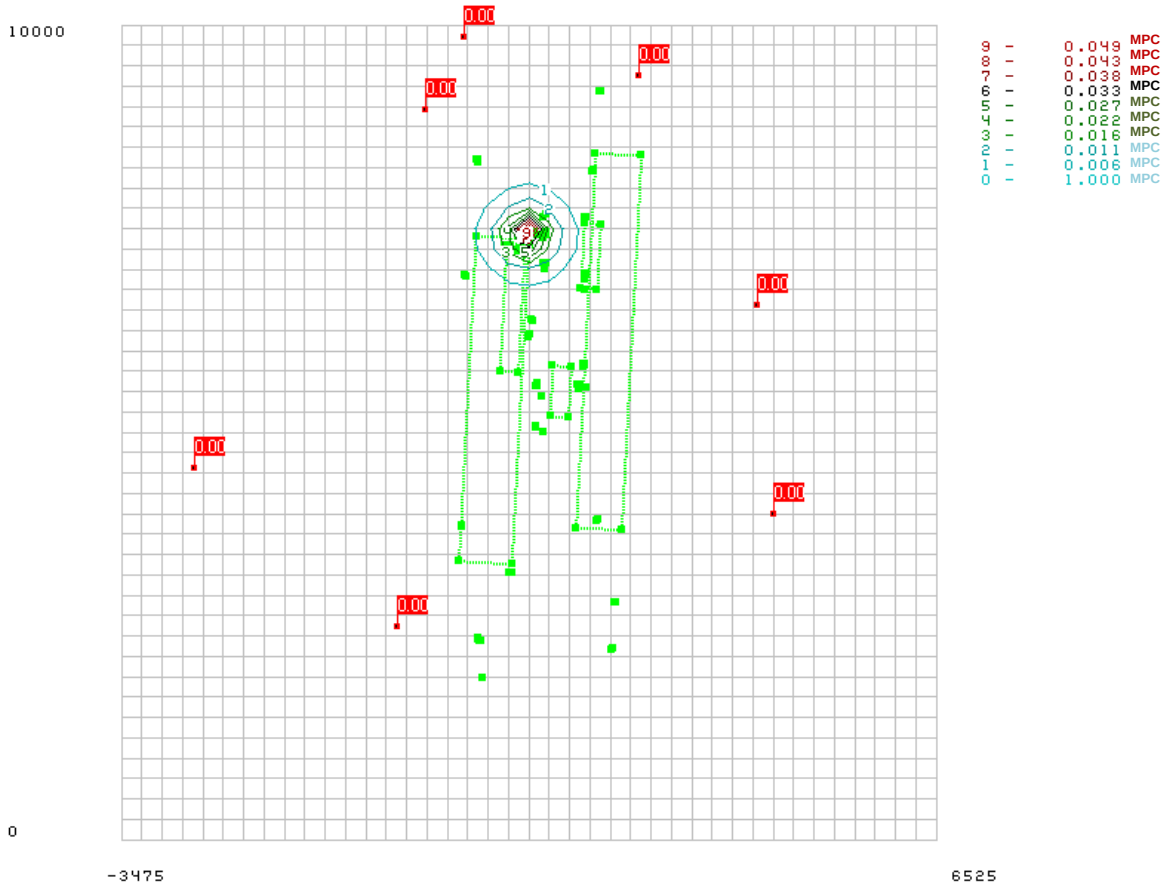
Substance 11000 / 2732 Non-methane volatile organic compounds (NMVOC)



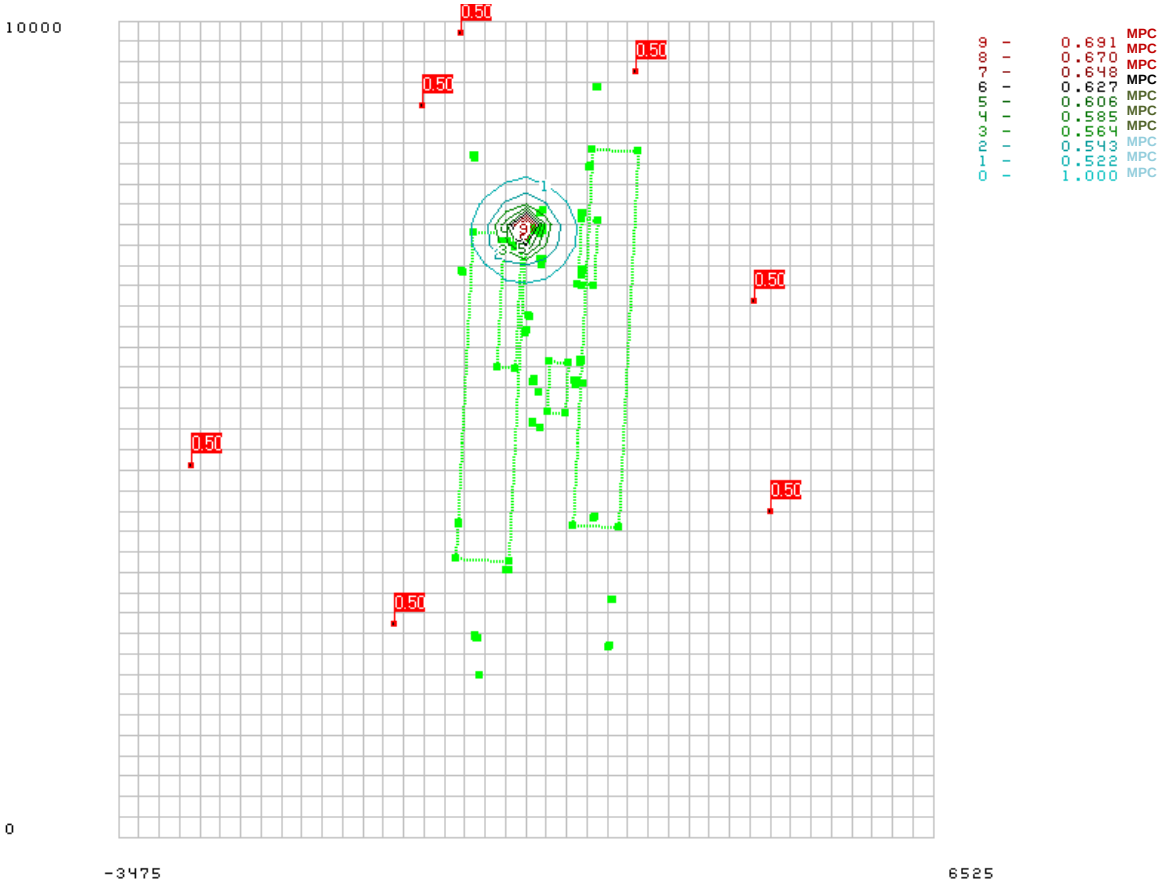
Substance 11000 / 2735 Non-methane volatile organic compounds (NMVOC)



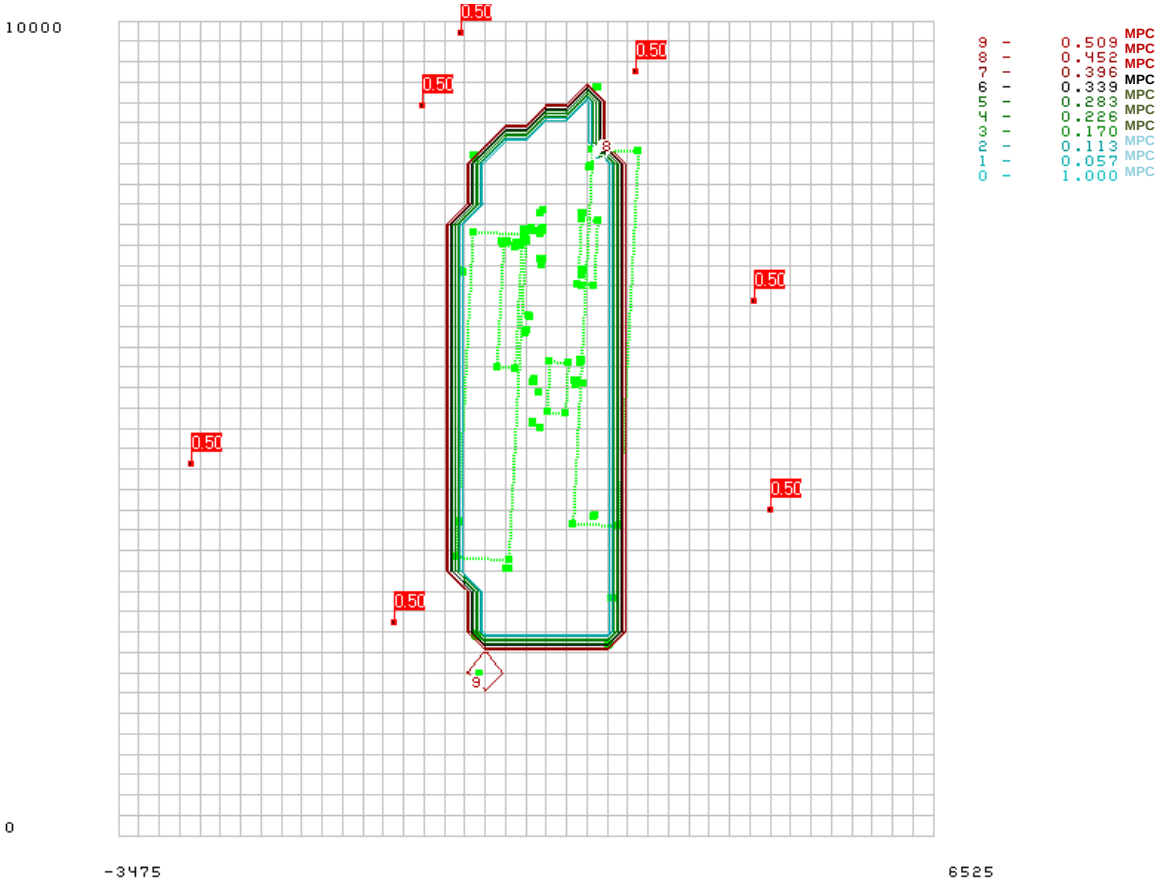
Substance 11000 / 2750 Non-methane volatile organic compounds (NMVOC)



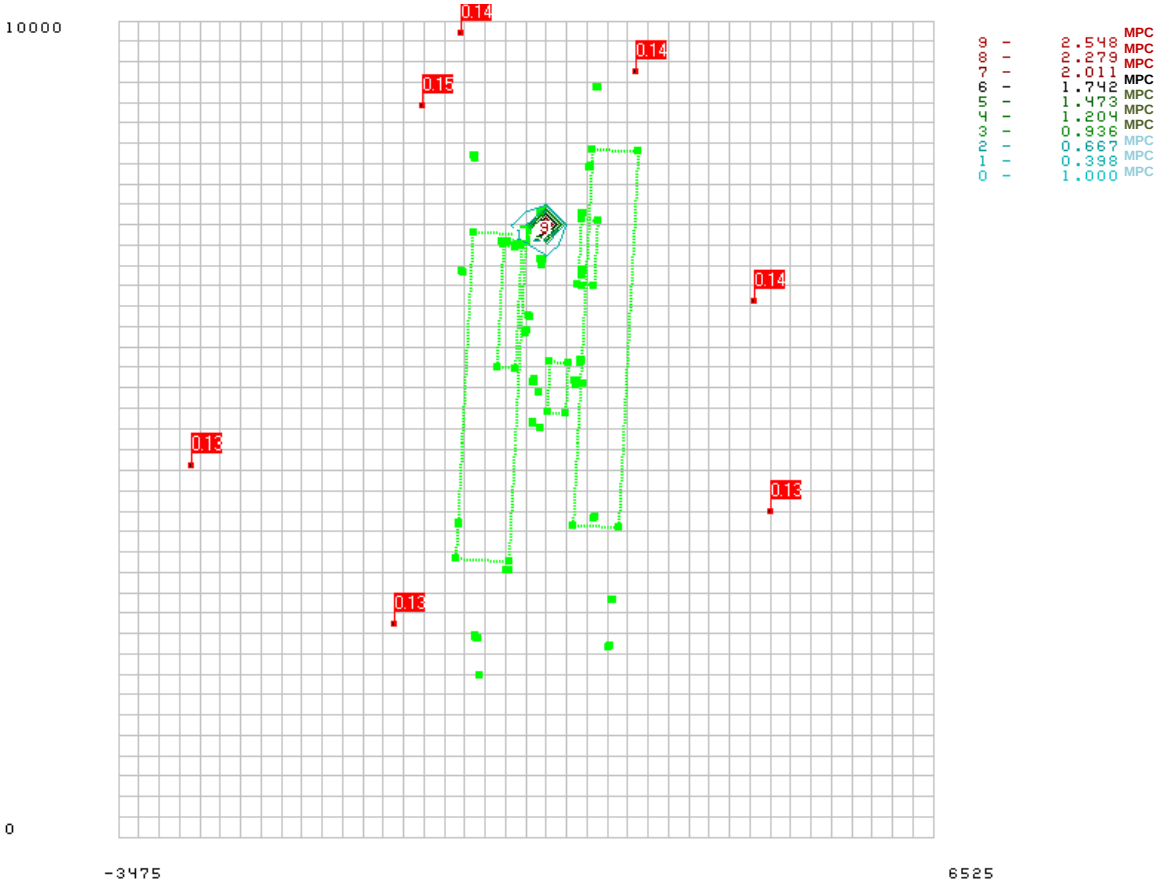
Substance 11000 / 2752 Non-methane volatile organic compounds (NMVOC)



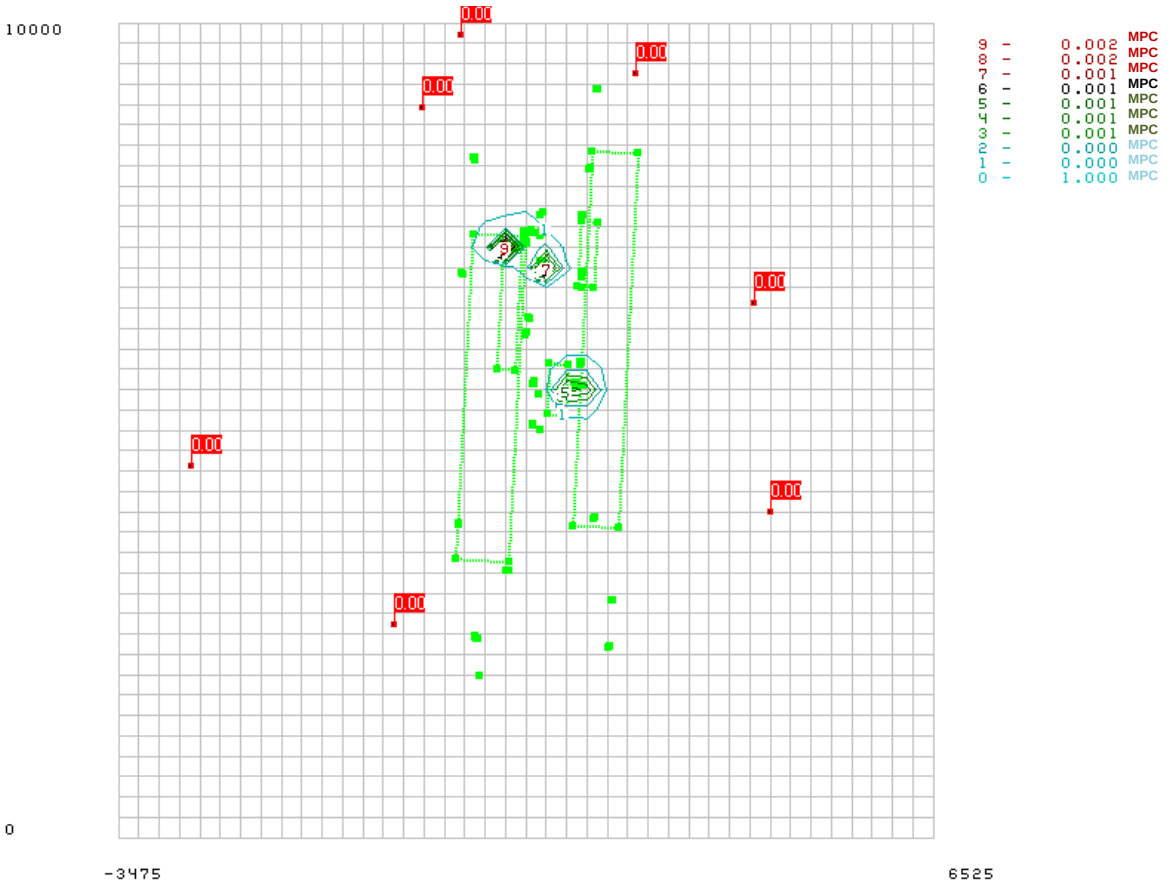
Substance 11000 / 2754 Non-methane volatile organic compounds (NMVOC)



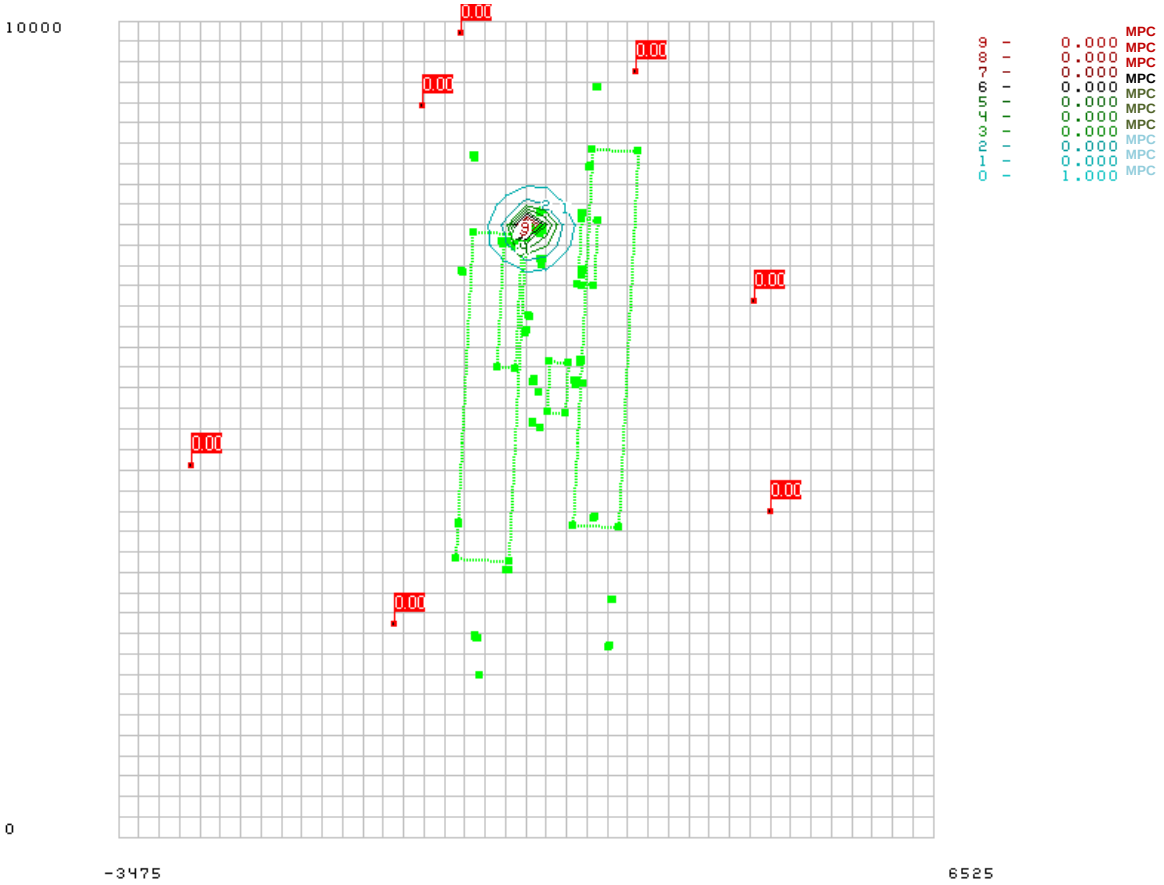
Substance 03000 / 2902 Substances in the form of suspended solid particles (microparticles and fibres)



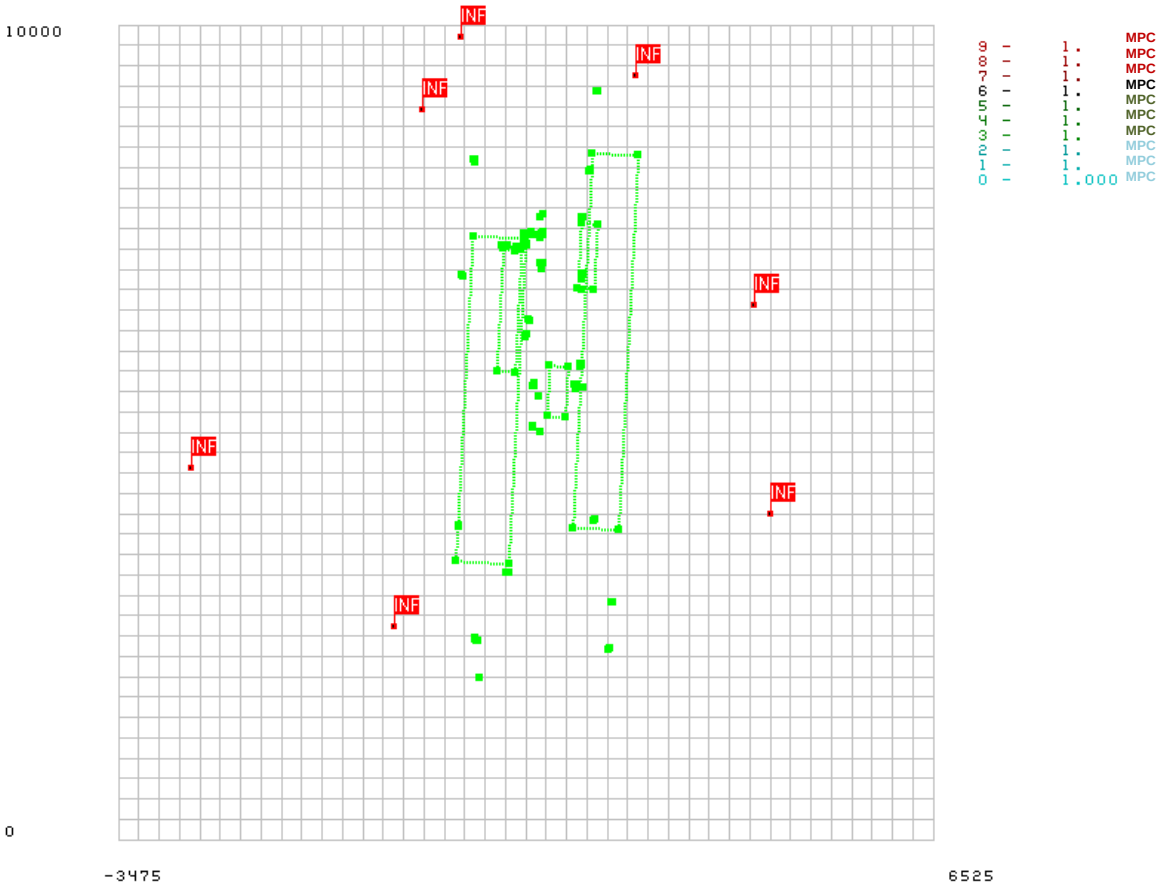
Substance - / 10226 Titanium dioxide



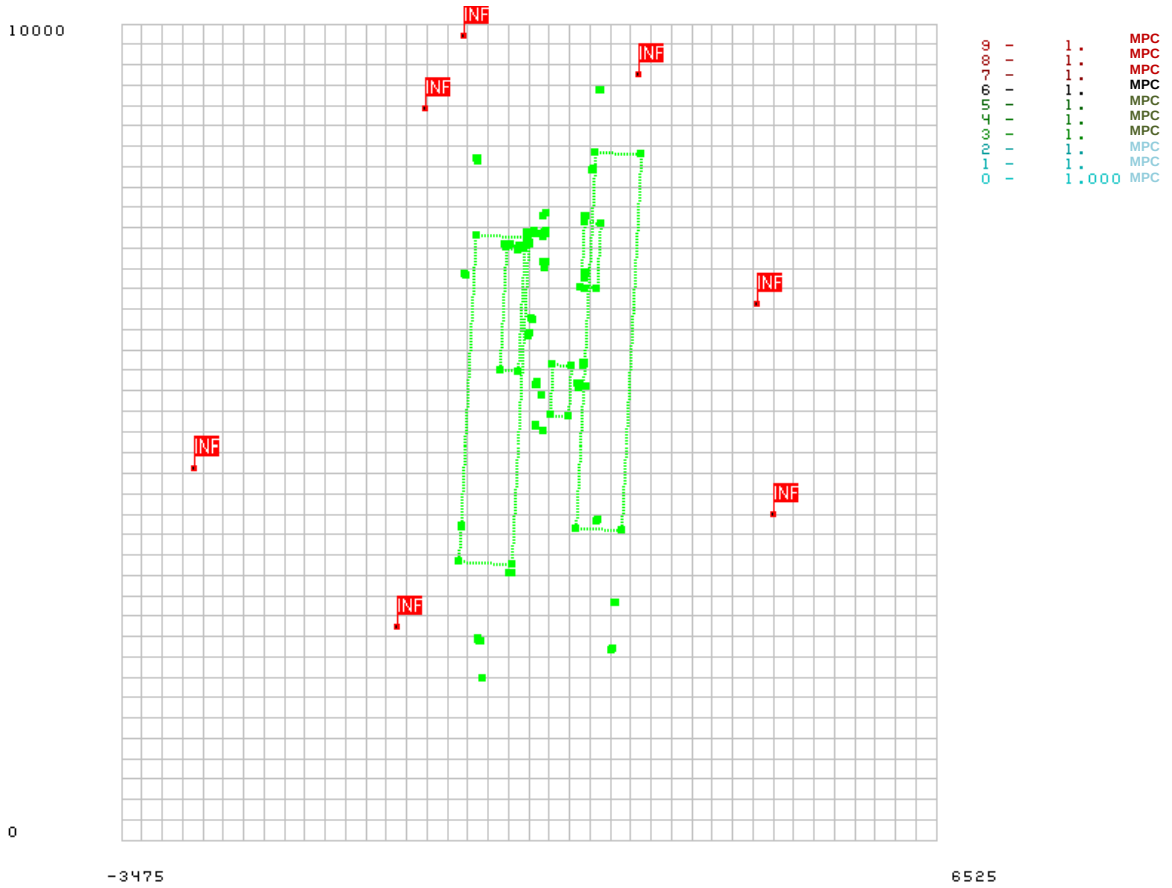
Substance 03000 / 10368 Substances in the form of suspended solid particles (microparticles and fibres)



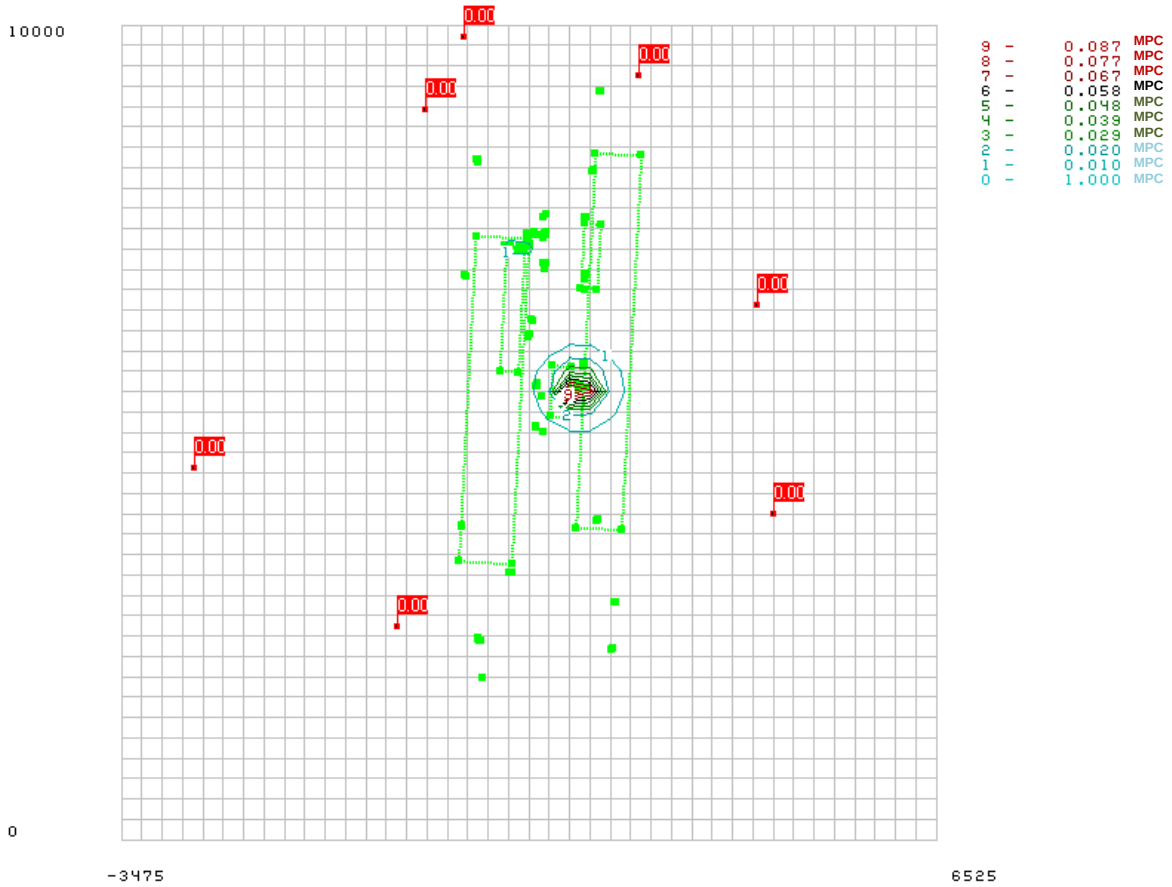
Substance 11000 / 10411 Non-methane volatile organic compounds (NMVOC)



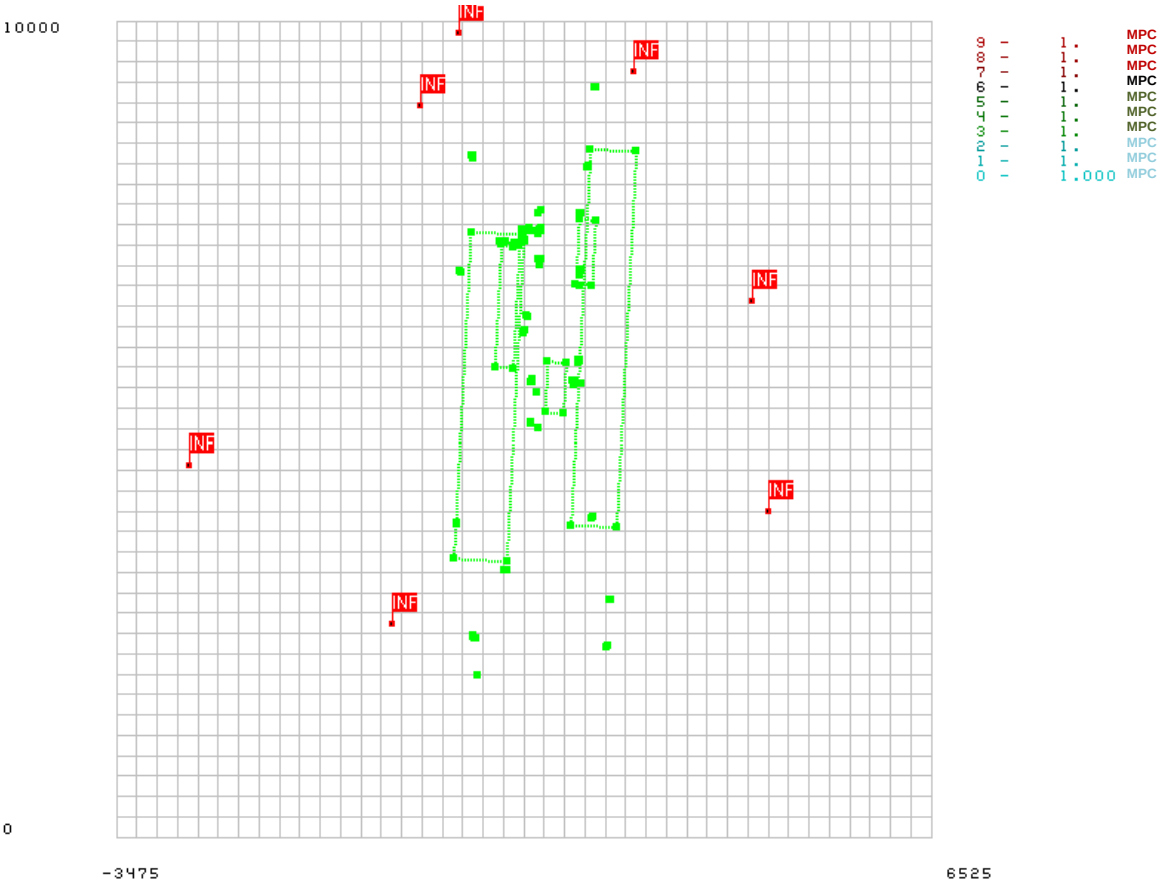
Substance 03000 / 10442 Substances in the form of suspended solid particles (microparticles and fibres)



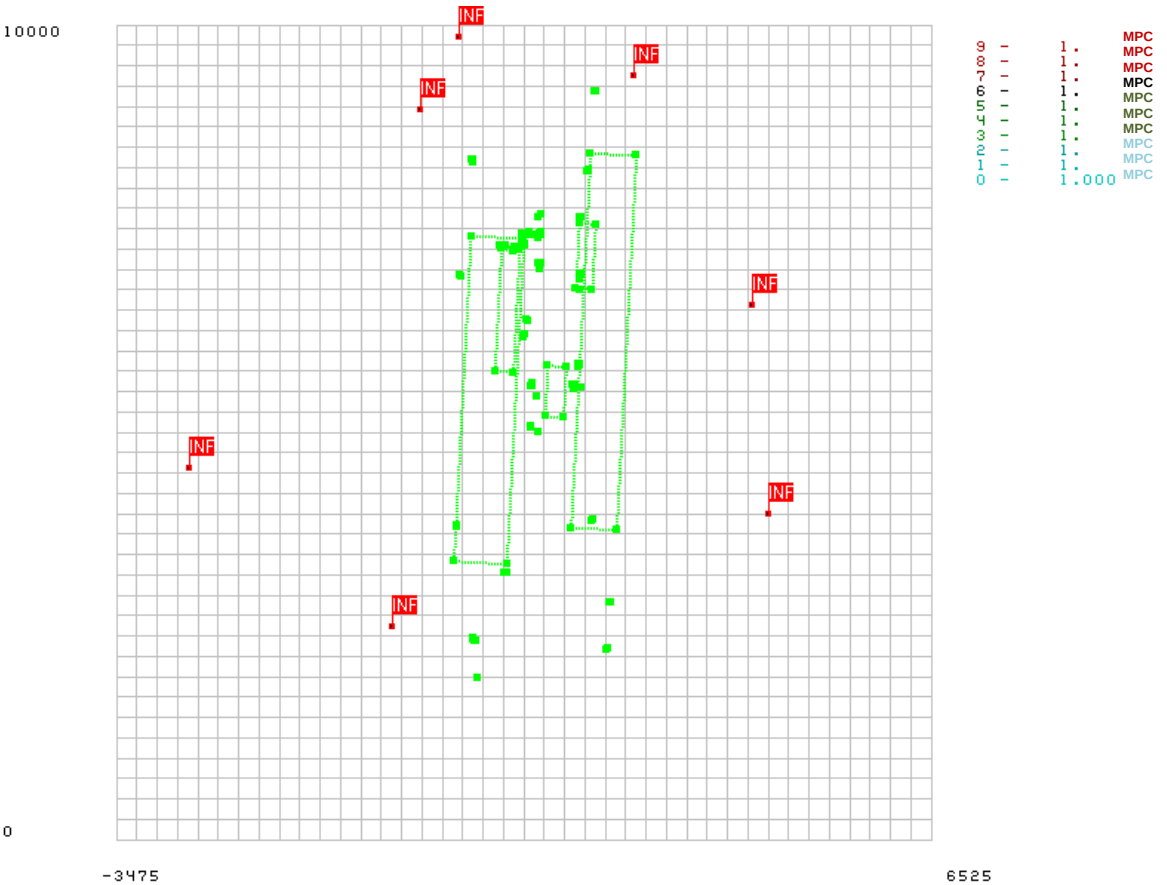
Summation group No. 11002



Substance 07000 / 11812 Carbon dioxide



Substance 04002 / 11815 Nitrogen(1) oxide (N20)



Annex 2

AUTOMATED SYSTEM FOR ATMOSPHERE
POLLUTION CALCULATION

EOL-PLIUS

(Version 5.23)

GENERAL REPORT ON CALCULATION RESULTS
DISPERSAL OF ATMOSPHERE POLLUTION FROM EMISSION SOURCES
SE «MA «BORYSPIL» (*takin into account the background pollution*
(newly created and renewed sources)

Kyiv HIIACC Derzhbud Ukrainy
+38 (044) 249-34-25

System calculation modules
“EOL-PLIUS”
realize OND-86 technique

Approved GGO of Voikov
unlimited validity period
ref. 26/861 of 3/27/92

Program recommended for use by Ministry of Environmental Protection and Nuclear Safety of Ukraine (ref. 11-5-68 of 5/7/98)

Ukraine, Kyiv, 2020

ToR for calculation

TABLE 1. List of production sites

Code of production site	Production site name
1	Production site

ToR for calculation TABLE 2. List of

substances.

Substance code	Substance name
03000 ------- 2902	Substances in the form of suspended solid particles (microparticles and fibres)
03004 —— 328	Soot
04001 ------- 301	Nitrogen oxides (in terms of nitrogen dioxide (NO + NO_2))
04002 —— 304	Nitrogen (1) oxide (N20)
04002 —— 11815	Nitrogen (1) oxide (N20)
04003 —— 303	Ammonia
05001 —— 330	Sulphur dioxide
05002 —— 333	Hydrogen sulphide (H2S)
06000 —— 337	Carbon oxide
07000 —— 11812	Carbon dioxide
11000 —— 2752	Non-methane volatile organic compounds (NMVOC):
11000 —— 2754	Non-methane volatile organic compounds (NMVOC):
11000 —— 10312	Non-methane volatile organic compounds (NMVOC):
11049 —— 1325	Formaldehyde
12000 —— 410	Methane
13101 —— 703	Benzo[a]pyrene

ToR for calculation

TABLE 3. List of summation groups.

Group code	Substances comprising the summation groups (codes)										Coefficient potent.
	1	2	3	4	5	6	7	8	9	10	
3	04003 (303)	05002 (333)									1
4	04003 (303)	05002 (333)	11049 (1325)								1
5	04003 (303)	11049 (1325)									1
30	05001 (330)	05002 (333)									1
31	04001 (301)	05001 (330)									1
37	04001 (301)	04003 (303)	04002 (304)	05001 (330)							1
39	05002 (333)	11049 (1325)									1

ToR for calculation

TABLE 4. Calculation sites parameters.

N No	Coord. of centre of symm.		Length, m	Width, m	Grid step		Angle of rotation of calc. site relative to OX axis of general coord. sys., deg.	Area characteristic
	X, m	Y, m			OX axis, m	OY axis, m		
1	1525	5000	10000	10000	250	250	0	1

TABLE 5. ToR for calculation

City name	Wind speed, m/sec					Wind speed, fractions (Umc)					Step of enumeration of dangerous wind direct.	Fix. wind direct.	Qty, max. contrib.	Number, max. concent.	Characteristic of calc. background
	1	2	3	4	5	1	2	3	4	5					
1. Boryspil											10		5	10	1

Input data

TABLE 1. Description of meteorological conditions and geographic reference

City code	City name	Average air temperature		Maximum wind speed, m/sec	Regional coeff. of strat. atmosphere	Angle between northern direction and axis OX, deg..	City area, sq.km	Required conc. level at the point (fractions of MPC)
		the hottest month, deg. E	the coldest month, deg. E					
1	Boryspil	27.4	-6.8		180		37.01	1

TABLE 2. Description of production sites (geographical reference)

City code	Production site code	Production site name	Basic coordinate system reference		
			X orig.,m	Y orig.,m	Angle of rotation, deg.
1	1	Production site			

TABLE 3. Description of harmful substances emission sources

City code	Production site code	Source code	Source name	Angle of the model or an angle between OX axis and the length of a planar source	Terrain code	Coordinate of a point source, or a beginning of a line source, or a centre of symmetry of a planar source		Coordinate of an end of a line source, or length and width of a planar source, or a point source with a rect. neck		Source height, m	Diameter of a point source or a planar source of type 2, or PGVS(Wo) release rate for a linear, (for a planar source of type 1 - 0)	PGVS flow rate, (for a planar source of type 1 - 0)	PGVS temperature (deg. C)	Hazard class
						X1, m	Y1, m	X2, m	Y2, m					
1	1	190	RW-1 (runway) (aircraft)	-3	1	2501	6118	560	4600	2		0	27.4	
		191	apron of terminal D (mobile, motor transport)	-3	1	2281	7166	200	800	2		0	27.4	
		192	apron of terminal B (mobile, motor transport)	-3	1	1912	5506	225	620	2		0	27.4	
		193	apron of terminal F (mobile, motor transport)	-3	1	1318	6500	225	1500	2		0	27.4	
		200	RW-2 (runway) (aircraft)	-3	1	1092	5402	650	4000	2		0	27.4	
		201	FFS - service station (including car refuelling); FFS, DF storage (breathing valve)	444	1	1621	5584			5	0.05	0	27.4	
		202	FFS - service station (including car refuelling); FFS, aviation fuel storage (breathing valve)	444	1	1621	5576			5	0.05	0	27.4	
		203	FFS - stations	444	1	1621	5566			5	0.05	0	27.4	

		203	FFS - service station (including car refuelling); FFS, DF storage (breathing valve)	444	1	1621	5566			5	0.05	0	27.4	
		204	FFS - service station (including car refuelling); FFS, DF storage (breathing valve)	444	1	1621	5560			5	0.05	0	27.4	
		205	FFS - service stations (including car refuelling); FFS, (filler neck) DF	444	1	1621	5582			4	0.5	0	27.4	
		206	FFS - service stations (including car refuelling); FFS, (filler neck) aviation fuel	444	1	1621	5578			4	0.5	0	27.4	
		207	FFS - service stations (including car refuelling); FFS (filler neck) ДП	444	1	1621	5562			4	0.5	0	27.4	
		208	FFS - service stations (including car refuelling); FFS (filler neck) ДП	444	1	1621	5564			4	0.5	0	27.4	
		209	FFS - service stations (including car refuelling); FFS (dispensing gun) DF	444	1	1620	5584			1.5	0.1	0	27.4	

210	FFS - service stations (including car refuelling); FFS (dispensing gun) aviation fuel	444	1	1622	5584			1.5	0.1	0	27.4	
211	FFS - service stations (including car refuelling); FFS (dispensing gun) DF	444	1	1620	5559			1.5	0.1	0	27.4	
212	FFS - service stations (including car refuelling); FFS (dispensing gun) DF	444	1	1622	5559			1.5	0.1	0	27.4	
213	stationary engines; FRLES, CMS, diesel-generator plant; diesel generator	444	1	636	3832			7	0.15	1.08	630	
214	Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir (breathing valve)	444	1	636	3828			7	0.05	0	27.4	
215	Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir (filler neck)	444	1	636	3823			4	0.5	0	27.4	
216	stationary engines; FRLES, CMS	444	1	630	6977			7	0.15	1.08	630	

			diesel generator plant; diesel generator										
		217	other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator plant; DF reservoir (breathing valve)	444	1	630	6969			7	0.05	0	27.4	
		218	Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir (filler neck)	444	1	630	6960			4	0.5	0	27.7	
		219	AC engine test site, inorg.	-3	1	1267	4096	170	100	2		0	27.4	
		220	ERS motor transport garage, deflector	444	1	1233	4932			8	0.5	0.295	27.4	
		221	apron S inorg. Mobile motor transport	-3	1	1327	6389	400	360			0	27.4	

TABLE 4. Specification of emission composition of the source

City code	Production site code	Source code	Substance code	Total emissions, tons/year	Coefficient of ordered sedimentation of the substance	Maximum emissions (g/sec), at a wind speed of									
						0.5 m/sec	1 m/sec	2 m/sec	4 m/sec	6 m/sec	8 m/sec	10 m/sec	12 m/sec	14 m/sec	16 m/sec
1	1	190	03000 ---- 2902		1	0.00125									
			03004 ---- 328		1	0.000125									
			04001 ---- 301		1	0.018903									
			06000 ---- 337		1	0.116708									
			11000 ------- 2754		1	0.0924051									
		191	03000 ---- 2902		1	0.00912									
			03004 ---- 328		1	0.00912									
			04001 ---- 301		1	0.03961									
			04002 ---- 304		1	0.00017									
			04003 ---- 303		1	1E-7									
			05001 ---- 330		1	0.00569									
			06000 ---- 337		1	0.08156									
			11000 ---- 2754		1	0.0115									
			12000 ---- 410		1	0.00045									
			13101 ---- 703		1	4E-5									
		192	03000		1	0.003909									

192	03000-------2902		1	0.003909										
	03004-------328		1	0.003909										
	04001-------301		1	0.017131										
	04002-------304		1	7.525E-5										
	04003-------303		1	8E-8										
	06000-------337		1	0.037018										
	11000-------2754		1	0.0052194										
	12000-------410		1	0.000196										
	13101-------703		1	3E-6										
193	03000-------2902		1	0.007166										
	03004-------328		1	0.007166										
	04001-------301		1	0.03108										
	04002-------304		1	0.000139										
	04003-------303		1	1.2E-8										
	05001-------330		1	0.004476										
	06000-------337		1	0.06288										
	11000-------2754		1	0.00839										
	12000		1											

			------- 410			0.00031								
			13101 ------- 703		1	3E-5								
		200	03000 ------- 2902		1	0.000474								
			03004 ------- 328		1	0.000474								
			04001 ------- 301		1	0.04333								
			06000 ------- 337		1	0.21772								
			11000 ------- 2754		1	0.018768997								
		201	05002 ------- 333		1	2E-9								
			11000 ------- 2754		1	7.2E-7								
			11000 ------- 10312		1	1.1E-9								
		202	05002 ------- 333		1	2.9E-10								
			11000 ------- 2754		1	4.9E-7								
			11000 ------- 10312		1	4.9E-10								
		203	05002 ------- 333		1	2.2E-9								
			11000 ------- 2754		1	7.7E-7								
			11000 ------- 10312		1	1.2E-9								
		204	05002 ------- 333		1	9.5E-10								
			11000 -------		1	3.4E-7								

	2754												
	11000 ------- 10312		1	5.1E-10									
205	05002 ------- 333		1	3.9E-7									
	11000 ------- 2754		1	0.00014									
	11000 ------- 10312		1	2.1E-7									
206	05002 ------- 333		1	4.4E-6									
	11000 ------- 2754		1	0.0073									
	11000 ------- 10312		1	7.3E-6									
207	05002 ------- 333		1	3.9E-7									
	11000 ------- 2754		1	0.00014									
	11000 ------- 10312		1	2.1E-7									
208	05002 ------- 333		1	6.2E-5									
	11000 ------- 2754		1	0.00014									
	11000 ------- 10312		1	2.1E-7									
209	05002 ------- 333		1	6.2E-5									
	11000 ------- 2754		1	0.022									
	11000 ------- 10312		1	7.5E-5									
210	05002 ------- 333		1	1.2E-10									

			11000 ------- 2754		1	1.9E-7									
			11000 ------- 10312		1	1.9E-10									
		211	05002 ------- 333		1	6.2E-5									
			11000 ------- 2754		1	0.022									
			11000 ------- 10312		1	4.2E-5									
		212	05002 ------- 333		1	6.2E-5									
			11000 ------- 2754		1	0.022									
			11000 ------- 10312		1	4.2E-5									
		213	03000 ------- 2902		1	0.00744									
			03004 ------- 328		1	0.00744									
			04001 ------- 301		1	0.2									
			05001 ------- 330		1	0.0625									
			06000 ------- 337		1	0.161458									
			11000 ------- 2754		1	0.043155									
			11049 ------- 1325		1	0.001786									
			13101 ------- 703		1	2E-7									
		214	05002 ------- 333		1	2.8E-11									
			11000		1										

	------- 2754			1E-8									
	11000 ------- 10312		1	1.5E-11									
215	05002 ------- 333		1	3.9E-7									
	11000 ------- 2754		1	0.00014									
	11000 ------- 10312		1	2.1E-7									
216	03000 ------- 2902		1	0.00744									
	03004 ------- 328		1	0.00744									
	04001 ------- 301		1	0.2									
	05001 ------- 330		1	0.0625									
	06000 ------- 337		1	0.1615									
	11000 ------- 2754		1	0.0432									
	11049 ------- 1325		1	0.0018									
	13101 ------- 703		1	2E-7									
217	05002 ------- 333		1	2.8E-11									
	11000 ------- 2754		1	1E-8									
	11000 ------- 10312		1	1.5E-11									
218	05002 ------- 333		1	3.9E-7									
	11000 -------		1	0.00014									

			2754											
			11000 ------- 10312		1	2.1E-7								
		219	03000 ------- 2902		1	0.000125								
			03004 ------- 328		1	0.000125								
			04001 ------- 301		1	0.018903								
			06000 ------- 337		1	0.116708								
			11000 ------- 2754		1	0.0131912								
		220	03000 ------- 2902		1	0.003257								
			03004 ------- 328		1	0.003257								
			04001 ------- 301		1	0.01402								
			04002 ------- 304		1	5.6E-5								
			05001 ------- 330		1	0.002021								
			06000 ------- 337		1	0.02552								
			11000 ------- 2754		1	0.003835								
			12000 ------- 410		1	0.000165								
			13101 ------- 703		1	1.4E-5								
		221	03000 ------- 2902		1	0.00586								
			03004 ------- 328		1	0.00586								

			04001 ------- 301		1	0.02535									
			04002 ------- 304		1	0.00011									
			04003 ------- 303		1	4E-8									
			05001 ------- 330		1	0.00356									
			06000 ------- 337		1	0.0493									
			11000 ------- 2754		1	0.00705									
			12000 ------- 410		1	0.00028									
			13101 ------- 703		1	3E-5									

TABLE 5. Description of harmful

Substance code	Substance name	MPC	Coefficient of ordered sedimentation
03000 ------- 2902	Substances in the form of suspended solid particles (microparticles and fibres)	0.5	1
03004 —— 328	Soot	0.15	1
04001 ------- 301	Nitrogen oxides (in terms of nitrogen dioxide ($NO + NO_2$))	0.2	1
04002 —— 304	Nitrogen (1) oxide (N20)	0.4	1
04002 —— 11815	Nitrogen (1) oxide (N20)		1
04003 —— 303	Ammonia	0.2	1
05001 —— 330	Sulphur dioxide	0.5	1
05002 —— 333	Hydrogen sulphide (H2S)	0.008	1
06000 —— 337	Carbon oxide	5	1
07000 —— 11812	Carbon dioxide		1
11000 ------- 2752	Non-methane volatile organic compounds (NMVOC):	1	1
11000 ------- 2754	Non-methane volatile organic compounds (NMVOC):	1	1
11000 ------- 10312	Non-methane volatile organic compounds (NMVOC):		1
11049 —— 1325	Formaldehyde	0.035	1
12000 —— 410	Methane	50	1
13101 —— 703	Benzo[a]pyrene	0.0001	1

TABLE 6. Description of harmful substances

Group code	Substances comprising the summation groups (codes)										Coefficient potent.
	1	2	3	4	5	6	7	8	9	10	
3	04003/303	05002/333									1
4	04003/303	05002/333	11049/1325								1
5	04003/303	11049/1325									1
30	05001/330	05002/333									1
31	04001/301	05001/330									1
37	04001/301	04003/303	04002/304	05001/330							1
39	05002/333	11049/1325									1

TABLE 7. Description of background concentrations distribution (U - wind speed m/sec)

City code	Substance code	Background ToR	Coordinate of observation post		Conc. (fractions of MPC), at U<=2	Concentration (fractions of MPC), at 2<U<U*, by direction							
			X, m	Y, m		N	NE	E	SE	S	SW	W	NW
1	03000 ---- 2902	b			0.1								
	04001 ---- 301	b			0.04								
	05001 ---- 330	b			0.4								
	06000 ---- 337	b			0.08								
	11000 ---- 2752	b			0.4								
	11000 ---- 2754	b			0.4								

List of sources emissions of which comprise substances from summation groups for calculation

City code	Summation group code	Codes of substance included in the summation group	Production site code	Source code	Emission g/sec	Emission tones/year	Hazard class.	Coordinate of a point source, or a beginning of a line source, or a centre of symmetry of a planar source		Coordinate of an end of a line source, or length and width of a planar source, or a point source with a rectangular neck		Source height, m	Diameter of a point source, or a planar source, or velocity of PGVS for a line source,	Flow rate of PGVS, m3/sec	Temperature of PGCS (deg.) C)
								X1, m	Y1, m	X2, m	Y2, m				
1	3	4003 / 303 5002 / 333	1	191	1E-7			2281	7166	200	800	2		0	27.4
			1	192	8E-8			1912	5506	225	620	2		0	27.4
			1	193	1.2E-8			1318	6500	225	1500	2		0	27.4
			1	201	2E-9			1621	5584			5	0.05	0	27.4
			1	202	2.9E-10			1621	5576			5	0.05	0	27.4
			1	203	2.2E-9			1621	5566			5	0.05	0	27.4
			1	204	9.5E-10			1621	5560			5	0.05	0	27.4
			1	205	3.9E-7			1621	5582			4	0.5	0	27.4
			1	206	4.4E-6			1621	5578			4	0.5	0	27.4
			1	207	3.9E-7			1621	5562			4	0.5	0	27.4
			1	208	6.2E-5			1621	5564			4	0.5	0	27.4
			1	209	6.2E-5			1620	5584			1.5	0.1	0	27.4
			1	210	1.2E-10			1622	5584			1.5	0.1	0	27.4
			1	211	6.2E-5			1620	5559			1.5	0.1	0	27.4
			1	212	6.2E-5			1622	5559			1.5	0.1	0	27.4
			1	214	2.8E-11			636	3828			7	0.05	0	27.4
			1	215	3.9E-7			636	3823			4	0.5	0	27.4
			1	217	2.8E-11			630	6969			7	0.05	0	27.4
			1	218	3.9E-7			630	6960			4	0.5	0	27.7
			1	221	4E-8			1327	6389	400	360			0	27.4
	4	4003 / 303 5002 / 333 11049 / 1325	1	191	1E-7			2281	7166	200	800	2		0	27.4
			1	192	8E-8			1912	5506	225	620	2		0	27.4
			1	193	1.2E-8			1318	6500	225	1500	2		0	27.4
			1	201	2E-9			1621	5584			5	0.05	0	27.4
			1	202	2.9E-10			1621	5576			5	0.05	0	27.4
			1	203	2.2E-9			1621	5566			5	0.05	0	27.4
			1	204	9.5E-10			1621	5560			5	0.05	0	27.4
			1	205	3.9E-7			1621	5582			4	0.5	0	27.4
			1	206	4.4E-6			1621	5578			4	0.5	0	27.4
			1	207	3.9E-7			1621	5562			4	0.5	0	27.4
			1	208	6.2E-5			1621	5564			4	0.5	0	27.4
			1	209	6.2E-5			1620	5584			1.5	0.1	0	27.4
			1	210	1.2E-10			1622	5584			1.5	0.1	0	27.4
			1	211	6.2E-5			1620	5559			1.5	0.1	0	27.4
			1	212	6.2E-5			1622	5559			1.5	0.1	0	27.4
			1	213	0.001786			636	3832			7	0.15	1.08	630
			1	214	2.8E-11			636	3828			7	0.05	0	27.4
			1	215	3.9E-7			636	3823			4	0.5	0	27.4
			1	216	0.0018			630	6977			7	0.15	1.08	630

			1	217	2.8E-11			630	6969			7	0.05	0	27.4
			1	218	3.9E-7			630	6960			4	0.5	0	27.7
			1	221	4E-8			1327	6389	400	360			0	27.4
	5	4003 / 303 11049 / 1325	1	191	1E-7			2281	7166	200	800	2		0	27.4
			1	192	8E-8			1912	5506	225	620	2		0	27.4
			1	193	1.2E-8			1318	6500	225	1500	2		0	27.4
			1	213	0.001786			636	3832			7	0.15	1.08	630
			1	216	0.0018			630	6977			7	0.15	1.08	630
			1	221	4E-8			1327	6389	400	360			0	27.4
	30	5001 / 330 5002 / 333	1	191	0.00569			2281	7166	200	800	2		0	27.4
			1	193	0.004476			1318	6500	225	1500	2		0	27.4
			1	201	2E-9			1621	5584			5	0.05	0	27.4
			1	202	2.9E-10			1621	5576			5	0.05	0	27.4
			1	203	2.2E-9			1621	5566			5	0.05	0	27.4
			1	204	9.5E-10			1621	5560			5	0.05	0	27.4
			1	205	3.9E-7			1621	5582			4	0.5	0	27.4
			1	206	4.4E-6			1621	5578			4	0.5	0	27.4
			1	207	3.9E-7			1621	5562			4	0.5	0	27.4
			1	208	6.2E-5			1621	5564			4	0.5	0	27.4
			1	209	6.2E-5			1620	5584			1.5	0.1	0	27.4
			1	210	1.2E-10			1622	5584			1.5	0.1	0	27.4
			1	211	6.2E-5			1620	5559			1.5	0.1	0	27.4
			1	212	6.2E-5			1622	5559			1.5	0.1	0	27.4
			1	213	0.0625			636	3832			7	0.15	1.08	630
			1	214	2.8E-11			636	3828			7	0.05	0	27.4
												4	0.5		

			1	215	3.9E-7			636	3823					0	27.4
			1	216	0.0625			630	6977			7	0.15	1.08	630
			1	217	2.8E-11			630	6969			7	0.05	0	27.4
			1	218	3.9E-7			630	6960			4	0.5	0	27.7
			1	220	0.002021			1233	4932			8	0.5	0.295	27.4
			1	221	0.00356			1327	6389	400	360			0	27.4
	31	4001 / 301 5001 / 330	1	190	0.018903			2501	6118	560	4600	2		0	27.4
			1	191	0.0453			2281	7166	200	800	2		0	27.4
			1	192	0.017131			1912	5506	225	620	2		0	27.4
			1	193	0.035556			1318	6500	225	1500	2		0	27.4
			1	200	0.04333			1092	5402	650	4000	2		0	27.4
			1	213	0.2625			636	3832			7	0.15	1.08	630
			1	216	0.2625			630	6977			7	0.15	1.08	630
			1	219	0.018903			1267	4096	170	100	2		0	27.4
			1	220	0.016041			1233	4932			8	0.5	0.295	27.4
			1	221	0.02891			1327	6389	400	360			0	27.4
	37	4001 / 301 4003 / 303 4002 / 304 5001 / 330	1	190	0.018903			2501	6118	560	4600	2		0	27.4
			1	191	0.0454701			2281	7166	200	800	2		0	27.4
			1	192	0.0172063 3			1912	5506	225	620	2		0	27.4
			1	193	0.0356950 12			1318	6500	225	1500	2		0	27.4
			1	200	0.04333			1092	5402	650	4000	2		0	27.4
			1	213	0.2625			636	3832			7	0.15	1.08	630
			1	216	0.2625			630	6977			7	0.15	1.08	630
			1	219	0.018903			1267	4096	170	100	2		0	27.4

			1	220	0.016097			1233	4932			8	0.5	0.295	27.4
			1	221	0.0290200 4			1327	6389	400	360			0	27.4
	39	5002 / 333 11049 / 1325	1	201	2E-9			1621	5584			5	0.05	0	27.4
			1	202	2.9E-10			1621	5576			5	0.05	0	27.4
			1	203	2.2E-9			1621	5566			5	0.05	0	27.4
			1	204	9.5E-10			1621	5560			5	0.05	0	27.4
			1	205	3.9E-7			1621	5582			4	0.5	0	27.4
			1	206	4.4E-6			1621	5578			4	0.5	0	27.4
			1	207	3.9E-7			1621	5562			4	0.5	0	27.4
			1	208	6.2E-5			1621	5564			4	0.5	0	27.4
			1	209	6.2E-5			1620	5584			1.5	0.1	0	27.4
			1	210	1.2E-10			1622	5584			1.5	0.1	0	27.4
			1	211	6.2E-5			1620	5559			1.5	0.1	0	27.4
			1	212	6.2E-5			1622	5559			1.5	0.1	0	27.4
			1	213	0.001786			636	3832			7	0.15	1.08	630
			1	214	2.8E-11			636	3828			7	0.05	0	27.4
			1	215	3.9E-7			636	3823			4	0.5	0	27.4
			1	216	0.0018			630	6977			7	0.15	1.08	630
			1	217	2.8E-11			630	6969			7	0.05	0	27.4
			1	218	3.9E-7			630	6960			4	0.5	0	27.7

Production suites and summation groups for calculation

City code	Production site code	Production site name	Summation group code	Codes of substances included in the summation group	Emission rate (g/sec)
1	1	Production site	3	4003 / 303 5002 / 333	0.000254197616
			4	4003 / 303 5002 / 333 11049 / 1325	0.003840197616
			5	4003 / 303 11049 / 1325	0.003586232
			30	5001 / 330 5002 / 333	0.141000965616
			31	4001 / 301 5001 / 330	0.749074
			37	4001 / 301 4003 / 303 4002 / 304 5001 / 330	0.749624482
			39	5002 / 333 11049 / 1325	0.003839965616

CALCULATION OF CONCENTRATION AT THE BORDER OF RESIDENTIAL AREA:

Concentration at the set points

3000 / 2902 Substances in the form of suspended solid particles (microparticles and fibres)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.050421	0.126052	300.00	1.10	213	26.12	191	21.92	193	16.05	221	13.61	192	13.35
4540	3970	0.050304	0.125759	220.00	1.10	193	28.30	221	25.02	191	20.47	192	16.70	216	4.80
-2580	4538	0.050276	0.125691	330.00	1.10	191	31.11	193	28.45	221	24.51	216	6.68	192	5.59
4333	6544	0.050372	0.125930	190.00	1.10	191	51.61	193	22.14	221	16.47	216	6.49	190	2.26
256	8930	0.050389	0.125973	70.00	1.10	193	34.57	221	29.07	216	14.10	192	12.74	191	2.44
2883	9352	0.050475	0.126188	110.00	1.10	191	45.04	193	18.70	221	16.48	192	10.06	190	3.76
733	9820	0.050341	0.125853	80.00	1.10	193	34.23	221	26.63	192	12.56	191	11.29	216	7.49

List of maximum concentrations

11000 / 10312 Non-methane volatile organic compounds (NMVOC)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-3475	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-3225	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2975	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2725	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2475	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2225	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-1975	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-1725	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-1475	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-1225	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

11000 / 2754 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.400000	0.500000	40.00	0.50	190	100.00	200	0.00	219	0.00	221	0.00	220	0.00
4540	3970	0.400000	0.500000	310.00	0.50	190	99.91	191	0.09	193	0.00	200	0.00	221	0.00
-2580	4538	0.400000	0.500000	110.00	0.50	221	NAN	220	NAN	219	NAN	218	NAN	217	NAN
4333	6544	0.400000	0.500000	280.00	0.50	190	100.00	191	0.00	193	0.00	200	0.00	221	0.00
256	8930	0.400001	0.500001	330.00	0.50	190	99.99	191	0.01	193	0.00	221	0.00	220	0.00
2883	9352	0.400000	0.500000	0.00	0.50	221	NAN	220	NAN	219	NAN	218	NAN	217	NAN
733	9820	0.400000	0.500000	340.00	0.50	190	100.00	191	0.00	221	0.00	220	0.00	219	0.00

Concentration at the set points

13101 / 703 Benzo[a]pyrene

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000002	0.024370	290.00	0.78	221	32.00	193	31.44	191	29.55	220	4.58	192	2.29
4540	3970	0.000002	0.022700	220.00	0.78	221	33.99	193	31.98	191	29.21	192	3.71	220	1.09
-2580	4538	0.000002	0.021637	330.00	0.78	191	34.46	221	32.18	193	30.87	192	1.49	220	0.96
4333	6544	0.000003	0.033329	190.00	0.26	191	50.48	221	24.01	193	23.60	192	1.29	220	0.61
256	8930	0.000003	0.031495	60.00	0.26	191	33.23	193	32.72	221	30.30	192	2.15	220	1.57
2883	9352	0.000003	0.036536	110.00	0.78	191	51.24	221	22.87	193	21.91	192	2.04	220	1.93
733	9820	0.000002	0.027017	70.00	0.78	191	40.11	193	28.99	221	26.82	192	2.49	220	1.57

Concentration at the set points

12000 / 410 Methane

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000023	0.000001	300.00	0.75	191	31.50	193	22.34	221	20.79	192	19.74	220	5.62
4540	3970	0.000022	0.000001	220.00	0.75	191	26.97	193	26.69	221	25.58	192	19.67	220	1.10
-2580	4538	0.000020	4.92E-007	340.00	0.75	191	29.30	193	26.48	221	25.79	192	15.68	220	2.76
4333	6544	0.000031	0.000001	180.00	0.25	191	42.51	193	22.60	221	21.37	192	12.26	220	1.26
256	8930	0.000029	0.000001	60.00	0.25	191	32.64	193	29.22	221	24.43	192	12.11	220	1.60
2883	9352	0.000034	0.000001	110.00	0.75	191	49.06	193	19.40	221	18.23	192	11.35	220	1.96
733	9820	0.000025	0.000001	70.00	0.75	191	38.21	193	25.32	221	21.18	192	13.69	220	1.60

Concentration at the set points

6000 / 337 Carbon oxide

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.409600	0.102400	300.00	1.60	200	29.19	213	21.63	219	16.97	190	8.16	191	8.15
4540	3970	0.404897	0.101224	210.00	0.50	200	30.97	190	19.08	193	11.23	192	9.98	221	9.34
-2580	4538	0.404716	0.101179	350.00	0.50	200	34.09	219	17.21	190	13.97	193	8.17	191	7.52
4333	6544	0.405394	0.101349	170.00	0.50	200	30.74	190	16.31	193	12.81	221	11.50	191	10.04
256	8930	0.407403	0.101851	70.00	1.60	200	36.58	193	14.62	221	12.20	219	11.89	216	11.12
2883	9352	0.407981	0.101995	110.00	1.60	200	24.19	191	22.55	190	16.35	219	13.04	193	8.25
733	9820	0.406554	0.101638	80.00	1.60	200	37.75	193	14.99	219	14.23	221	11.18	190	6.42

Concentration at the set points

5002 / 333 Hydrogen sulphide (H2S)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

5001 / 330 Sulphur dioxide

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.200817	0.502042	300.00	6.19	213	92.36	191	4.28	220	1.20	193	1.16	221	0.99
4540	3970	0.200176	0.500439	220.00	2.06	216	40.79	193	25.44	221	22.88	191	10.82	220	0.07
-2580	4538	0.200195	0.500488	330.00	2.06	216	37.45	191	24.13	193	20.65	221	17.73	220	0.05
4333	6544	0.200265	0.500662	190.00	0.50	191	37.69	216	29.70	193	17.95	221	14.30	213	0.20
256	8930	0.200478	0.501196	80.00	6.19	216	85.06	213	11.75	193	1.33	221	1.04	220	0.81
2883	9352	0.200292	0.500731	120.00	0.50	216	27.54	191	26.90	193	19.02	221	14.55	213	10.59
733	9820	0.200302	0.500756	90.00	6.19	216	68.17	213	24.53	193	3.47	221	3.11	220	0.72

Concentration at the set points

3004 / 328 Soot

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000687	0.005721	300.00	1.10	213	26.67	191	22.39	193	16.39	221	13.90	192	13.63
4540	3970	0.000491	0.004091	220.00	1.10	193	29.18	221	25.80	191	21.11	192	17.21	216	4.95
-2580	4538	0.000451	0.003760	330.00	1.10	191	31.75	193	29.03	221	25.02	216	6.81	192	5.70
4333	6544	0.000607	0.005061	190.00	1.10	191	52.68	193	22.60	221	16.82	216	6.62	200	0.63
256	8930	0.000640	0.005330	70.00	1.10	193	35.05	221	29.47	216	14.29	192	12.92	191	2.47
2883	9352	0.000765	0.006378	110.00	1.10	191	46.61	193	19.35	221	17.06	192	10.41	213	2.25
733	9820	0.000559	0.004662	80.00	1.10	193	34.78	221	27.05	192	12.76	191	11.47	216	7.61

Concentration at the set points

4002 / 304 Nitrogen (1) oxide (N2O)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000009	0.000028	290.00	0.75	193	31.24	191	27.05	221	25.16	192	12.54	220	4.00
4540	3970	0.000009	0.000028	220.00	0.75	193	29.82	191	25.39	221	25.04	192	18.82	220	0.93
-2580	4538	0.000008	0.000025	340.00	0.75	193	29.67	191	27.65	221	25.31	192	15.04	220	2.34
4333	6544	0.000012	0.000039	180.00	0.25	191	40.42	193	25.51	221	21.13	192	11.85	220	1.08
256	8930	0.000012	0.000037	60.00	0.25	193	32.57	191	30.66	221	23.86	192	11.56	220	1.35
2883	9352	0.000013	0.000042	110.00	0.75	191	47.02	193	22.07	221	18.17	192	11.06	220	1.68
733	9820	0.000010	0.000032	70.00	0.75	191	36.17	193	28.45	221	20.85	192	13.17	220	1.36

Concentration at the set points

4003 / 303 Ammonia

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	3.49E-009	2.18E-008	300.00	0.50	192	42.33	191	36.33	221	16.51	193	4.83	0	0.00
4540	3970	3.64E-009	2.27E-008	220.00	0.50	192	42.35	191	34.54	221	17.96	193	5.15	0	0.00
-2580	4538	2.89E-009	1.80E-008	340.00	0.50	191	37.28	192	36.47	221	20.44	193	5.81	0	0.00
4333	6544	4.19E-009	2.62E-008	180.00	0.50	191	50.87	192	22.11	221	21.17	193	5.84	0	0.00
256	8930	4.15E-009	2.59E-008	50.00	0.50	191	53.52	192	25.54	221	15.52	193	5.42	0	0.00
2883	9352	5.25E-009	3.28E-008	110.00	0.50	191	57.25	192	24.50	221	14.08	193	4.17	0	0.00
733	9820	3.91E-009	2.45E-008	70.00	0.50	191	48.09	192	29.44	221	17.01	193	5.46	0	0.00

Concentration at the set points

4001 / 301 Nitrogen oxides (in terms of nitrogen dioxide ($NO + NO_2$))

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.012094	0.075587	300.00	1.89	213	53.76	200	12.31	191	8.82	219	5.47	192	5.27
4540	3970	0.009633	0.060203	210.00	0.50	200	18.49	193	16.65	221	14.41	192	13.85	191	9.71
-2580	4538	0.009586	0.059910	340.00	0.50	200	19.06	193	16.42	191	16.12	221	14.14	216	9.39
4333	6544	0.010048	0.062799	180.00	0.50	191	24.74	193	18.57	221	16.48	200	13.82	216	11.77
256	8930	0.010683	0.066768	70.00	0.50	216	24.44	200	18.61	193	17.30	221	13.80	192	6.41
2883	9352	0.010546	0.065912	110.00	0.50	191	28.06	200	14.63	193	13.38	221	11.04	190	9.88
733	9820	0.010196	0.063726	80.00	0.50	200	18.56	193	17.17	216	15.66	221	13.32	191	12.71

Concentration at the set points

Summation group No. 39

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

Summation group No. 37

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.547117	300.00	1.93	213	9.35	200	1.91	191	1.46	193	0.85	219	0.84
4540	3970	0.00E+000	0.536546	220.00	0.50	191	1.66	193	1.62	221	1.38	200	1.26	192	1.04
-2580	4538	0.00E+000	0.536396	340.00	0.50	200	1.60	193	1.46	191	1.43	221	1.25	216	0.89
4333	6544	0.00E+000	0.538342	180.00	0.50	191	2.65	193	1.99	221	1.76	200	1.40	216	1.34
256	8930	0.00E+000	0.541034	70.00	0.50	216	3.34	200	2.26	193	2.23	221	1.78	192	0.78
2883	9352	0.00E+000	0.540256	110.00	0.50	191	3.50	200	1.72	193	1.67	221	1.37	190	1.16
733	9820	0.00E+000	0.538940	80.00	0.50	200	1.97	193	1.93	216	1.87	221	1.50	191	1.43

Concentration at the set points

Summation group No. 31

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.547096	300.00	1.93	213	21.01	200	4.30	191	3.28	193	1.91	219	1.90
4540	3970	0.00E+000	0.536532	220.00	0.50	191	4.23	193	4.12	221	3.51	200	3.20	192	2.65
-2580	4538	0.00E+000	0.536383	340.00	0.50	200	4.08	193	3.72	191	3.65	221	3.20	216	2.26
4333	6544	0.00E+000	0.538324	180.00	0.50	191	6.55	193	4.92	221	4.36	200	3.46	216	3.32
256	8930	0.00E+000	0.541017	70.00	0.50	216	7.98	200	5.40	193	5.31	221	4.23	192	1.86
2883	9352	0.00E+000	0.540235	110.00	0.50	191	8.41	200	4.15	193	4.01	221	3.30	190	2.80
733	9820	0.00E+000	0.538925	80.00	0.50	200	4.84	193	4.73	216	4.59	221	3.67	191	3.50

Concentration at the set points

Summation group No. 30

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.500000	40.00	0.50	218	0.00	217	0.00	215	0.00	214	0.00	212	0.00
4540	3970	0.00E+000	0.500000	310.00	0.50	191	0.00	193	0.00	218	0.00	217	0.00	215	0.00
-2580	4538	0.00E+000	0.500000	110.00	0.50	218	0.00	217	0.00	215	0.00	214	0.00	212	0.00
4333	6544	0.00E+000	0.500000	280.00	0.50	191	0.00	193	0.00	218	0.00	217	0.00	215	0.00
256	8930	0.00E+000	0.500000	330.00	0.50	191	0.00	193	0.00	218	0.00	217	0.00	215	0.00
2883	9352	0.00E+000	0.500000	0.00	0.50	218	0.00	217	0.00	215	0.00	214	0.00	212	0.00
733	9820	0.00E+000	0.500000	340.00	0.50	191	0.00	218	0.00	217	0.00	215	0.00	214	0.00

Concentration at the set points

Summation group No. 5

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.001311	300.00	6.73	213	99.98	216	0.02	192	0.00	191	0.00	221	0.00
4540	3970	0.00E+000	0.000218	180.00	6.73	213	100.00	216	0.00	192	0.00	193	0.00	221	0.00
-2580	4538	0.00E+000	0.000276	10.00	6.73	213	100.00	192	0.00	216	0.00	193	0.00	221	0.00
4333	6544	0.00E+000	0.000212	190.00	6.73	216	99.99	191	0.00	193	0.00	221	0.00	213	0.00
256	8930	0.00E+000	0.000811	80.00	6.73	216	88.12	213	11.88	221	0.00	193	0.00	192	0.00
2883	9352	0.00E+000	0.000256	130.00	6.73	216	99.66	213	0.34	221	0.00	193	0.00	191	0.00
733	9820	0.00E+000	0.000487	90.00	6.73	216	73.92	213	26.08	221	0.00	193	0.00	192	0.00

Concentration at the set points

Summation group No. 4

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.00E+000	1.01E-017	310.00	0.50	191	33.33	193	0.00	216	0.00	213	0.00	218	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.00E+000	1.00E-018	280.00	0.50	191	33.33	193	0.00	216	0.00	213	0.00	218	0.00
256	8930	0.00E+000	3.31E-015	330.00	0.50	191	33.33	193	0.00	216	0.00	213	0.00	218	0.00
2883	9352	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.00E+000	3.38E-019	340.00	0.50	191	33.33	216	0.00	213	0.00	218	0.00	217	0.00

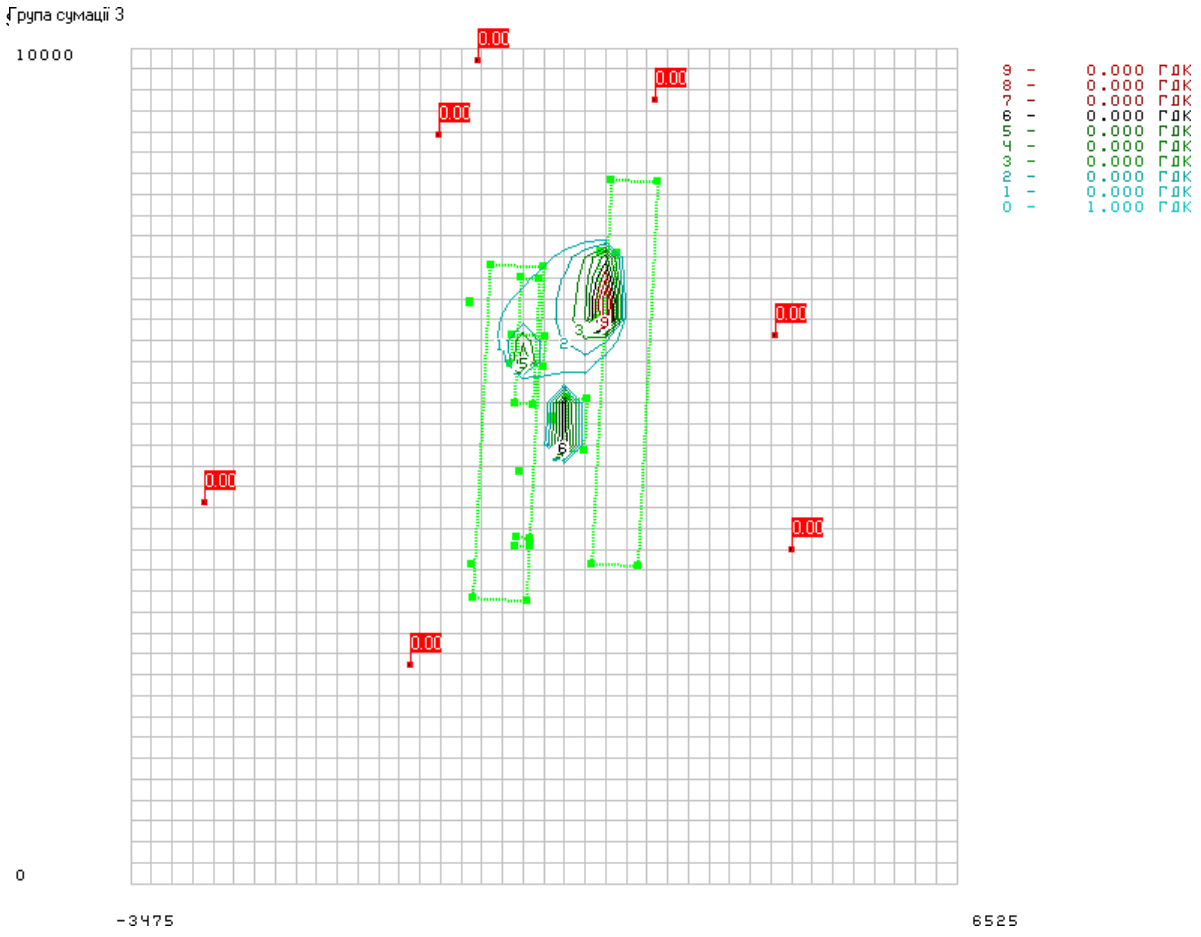
Concentration at the set points

Summation group No. 3

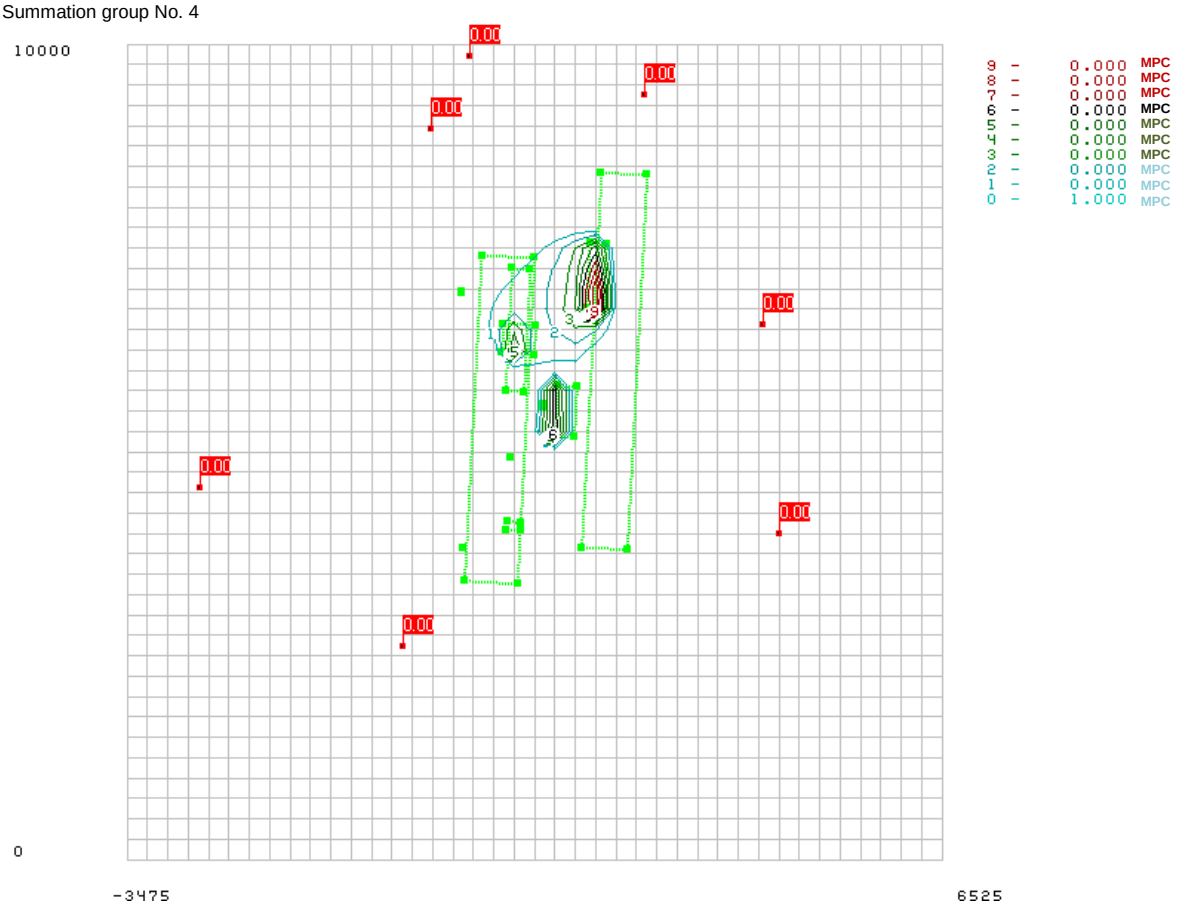
Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.00E+000	1.01E-017	310.00	0.50	191	50.00	193	0.00	218	0.00	217	0.00	215	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.00E+000	1.00E-018	280.00	0.50	191	50.00	193	0.00	218	0.00	217	0.00	215	0.00
256	8930	0.00E+000	3.31E-015	330.00	0.50	191	50.00	193	0.00	218	0.00	217	0.00	215	0.00
2883	9352	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.00E+000	3.38E-019	340.00	0.50	191	50.00	218	0.00	217	0.00	215	0.00	214	0.00

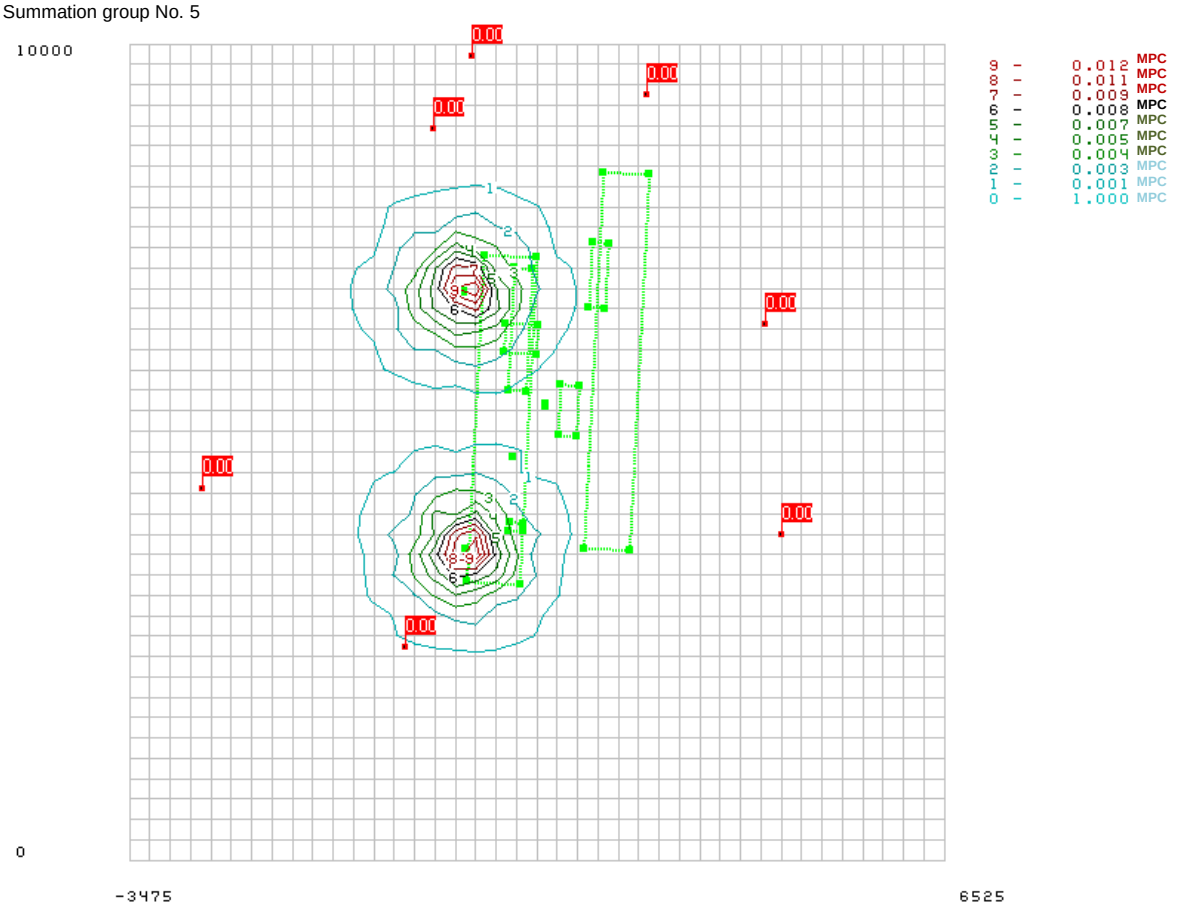
CONCENTRATION DISTRIBUTION MAPS



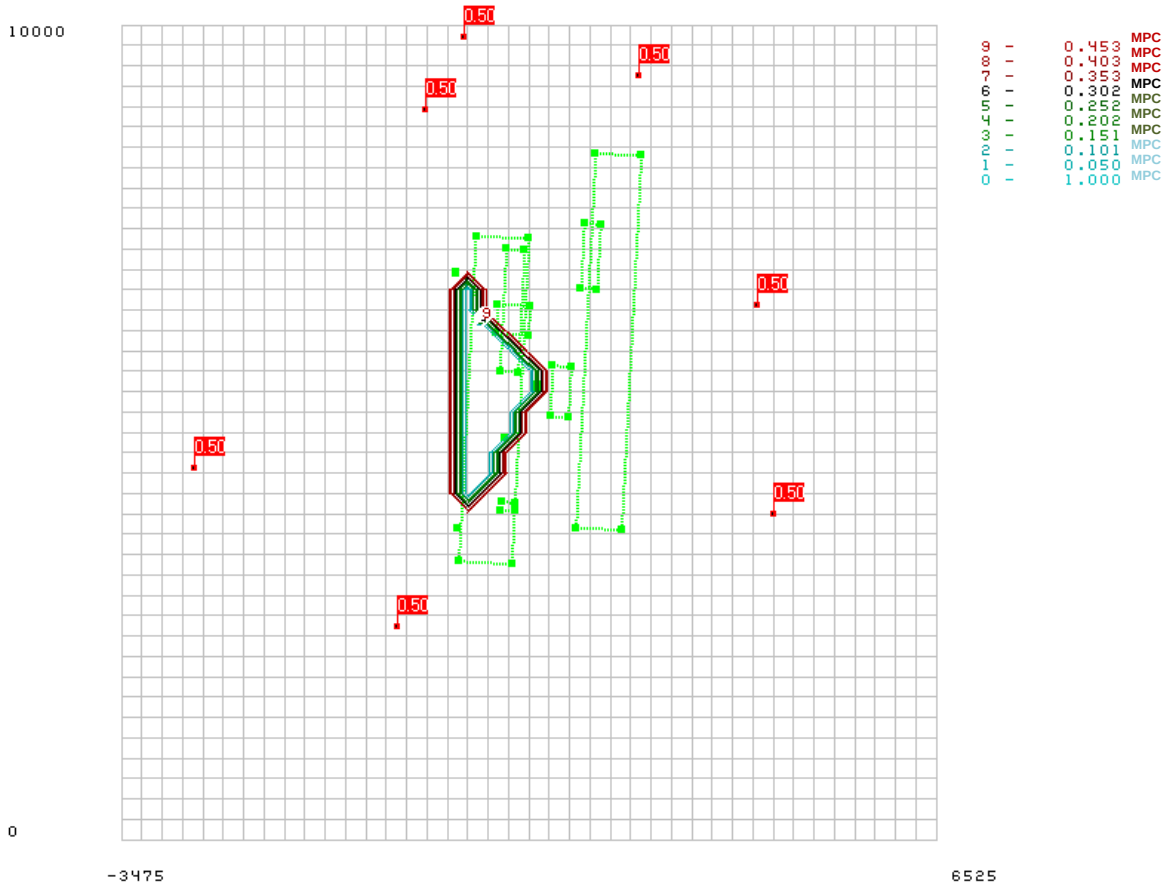
Summation group No. 4



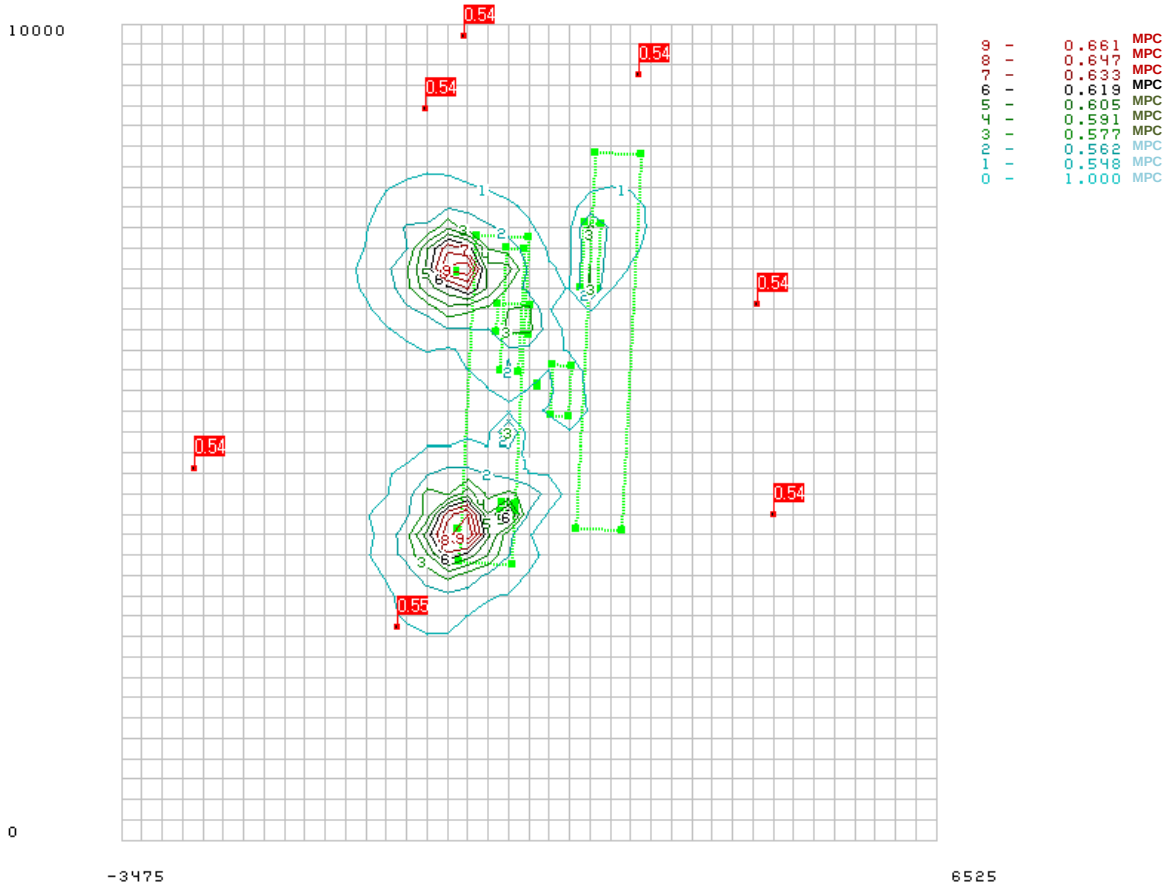
Summation group No. 5



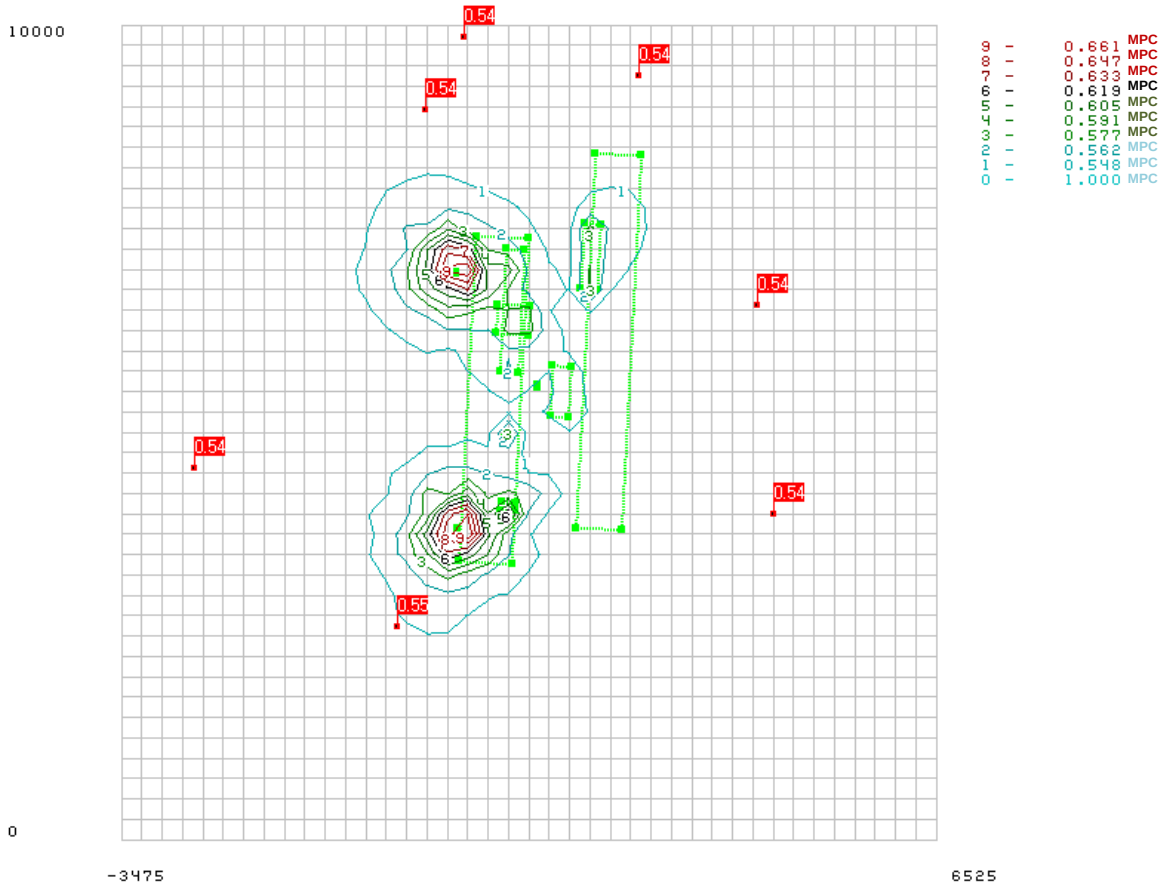
Summation group No. 30



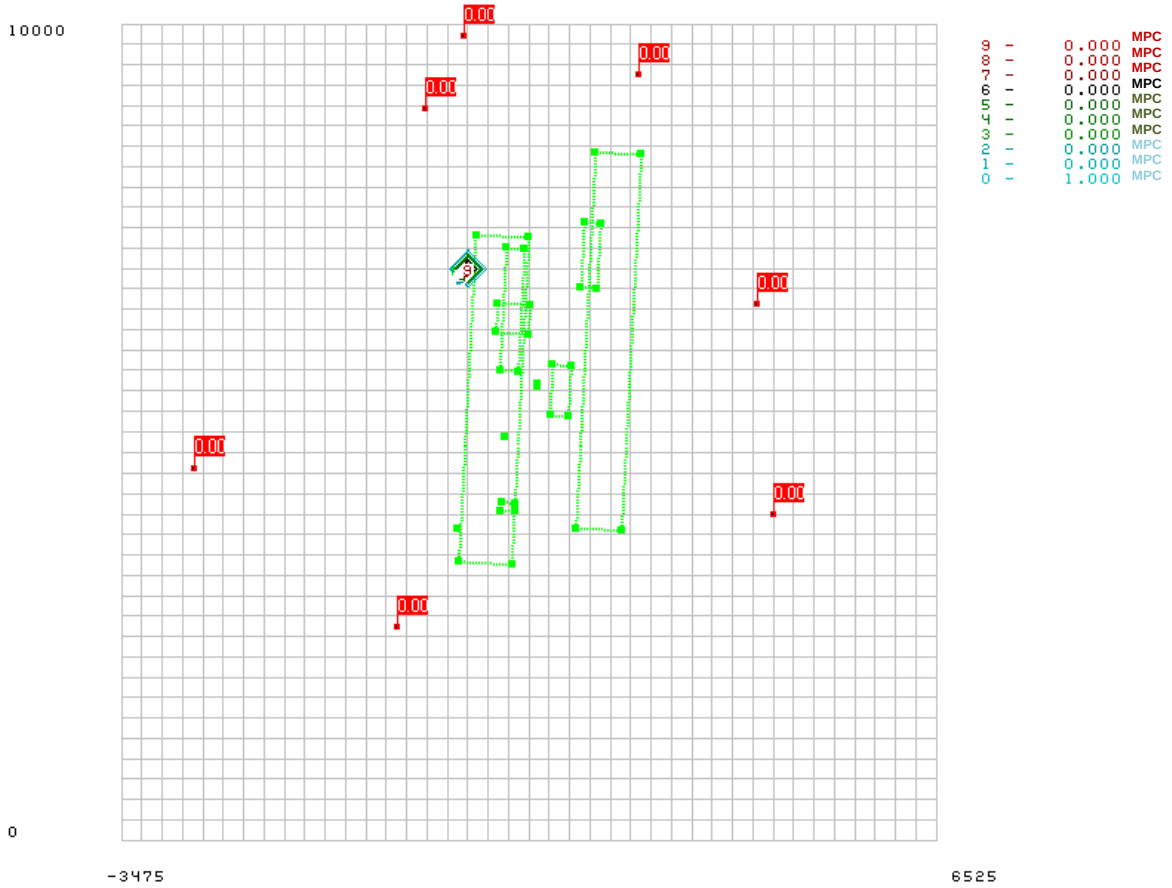
Summation group No. 31



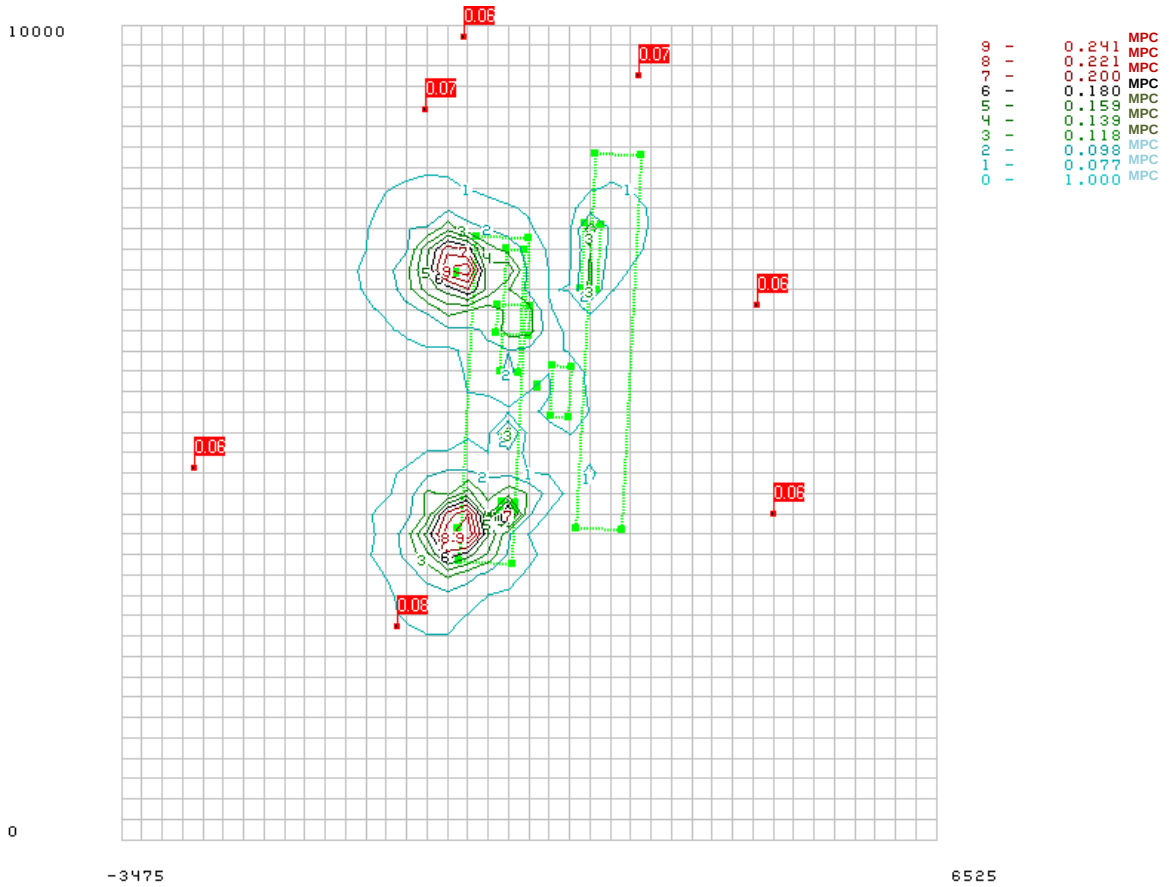
Summation group No. 37



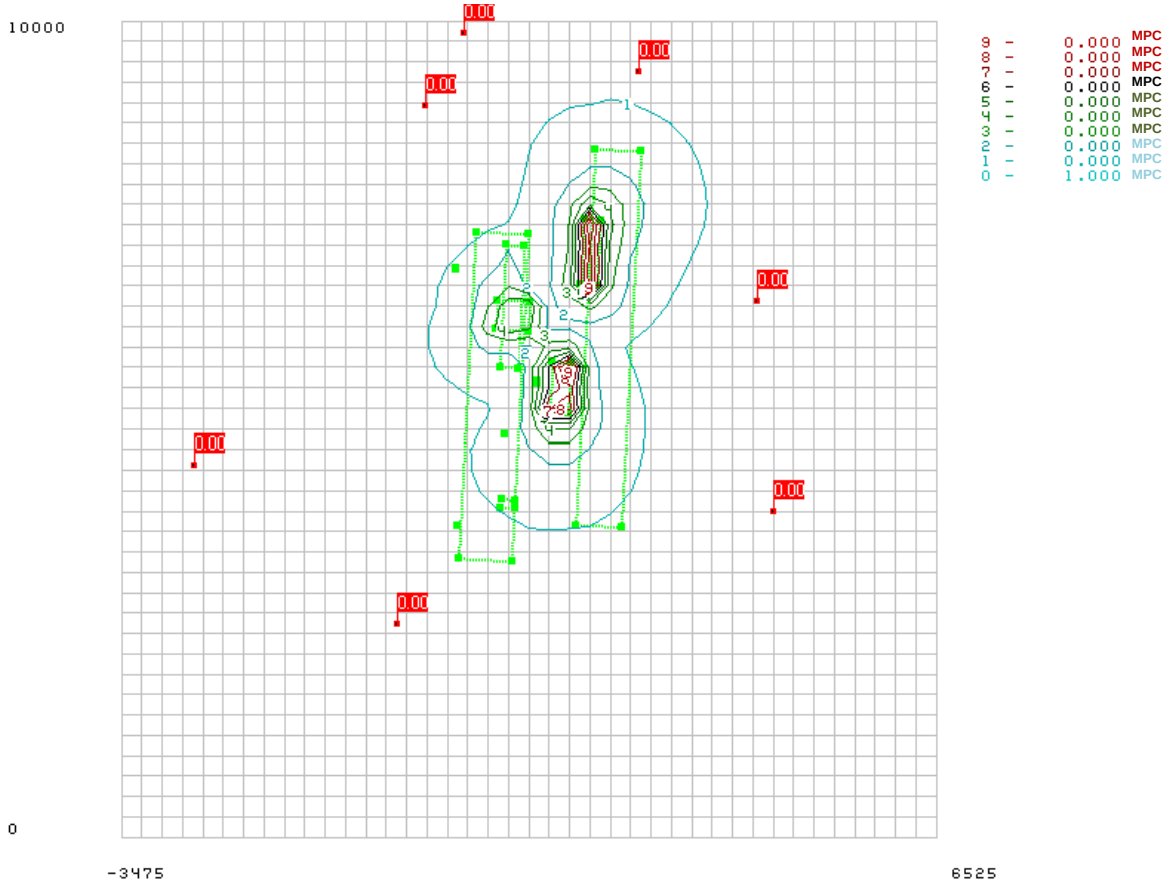
Summation group No. 39



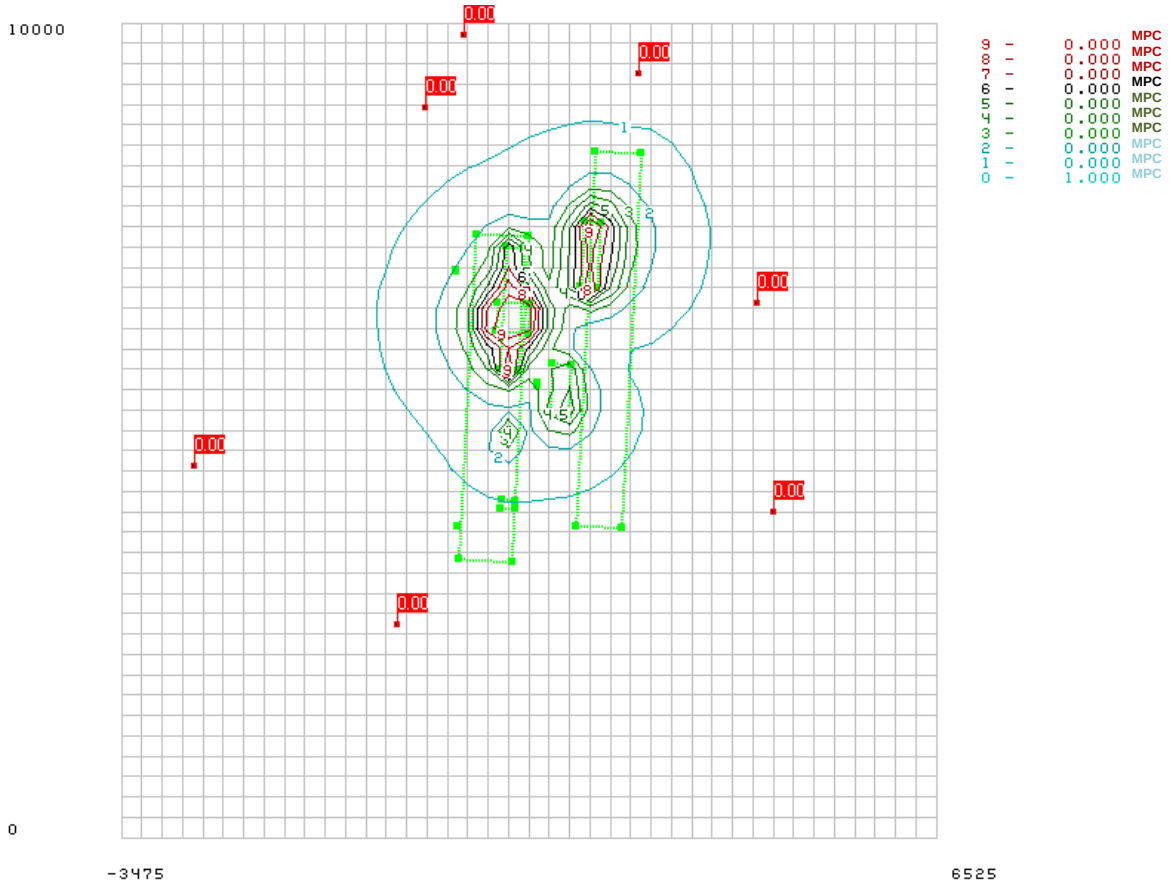
Substance 4001 / 301 Nitrogen oxides (in terms of nitrogen dioxide (NO + NO2))



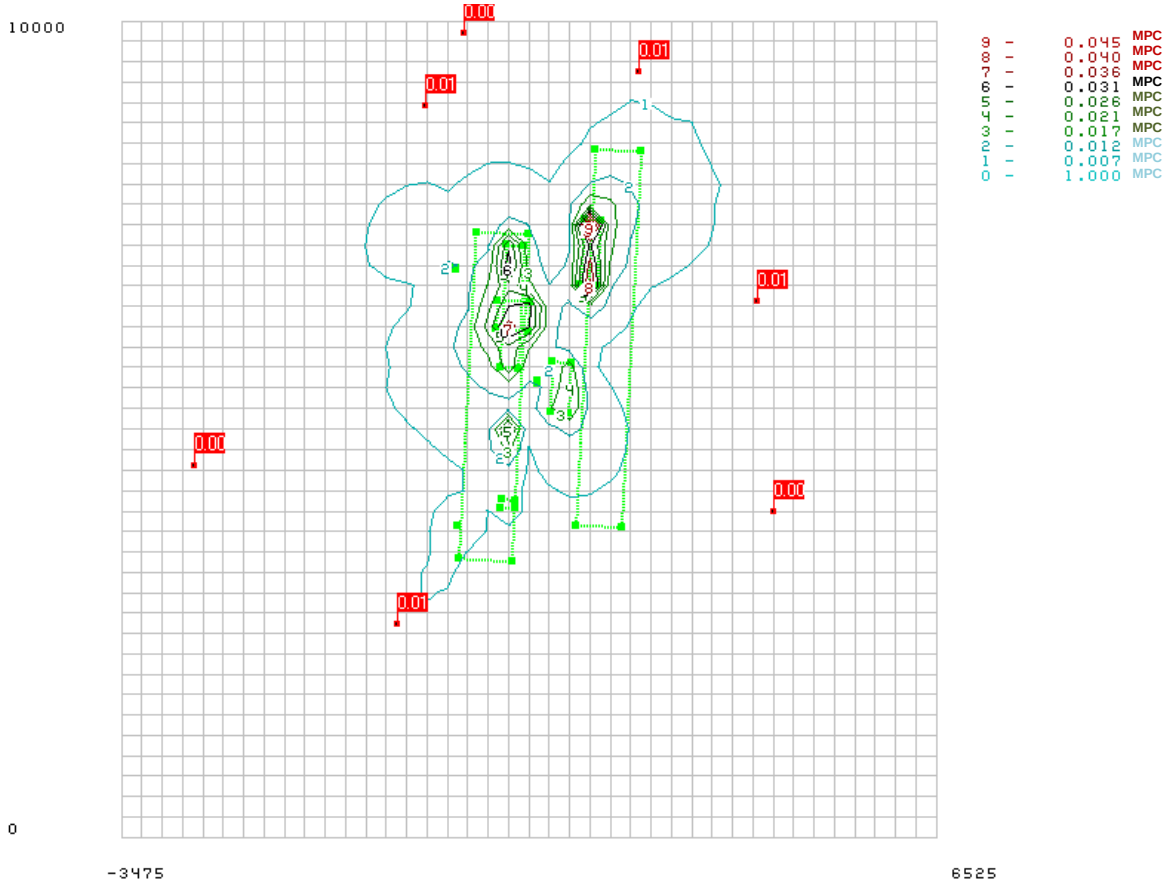
Substance 04003 / 303 Ammonia



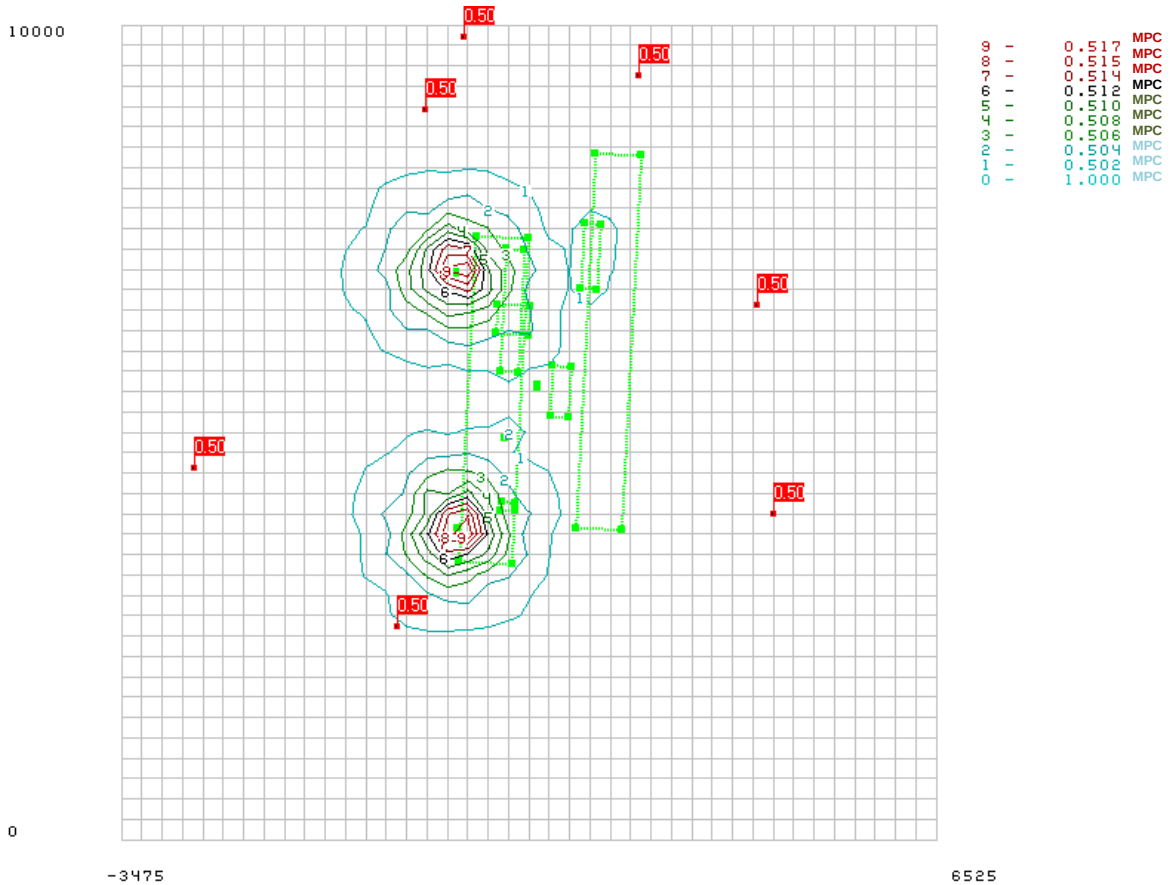
Substance 04002 / 304 Nitrogen(1) oxide (N2O)



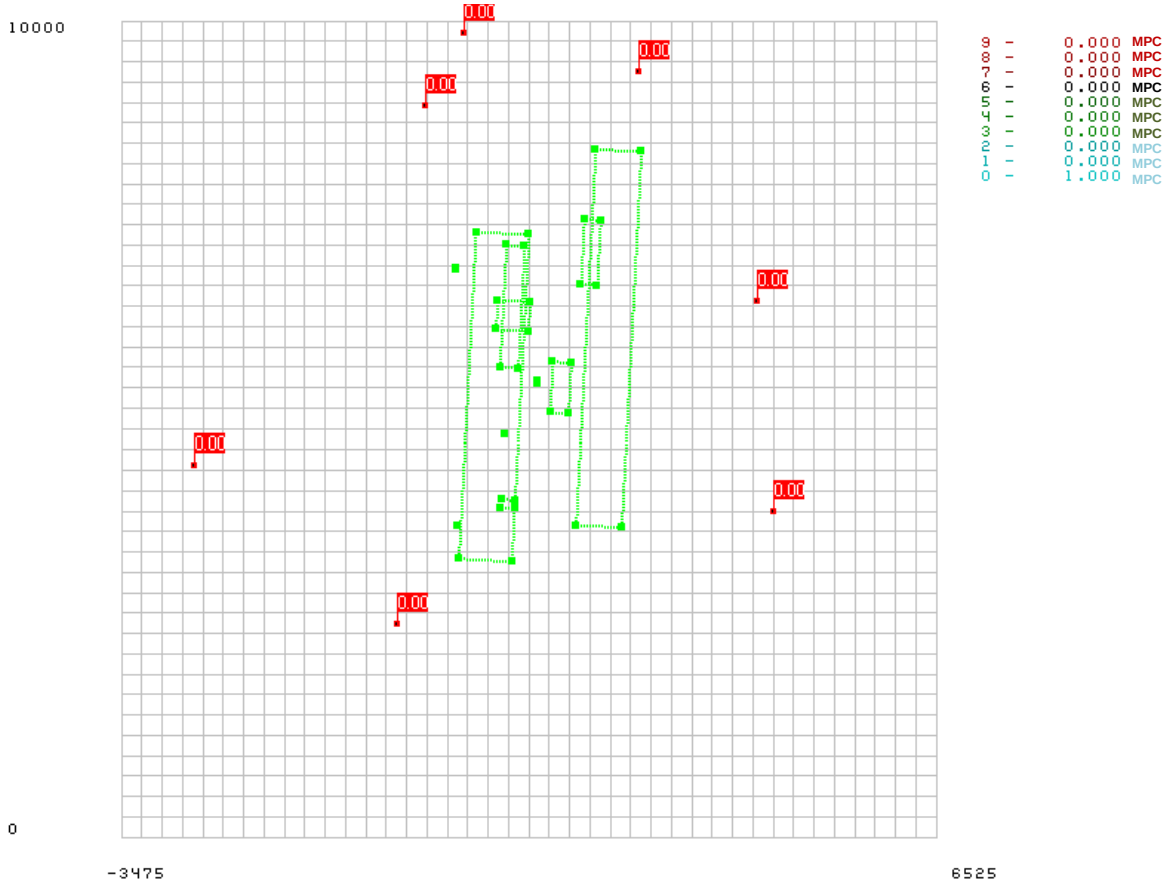
Substance 03004 / 328 Soot



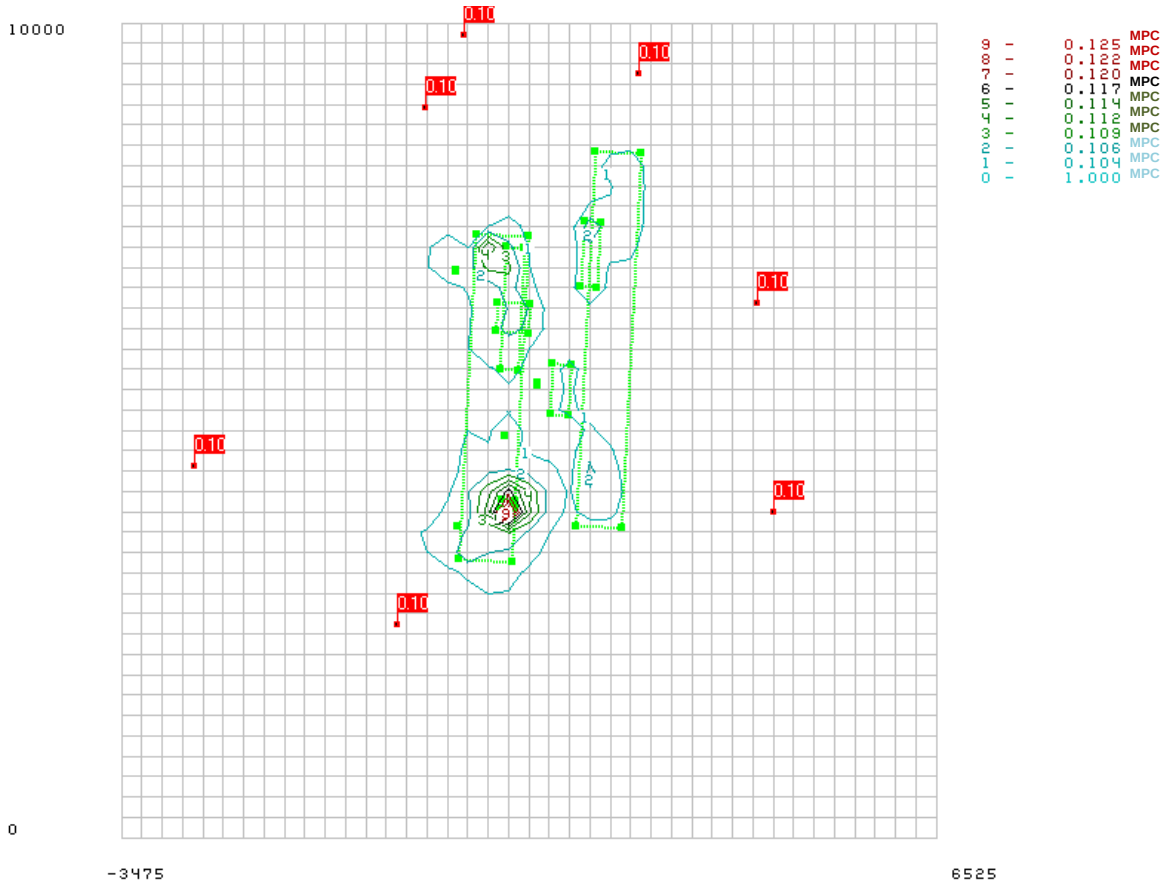
Substance 05001 / 330 Sulphur dioxide



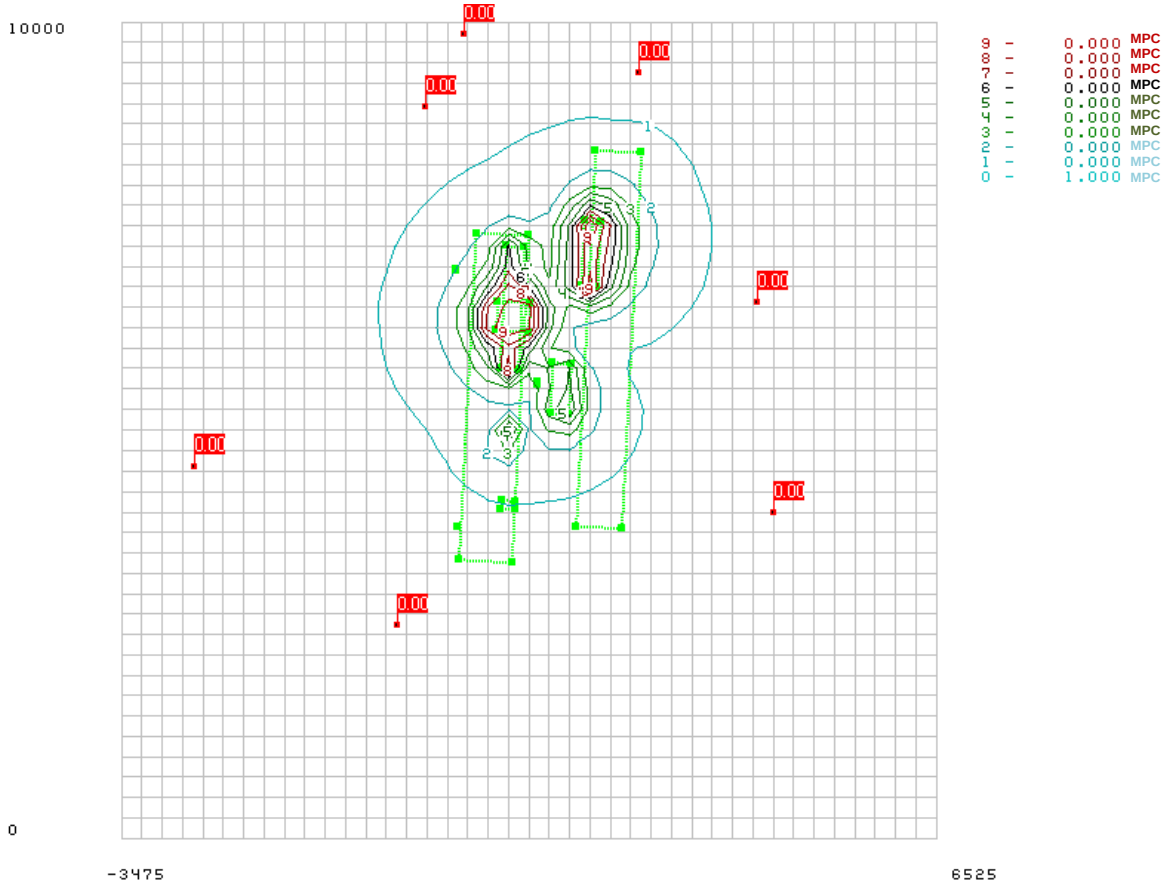
Substance 05002 / 333 Hydrogen sulphide (H2S)



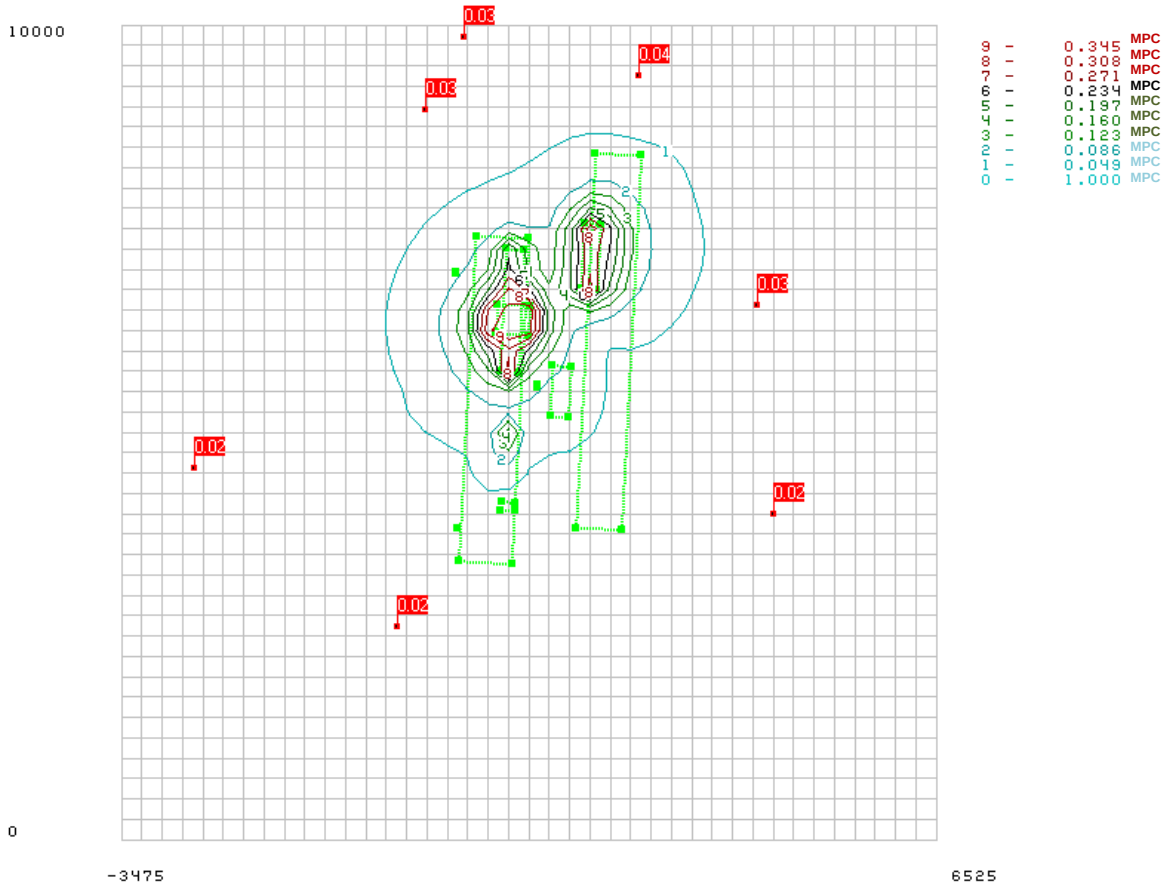
Substance 06000 / 337 Carbon oxide



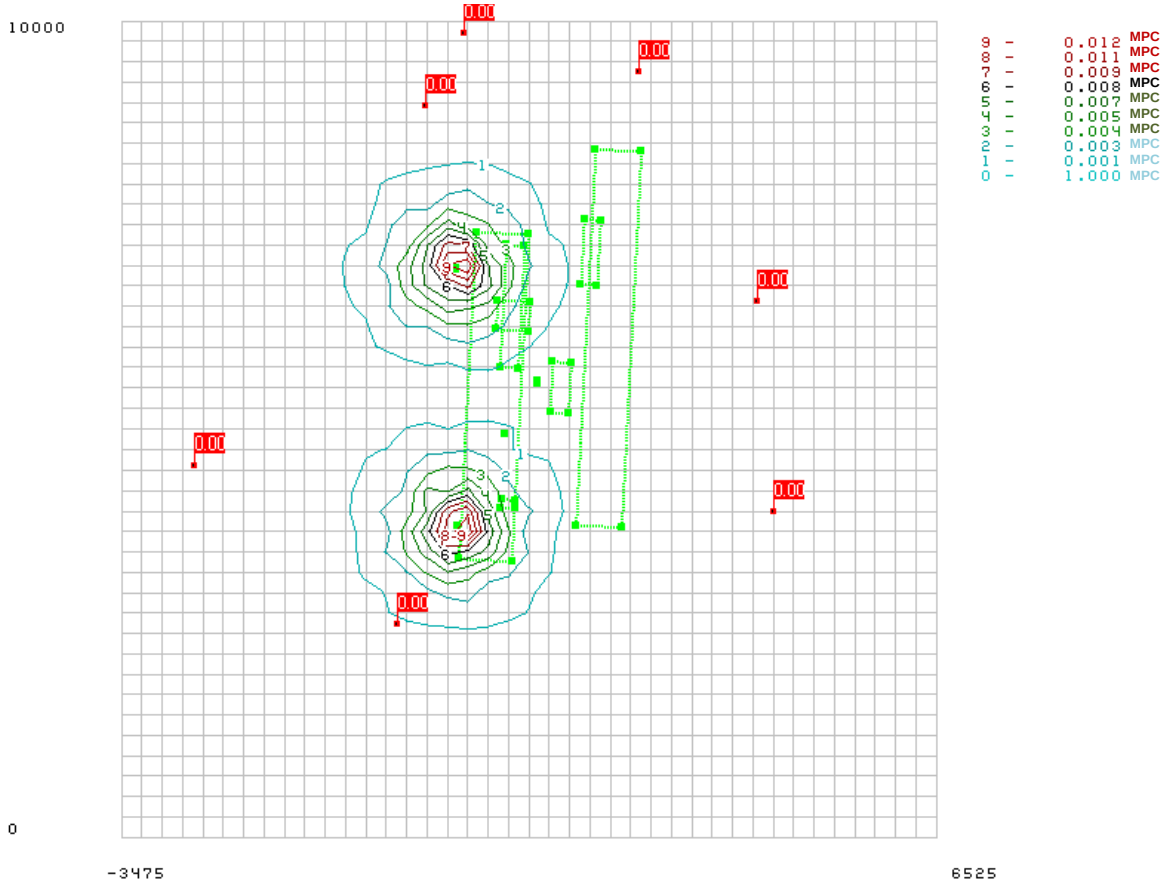
Substance 12000 / 410 Methane



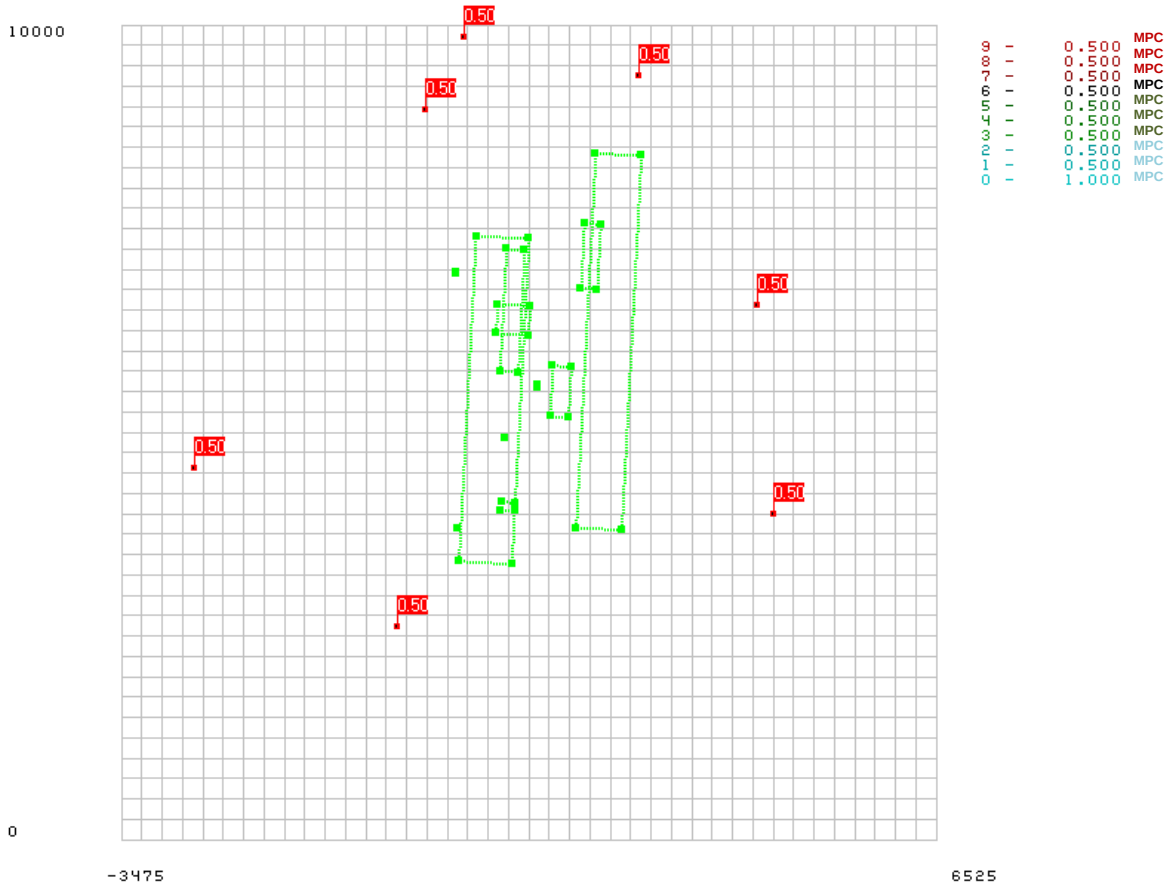
Substance 13101 / 703 Benzo[a]pyrene



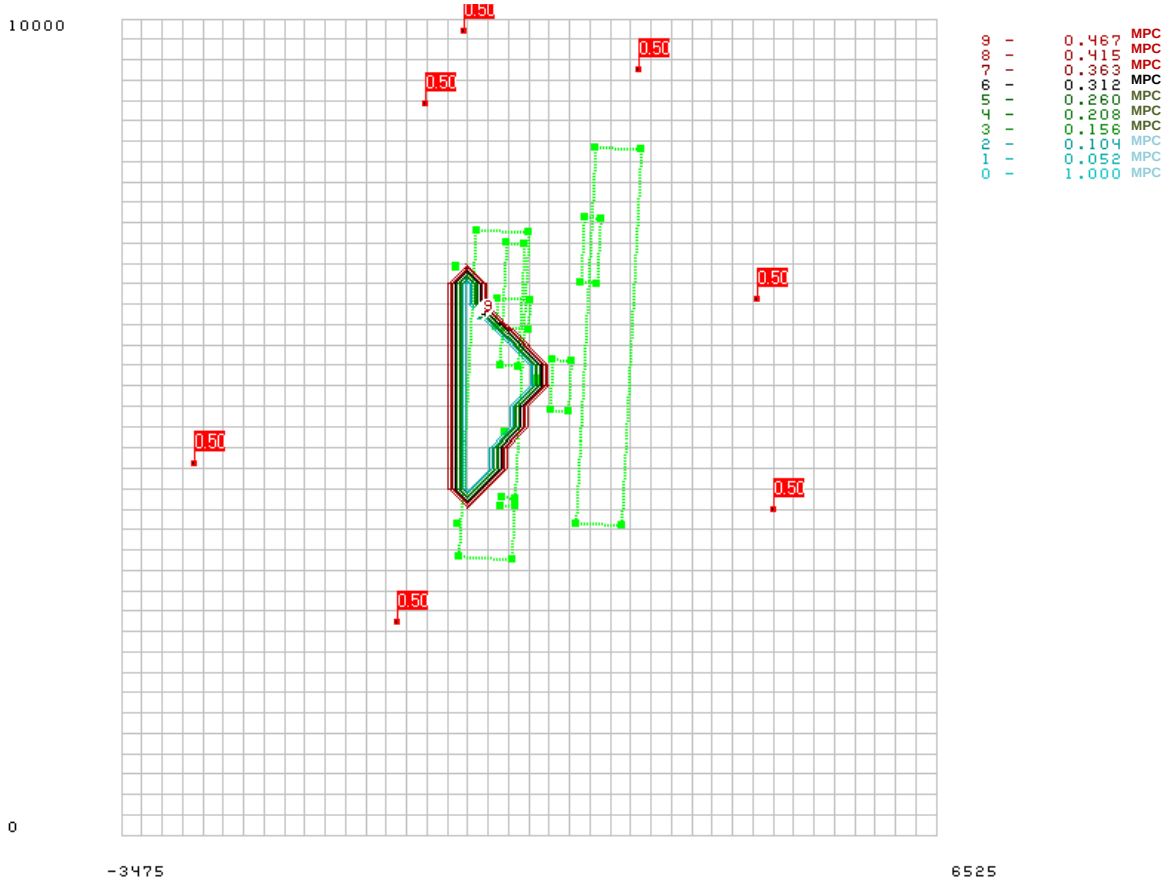
Substance 11049 / 1325 Formaldehyde



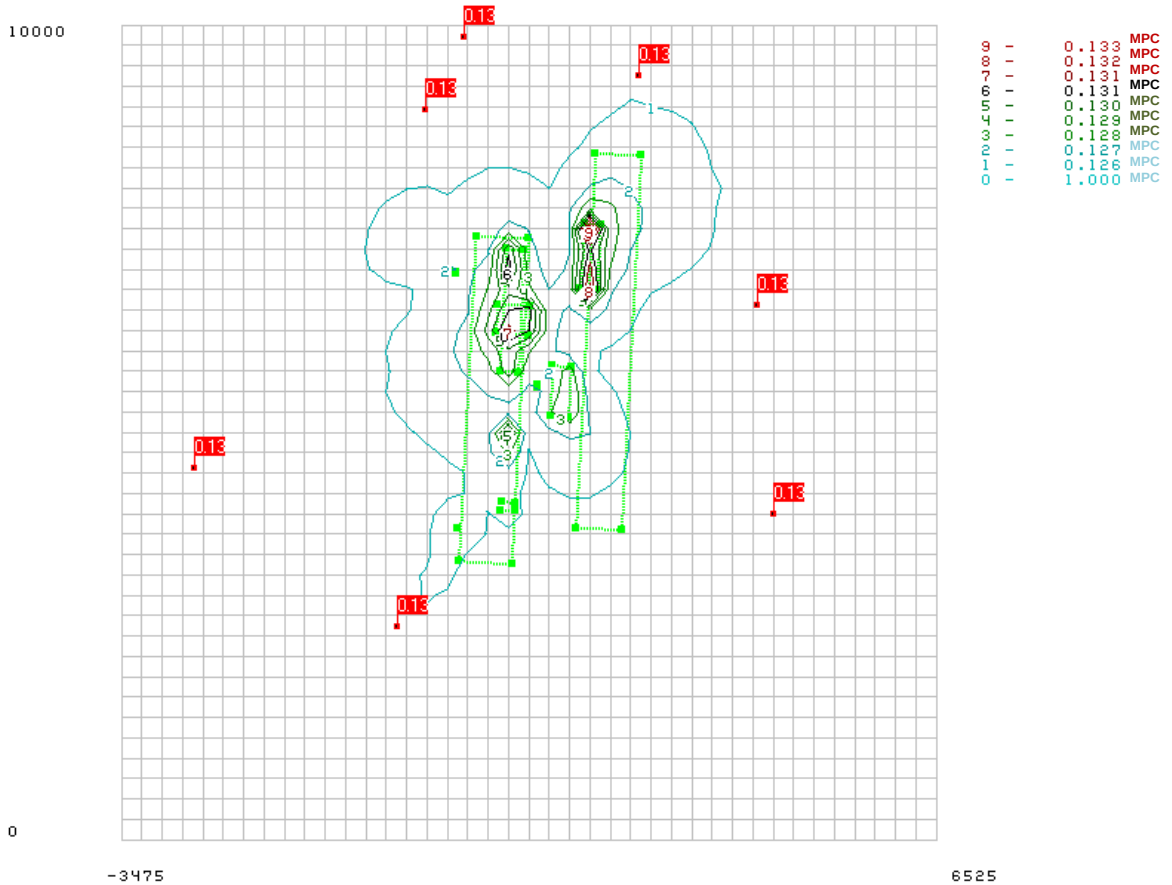
Substance 11000 / 2752 Non-methane volatile organic compounds (NMVOC)



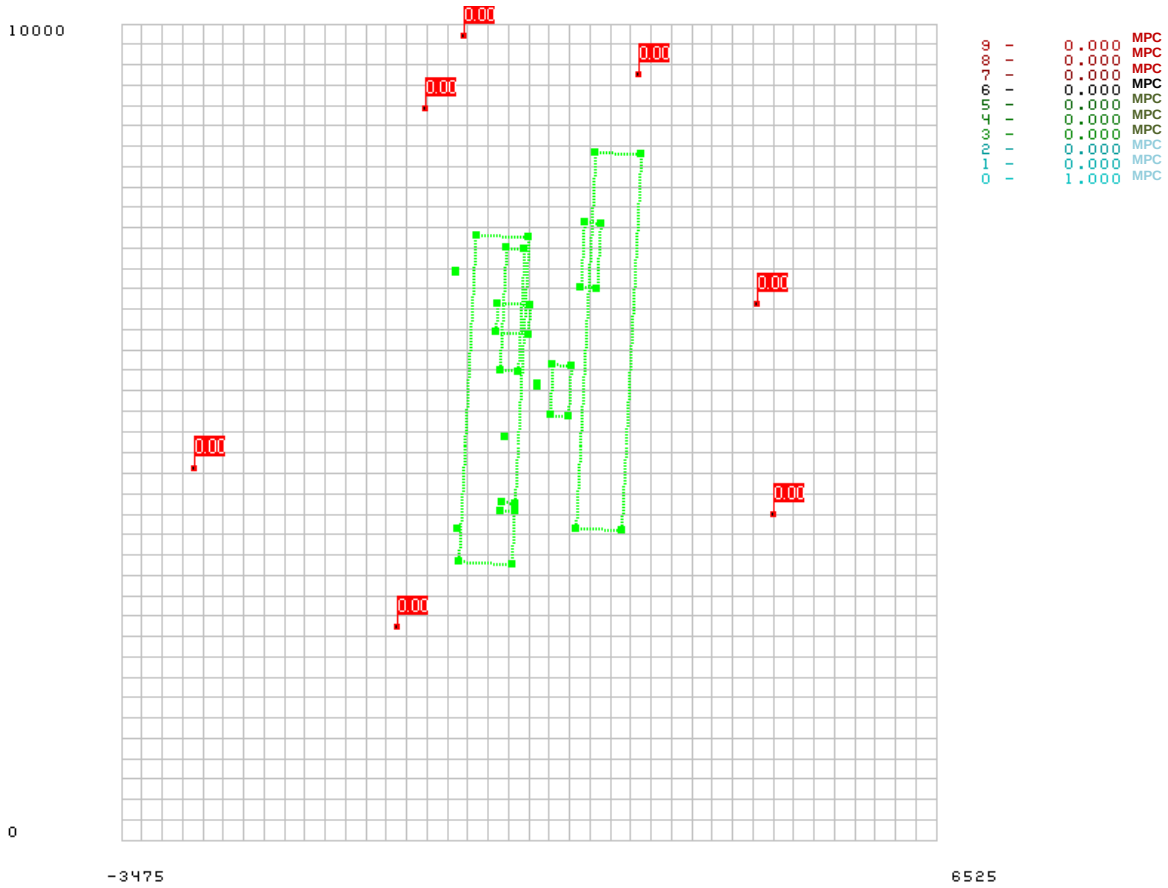
Substance 11000 / 2754 Non-methane volatile organic compounds (NMVOC)



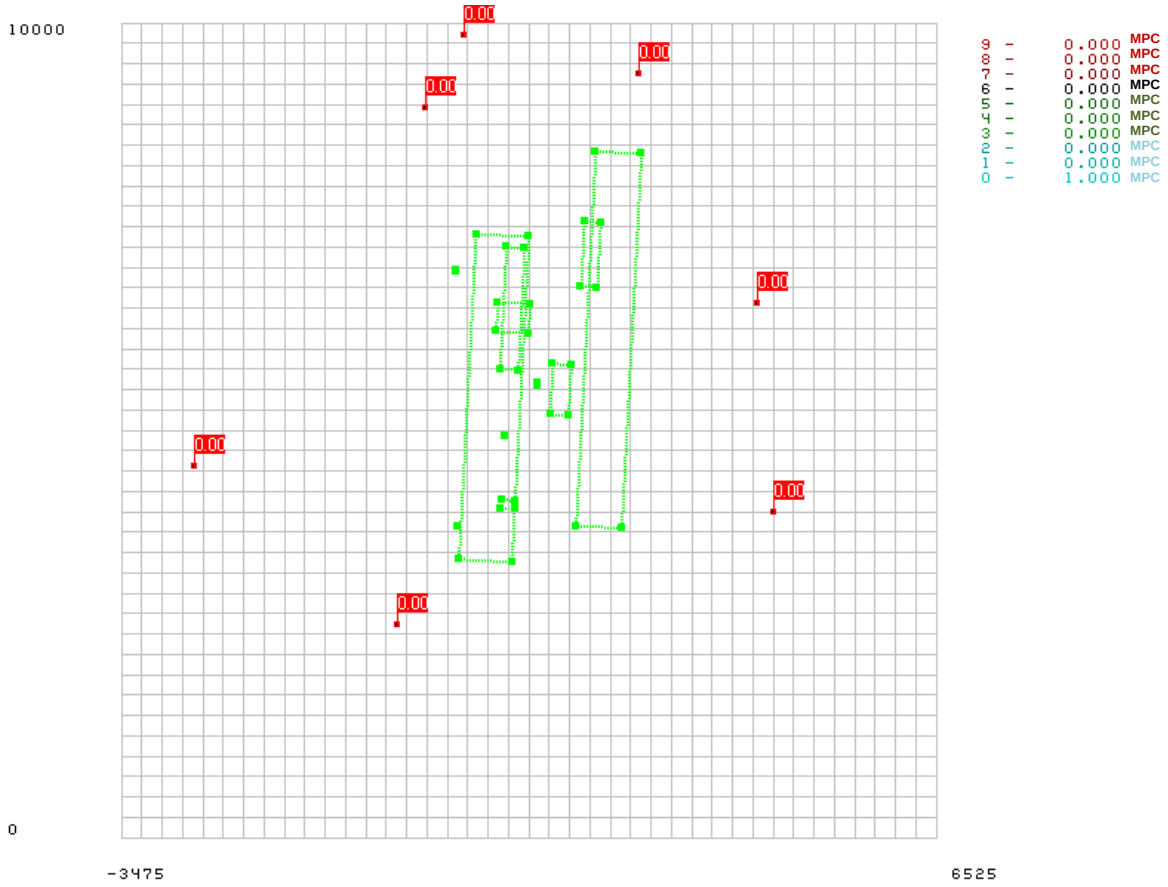
Substance 03000 / 2902 Substances in the form of suspended solid particles (microparticles and fibres)



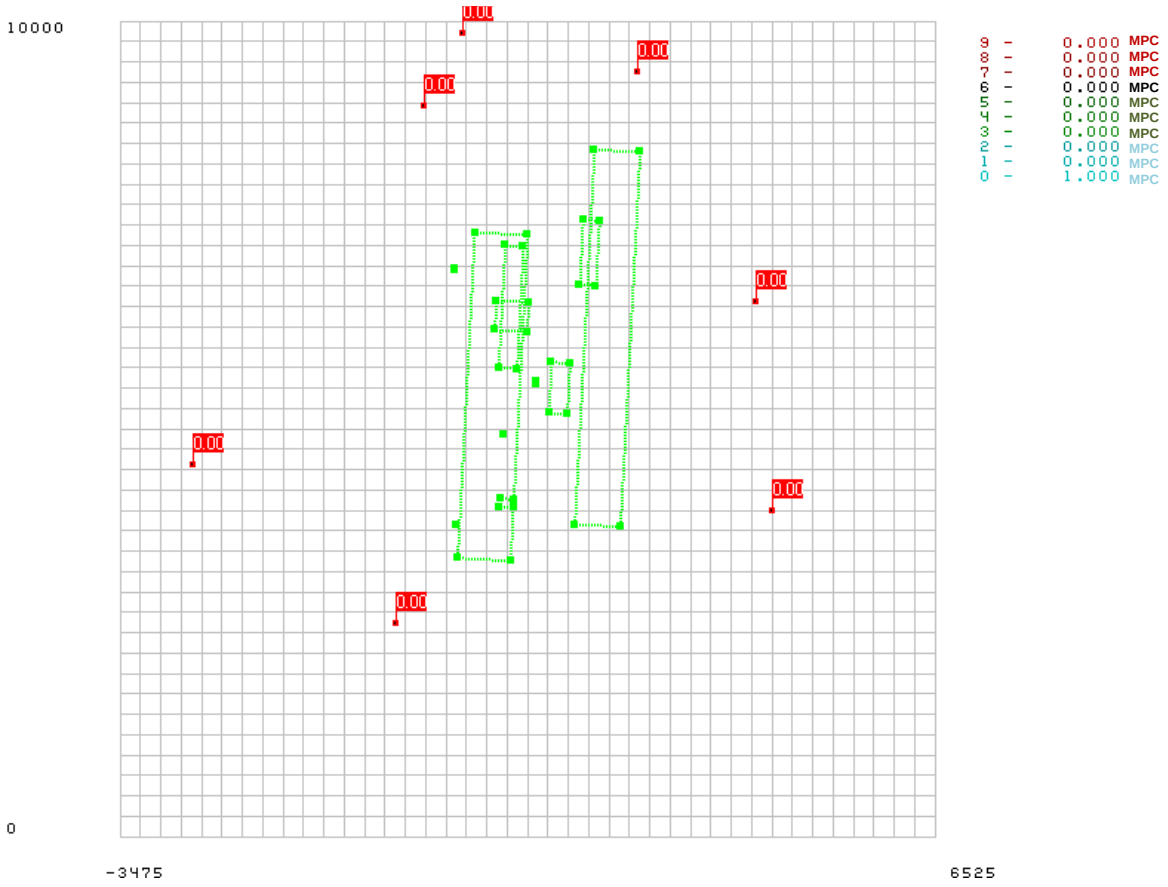
Substance 11000 / 10312 Non-methane volatile organic compounds (NMVOC)



Substance 07000 / 11812 Carbon dioxide



Substance 04002 / 11815 Nitrogen(1) oxide (N2O)



Annex 3

AUTOMATED SYSTEM FOR ATMOSPHERE
POLLUTION CALCULATION

EOL-PLIUS

(Version 5.23)

GENERAL REPORT ON CALCULATION RESULTS
DISPERSAL OF ATMOSPHERE POLLUTION FROM EMISSION SOURCES
SE «MA «BORYSPIL» *(without taking into account the background pollution*
(newly created and renewed sources)

Kyiv HIIACC Derzhbud Ukrainy
+38 (044) 249-34-25

System calculation modules
“EOL-PLIUS”
realize OND-86 technique

Approved GGO of Voikov
unlimited validity period
ref. 26/861 of 3/27/92

Program recommended for use by Ministry of Environmental Protection and Nuclear Safety of Ukraine (ref. 11-5-68 of 5/7/98)

Ukraine, Kyiv, 2020

ToR for calculation

TABLE 1. List of production sites

Code of production site	Production site name
1	Production site

ToR for calculation TABLE 2. List of

substances.

Substance code	Substance name
03000 ------- 2902	Substances in the form of suspended solid particles (microparticles and fibres)
03004 —— 328	Soot
04001 ------- 301	Nitrogen oxides (in terms of nitrogen dioxide (NO + NO_2))
04002 —— 304	Nitrogen (1) oxide (N20)
04002 —— 11815	Nitrogen (1) oxide (N20)
04003 —— 303	Ammonia
05001 —— 330	Sulphur dioxide
05002 —— 333	Hydrogen sulphide (H2S)
06000 —— 337	Carbon oxide
07000 —— 11812	Carbon dioxide
11000 —— 2754	Non-methane volatile organic compounds (NMVOC):
11000 —— 10312	Non-methane volatile organic compounds (NMVOC):
11049 —— 1325	Formaldehyde
12000 —— 410	Methane
13101 —— 703	Benzo[a]pyrene

ToR for calculation

TABLE 3. List of summation groups.

Group code	Substances comprising the summation groups (codes)										Coefficient potent.
	1	2	3	4	5	6	7	8	9	10	
3	04003 (303)	05002 (333)									1
4	04003 (303)	05002 (333)	11049 (1325)								1
5	04003 (303)	11049 (1325)									1
30	05001 (330)	05002 (333)									1
31	04001 (301)	05001 (330)									1
37	04001 (301)	04003 (303)	04002 (304)	05001 (330)							1
39	05002 (333)	11049 (1325)									1

ToR for calculation

TABLE 4. Calculation sites parameters.

N п/п	Coord. of centre of symm.		Length, m	Width, m	Grid step		Angle of rotation of calc. site relative to OX axis of general coord. sys., deg.	Characteristic of the area
	X, m	Y, m			OX axis, m	OY axis, m		
1	1525	5000	10000	10000	250	250	0	0

TABLE 5. ToR for calculation

City name	Wind speed, m/sec					Wind speed, fractions (Umc)					Step of enumeration of dangerous wind direct.	Fix. direct. of wind	Qty, max. contrib.	Number, max. concent.	Characteristic of calc. background
	1	2	3	4	5	1	2	3	4	5					
1. Boryspil											10		5	10	1

Input data

TABLE 1. Description of meteorological conditions and geographic reference

City code	City name	Average air temperature		Maximum wind speed, m/sec	Regional coeff. of strat. atmosphere	Angle between northern direction and OX axis, deg.	City area, sq.km	Required conc. level at the point (fractions of MPC)
		the hottest month, deg. C	the coldest month, deg. C					
1	Boryspil	27,4	-6,8		180		37,01	1

TABLE 2. Description of production sites (geographical reference)

City code	Production site code	Production site name	Basic coordinate system reference		
			X orig.,m	Y orig.,m	Angle of rotation, deg.
1	1	Production site			

TABLE 3. Description of harmful substances emission sources

City code	Production site code	Source code	Source name	Angle of the model or an angle between OX axis and the length of a planar source	Terrain code	Coordinate of a point source, or a beginning of a line source, or a centre of symmetry of a planar source		Coordinate of an end of a line source, or length and width of a planar source, or a point source with a rect. neck		Source height, m	Diameter of a point source or a planar source of type 2, or PGVS(Wo) release rate for a linear, (for a planar source of type 1 - 0)	PGVS flow rate, (for a planar source of type 1 - 0)	PGVS temperature (deg. C)	Hazard class
						X1, m	Y1, m	X2, m	Y2, m					
1	1	190	RW-1 (runway) (aircraft)	-3	1	2501	6118	560	4600	2		0	27,4	
		191	apron of terminal D (mobile, motor transport)	-3	1	2281	7166	200	800	2		0	27,4	
		192	apron of terminal B (mobile, motor transport)	-3	1	1912	5506	225	620	2		0	27,4	
		193	apron of terminal F (mobile, motor transport)	-3	1	1318	6500	225	1500	2		0	27,4	
		200	RW-2 (runway) (aircraft)	-3	1	1092	5402	650	4000	2		0	27,4	
		201	FFS - service station (including car refuelling); FFS, DF storage (breathing valve)	444	1	1621	5584			5	0.05	0	27,4	
		202	FFS - service station (including car refuelling); FFS, aviation fuel storage (breathing valve)	444	1	1621	5576			5	0.05	0	27,4	
		203	FFS - stations	444	1	1621	5566			5	0.05	0	27,4	

		203	FFS - service station (including car refuelling); FFS, DF storage (breathing valve)	444	1	1621	5566			5	0.05	0	27,4	
		204	FFS - service station (including car refuelling); FFS, DF storage (breathing valve)	444	1	1621	5560			5	0.05	0	27,4	
		205	FFS - service stations (including car refuelling); FFS, (filler neck) DF	444	1	1621	5582			4	0,5	0	27,4	
		206	FFS - service stations (including car refuelling); FFS, (filler neck) aviation fuel	444	1	1621	5578			4	0,5	0	27,4	
		207	FFS - service stations (including car refuelling); FFS, (filler neck) DF	444	1	1621	5562			4	0,5	0	27,4	
		208	FFS - service stations (including car refuelling); FFS, (filler	444	1	1621	5564			4	0,5	0	27,4	

	neck) DF											
209	FFS - service stations (including car refuelling); FFS (dispensing gun) DF	444	1	1620	5584			1,5	0,1	0	27,4	
210	FFS - service stations (including car refuelling); FFS (dispensing gun) aviation fuel	444	1	1622	5584			1,5	0,1	0	27,4	
211	FFS - service stations (including car refuelling); FFS (dispensing gun) DF	444	1	1620	5559			1,5	0,1	0	27,4	
212	FFS - service stations (including car refuelling); FFS (dispensing gun) DF	444	1	1622	5559			1,5	0,1	0	27,4	
213	stationary engines; FRLES, CMS, diesel-generator plant; diesel generator	444	1	636	3832			7	0,15	1,08	630	
214	other types of transportation and storage (including pipelines); FRLES, CMS, diesel	444	1	636	3828			7	0.05	0	27,4	

	generator plant; DF reservoir (breathing valve)											
215	Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir (filler neck)	444	1	636	3823			4	0,5	0	27,4	
216	stationary engines; FRLES, CMS, diesel-generator plant; diesel generator	444	1	630	6977			7	0,15	1,08	630	
217	other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator plant; DF reservoir (breathing valve)	444	1	630	6969			7	0,05	0	27,4	
218	Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir (filler neck)	444	1	630	6960			4	0,5	0	27,7	
219	AC engine test site, inorg.	-3	1	1267	4096	170	100	2		0	27,4	
	garage	444						8	0,5	0,295		

		220	for ERS motor transport storage, deflector		1	1233	4932						27,4	
		221	apron S, inorg., mobile motor transport	-3	1	1327	6389	400	360			0	27,4	

TABLE 4. Specification of emission composition of the source

City code	Production site code	Source code	Substance code	Total emissions, tons/year	Coef. of ordered sedimentation of the substance	Maximum emissions (g/sec), at a wind speed of									
						0.5 m/sec	1 m/sec	2 m/sec	4 m/sec	6 m/sec	8 m/sec	10 m/sec	12 m/sec	14 m/sec	16 m/sec
1	1	190	03000 ---- 2902		1	0,00125									
			03004 ---- 328		1	0,000125									
			04001 ---- 301		1	0,018903									
			06000 ---- 337		1	0,116708									
			11000 ------- 2754		1	0,0924051									
		191	03000 ---- 2902		1	0,00912									
			03004 ---- 328		1	0,00912									
			04001 ---- 301		1	0,03961									
			04002 ---- 304		1	0,00017									
			04003 ---- 303		1	1E-7									
			05001 ---- 330		1	0,00569									
			06000 ---- 337		1	0,08156									
			11000 ---- 2754		1	0,0115									
			12000 ---- 410		1	0,00045									
			13101 ---- 703		1	4E-5									
		192	03000 ------- 2902		1	0,003909									

192	03000 ------- 2902		1	0,003909											

			03004 ------- 328		1	0,003909									
			04001 ------- 301		1	0,017131									
			04002 ------- 304		1	7,525E-5									
			04003 ------- 303		1	8E-8									
			06000 ------- 337		1	0,037018									
			11000 ------- 2754		1	0,005219 4									
			12000 ------- 410		1	0,000196									
			13101 ------- 703		1	3E-6									
		193	03000 ------- 2902		1	0,007166									
			03004 ------- 328		1	0,007166									
			04001 ------- 301		1	0,03108									
			04002 ------- 304		1	0.000139									
			04003 ------- 303		1	1,2E-8									
			05001 ------- 330		1	0,004476									
			06000 ------- 337		1	0,06288									
			11000 ------- 2754		1	0,00839									
			12000		1										

			------- 410			0,00031								
			13101 ------- 703		1	3E-5								
		200	03000 ------- 2902		1	0,000474								
			03004 ------- 328		1	0,000474								
			04001 ------- 301		1	0.04333								
			06000 ------- 337		1	0,21772								
			11000 ------- 2754		1	0.018768997								
		201	05002 ------- 333		1	2E-9								
			11000 ------- 2754		1	7.2E-7								
			11000 ------- 10312		1	1.1E-9								
		202	05002 ------- 333		1	2.9E-10								
			11000 ------- 2754		1	4.9E-7								
			11000 ------- 10312		1	4.9E-10								
		203	05002 ------- 333		1	2.2E-9								
			11000 ------- 2754		1	7.7E-7								
			11000 ------- 10312		1	1.2E-9								
		204	05002 ------- 333		1	9.5E-10								
			11000 -------		1	3.4E-7								

			2754											
			11000 ------- 10312		1	5.1E-10								
		205	05002 ------- 333		1	3.9E-7								
			11000 ------- 2754		1	0.00014								
			11000 ------- 10312		1	2.1E-7								
		206	05002 ------- 333		1	4.4E-6								
			11000 ------- 2754		1	0.0073								
			11000 ------- 10312		1	7.3E-6								
		207	05002 ------- 333		1	3.9E-7								
			11000 ------- 2754		1	0.00014								
			11000 ------- 10312		1	2.1E-7								
		208	05002 ------- 333		1	6.2E-5								
			11000 ------- 2754		1	0.00014								
			11000 ------- 10312		1	2.1E-7								
		209	05002 ------- 333		1	6.2E-5								
			11000 ------- 2754		1	0.022								
			11000 ------- 10312		1	7.5E-5								
		210	05002 ------- 333		1	1.2E-10								

			11000 ------- 2754		1	1.9E-7									
			11000 ------- 10312		1	1.9E-10									
		211	05002 ------- 333		1	6.2E-5									
			11000 ------- 2754		1	0.022									
			11000 ------- 10312		1	4.2E-5									
		212	05002 ------- 333		1	6.2E-5									
			11000 ------- 2754		1	0.022									
			11000 ------- 10312		1	4.2E-5									
		213	03000 ------- 2902		1	0.00744									
			03004 ------- 328		1	0.00744									
			04001 ------- 301		1	0.2									
			05001 ------- 330		1	0.0625									
			06000 ------- 337		1	0.161458									
			11000 ------- 2754		1	0.043155									
			11049 ------- 1325		1	0.001786									
			13101 ------- 703		1	2E-7									
		214	05002 ------- 333		1	2.8E-11									
			11000		1										

			------- 2754			1E-8									
			11000 ------- 10312		1	1.5E-11									
		215	05002 ------- 333		1	3.9E-7									
			11000 ------- 2754		1	0.00014									
			11000 ------- 10312		1	2.1E-7									
		216	03000 ------- 2902		1	0.00744									
			03004 ------- 328		1	0.00744									
			04001 ------- 301		1	0.2									
			05001 ------- 330		1	0.0625									
			06000 ------- 337		1	0.1615									
			11000 ------- 2754		1	0.0432									
			11049 ------- 1325		1	0.0018									
			13101 ------- 703		1	2E-7									
		217	05002 ------- 333		1	2.8E-11									
			11000 ------- 2754		1	1E-8									
			11000 ------- 10312		1	1.5E-11									
		218	05002 ------- 333		1	3.9E-7									
			11000 -------		1	0.00014									

			2754											
			11000 ------- 10312		1	2.1E-7								
		219	03000 ------- 2902		1	0,000125								
			03004 ------- 328		1	0,000125								
			04001 ------- 301		1	0.018903								
			06000 ------- 337		1	0.116708								
			11000 ------- 2754		1	0.0131912								
		220	03000 ------- 2902		1	0.003257								
			03004 ------- 328		1	0.003257								
			04001 ------- 301		1	0.01402								
			04002 ------- 304		1	5.6E-5								
			05001 ------- 330		1	0.002021								
			06000 ------- 337		1	0.02552								
			11000 ------- 2754		1	0.003835								
			12000 ------- 410		1	0.000165								
			13101 ------- 703		1	1.4E-5								
		221	03000 ------- 2902		1	0.00586								
			03004 ------- 328		1	0.00586								

			04001 ------- 301		1	0.02535									
			04002 ------- 304		1	0.00011									
			04003 ------- 303		1	4E-8									
			05001 ------- 330		1	0.00356									
			06000 ------- 337		1	0.0493									
			11000 ------- 2754		1	0.00705									
			12000 ------- 410		1	0.00028									
			13101 ------- 703		1	3E-5									

TABLE 5. Description of harmful substances

Substance code	Substance name	MPC	Coefficient of ordered sedimentation
03000 ------- 2902	Substances in the form of suspended solid particles (microparticles and fibres)	0,5	1
03004 ------- 328	Soot	0,15	1
04001 ------- 301	Nitrogen oxides (in terms of nitrogen dioxide (NO + NO2))	0.2	1
04002 ------- 304	Nitrogen (1) oxide (N20)	0,4	1
04002 ------- 11815	Nitrogen (1) oxide (N20)	0	1
04003 ------- 303	Ammonia	0.2	1
05001 ------- 330	Sulphur dioxide	0,5	1
05002 ------- 333	Hydrogen sulphide (H2S)	0,008	1
06000 ------- 337	Carbon oxide	5	1
07000 ------- 11812	Carbon dioxide	0	1
11000 ------- 2754	Non-methane volatile organic compounds (NMVOC):	1	1
11000 ------- 10312	Non-methane volatile organic compounds (NMVOC):	0	1
11049	Formaldehyde	0,035	1
11049 ------- 1325	Formaldehyde	0,035	1
12000 ------- 410	Methane	50	1
13101 ------- 703	Benzo[a]pyrene	0,0001	1

TABLE 6. Description of harmful substances summation groups

Group code	Substances comprising the summation groups (codes)										Coefficient potent.
	1	2	3	4	5	6	7	8	9	10	
3	04003 ------- 303	05002 ------- 333									1
4	04003 ------- 303	05002 ------- 333	11049 ------- 1325								1
5	04003 ------- 303	11049 ------- 1325									1
30	05001 ------- 330	05002 ------- 333									1
31	04001 ------- 301	05001 ------- 330									1
37	04001 ------- 301	04003 ------- 303	04002 ------- 304	05001 ------- 330							1
39	05002 ------- 333	11049 ------- 1325									1

TABLE 7. Description of background concentrations distribution (U - wind speed m/sec)

City code	Substance code	Background ToR	Coordinate of observation		Conc. (fractions of MPC), at	Concentration (fractions of MPC), at 2<U<U*, by direction							
			X, m	Y, m		N	NE	C	SE	S	SW	3	SW

List of sources emissions of which comprise substances from summation groups for calculation

City code	Summation group code	Codes of substance included in the summation group	Production site code	Source code	Emission g/sec	Emission tones/year	Hazard class.	Coordinate of a point source, or a beginning of a line source, or a centre of symmetry of a planar source		Coordinate of an end of a line source, or length and width of a planar source, or a point source with a rectangular neck		Source height, m	Diameter of a point source, or a planar source, or velocity of PGVS for a line source,	Flow rate of PGVS, m3/stc	Temperature of PGCS (deg.) C)
								X1, m	Y1, m	X2, m	Y2, m				
1	3	4003 / 303 5002 / 333	1	191	1E-7			2281	7166	200	800	2		0	27,4
			1	192	8E-8			1912	5506	225	620	2		0	27,4
			1	193	1,2E-8			1318	6500	225	1500	2		0	27,4
			1	201	2E-9			1621	5584			5	0,05	0	27,4
			1	202	2.9E-10			1621	5576			5	0,05	0	27,4
			1	203	2.2E-9			1621	5566			5	0,05	0	27,4
			1	204	9.5E-10			1621	5560			5	0,05	0	27,4
			1	205	3.9E-7			1621	5582			4	0,5	0	27,4
			1	206	4.4E-6			1621	5578			4	0,5	0	27,4
			1	207	3.9E-7			1621	5562			4	0,5	0	27,4
			1	208	6.2E-5			1621	5564			4	0,5	0	27,4
			1	209	6.2E-5			1620	5584			1,5	0,1	0	27,4
			1	210	1.2E-10			1622	5584			1,5	0,1	0	27,4
			1	211	6.2E-5			1620	5559			1,5	0,1	0	27,4
			1	212	6.2E-5			1622	5559			1,5	0,1	0	27,4
			1	214	2.8E-11			636	3828			7	0,05	0	27,4
			1	215	3.9E-7			636	3823			4	0,5	0	27,4
			1	217	2.8E-11			630	6969			7	0,05	0	27,4
			1	218	3.9E-7			630	6960			4	0,5	0	27,7
			1	221	4E-8			1327	6389	400	360			0	27,4
	4	4003 / 303 5002 / 333 11049 / 1325	1	191	1E-7			2281	7166	200	800	2		0	27,4
			1	192	8E-8			1912	5506	225	620	2		0	27,4
			1	193	1,2E-8			1318	6500	225	1500	2		0	27,4
			1	201	2E-9			1621	5584			5	0,05	0	27,4
			1	202	2.9E-10			1621	5576			5	0,05	0	27,4
			1	203	2.2E-9			1621	5566			5	0,05	0	27,4
			1	204	9.5E-10			1621	5560			5	0,05	0	27,4
			1	205	3.9E-7			1621	5582			4	0,5	0	27,4
			1	206	4.4E-6			1621	5578			4	0,5	0	27,4
			1	207	3.9E-7			1621	5562			4	0,5	0	27,4
			1	208	6.2E-5			1621	5564			4	0,5	0	27,4
			1	209	6.2E-5			1620	5584			1,5	0,1	0	27,4
			1	210	1.2E-10			1622	5584			1,5	0,1	0	27,4
			1	211	6.2E-5			1620	5559			1,5	0,1	0	27,4
			1	212	6.2E-5			1622	5559			1,5	0,1	0	27,4
			1	213	0.001786			636	3832			7	0,15	1,08	630
			1	214	2.8E-11			636	3828			7	0,05	0	27,4
			1	215	3.9E-7			636	3823			4	0,5	0	27,4
			1	216	0.0018			630	6977			7	0,15	1,08	630

			1	217	2.8E-11			630	6969			7	0,05	0	27,4
			1	218	3.9E-7			630	6960			4	0,5	0	27,7
			1	221	4E-8			1327	6389	400	360			0	27,4
	5	4003 / 303 11049 / 1325	1	191	1E-7			2281	7166	200	800	2		0	27,4
			1	192	8E-8			1912	5506	225	620	2		0	27,4
			1	193	1,2E-8			1318	6500	225	1500	2		0	27,4
			1	213	0.001786			636	3832			7	0,15	1,08	630
			1	216	0.0018			630	6977			7	0,15	1,08	630
			1	221	4E-8			1327	6389	400	360			0	27,4
	30	5001 / 330 5002 / 333	1	191	0,00569			2281	7166	200	800	2		0	27,4
			1	193	0,004476			1318	6500	225	1500	2		0	27,4
			1	201	2E-9			1621	5584			5	0,05	0	27,4
			1	202	2.9E-10			1621	5576			5	0,05	0	27,4
			1	203	2.2E-9			1621	5566			5	0,05	0	27,4
			1	204	9.5E-10			1621	5560			5	0,05	0	27,4
			1	205	3.9E-7			1621	5582			4	0,5	0	27,4
			1	206	4.4E-6			1621	5578			4	0,5	0	27,4
			1	207	3.9E-7			1621	5562			4	0,5	0	27,4
			1	208	6.2E-5			1621	5564			4	0,5	0	27,4
			1	209	6.2E-5			1620	5584			1,5	0,1	0	27,4
			1	210	1.2E-10			1622	5584			1,5	0,1	0	27,4
			1	211	6.2E-5			1620	5559			1,5	0,1	0	27,4
			1	212	6.2E-5			1622	5559			1,5	0,1	0	27,4
			1	213	0.0625			636	3832			7	0,15	1,08	630
			1	214	2.8E-11			636	3828			7	0,05	0	27,4
												4	0,5		

			1	215	3.9E-7			636	3823					0	27,4
			1	216	0.0625			630	6977			7	0,15	1,08	630
			1	217	2.8E-11			630	6969			7	0,05	0	27,4
			1	218	3.9E-7			630	6960			4	0,5	0	27,7
			1	220	0.002021			1233	4932			8	0,5	0,295	27,4
			1	221	0.00356			1327	6389	400	360			0	27,4
	31	4001 / 301 5001 / 330	1	190	0.018903			2501	6118	560	4600	2		0	27,4
			1	191	0,0453			2281	7166	200	800	2		0	27,4
			1	192	0,017131			1912	5506	225	620	2		0	27,4
			1	193	0,035556			1318	6500	225	1500	2		0	27,4
			1	200	0.04333			1092	5402	650	4000	2		0	27,4
			1	213	0,2625			636	3832			7	0,15	1,08	630
			1	216	0,2625			630	6977			7	0,15	1,08	630
			1	219	0.018903			1267	4096	170	100	2		0	27,4
			1	220	0,016041			1233	4932			8	0,5	0,295	27,4
			1	221	0,02891			1327	6389	400	360			0	27,4
	37	4001 / 301 4003 / 303 4002 / 304 5001 / 330	1	190	0.018903			2501	6118	560	4600	2		0	27,4
			1	191	0,0454701			2281	7166	200	800	2		0	27,4
			1	192	0,0172063 3			1912	5506	225	620	2		0	27,4
			1	193	0,0356950 12			1318	6500	225	1500	2		0	27,4
			1	200	0.04333			1092	5402	650	4000	2		0	27,4
			1	213	0,2625			636	3832			7	0,15	1,08	630
			1	216	0,2625			630	6977			7	0,15	1,08	630
			1	219	0.018903			1267	4096	170	100	2		0	27,4

			1	220	0,016097			1233	4932			8	0,5	0,295	27,4
			1	221	0,02902004			1327	6389	400	360			0	27,4
	39	5002 / 333 11049 / 1325	1	201	2E-9			1621	5584			5	0,05	0	27,4
			1	202	2.9E-10			1621	5576			5	0,05	0	27,4
			1	203	2.2E-9			1621	5566			5	0,05	0	27,4
			1	204	9.5E-10			1621	5560			5	0,05	0	27,4
			1	205	3.9E-7			1621	5582			4	0,5	0	27,4
			1	206	4.4E-6			1621	5578			4	0,5	0	27,4
			1	207	3.9E-7			1621	5562			4	0,5	0	27,4
			1	208	6.2E-5			1621	5564			4	0,5	0	27,4
			1	209	6.2E-5			1620	5584			1,5	0,1	0	27,4
			1	210	1.2E-10			1622	5584			1,5	0,1	0	27,4
			1	211	6.2E-5			1620	5559			1,5	0,1	0	27,4
			1	212	6.2E-5			1622	5559			1,5	0,1	0	27,4
			1	213	0.001786			636	3832			7	0,15	1,08	630
			1	214	2.8E-11			636	3828			7	0,05	0	27,4
			1	215	3.9E-7			636	3823			4	0,5	0	27,4
			1	216	0.0018			630	6977			7	0,15	1,08	630
			1	217	2.8E-11			630	6969			7	0,05	0	27,4
			1	218	3.9E-7			630	6960			4	0,5	0	27,7

Production suites and summation groups for calculation

City code	Production site code	Production site name	Summation group code	Codes of substances included in the summation group	Emission rate (g/sec)
1	1	Production site	3	4003 / 303 5002 / 333	0,000254197616
			4	4003 / 303 5002 / 333 11049 / 1325	0,003840197616
			5	4003 / 303 11049 / 1325	0,003586232
			30	5001 / 330 5002 / 333	0,141000965616
			31	4001 / 301 5001 / 330	0,749074
			37	4001 / 301 4003 / 303 4002 / 304 5001 / 330	0,749624482
			39	5002 / 333 11049 / 1325	0,003839965616

CALCULATION OF CONCENTRATION AT THE BORDER OF RESIDENTIAL AREA:

Concentration at the set points

3000 / 2902 Substances in the form of suspended solid particles (microparticles and fibres)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0,000701	0,001402	300,00	1,10	213	26,12	191	21,92	193	16,05	221	13,61	192	13,35
4540	3970	0,000506	0,001012	220,00	1,10	193	28,30	221	25,02	191	20,47	192	16,70	216	4,80
-2580	4538	0,000460	0,000921	330,00	1,10	191	31,11	193	28,45	221	24,51	216	6,68	192	5,59
4333	6544	0,000620	0,001240	190,00	1,10	191	51.61	193	22.14	221	16.47	216	6.49	190	2.26
256	8930	0.000648	0.001297	70.00	1.10	193	34.57	221	29.07	216	14.10	192	12.74	191	2.44
2883	9352	0.000792	0.001584	110.00	1.10	191	45.04	193	18.70	221	16.48	192	10.06	190	3.76
733	9820	0.000568	0.001137	80.00	1.10	193	34.23	221	26.63	192	12.56	191	11.29	216	7.49

List of maximum concentrations

11000 / 10312 Non-methane volatile organic compounds (NMVOC)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-3475	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-3225	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2975	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2725	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2475	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2225	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-1975	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-1725	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-1475	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-1225	0	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

11000 / 2754 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	3.38E-012	3.38E-012	40.00	0.50	190	100.00	200	0.00	219	0.00	221	0.00	220	0.00
4540	3970	2.04E-010	2.04E-010	310.00	0.50	190	99.91	191	0.09	193	0.00	200	0.00	221	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	7.72E-008	7.72E-008	280.00	0.50	190	100.00	191	0.00	193	0.00	200	0.00	221	0.00
256	8930	0.000001	0.000001	330.00	0.50	190	99.99	191	0.01	193	0.00	221	0.00	220	0.00
2883	9352	2.51E-021	2.51E-021	10.00	0.50	190	100.00	221	0.00	220	0.00	219	0.00	218	0.00
733	9820	2.54E-009	2.54E-009	340.00	0.50	190	100.00	191	0.00	221	0.00	220	0.00	219	0.00

Concentration at the set points

13101 / 703 Benzo[a]pyrene

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000002	0.019496	290.00	0.78	221	32.00	193	31.44	191	29.55	220	4.58	192	2.29
4540	3970	0.000002	0.018160	220.00	0.78	221	33.99	193	31.98	191	29.21	192	3.71	220	1.09
-2580	4538	0.000002	0.017310	330.00	0.78	191	34.46	221	32.18	193	30.87	192	1.49	220	0.96
4333	6544	0.000003	0.026663	190.00	0.26	191	50.48	221	24.01	193	23.60	192	1.29	220	0.61
256	8930	0.000003	0.025196	60.00	0.26	191	33.23	193	32.72	221	30.30	192	2.15	220	1.57
2883	9352	0.000003	0.029229	110.00	0.78	191	51.24	221	22.87	193	21.91	192	2.04	220	1.93
733	9820	0.000002	0.021614	70.00	0.78	191	40.11	193	28.99	221	26.82	192	2.49	220	1.57

Concentration at the set points

12000 / 410 Methane

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000023	4.53E-007	300.00	0.75	191	31.50	193	22.34	221	20.79	192	19.74	220	5.62
4540	3970	0.000022	4.46E-007	220.00	0.75	191	26.97	193	26.69	221	25.58	192	19.67	220	1.10
-2580	4538	0.000020	3.94E-007	340.00	0.75	191	29.30	193	26.48	221	25.79	192	15.68	220	2.76
4333	6544	0.000031	0.000001	180.00	0.25	191	42.51	193	22.60	221	21.37	192	12.26	220	1.26
256	8930	0.000029	0.000001	60.00	0.25	191	32.64	193	29.22	221	24.43	192	12.11	220	1.60
2883	9352	0.000034	0.000001	110.00	0.75	191	49.06	193	19.40	221	18.23	192	11.35	220	1.96
733	9820	0.000025	0.000001	70.00	0.75	191	38.21	193	25.32	221	21.18	192	13.69	220	1.60

Concentration at the set points

6000 / 337 Carbon oxide

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.016000	0.003200	300.00	1.60	200	29.19	213	21.63	219	16.97	190	8.16	191	8.15
4540	3970	0.008161	0.001632	210.00	0.50	200	30.97	190	19.08	193	11.23	192	9.98	221	9.34
-2580	4538	0.007859	0.001572	350.00	0.50	200	34.09	219	17.21	190	13.97	193	8.17	191	7.52
4333	6544	0.008990	0.001798	170.00	0.50	200	30.74	190	16.31	193	12.81	221	11.50	191	10.04
256	8930	0.012338	0.002468	70.00	1.60	200	36.58	193	14.62	221	12.20	219	11.89	216	11.12
2883	9352	0.013301	0.002660	110.00	1.60	200	24.19	191	22.55	190	16.35	219	13.04	193	8.25
733	9820	0.010923	0.002185	80.00	1.60	200	37.75	193	14.99	219	14.23	221	11.18	190	6.42

Concentration at the set points

5002 / 333 Hydrogen sulphide (H2S)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

5001 / 330 Sulphur dioxide

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.001362	0.002723	300.00	6.19	213	92.36	191	4.28	220	1.20	193	1.16	221	0.99
4540	3970	0.000293	0.000586	220.00	2.06	216	40.79	193	25.44	221	22.88	191	10.82	220	0.07
-2580	4538	0.000325	0.000650	330.00	2.06	216	37.45	191	24.13	193	20.65	221	17.73	220	0.05
4333	6544	0.000441	0.000883	190.00	0.50	191	37.69	216	29.70	193	17.95	221	14.30	213	0.20
256	8930	0.000797	0.001595	80.00	6.19	216	85.06	213	11.75	193	1.33	221	1.04	220	0.81
2883	9352	0.000487	0.000974	120.00	0.50	216	27.54	191	26.90	193	19.02	221	14.55	213	10.59
733	9820	0.000504	0.001008	90.00	6.19	216	68.17	213	24.53	193	3.47	221	3.11	220	0.72

Concentration at the set points

3004 / 328 Soot

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000687	0.004577	300.00	1.10	213	26.67	191	22.39	193	16.39	221	13.90	192	13.63
4540	3970	0.000491	0.003273	220.00	1.10	193	29.18	221	25.80	191	21.11	192	17.21	216	4.95
-2580	4538	0.000451	0.003008	330.00	1.10	191	31.75	193	29.03	221	25.02	216	6.81	192	5.70
4333	6544	0.000607	0.004049	190.00	1.10	191	52.68	193	22.60	221	16.82	216	6.62	200	0.63
256	8930	0.000640	0.004264	70.00	1.10	193	35.05	221	29.47	216	14.29	192	12.92	191	2.47
2883	9352	0.000765	0.005103	110.00	1.10	191	46.61	193	19.35	221	17.06	192	10.41	213	2.25
733	9820	0.000559	0.003729	80.00	1.10	193	34.78	221	27.05	192	12.76	191	11.47	216	7.61

Concentration at the set points

4002 / 304 Nitrogen (1) oxide (N2O)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000009	0.000022	290.00	0.75	193	31.24	191	27.05	221	25.16	192	12.54	220	4.00
4540	3970	0.000009	0.000022	220.00	0.75	193	29.82	191	25.39	221	25.04	192	18.82	220	0.93
-2580	4538	0.000008	0.000020	340.00	0.75	193	29.67	191	27.65	221	25.31	192	15.04	220	2.34
4333	6544	0.000012	0.000031	180.00	0.25	191	40.42	193	25.51	221	21.13	192	11.85	220	1.08
256	8930	0.000012	0.000030	60.00	0.25	193	32.57	191	30.66	221	23.86	192	11.56	220	1.35
2883	9352	0.000013	0.000034	110.00	0.75	191	47.02	193	22.07	221	18.17	192	11.06	220	1.68
733	9820	0.000010	0.000025	70.00	0.75	191	36.17	193	28.45	221	20.85	192	13.17	220	1.36

Concentration at the set points

4003 / 303 Ammonia

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	3.49E-009	1.74E-008	300.00	0.50	192	42.33	191	36.33	221	16.51	193	4.83	0	0.00
4540	3970	3.64E-009	1.82E-008	220.00	0.50	192	42.35	191	34.54	221	17.96	193	5.15	0	0.00
-2580	4538	2.89E-009	1.44E-008	340.00	0.50	191	37.28	192	36.47	221	20.44	193	5.81	0	0.00
4333	6544	4.19E-009	2.10E-008	180.00	0.50	191	50.87	192	22.11	221	21.17	193	5.84	0	0.00
256	8930	4.15E-009	2.07E-008	50.00	0.50	191	53.52	192	25.54	221	15.52	193	5.42	0	0.00
2883	9352	5.25E-009	2.63E-008	110.00	0.50	191	57.25	192	24.50	221	14.08	193	4.17	0	0.00
733	9820	3.91E-009	1.96E-008	70.00	0.50	191	48.09	192	29.44	221	17.01	193	5.46	0	0.00

Concentration at the set points

4001 / 301 Nitrogen oxides (in terms of nitrogen dioxide (NO + NO2))

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.006823	0.034116	300.00	1.89	213	53.76	200	12.31	191	8.82	219	5.47	192	5.27
4540	3970	0.002721	0.013604	210.00	0.50	200	18.49	193	16.65	221	14.41	192	13.85	191	9.71
-2580	4538	0.002643	0.013214	340.00	0.50	200	19.06	193	16.42	191	16.12	221	14.14	216	9.39
4333	6544	0.003413	0.017066	180.00	0.50	191	24.74	193	18.57	221	16.48	200	13.82	216	11.77
256	8930	0.004472	0.022358	70.00	0.50	216	24.44	200	18.61	193	17.30	221	13.80	192	6.41
2883	9352	0.004243	0.021216	110.00	0.50	191	28.06	200	14.63	193	13.38	221	11.04	190	9.88
733	9820	0.003660	0.018301	80.00	0.50	200	18.56	193	17.17	216	15.66	221	13.32	191	12.71

Concentration at the set points

Summation group No. 39

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

Summation group No. 37

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.036255	300.00	1.93	213	14.78	200	3.03	191	2.31	193	1.35	219	1.33
4540	3970	0.00E+000	0.014153	220.00	0.50	191	4.81	193	4.69	221	3.99	200	3.64	192	3.01
-2580	4538	0.00E+000	0.013813	340.00	0.50	200	4.71	193	4.30	191	4.22	221	3.70	216	2.61
4333	6544	0.00E+000	0.017950	180.00	0.50	191	6.47	193	4.86	221	4.30	200	3.41	216	3.27
256	8930	0.00E+000	0.023655	70.00	0.50	216	6.77	200	4.58	193	4.52	221	3.60	192	1.58
2883	9352	0.00E+000	0.022161	110.00	0.50	191	7.35	200	3.62	193	3.51	221	2.89	190	2.44
733	9820	0.00E+000	0.019241	80.00	0.50	200	4.58	193	4.49	216	4.35	221	3.48	191	3.32

Concentration at the set points

Summation group No. 31

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.036222	300.00	1.93	213	29.01	200	5.94	191	4.53	193	2.64	219	2.62
4540	3970	0.00E+000	0.014133	220.00	0.50	191	9.50	193	9.26	221	7.90	200	7.20	192	5.96
-2580	4538	0.00E+000	0.013796	340.00	0.50	200	9.32	193	8.50	191	8.34	221	7.31	216	5.17
4333	6544	0.00E+000	0.017925	180.00	0.50	191	12.76	193	9.58	221	8.49	200	6.74	216	6.46
256	8930	0.00E+000	0.023633	70.00	0.50	216	13.37	200	9.05	193	8.89	221	7.09	192	3.12
2883	9352	0.00E+000	0.022133	110.00	0.50	191	14.52	200	7.16	193	6.93	221	5.71	190	4.84
733	9820	0.00E+000	0.019221	80.00	0.50	200	9.05	193	8.86	216	8.60	221	6.86	191	6.56

Concentration at the set points

Summation group No. 30

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.00E+000	1.83E-013	310.00	0.50	191	50.00	193	0.00	218	0.00	217	0.00	215	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.00E+000	1.82E-014	280.00	0.50	191	50.00	193	0.00	218	0.00	217	0.00	215	0.00
256	8930	0.00E+000	6.03E-011	330.00	0.50	191	50.00	193	0.00	218	0.00	217	0.00	215	0.00
2883	9352	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.00E+000	6.16E-015	340.00	0.50	191	50.00	218	0.00	217	0.00	215	0.00	214	0.00

Concentration at the set points

Summation group No. 5

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.001049	300.00	6.73	213	99.98	216	0.02	192	0.00	191	0.00	221	0.00
4540	3970	0.00E+000	0.000175	180.00	6.73	213	100.00	216	0.00	192	0.00	193	0.00	221	0.00
-2580	4538	0.00E+000	0.000221	10.00	6.73	213	100.00	192	0.00	216	0.00	193	0.00	221	0.00
4333	6544	0.00E+000	0.000170	190.00	6.73	216	99.99	191	0.00	193	0.00	221	0.00	213	0.00
256	8930	0.00E+000	0.000649	80.00	6.73	216	88.12	213	11.88	221	0.00	193	0.00	192	0.00
2883	9352	0.00E+000	0.000204	130.00	6.73	216	99.66	213	0.34	221	0.00	193	0.00	191	0.00
733	9820	0.00E+000	0.000389	90.00	6.73	216	73.92	213	26.08	221	0.00	193	0.00	192	0.00

Concentration at the set points

Summation group No. 4

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.00E+000	8.06E-018	310.00	0.50	191	33.33	193	0.00	216	0.00	213	0.00	218	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.00E+000	8.00E-019	280.00	0.50	191	33.33	193	0.00	216	0.00	213	0.00	218	0.00
256	8930	0.00E+000	2.65E-015	330.00	0.50	191	33.33	193	0.00	216	0.00	213	0.00	218	0.00
2883	9352	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.00E+000	2.71E-019	340.00	0.50	191	33.33	216	0.00	213	0.00	218	0.00	217	0.00

Concentration at the set points

Summation group No. 3

Calculation site 1

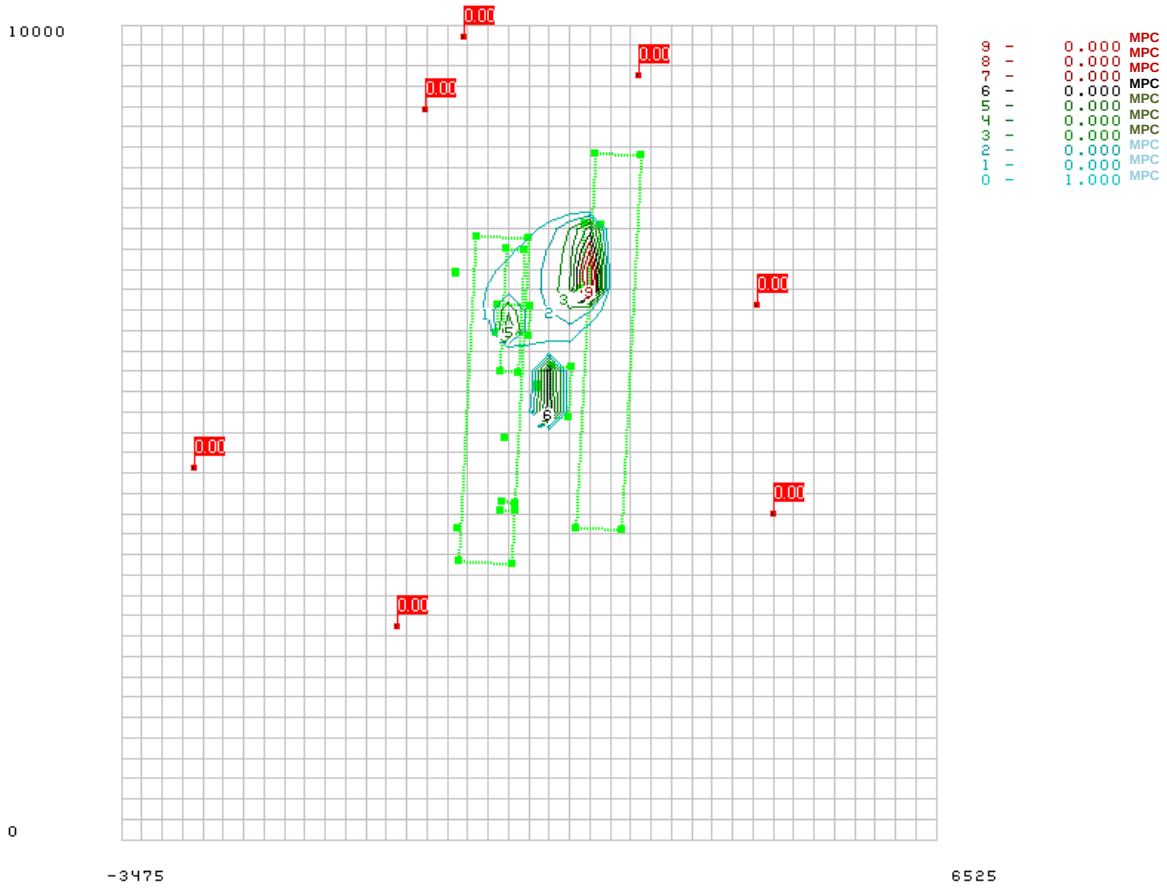
Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.00E+000	8.06E-018	310.00	0.50	191	50.00	193	0.00	218	0.00	217	0.00	215	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.00E+000	8.00E-019	280.00	0.50	191	50.00	193	0.00	218	0.00	217	0.00	215	0.00
256	8930	0.00E+000	2.65E-015	330.00	0.50	191	50.00	193	0.00	218	0.00	217	0.00	215	0.00
2883	9352	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.00E+000	2.71E-019	340.00	0.50	191	50.00	218	0.00	217	0.00	215	0.00	214	0.00

CONCENTRATION DISTRIBUTION MAPS

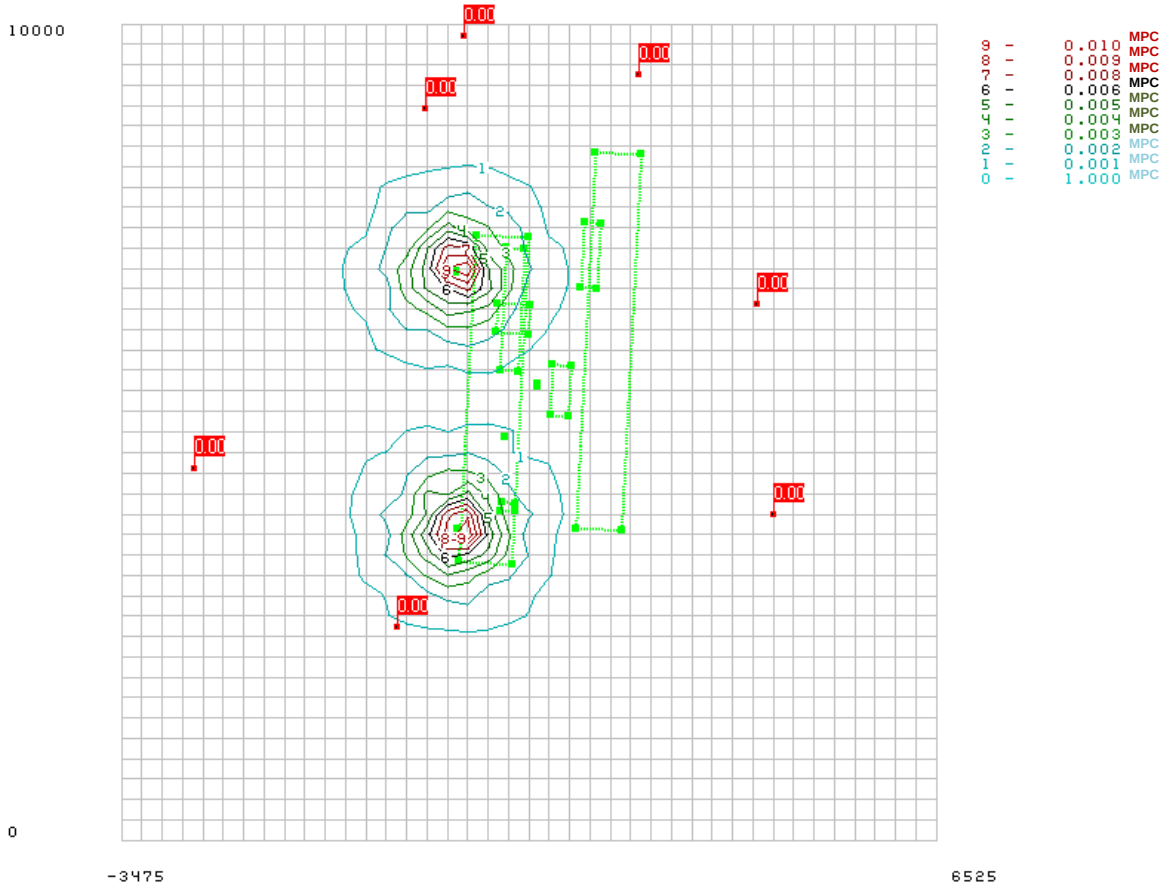
Summation group No. 3



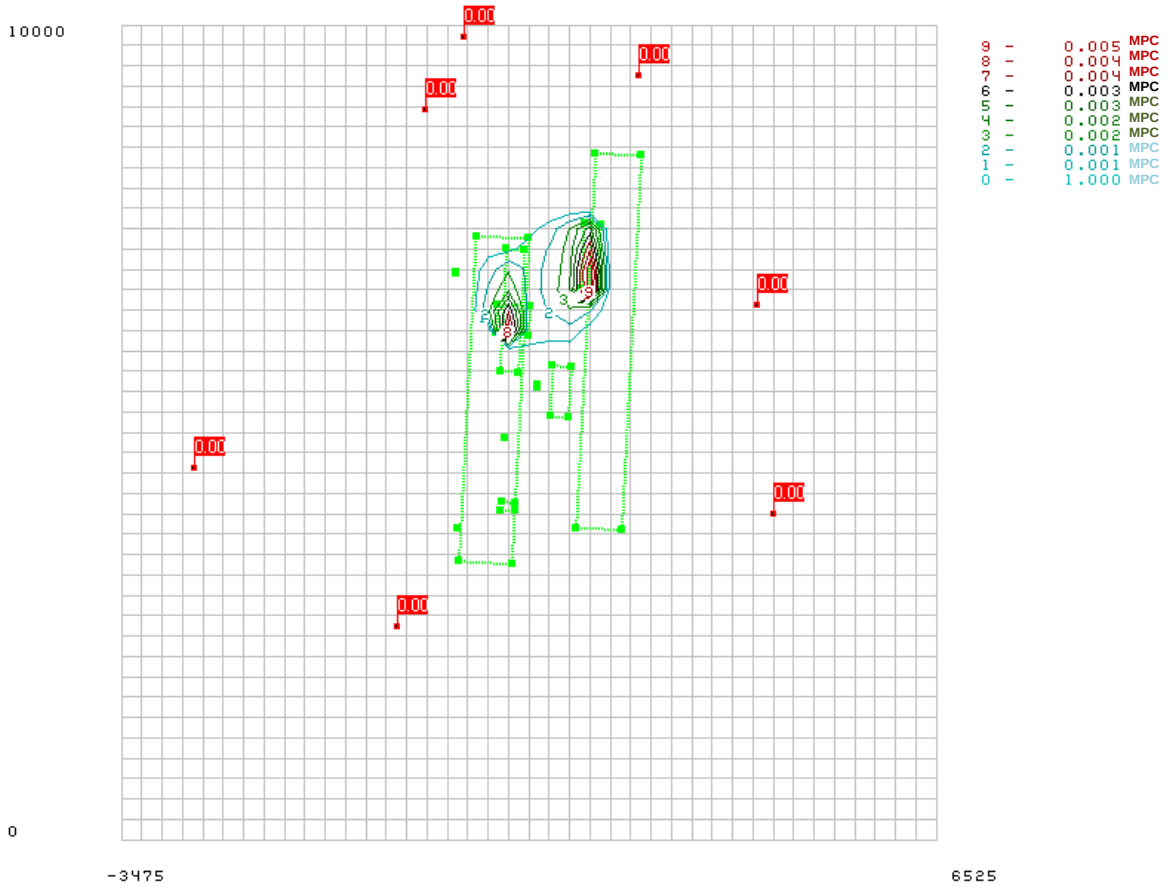
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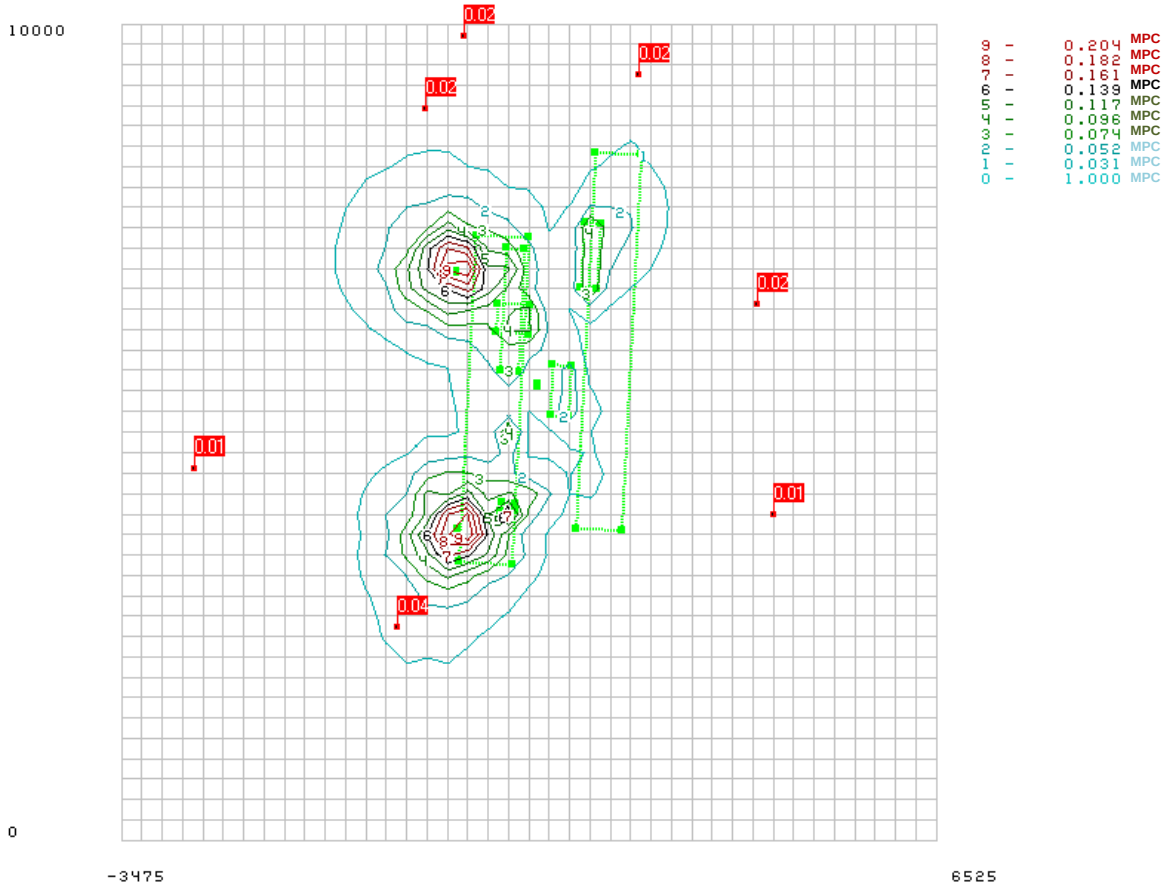
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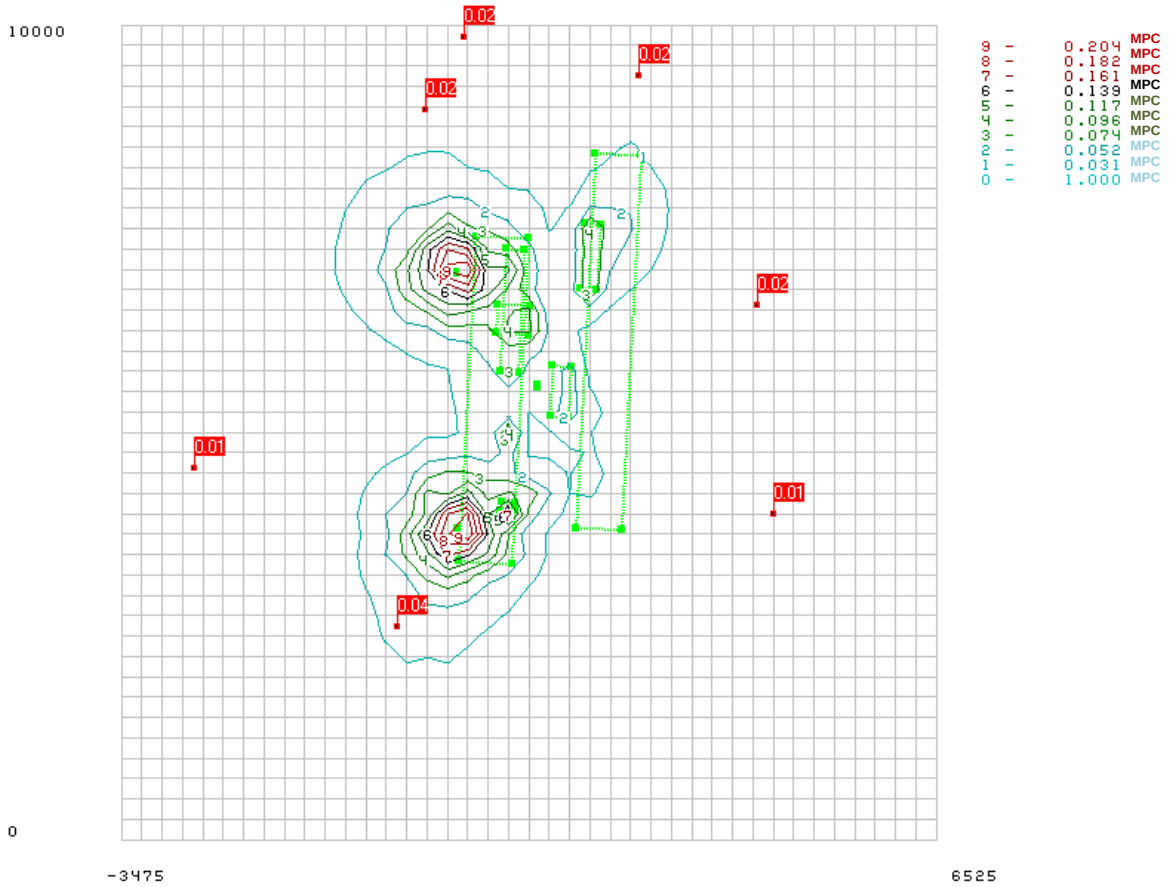
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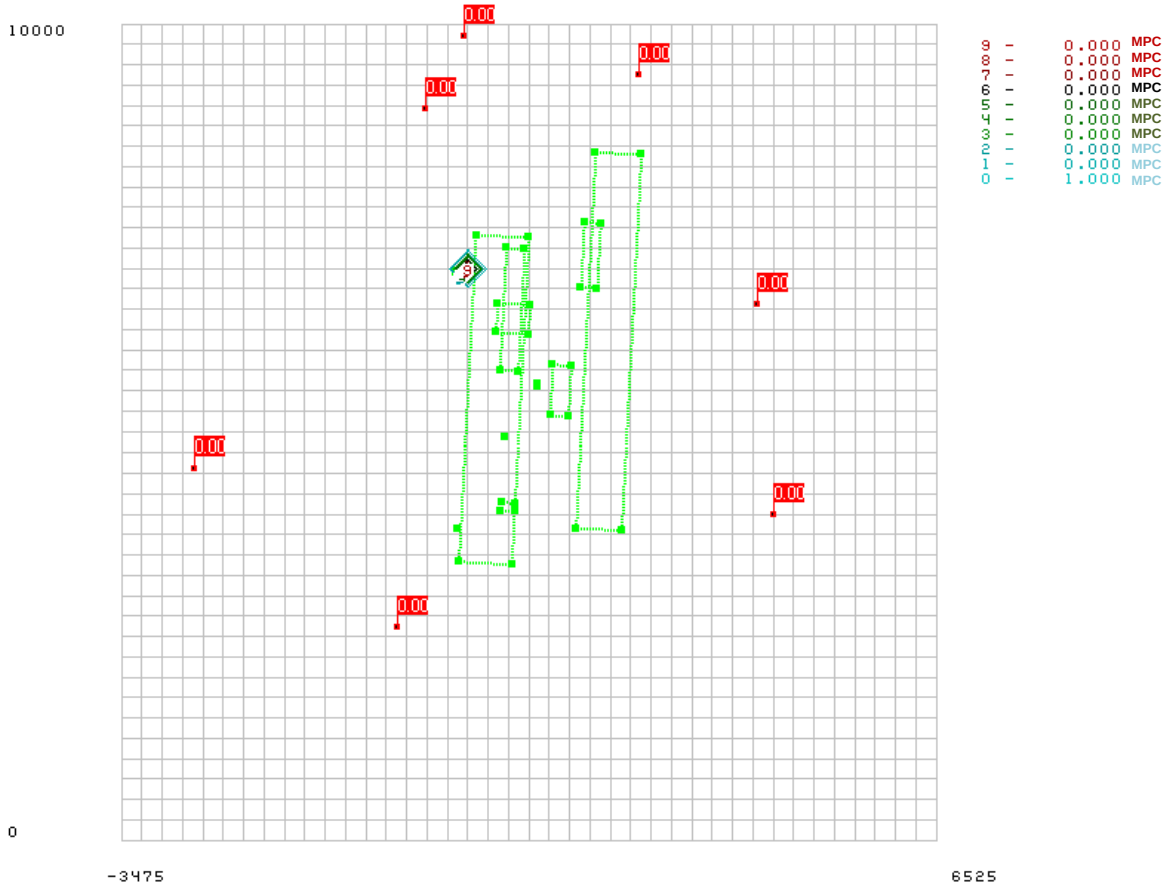
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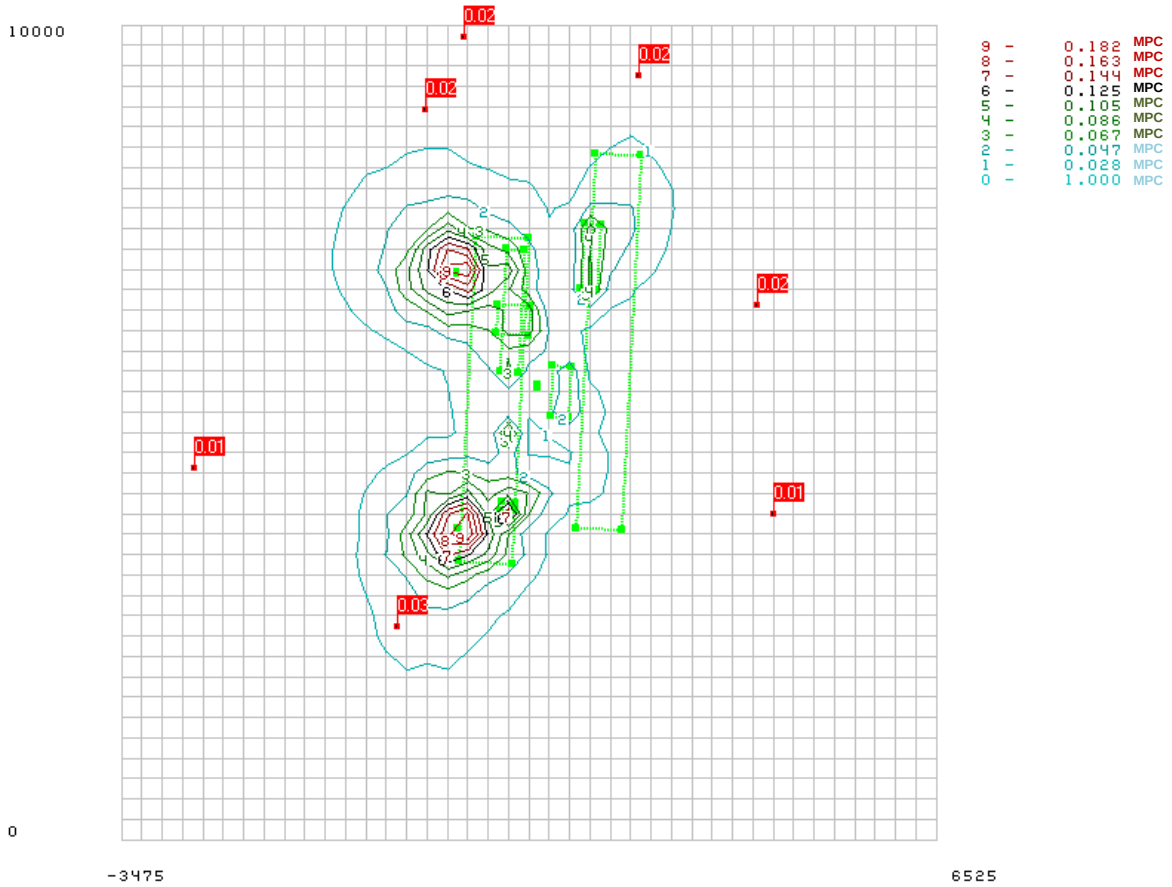
Summation group No. 37



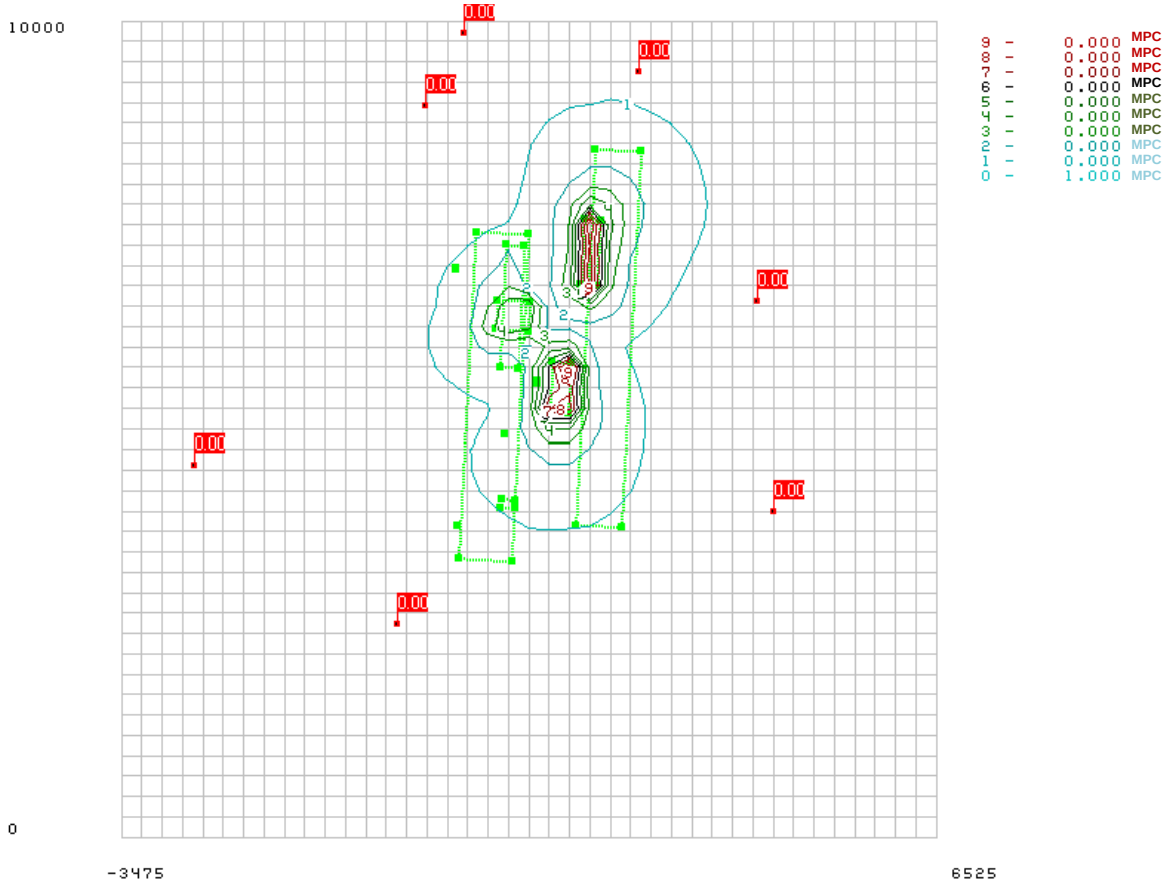
Summation group No. 39



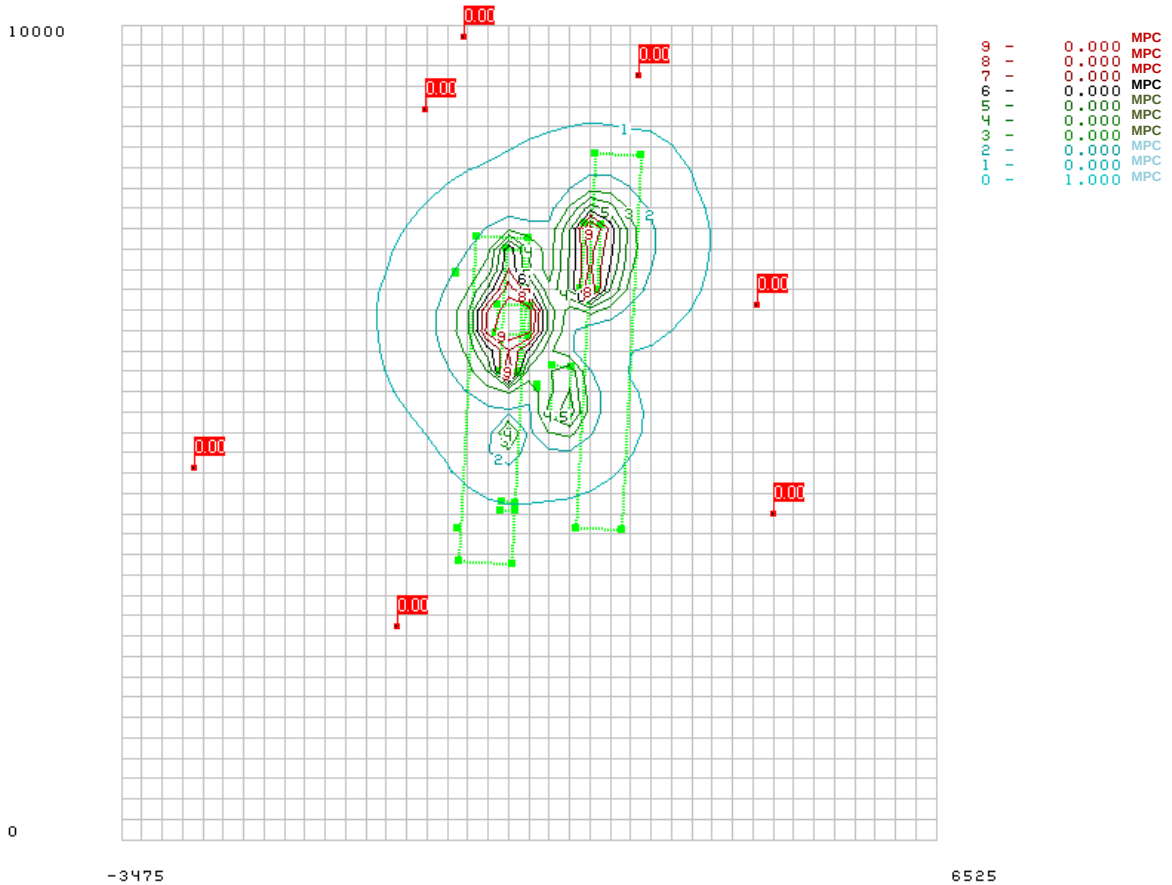
Substance 04001 / 301 Nitrogen oxides (in terms of nitrogen dioxide (NO + NO2))



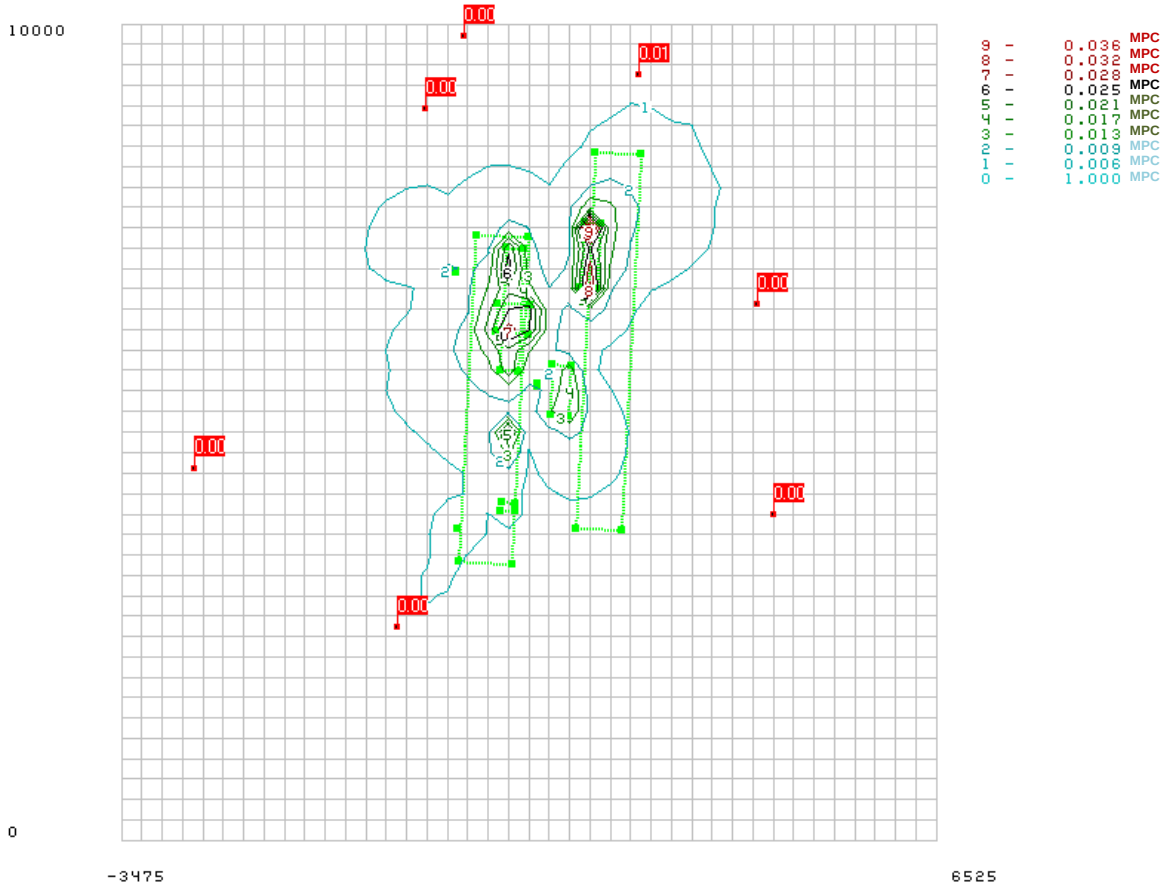
Substance 04003 / 303 Ammonia



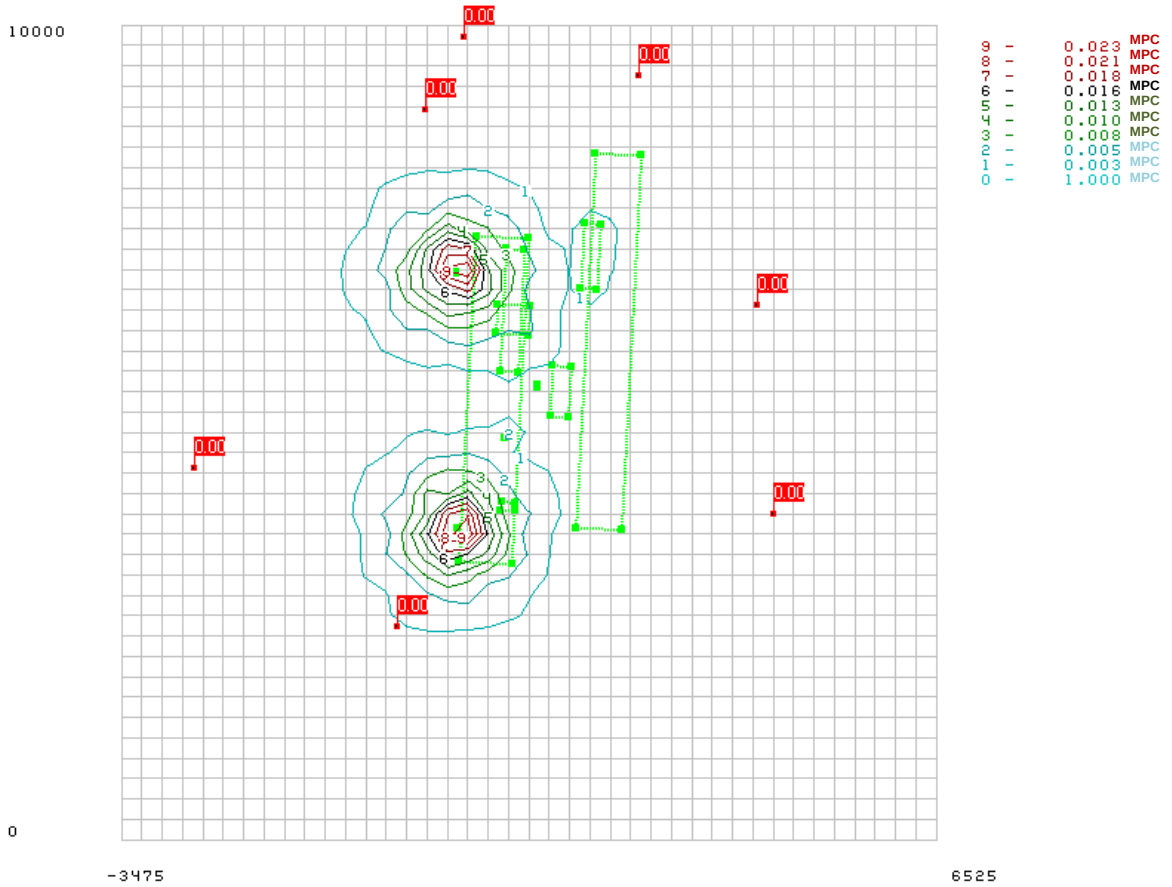
Substance 04002 / 304 Nitrogen(1) oxide (N2O)



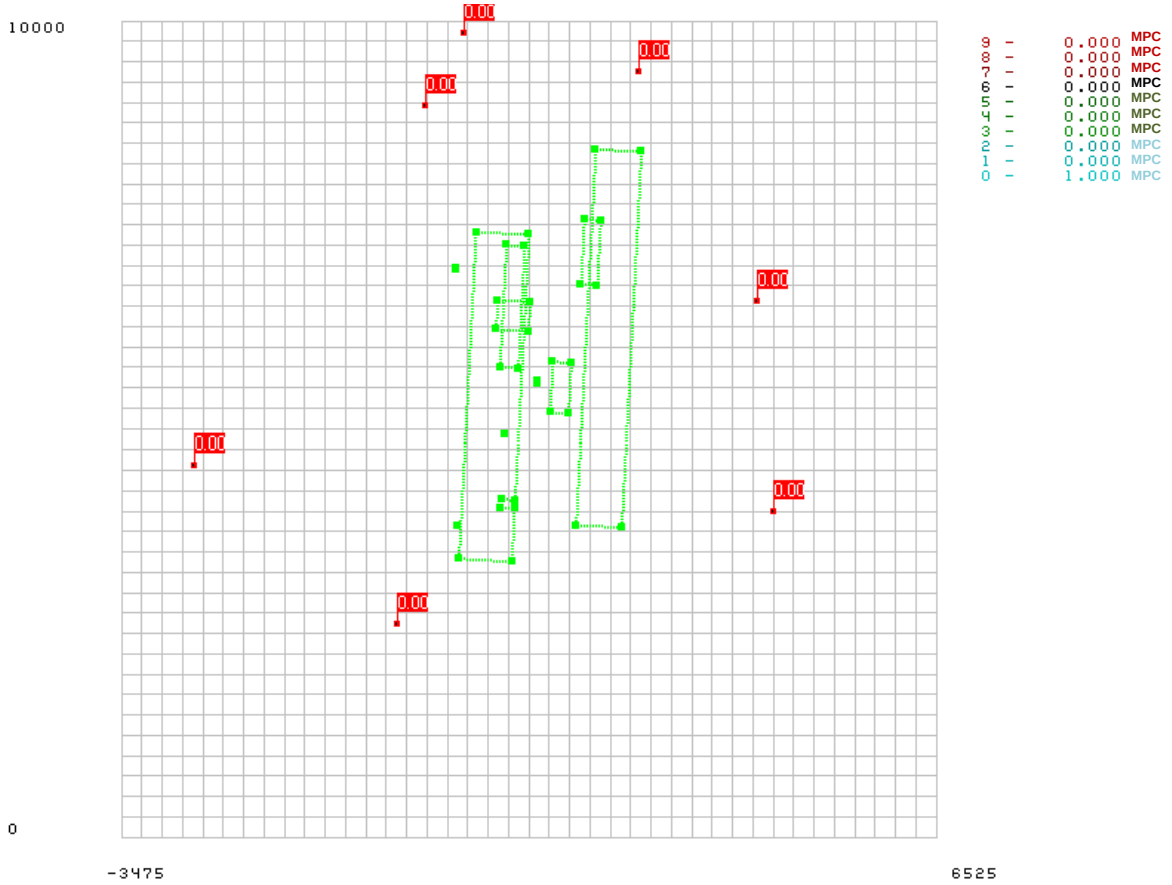
Substance 03004 / 328 Soot



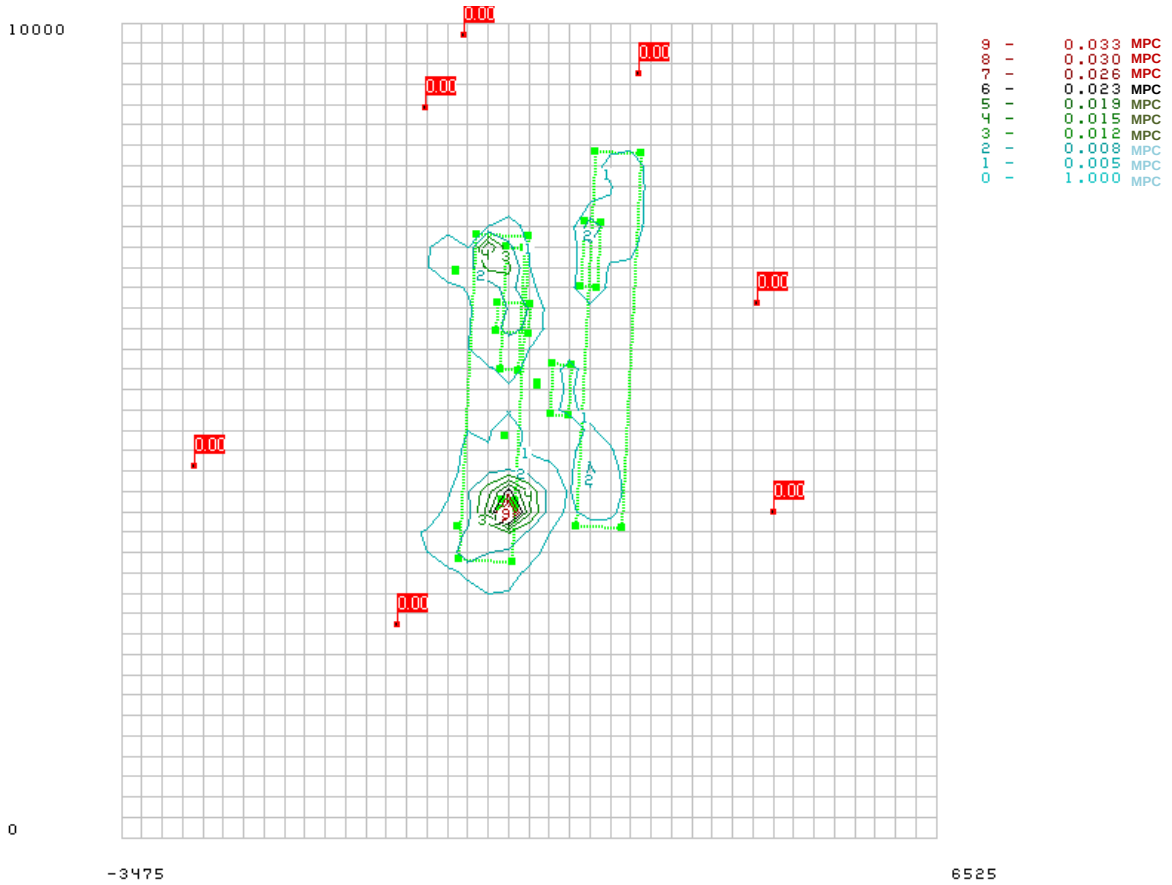
Substance 05001 / 330 Sulphur dioxide



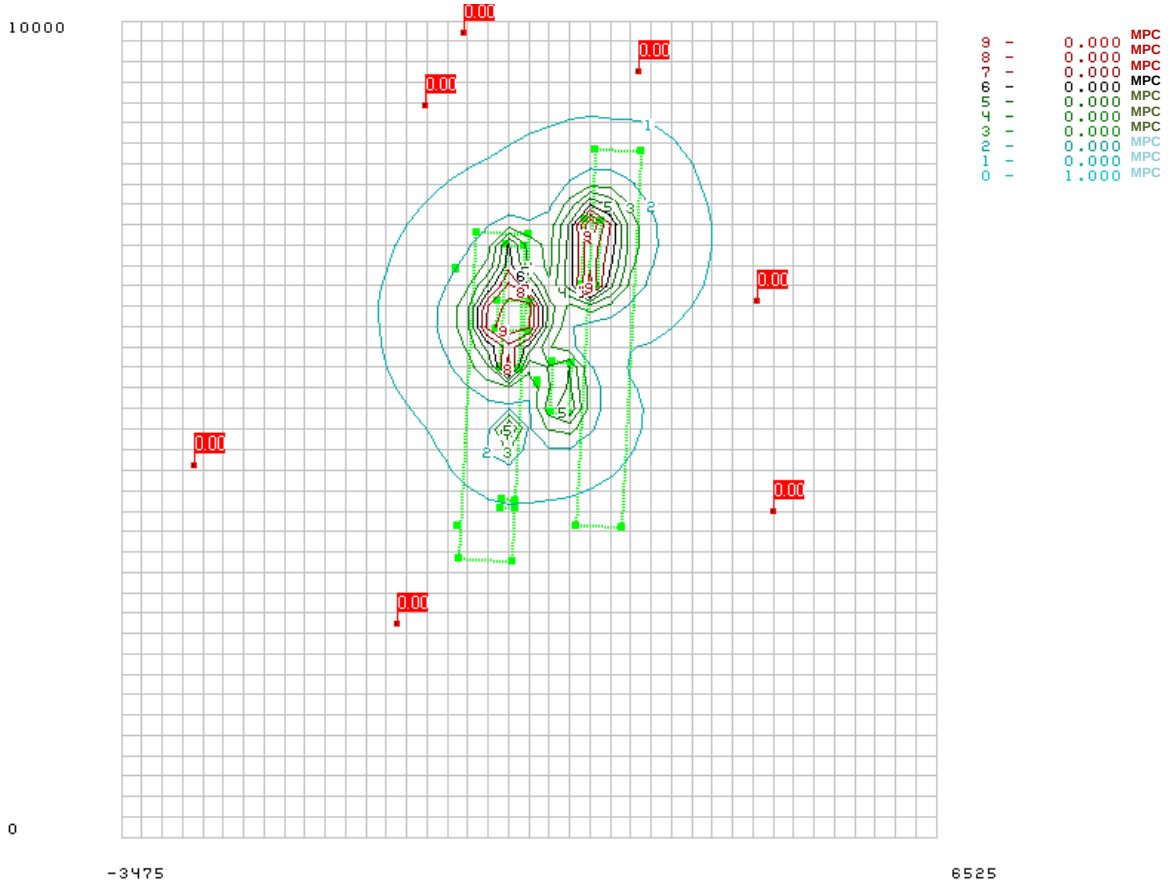
Substance 05002 / 333 Hydrogen sulphide (H2S)



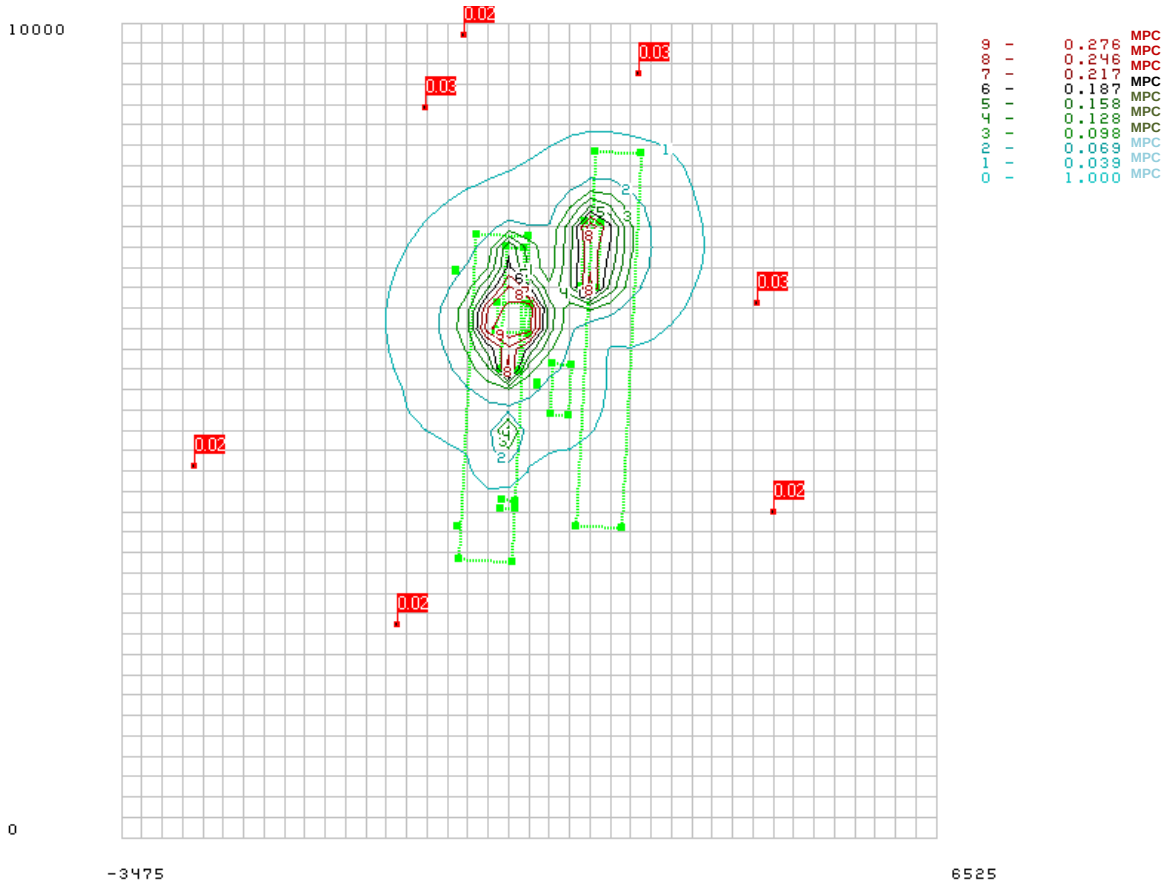
Substance 06000 / 337 Carbon oxide



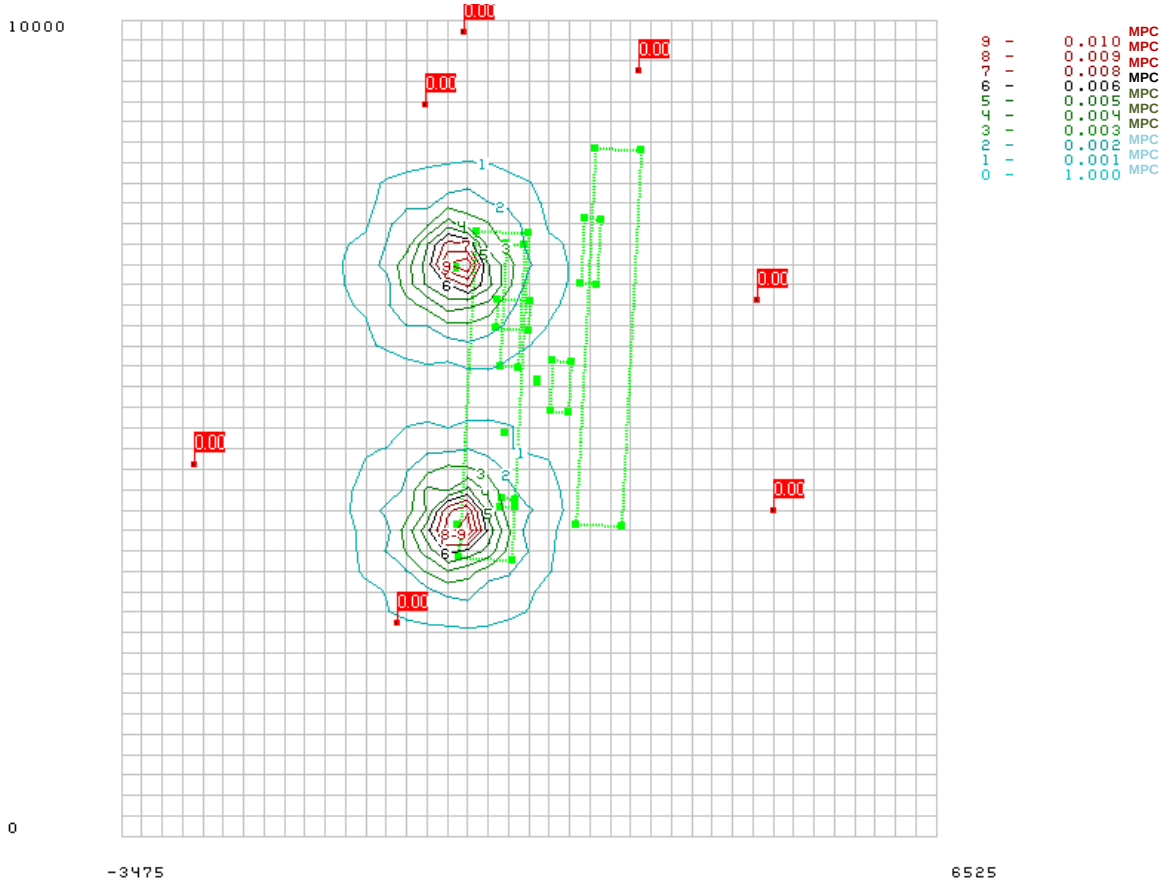
Substance 12000 / 410 Methane



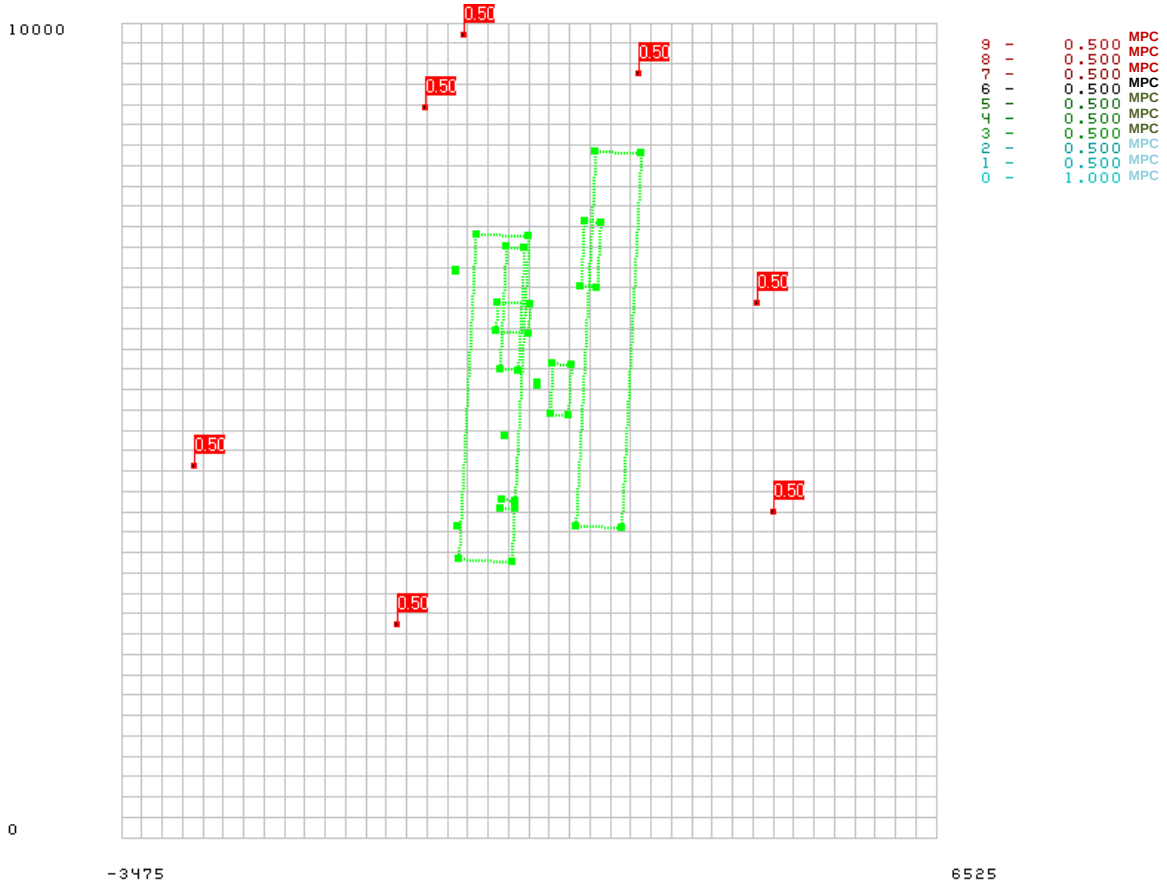
Substance 13101 / 703 Benzo[a]pyrene



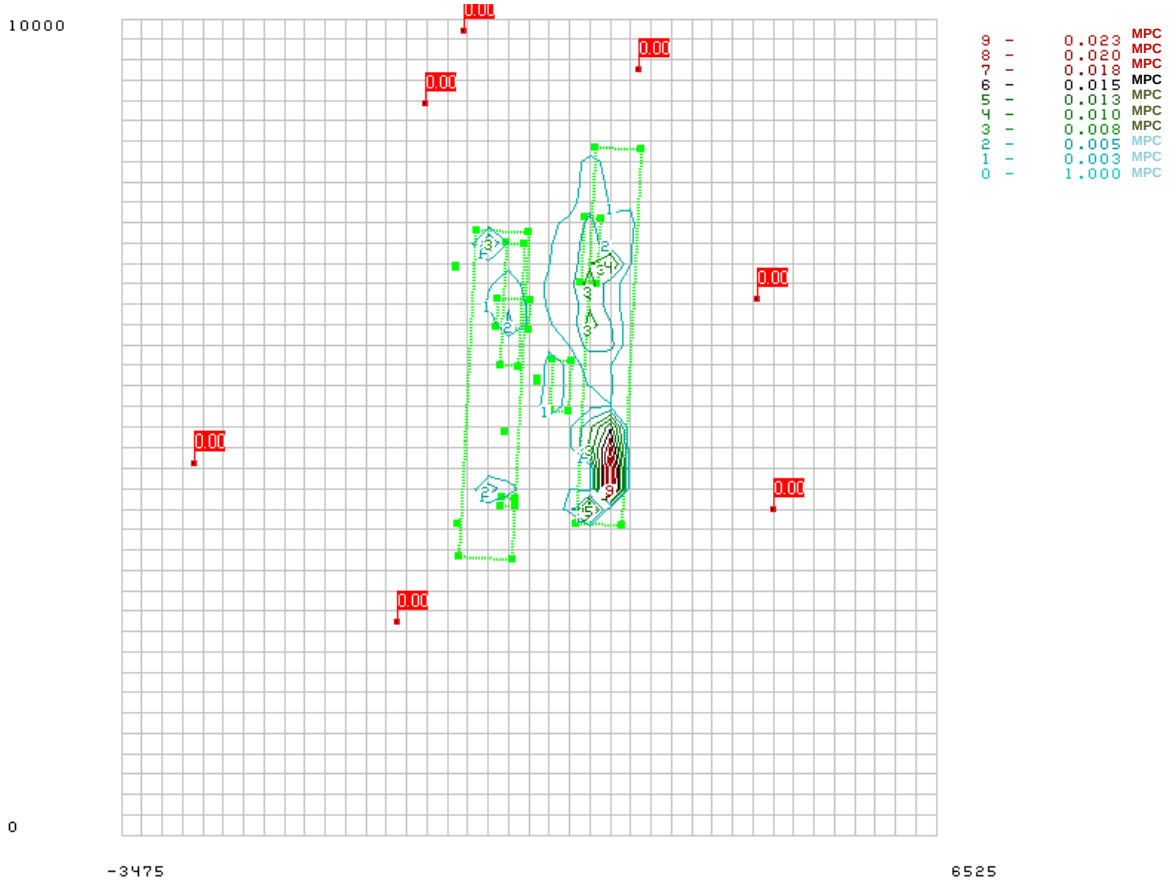
Substance 11049 / 1325 Formaldehyde



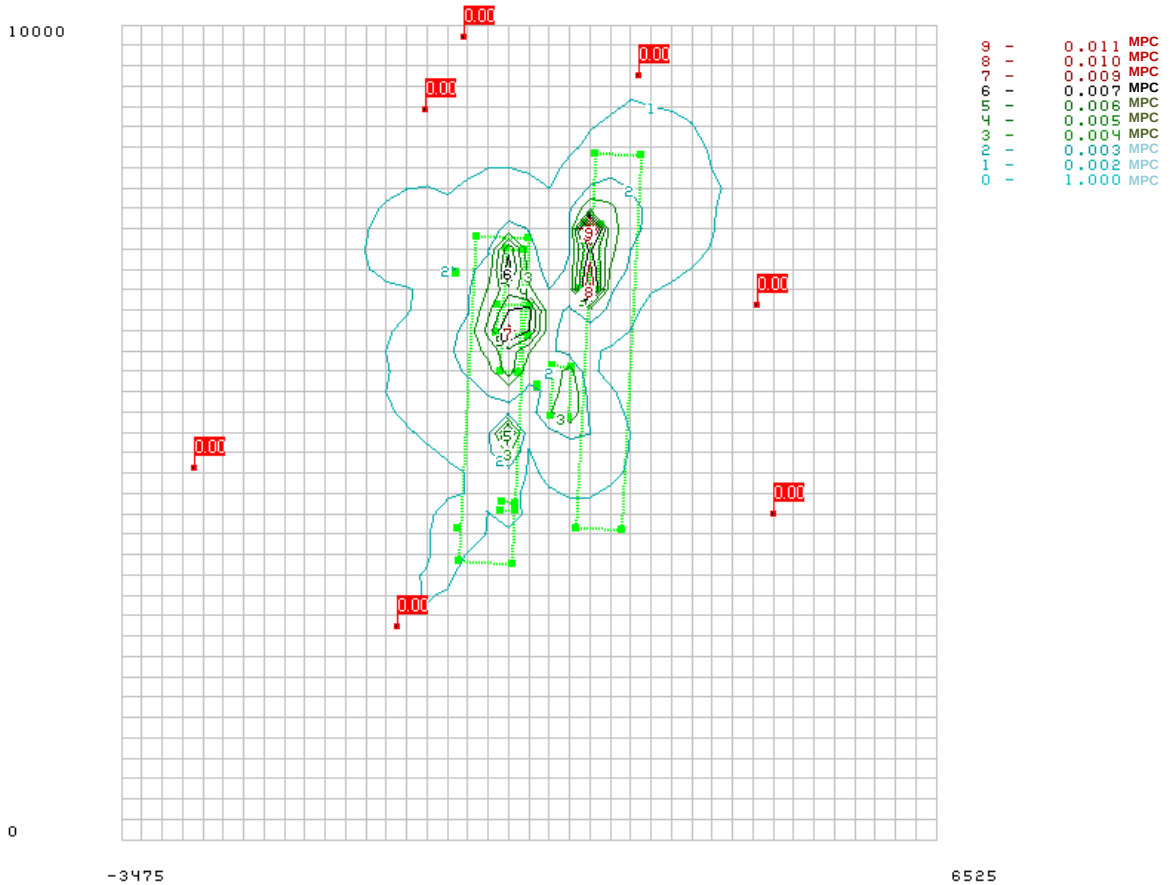
Substance 11000 / 2752 Non-methane volatile organic compounds (NMVOC)



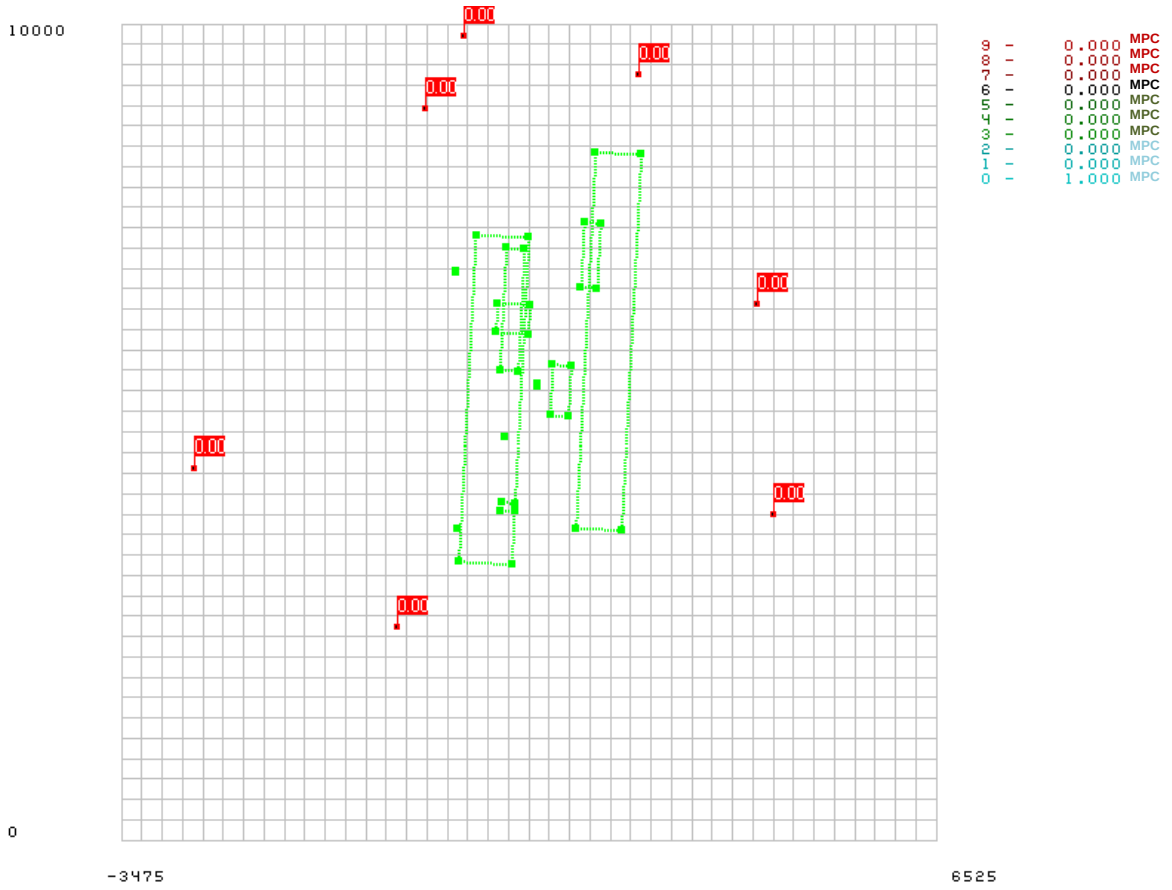
Substance 11000 / 2754 Non-methane volatile organic compounds (NMVOC)



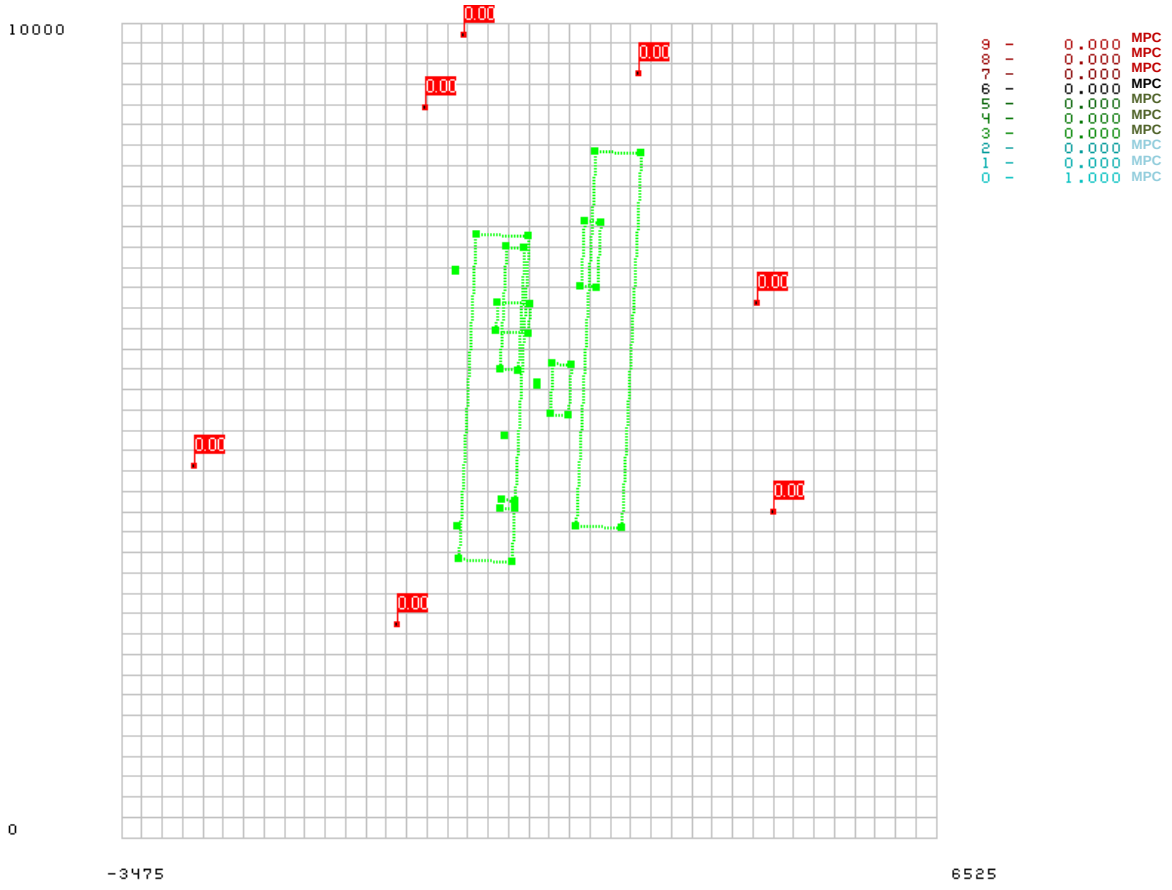
Substance 03000 / 2902 Substances in the form of suspended solid particles (microparticles and fibres)



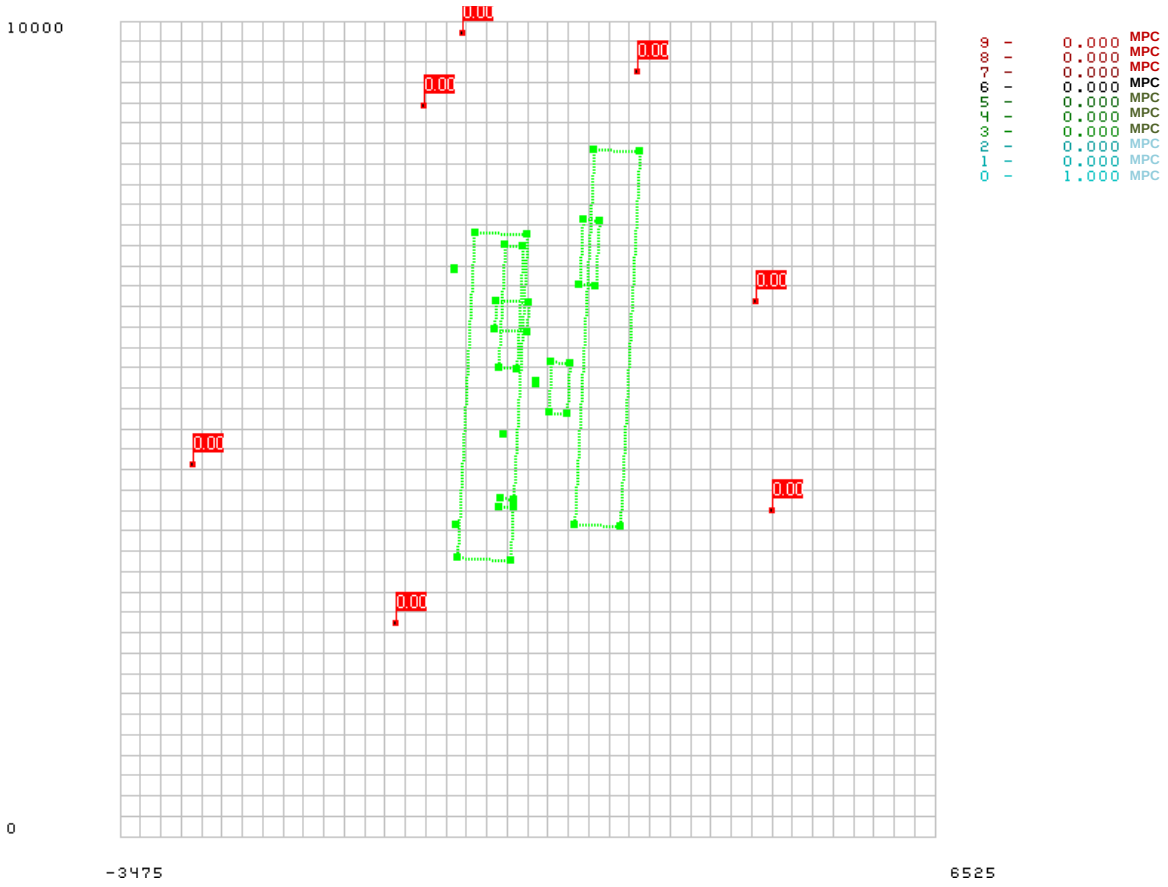
Substance 11000 / 10312 Non-methane volatile organic compounds (NMVOC)



Substance 07000 / 11812 Carbon dioxide



Substance 04002 / 11815 Nitrogen(1) oxide (N2O)



Annex 4

AUTOMATED SYSTEM FOR ATMOSPHERE
POLLUTION CALCULATION

EOL-PLIUS

(Version 5.23)

GENERAL REPORT ON CALCULATION RESULTS
DISPERSAL OF ATMOSPHERE POLLUTION FROM EMISSION SOURCES
SE «MA «BORYSPIL» (prospective state)

Kyiv HIIACC Derzhbud Ukrainy
+38 (044) 249-34-25

System calculation modules
“EOL-PLIUS”
realize OND-86 technique

Approved GGO of Voikov
unlimited validity period
ref. 26/861 of 3/27/92

Program recommended for use by Ministry of Environmental Protection and Nuclear Safety of Ukraine (ref. 11-5-68 of 5/7/98)

Ukraine, Kyiv, 2020

ToR for calculation

TABLE 1. List of production sites

Code of production site	Production site name
1	Production site

ToR for calculation TABLE 2. List of

substances.

Substance code	Substance name
- 150	Sodium hydroxide (lye, caustic soda)
- 10226	Titanium dioxide
01002 ------- 110	Vanadium and its compounds (in terms of vanadium pentoxide)
01003 123	Iron and its compounds (in terms of iron)
01009 184	Lead and its compounds (in terms of lead)
01010 ------- 203	Chromium and its compounds (in terms of chromium trioxide)
01104 143	Mangan and its compounds (in terms of mangan)
03000 ------- 323	Substances in the form of suspended solid particles (microparticles and fibres)
03000 ------- 2902	Substances in the form of suspended solid particles (microparticles and fibres)
03000 ------- 10368	Substances in the form of suspended solid particles (microparticles and fibres)
03000 ------- 10442	Substances in the form of suspended solid particles (microparticles and fibres)
03004 328	Soot
04001 ------- 301	Nitrogen oxides (in terms of nitrogen dioxide [NO + NO2])
04002 304	Nitrogen (1) oxide (N20)
04002 11815	Nitrogen (1) oxide (N20)
04003 303	Ammonia
05001 330	Sulphur dioxide
05002	Hydrogen sulphide (H2S)
05004 ------- 322	Sulfuric acid (H2S04) (sulphuric acid)
06000	Carbon oxide

337	
07000 —— 11812	Carbon dioxide
11000 —— 514	Non-methane volatile organic compounds (NMVOC):
11000 —— 1042	Non-methane volatile organic compounds (NMVOC):
11000 —— 1056	Non-methane volatile organic compounds (NMVOC):
11000 —— 1061	Non-methane volatile organic compounds (NMVOC):
11000 —— 1319	Non-methane volatile organic compounds (NMVOC):
11000 —— 2704	Non-methane volatile organic compounds (NMVOC):
11000 —— 2732	Non-methane volatile organic compounds (NMVOC):
11000 —— 2735	Non-methane volatile organic compounds (NMVOC):
11000 —— 2750	Non-methane volatile organic compounds (NMVOC):
11000 —— 2752	Non-methane volatile organic compounds (NMVOC):
11000 —— 2754	Non-methane volatile organic compounds (NMVOC):
11000 —— 10312	Non-methane volatile organic compounds (NMVOC):
11000 —— 10411	Non-methane volatile organic compounds (NMVOC):
11001 —— 2001	Acrylonitrile
11007 —— 1401	Acetone
11009 ------- 1210	Butyl acetate
11020 —— 1246	Ethylcellosolve
11021 —— 1240	Ethyl acetate
11030 —— 616	Xylene
11037	Styrene

——— 620	
11041 ——— 621	Toluene
11049 ——— 1325	Formaldehyde
12000 ——— 410	Methane
13101 ——— 703	Benzo[a]pyrene
16000 ------- 343	Fluor and its compounds (in terms of fluor)
16000 ------- 344	Fluor and its compounds (in terms of fluor)
16001 ——— 342	Hydrogen fluoride

ToR for calculation

TABLE 3. List of summation groups.

Group code	Substances comprising the summation groups (codes)										Coefficient potent.
	1	2	3	4	5	6	7	8	9	10	
3	04003 303	05002 333									1
4	04003 303	05002 333	11049 1325								1
5	04003 303	11049 1325									1
10	01002 110	01104 143									1
11	01002 110	05001 330									1
12	01002 110	01010 203									1
27	01009 184	05001 330									1
28	05004 322	05001 330									1
30	05001 330	05002 333									1
31	04001 301	05001 330									1
35	05001 330	16001 342									1
37	04001 301	04003 303	04002 304	05001 330							1
39	05002 333	11049 1325									1
11002	16001 342	16000 344									1

ToR for calculation

TABLE 4. Calculation sites parameters.

N No	Coord. of centre of symm.		Length, m	Width, m	Grid step		Angle of rotation of calc. site relative to OX axis of general coord. sys., deg.	Characteristic of the area
	X, m	Y, m			OX axis, m	OY axis, m		
1	1525	5000	10000	10000	250	250	0	1

TABLE 5. ToR for calculation

City name	Wind speed, m/sec					Wind speed, fractions (Umc)					Step of enumeration of dangerous wind direct.	Fix. direct. of wind	Qty, max. contrib.	Number, max. concent.	Characteristic of calc. background
	1	2	3	4	5	1	2	3	4	5					
1. Boryspil											10		5	10	1

Input data

TABLE 1. Description of meteorological conditions and geographic reference

City code	City name	Average air temperature		Maximum wind speed, m/sec	Regional coeff. of strat. atmosphere	Angle between northern direction and OX axis, deg.	City area, sq.km	Required conc. level at the point (fractions of MPC)
		the hottest month, deg. C	the coldest month, deg. C					
1	Boryspil	27,4	-6,8		180		37,01	1

TABLE 2. Description of production sites (geographical reference)

City code	Production site code	Production site name	Basic coordinate system reference		
			X orig.,m	Y orig.,m	Angle of rotation, deg.
1	1	Production site			

TABLE 3. Description of harmful substances emission sources

City code	Production site code	Source code	Source name	Angle of the model or an angle between OX axis and the length of a planar source	Terrain code	Coordinate of a point source, or a beginning of a line source, or a centre of symmetry of a planar source		Coordinate of an end of a line source, or length and width of a planar source, or a point source with a rect. neck		Source height, m	Diameter of a point source or a planar source of type 2, or PGVS(Wo) release rate for a linear, (for a planar source of type 1 - 0)	PGVS flow rate, (for a planar source of type 1 - 0)	PGVS temperature (deg. C)	Hazard class
						X1, m	Y1, m	X2, m	Y2, m					
1	1	1	Source 1 RCS, woodworking shop; woodworking machines – 6 units	444	1	1669	7423			10	0.63	1.9	15	
		3	Source 3 RCS, welding shop; welding station	444	1	1696	7395			8	0.25	0.557	17	
		4	Source 4 RCS, welding shop; welding station - 2 units	444	1	1704	7392			7.3	0.25	0.671	17	
		5	Source 5 RCS, welding shop; welding station - 3 units	444	1	1704	7389			7.4	0.2	0.218	17	
		6	Source 106 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	2303	8206			1	0.1	0	27.8	
		7	Source 7 RCS; warehouse of rubble with 5–20 fraction	444	1	1726	7455			2	0.5	0.294	27.8	
		8	Source 8 RCS; warehouse of rubble with 20–40 fraction	444	1	1726	7442			2	0.5	0.294	27.8	
		9	Source 9 RCS; sand storage	444	1	1708	7448			2	0.5	0.294	27.8	
		10	Source 10 RCS; chippings storage	444	1	1725	7434			2	0.5	0.294	27.8	

		11	Source 11 EVS, assembly shop; grinding machine; drilling machine	444	1	1595	7445			8	0.25	0.159	17	
		12	Source 12 EVS, fuel shop; bath — 2 units	444	1	1581	7420			10	0.15	0.552	20	
		13	Source 13 EVS, repair shop; internal combustion engine – 1 unit	444	1	1580	7430			8	0.2	0.103	18	
		14	Source 14 EVS, repair shop; internal combustion engine – 1 unit	444	1	1580	7436			8	0.2	0.101	18	
		15	Source 15 EVS, repair shop; internal combustion engine – 4 units	444	1	1558	7438			8	0.35	0.427	18	
		16	Source 16 EVS, turning shop; grinding machine, drum lathe	444	1	1575	7447			9	0.31	0.201	19	
		17	Source 17 EVS, turning shop; bath	444	1	1581	7456			8	0.15	0.568	19	
		18	Source 18 EVS, motor shop; internal combustion engine, component degreasing site	444	1	1568	7439			10	0.5	0.877	18	

19	Source 19 EVS, welding shop; grinding machine	444	1	1569	7451			9.5	0.1	0.186	17	
20	Source 20 EVS, welding shop; welding station - 2 units	444	1	1534	7443			9.2	0.4	0.779	18	
22	Source 22 EVS, curing department; grinding machine	444	1	1561	7442			10	0.315	0.217	18	
23	Source 23 EVS, copper shop; soldering station	444	1	1558	7442			10	0.5	0.794	18	
24	Source 24 EVS, accumulator shop; accumulator charging station - 8 units	444	1	1550	7437			10	0.315	0.211	18	
25	Source 25 EVS, bus maintenance shop; internal combustion engine - 2 units	444	1	1548	7438			10	0.32	0.346	21	
26	Source 26 EVS, diagnostics shop; internal combustion engine	444	1	1535	7451			1.5	0.14	0.101	20	
27	Source 27 RCS, woodworking shop; woodworking machine US-2M	444	1	1535	7433			6.3	0.19	0.526	17	
	Source 28	444						8.7	1.2	4.92	19	

28	EVS, KM and F, wash station; internal combustion engine - 2 units		1	1517	7425							
29	Source 29 EVS, KM and F, wash station; internal combustion engine - 2 units	444	1	1519	7434			7.5	0.82	0.433	19	
30	Source 30 EVS, KM and F, wash station; spray booth	444	1	1503	7424			9.1	1.9	6.25	21	
31	Source 31 EVS, KM and F, painting station; spray booth	444	1	1503	7433			9.1	1.9	6.63	21	
32	Source 32 EVS, KM and F, painting station; heat generator Blowterm MKFL	444	1	1503	7429			9.9	0.24	0.097	118	
33	Source 33 EVS, KM and F, painting station; heat generator Blowterm MKFL	444	1	1503	7431			9.9	0.24	0.097	131	
34	Source 34 EVS, KM and F, spray preparation site; spray preparation station	444	1	1503	7440			9.1	1.9	6.75	19	
35	Source 35 EVS, KM and F,	444	1	1503	7446			9.1	1.9	6.84	19	

	spray preparation site; spray preparation station											
36	Source 36 EVS, KM and F, express laboratory, paint preparation machine	444	1	1503	7451			9.1	0.18	0.243	19	
37	Source 37 EVS, KM and F, express laboratory, paint storage cabinet	444	1	1502	7453			9.1	0.11	0.215	19	
38	Source 38 EVS, KM and F, express laboratory, paint preparation machine	444	1	1503	7452			8.3	0.25	0.543	19	
39	Source 39 HPB No 2; boiler unit "HWK 10000" No 1	444	1	1690	7640			25	0.92	5.59	119.5	
40	Source 40 HPB 2; boiler unit "HWK 10000" No 2	444	1	1690	7646			25	0.92	5.53	121.4	
41	Source 41 HPB No 2; boiler unit "HWK 10000" No. 3 (if operated on natural gas)	444	1	1690	7652			25	0.92	5.59	115.3	
42	Source 42 EVS, stationary heating of special motor transport engines;	444	1	2196	5555			1.5	0.15	0.189	345	

	Thermal machine UMP-350											
43	Source 43 EVS, stationary heating of special motor transport engines; kerosene container filler neck	444	1	2224	5554			3	0.05	0	27.8	
44	Source 44 EVS, stationary heating of special motor transport engines; kerosene reservoir	444	1	2233	5554			3	0.05	0	27.8	
45	Source 45 EVS, stationary heating of special motor transport engines; thermal machine UMP-350	444	1	1603	5085			1.5	0.15	0.138	278	
46	Source 46 EVS, stationary heating of special motor transport engines; kerosene container filler neck	444	1	1600	5068			1	0.1	0	27.8	
47	Source 47 EVS, stationary heating of special motor transport engines; kerosene reservoir	444	1	1608	5068			3	0.05	0	27.8	
48	Source 48 HPB No 2; DF reservoir	444	1	1735	7679			3	0.05	0	27.8	
	Source 49	444						1	0.1	0		

		49	HOB No 2; (DF reservoir filler neck)		1	1734	7679						27.8	
		51	Source 51 EVS, MS on apron; internal combustion engine - 2 units	444	1	1684	5452			5	0.3	0.065	18	
		52	Source 52 EVS, MS on apron; internal combustion engine - 2 units	444	1	1684	5442			5	0.3	0.065	18	
		53	Source 53 FFS 1; filler neck HST 25 No 5	444	1	1514	7305			1	0.1	0	27.8	
		54	Source 54 FFS 1; reservoir HST 25 No 5	444	1	1516	7298			3	0.05	0	27.8	
		55	Source 55 FFS 1; dispensing gun	444	1	1507	7306			1	0.1	0	27.8	
		56	Source 56 FFS 1; filler neck HST 25 No 4	444	1	1519	7305			1	0.1	0	27.8	
		57	Source 57 FFS 1; reservoir HST 25 No 4	444	1	1518	7298			3	0.05	0	27.8	
		58	Source 58 FFS 1; dispensing gun	444	1	1525	7306			1	0.1	0	27.8	
		59	Source 59 FFS 1; filler neck HST 25 No 53	444	1	1520	7302			3	0.05	0	27.8	
		60	Source 60 FFS 1; reservoir HST 25 No 3	444	1	1502	7326			3	0.05	0	27.8	

61	Source 61 FFS 1; dispensing gun	444	1	1525	7319			1	0.1	0	27.8	
62	Source 62 FFS 1; filler neck HST 25 No 2	444	1	1514	7322			3	0.05	0	27.8	
63	Source 63 FFS 1; reservoir HST 25 No 2	444	1	1500	7325			1	0.1	0	27.8	
64	Source 64 FFS 1; dispensing gun	444	1	1508	7319			1	0.1	0	27.8	
65	Source 65 FFS 1; filler neck HST 25 No 1	444	1	1496	7321			1	0.1	0	27.8	
66	Source 66 FFS 1; reservoir HST 25 No 1	444	1	1498	7325			3	0.05	0	27.8	
67	Source 67 FFS 1; dispensing gun	444	1	1491	7318			1	0.1	0	27.8	
74	Source 74 HPB No 1; boiler unit UWM-1000 st. No 3, boiler unit Vitomax-200 st. No 2	444	1	1560	6384			30	1	4.52	134	
75	Source 75 HPB No 1; boiler unit Vitomax-300 st. No 1	444	1	1568	6380			12	0.45	0.643	136	
76	Source 76 HPB No 1; boiler unit Vitomax-300 st. No 2	444	1	1576	6379			12	0.45	0.644	138	
77	Source 77 BPM, MSSA, OCS No 1, alkaline accumulator unit;	444	1	2135	5586			7.5	0.56	1.59	16	

	accumulator charging station - 6 units											
78	Source 78 BPM, MSSA, OCS No 1, acid accumulator unit; accumulator charging station - 8 units	444	1	2141	5580			7.5	0.29	0.596	19	
79	Source 79 BPM, MSSA, welding shop; welding station	444	1	2139	5544			7.5	0.89	0.989	16	
80	Source 80 BPM, MSSA, welding shop; welding station	444	1	2143	5540			2	0.5	0.294	27.8	
81	Source 81 BPM, MSSA, OCS No 1, acid accumulator unit; accumulator charging station - 28 units	444	1	2144	5565			2	0.5	0.294	27.8	
82	Source 82 BPM, MSSA, OCS No 1, alkaline accumulator unit; accumulator charging station - 9 units	444	1	2119	5590			2	0.5	0.294	27.8	
83	Source 83 BPM, MSSA, OCS No 2, acid accumulator unit; accumulator charging station - 19 units	444	1	1538	6204			2	0.5	0.294	27.8	
84	Source 84 BPM, MSSA, OCS No 2, acid accumulator unit; accumulator charging	444	1	1524	6178			2	0.5	0.294	27.8	

	station											

	accumulators - 26 units											
85	Source 85 BPM, MAU PJSC (MAU-M-Boryspil), alkaline accumulator unit; accumulator charging station - 2 units	444	1	2139	5555			7.5	0.72	0.371	19	
86	Source 86 BPM, MAU PJSC (MAU-M-Boryspil), alkaline accumulator unit; accumulator charging station - 6 units	444	1	2138	5560			7.5	0.72	0.508	19	
94	Source 94 CFS, FOMS, FLM laboratory FLM No 1; exhaust hoodx - 4 units	444	1	1689	5013			5.5	0.37	0.308	19	
95	Source 95 CFS, FOMS, special fluid laboratory No 2; exhaust hood - 2 units	444	1	1695	5004			5.5	0.26	0.221	19	
96	Source 96 FRLES, CMS, welding area; welding station	444	1	1729	7085			2	0.5	0.294	27.8	
97	Source 97 FRLES, CMS, acid accumulator unit; accumulator charging station - 3 units	444	1	1702	7078			11	0.42	0.906	19	
101	Source 101 FRLES, CMS, diesel-generator plant; diesel generator	444	1	2385	9190			2.3	0.055	0.044	120	

	8041 Iveko											
102	Source 102 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	2399	9199			1	0.1	0	27.8	
103	Source 103 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	2390	9200			3	0.05	0	27.8	
104	Source 104 FRLES, CMS, diesel-generator plant; diesel generator Scania SC-4096	444	1	2309	8222			2.3	0.16	0.164	133	
105	Source 105 FRLES, CMS, diesel generator plant; DF reservoir filler neck	444	1	2293	8205			2	0.051	0.007	27.8	
107	Source 107 FRLES, CMS, diesel-generator plant; diesel generator DGA-24	444	1	900	8357			3	0.06	0.04	129	
108	Source 108 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	901	8324			1	0.1	0	27.8	
109	Source 109 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	900	8313			3	0.05	0	27.8	
110	Source 110 FRLES, CMS, diesel-generator plant; diesel generator AD-	444	1	887	8357			2.5	0.05	0.033	72	

	10											
111	Source 111 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 1	444	1	1284	7293			5.5	0.095	0.103	119	
112	Source 112 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 1	444	1	1284	7287			5.5	0.095	0.149	122	
113	Source 114 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 1	444	1	1283	7281			5.5	0.095	0.134	97	
114	Source 114 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 2	444	1	1283	7276			5.5	0.095	0.109	74	
115	Source 115 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	1288	7301			1	0.1	0	27.8	
116	Source 116 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	1295	7301			3	0.05	0	27.8	
120	Source 120 FRLES, CMS, diesel-generator plant; diesel generator Perkins No 1	444	1	2190	5852			4.5	0.07	0.092	165	
121	Source 121 FRLES, CMS, diesel-generator plant; diesel	444	1	2193	5846			4.5	0.07	0.092	162	

	Generator Perkins No 2											
122	Source 122 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	2201	5846			1	0.1	0	27.8	
123	Source 123 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	2209	5846			3	0.05	0	27.8	
124	Source 124 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 1	444	1	2193	5825			4	0.095	0.122	88	
125	Source 125 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 1	444	1	2193	5819			4	0.095	0.14	91	
126	Source 126 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 2	444	1	2193	5813			4	0.095	0.136	89	
127	Source 127 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200 No 2	444	1	2193	5807			4	0.095	0.146	87	
128	Source 128 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	2203	5819			1	0.1	0	27.8	
129	Source 129 SRSTZM, CMS, diesel generator	444	1	2205	5825			3	0.05	0	27.8	

	plant;											

	DF reservoir											
130	Source 130 FRLES, CMS, diesel-generator plant; diesel generator Scania SC-4096	444	1	2364	3939			2.3	0.16	0.165	139	
131	Source 131 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	2351	3925			1	0.1	0	27.8	
132	Source 132 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	2359	3925			3	0.05	0	27.8	
136	Source 136 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200	444	1	1294	3283			5.5	0.095	0.143	79	
137	Source 137 FRLES, CMS, diesel-generator plant; diesel generator ASDA-200	444	1	1286	3283			5.5	0.095	0.153	91	
138	Source 138 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	1321	3283			1	0.1	0	27.8	
139	Source 139 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	1310	3283			3	0.05	0	27.8	
140	Source 140 FRLES, CMS, diesel-generator plant; diesel generator	444	1	2564	2914			2.3	0.055	0.045	122	

	8041 Iveko											
141	Source 141 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	2574	2925			1	0.1	0	27.8	
142	Source 142 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	2583	2925			3	0.05	0	27.8	
143	Source 143 FRLES, CMS, diesel-generator plant; diesel generator 8041 Iveko	444	1	2541	2339			2.3	0.055	0.044	119	
144	Source 144 (DF reservoir filler neck)	444	1	2561	2324			1	0.1	0	27.8	
145	Source 145 SRSTZM, CMS, diesel generator plant; DF reservoir	444	1	2552	2348			3	0.05	0	27.8	
146	Source 146 FRLES, CMS, diesel-generator plant; diesel generator DGA-24	444	1	917	2446			4	0.075	0.05	93	
147	Source 147 FRLES, CMS, diesel-generator plant; diesel generator AD-10	444	1	931	2446			4.4	0.055	0.034	60	
148	Source 148 SRSTZM, CMS, diesel generator plant; DF reservoir filler neck	444	1	904	2472			1	0.05	0	27.8	
149	Source 149 SRSTZM, CMS, diesel generator plant;	444	1	904	2481			3	0.05	0	27.8	

	generator unit; DF reservoir											
150	Source 150 FRLES, CMS, diesel-generator plant; diesel generator ASDA-12 No 1	444	1	949	1988			3.5	0.055	0.028	77	
151	Source 151 FRLES, CMS, diesel-generator plant; diesel generator ASDA-12 No 2	444	1	948	1997			3.5	0.055	0.031	65	
152	Source 152 FRLES, CMS, diesel-generator plant; diesel generator ASDA-12 No 1	444	1	2825	11215			4	0.055	0.03	68	
153	Source 153 FRLES, CMS, diesel-generator plant; diesel generator ASDA-12 No 2	444	1	2825	11214			4	0.055	0.029	69	
154	Source 154 diesel-generator unit P40P1	444	1	1721	7015			1.5	0.065	0.078	173	
156	Source 156 storage hangar, mechanical area; welding station	444	1	1398	7273			10	0.15	0.559	20	
157	Source 157 storage hangar, maintenance site; internal combustion engine	444	1	1386	7248			8	0.12	0.089	22	
158	Source 158 storage hangar, washing station; washing	444	1	1388	7227			3.5	0.12	0.029	158	

	machine "Karcher"											
159	Source 159 HPB No 1; boiler unit "HWK 10000" st. No 1	444	1	1560	6393			30	1	4.521	128	
166	Source 166 terminal D; diesel-generator unit; diesel-generator SDMO X2800 No 1	444	1	2212	6945			15.4	0.5	6.8	500	
167	Source 167 terminal D; diesel-generator unit; diesel-generator SDMC X2800 No 2	444	1	2212	6958			15.4	0.5	6.8	500	
168	Source 168 terminal D, diesel generator plant; supply tank - 4 units	444	1	2224	6952			3	0.05	0	27.8	
169	Source 169 terminal D, DF reservoir	444	1	2200	6877			3	0.05	0	27.8	
170	Source 170 terminal D, DF reservoir filler neck	444	1	2200	6888			1	0.1	0	27.8	
174	Source 174, FRLES, TP-1023, welding station	444	1	1234	7300			2.7	0.1	0.077	16	
175	Source 175 FOMS, FOMP and SR, CFS, laboratories FOM No 1 and of special fluid No 2; analysis sites	444	1	1696	5008			5.5	0.26	0.242	19	

	— 4 units											
181	Source 181 FFS 3; (modular FFS-30); HST- 20	444	1	2213	7650			3	0.05	0	27.4	
182	Source 182 FFS 3; (modular FFS-30); filler neck HST-20	444	1	2213	6751			1	0.1	0	27.4	
183	Source 183 FFS 3; (modular FFS-30); HST- 10	444	1	2217	7650			3	0.05	0	27.4	
184	Source 184 FFS 3; (modular FFS-30); filler neck HST-10	444	1	2217	7651			1	0.1	0	27.4	
185	Source 185 FFS 3; (modular FFS-30); dispensing gun; (car tank)	444	1	2220	7651			1	0.1	0	27.4	
186	Source 186 EVS, repair shop; internal combustion engine – 3 units	444	1	1596	7430			9.2	0.63	2.56	18	
187	Source 187 EVS, repair shop; internal combustion engine – 3 units	444	1	1537	7435			9.2	0.63	2.52	18	
188	Source 188 EVS, repair shop; internal combustion engine – 3 units	444	1	1534	7445			9.2	0.63	2.51	18	

189	Source 189 EVS, diagnostics shop; internal combustion engine - 1 unit	444	1	1534	7446			9.2	0.4	0.696	18	
190	RW-1 (runway (aircraft)	-3	1	2501	6118	560	4600	2		0	27.4	
191	apron of terminal D (mobile, motor transport)	-3	1	2281	7166	200	800	2		0	27.4	
192	apron of terminal B (mobile, motor transport)	-3	1	1912	5506	225	620	2		0	27.4	
193	apron of terminal F (mobile, motor transport)	-3	1	1318	6500	225	1500	2		0	27.4	
200	RW-2 (runway (aircraft)	-3	1	1092	5402	650	4000	2		0	27.4	
201	FFS - service station (including car refuelling); FFS, DF storage (breathing valve)	444	1	1621	5584			5	0.05	0	27.4	
202	FFS - service station (including car refuelling); FFS, aviation fuel storage (breathing valve)	444	1	1621	5576			5	0.05	0	27.4	
203	FFS - service stations (including	444	1	1621	5566			5	0.05	0	27.4	

	car refuelling); FFS, DF storage (breathing valve)											
204	FFS - service stations (including car refuelling); FFS, DF storage (breathing valve)	444	1	1621	5560			5	0.05	0	27.4	
205	FFS - service stations (including car refuelling); FFS, (filler neck) DF	444	1	1621	5582			4	0.5	0	27.4	
206	FFS - service stations (including car refuelling); FFS, (filler neck) aviation fuel	444	1	1621	5578			4	0.5	0	27.4	
207	FFS - service stations (including car refuelling); FFS, (filler neck) DF	444	1	1621	5562			4	0.5	0	27.4	
208	FFS - service stations (including car refuelling); FFS, (filler neck) DF	444	1	1621	5564			4	0.5	0	27.4	
209	FFS - service stations (including	444	1	1620	5584			1.5	0.1	0	27.4	

	car fuelling); FFS (dispensing gun) DF											
210	FFS - service stations (including car refuelling); FFS (dispensing gun) aviation fuel	444	1	1622	5584			1.5	0.1	0	27.4	
211	FFS - service stations (including car refuelling); FFS (dispensing gun) DF	444	1	1620	5559			1.5	0.1	0	27.4	
212	FFS - service stations (including car refuelling); FFS (dispensing gun) DF	444	1	1622	5559			1.5	0.1	0	27.4	
213	stationary engines; FRLES, CMS, diesel-generator plant; diesel generator	444	1	636	3832			7	0.15	1.08	630	
214	other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator plant; DF reservoir (breathing valve)	444	1	636	3828			7	0.05	0	27.4	
	Other types	444						4	0.5	0		

		215	of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir (filler neck)		1	636	3823					27.4	
		216	stationary engines; FRLES, CMS, diesel-generator plant; diesel generator	444	1	630	6977			7	0.15	1.08	630	
		217	other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator plant; DF reservoir (breathing valve)	444	1	630	6969			7	0.05	0	27.4	
		218	Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir (filler neck)	444	1	630	6960			4	0.5	0	27,7	
		219	AC engine test site, inorg.	-4	1	1267	4096	170	100	2		0	27.4	
		220	ERS motor transport garage, deflector	444	1	1233	4932			8	0.5	0,295	27.4	

TABLE 4. Specification of emission composition of the source

City code	Production site code	Source code	Substance code	Total emissions, tons/year	Coefficient of ordered sedimentation of the substance	Maximum emissions (g/sec), at a wind speed of									
						0.5 m/sec	1 m/sec	2 m/sec	4 m/sec	6 m/sec	8 m/sec	10 m/sec	12 m/sec	14 m/sec	16 m/sec
1	1	1	03000 ---- 2902	0.02073	1	0.04									
		3	01003 ---- 123	0.000607	1	0.00201									
			01104 ---- 143	5.3E-5	1	0.000148									
			04001 ---- 301	0.001523	1	0.007334									
			06000 ---- 337	0.00012	1	0.000666									
		4	01003 ---- 123	0.000433	1	0.00138									
			01104 ---- 143	4.7E-5	1	0.000134									
		5	01003 ---- 123	0.00026	1	0.0004									
			01104 ---- 143	2.6E-5	1	3.7E-5									
			04001 ---- 301	0.000381	1	0.001833									
			06000 ---- 337	3E-5	1	0.000167									
		6	11000 ---- 2754	4E-8	1	1E-8									
		7	03000 ---- 2902	0.12649	1	0.03798									
		8	03000 ---- 2902	0.10521	1	0.03165									
		9	03000 ---- 2902	0.22639	1	0.09207									
		10	03000	0.07367	1	0.04199									

		11	03000 ---- 2902	3.4E-5	1	0.00221								
			03000 ---- 10368	2.2E-5	1	0.000134								
		12	11000 ---- 1042	0.001305	1	0.0123								
			11000 ---- 1061	0.001958	1	0.0081								
			11000 ---- 2732	0.020256	1	0.0348								
			11007 ---- 1401	0.000914	1	0.00361								
			11009 ---- 1210	0.001305	1	0.0083								
			11020 ---- 1246	0.001044	1	0.0052								
			11041 ---- 621	0.006525	1	0.0188								
		13	04001 ---- 301	2E-6	1	0.00427								
			06000 ---- 337	0.000237	1	0.065								
			11000 ---- 2754	4E-7	1	0.00034								
		14	04001 ---- 301	2E-6	1	0.00439								
			06000 ---- 337	0.000237	1	0.064								
			11000 ---- 2754	4E-7	1	0.00034								
		15	04001 ---- 301	2.9E-5	1	0.0184								
			06000 ---- 337	0.001123	1	0.188								
			11000	4.2E-6	1	0.000544								

			----2754											
		16	03000----2902	0.00082	1	0.00332								
		17	11000----2732	0.00844	1	0.131								
		18	11000----1061	0.001376	1	0.000956								
			11000----1319	0.001376	1	0.000956								
			11000----2732	0.006423	1	0.00446								
			11000----2735	1.1E-5	1	0.0003								
		19	03000----2902	0.000513	1	0.0027								
		20	-----10226	1.5E-5	1	0.000131								
			01003----123	0.000937	1	0.00153								
			01010----203	2E-6	1	3E-6								
			01104----143	9.93E-5	1	0.0005								
			03000----323	5.3E-5	1	0.000472								
			04001----301	0.0001614	1	0.009167								
			06000----337	0.000293	1	0.000411								
		22	03000----2902	0.0032	1	0.0089								
		23	01009----184	8E-7	1	6E-6								
			05001----	3E-7	1	2E-7								

			330											
			06000----337	4E-7	1	3E-7								
			11000----514	1E-5	1	7E-6								
			11000----2704	0.03075	1	0.0214								
			11000----2754	2.3E-5	1	1.6E-5								
			11001----2001	3E-6	1	2E-6								
		24	05004----322	0.000843	1	0.000378								
		25	04001----301	0.000737	1	0.00332								
			06000----337	0.001032	1	0.00433								
			11000----2754	0.000103	1	0.000478								
		26	04001----301	1.3E-5	1	0.00428								
			06000----337	0.002089	1	0.064								
			11000----2754	1.8E-6	1	0.00034								
		27	03000----2902	0.00336	1	0.0106								
		28	04001----301	0.004124	1	0.001256								
			06000----337	0.018454	1	0.037684								
			11000----2754	0.000577	1	0.000176								
		29	04001----301	0.000336	1	0.00011								

			06000----337	0.001624	1	0.003316									
			11000----2754	5.1E-5	1	1.5E-5									
		30	03000----2902	0.000458	1	0.0235									
			11000----1042	0.007407	1	0.043									
			11000----1061	0.001384	1	0.066									
			11000----2750	0.006645	1	0.005171									
			11000----2752	0.023394	1	0.204									
			11000----10411	0.00735	1	0.005719									
			11007----1401	0.000553	1	0.0221									
			11009----1210	0.023228	1	0.041									
			11020----1246	0.003255	1	0.0381									
			11021----1240	0.00638	1	0.0338									
			11030----616	0.027389	1	0.066									
			11041----621	0.015264	1	0.0325									
		31	03000----2902	0.000485	1	0.0248									
			11000----1042	0.007858	1	0.045									
			11000----1061	0.001467	1	0.069									
			11000	0.00705	1	0.005485									

			---- 2750												
			11000 ---- 2752	0.024816	1	0.217									
			11000 ---- 10411	0.007797	1	0.006067									
			11007 ---- 1401	0.000587	1	0.0227									
			11009 ---- 1210	0.02464	1	0.042									
			11020 ---- 1246	0.003453	1	0.04									
			11021 ---- 1240	0.006767	1	0.0351									
			11030 ---- 616	0.029054	1	0.07									
			11041 ---- 621	0.016193	1	0.0345									
		32	03000 ---- 2902	0.000651	1	0.00362									
			04001 ---- 301	0.015358	1	0.01271									
			04002 ---- 11815	0.000277	1	8.78E-6									
			05001 ---- 330	0.02604	1	0.00378									
			06000 ---- 337	0.126294	1	0.10185									
			07000 ---- 11812	20.507	1	0.65									
			12000 ---- 410	0.000832	1	2.6E-5									
		33	03000 ---- 2902	0.000651	1	0.0034									
			04001 ----	0.016683	1	0.01426									

			301											
			04002 ---- 11815	0.000277	1	8.78E-6								
			05001 ---- 330	0.02604	1	0.00427								
			06000 ---- 337	0.116627	1	0.09719								
			07000 ---- 11812	20.507	1	0.65								
			12000 ---- 410	0.000832	1	9.5E-5								
		34	03000 ---- 2902	0.000168	1	0.029								
			11037 ---- 620	0.005588	1	0.0096								
		35	03000 ---- 2902	0.00017	1	0.0308								
			11037 ---- 620	0.005662	1	0.0097								
		36	11000 ---- 1042	0.000218	1	0.000303								
			11000 ---- 1061	4.1E-5	1	5.7E-5								
			11000 ---- 2750	0.000196	1	0.000272								
			11000 ---- 2752	0.000689	1	0.000957								
			11000 ---- 10411	0.000216	1	0.0003								
			11007 ---- 1401	1.6E-5	1	2.2E-5								
			11009 ---- 1210	0.000684	1	0.00095								
			11020 ---- 1246	9.6E-5	1	0.000133								

			11021 ---- 1240	0.000188	1	0.000261									
			11030 ---- 616	0.000807	1	0.001121									
			11041 ---- 621	0.000449	1	0.000624									
		37	11000 ---- 1042	0.000193	1	0.00083									
			11000 ---- 1061	3.6E-5	1	0.0014									
			11000 ---- 2750	0.000173	1	0.0014									
			11000 ---- 2752	0.00061	1	0.0014									
			11000 ---- 10411	0.000192	1	0.00083									
			11007 ---- 1401	1.4E-5	1	0.0027									
			11009 ---- 1210	0.000605	1	0.00055									
			11020 ---- 1246	8.4E-5	1	0.00055									
			11021 ---- 1240	0.000166	1	0.00083									
			11030 ---- 616	0.000714	1	0.00083									
			11041 ---- 621	0.000398	1	0.0014									
		38	11000 ---- 1042	0.000103	1	0.000143									
			11000 ---- 1061	1.9E-5	1	2.3E-5									
			11000 ---- 2750	9.2E-5	1	0.000128									
			11000	0.000325	1	0.000451									

			---- 2752												
			11000 ---- 10411	0.000102	1	0.000142									
			11007 ---- 1401	8E-6	1	1.1E-5									
			11009 ---- 1210	0.000322	1	0.000447									
			11020 ---- 1246	4.5E-5	1	6.3E-5									
			11021 ---- 1240	8.9E-5	1	0.000124									
			11030 ---- 616	0.00038	1	0.000528									
			11041 ---- 621	0.000212	1	0.000294									
		39	04001 ---- 301	1.234292	1	0.2153									
			06000 ---- 337	0.023956	1	0.0041									
		40	04001 ---- 301	0.110445	1	0.2108									
			06000 ---- 337	0.0027	1	0.004									
		41	04001 ---- 301	1.993778	1	0.2014									
			06000 ---- 337	0.037157	1	0.0041									
		42	03000 ---- 2902	3.2E-5	1	0.0075									
			04001 ---- 301	0.004321	1	0.03667									
			05001 ---- 330	0.002124	1	0.01229									
			06000 ----	0.20289	1	0.165									

	337												
43	11000 ---- 2732	2E-10	1	1E-6									
44	11000 ---- 2732	2E-10	1	1E-7									
45	03000 ---- 2902	0.000172	1	0.0048									
	04001 ---- 301	0.020198	1	0.0218									
	05001 ---- 330	0.011439	1	0.01035									
	06000 ---- 337	0.162544	1	0.1718									
46	11000 ---- 2732	7E-9	1	5E-6									
47	11000 ---- 2732	4.3E-5	1	3E-6									
48	11000 ---- 2754	1.8E-5	1	6E-7									
49	11000 ---- 2754	6E-9	1	6E-7									
51	04001 ---- 301	0.002792	1	0.003102									
	06000 ---- 337	0.105159	1	0.116843									
	11000 ---- 2754	0.000391	1	0.000435									
52	04001 ---- 301	0.002792	1	0.003102									
	06000 ---- 337	0.105159	1	0.116843									
	11000 ---- 2754	0.000391	1	0.000435									
53	11000 ---- 2704	0.000203	1	0.006773									

54	11000 ---- 2704	0.41511	1	0.013163										
55	11000 ---- 2704	0.000834	1	0.003483										
56	11000 ---- 2704	8.5E-6	1	0.001391										
57	11000 ---- 2704	0.085226	1	0.002703										
58	11000 ---- 2704	3.5E-5	1	0.000709										
59	11000 ---- 2754	4E-7	1	5E-6										
60	11000 ---- 2754	9.6E-5	1	3E-6										
61	11000 ---- 2754	1.6E-6	1	2.5E-6										
62	11000 ---- 2704	0.000154	1	0.005911										
63	11000 ---- 2704	0.362287	1	0.011488										
64	11000 ---- 2704	0.000635	1	0.00304										
65	11000 ---- 2754	1.6E-7	1	3E-6										
66	11000 ---- 2754	6.6E-5	1	2.1E-6										
67	11000 ---- 2754	1.7E-6	1	2E-6										
74	04001 ---- 301	1.484105	1	0.48892										
	06000 ---- 337	0.071406	1	0.02705										
75	04001 ---- 301	0.283522	1	0.035										
	06000	0.018927	1	0.0017										

			----337												
		76	04001----301	0.290267	1	0.0325									
			06000----337	0.020315	1	0.0017									
		77	-----150	0.000346	1	0.000333									
		78	05004----322	0.001019	1	0.000261									
		79	-----10226	0.000123	1	0.000131									
			01002----110	3E-6	1	0.000114									
			01003----123	0.004435	1	0.0039									
			01010----203	1.2E-5	1	0.000307									
			01104----143	0.000511	1	0.00053									
			03000----323	0.000451	1	0.000472									
			04001----301	0.001312	1	0.009167									
			06000----337	0.000615	1	0.00355									
			16000----343	2.44E-5	1	0.00128									
			16000----344	3.5E-5	1	0.00072									
			16001----342	2.2E-5	1	0.000499									
		80	-----10226	8.3E-5	1	0.000131									
			01003----	0.048626	1	0.003973									

			123											
			01010----203	1.4E-5	1	0.000307								
			01104----143	0.001792	1	0.00052								
			03000----323	0.000311	1	0.000472								
			04001----301	0.00909	1	0.009167								
			06000----337	0.009922	1	0.00355								
			16000----343	2.45E-5	1	0.00128								
			16000----344	4E-5	1	0.00072								
			16001----342	1.4E-5	1	0.000336								
		81	05004----322	0.021913	1	0.002739								
		82	-----150	0.00131	1	0.0005								
		83	05004----322	0.01867	1	0.002331								
		84	05004----322	0.066263	1	0.004014								
		85	-----150	0.005776	1	1.8E-5								
		86	-----150	0.003136	1	3.3E-5								
		94	11000----2732	0.0894	1	0.0096								
			11000----2735	0.000383	1	0.000222								
		95	11000----1056	0.00143	1	0.000917								

			11020 ---- 1246	0.00296	1	0.0019									
		96	- ---- 10226	1E-5	1	0.000131									
			01003 ---- 123	0.00012	1	0.0016									
			01104 ---- 143	3.3E-5	1	0.000435									
			03000 ---- 323	3.5E-5	1	0.000472									
		97	05004 ---- 322	0.000266	1	0.000188									
		101	03000 ---- 2902	2E-5	1	0.000646									
			05001 ---- 330	1E-5	1	0.000396									
			06000 ---- 337	0.0009	1	0.033396									
			11000 ---- 2754	0.001	1	0.0333									
		102	11000 ---- 2754	4.2E-13	1	2.3E-10									
		103	11000 ---- 2754	6E-8	1	2E-9									
		104	03000 ---- 2902	6E-5	1	0.002352									
			04001 ---- 301	0.0013	1	0.047724									
			05001 ---- 330	4E-5	1	0.00164									
			06000 ---- 337	0.0004	1	0.016072									
			11000 ---- 2754	0.0069	1	0.24									
		105	11000	3E-12	1	2E-9									

	---- 2754												
107	03000 ---- 2902	4.24E-5	1	0.00162									
	04001 ---- 301	0.0003	1	0.00928									
	05001 ---- 330	4.24E-5	1	0.00164									
	06000 ---- 337	0.0028	1	0.10432									
	11000 ---- 2754	0.0008	1	0.0267									
108	11000 ---- 2754	3.3E-13	1	1.9E-10									
109	11000 ---- 2754	4E-8	1	1E-9									
110	03000 ---- 2902	2.02E-5	1	0.000752									
	04001 ---- 301	0.0001	1	0.005181									
	05001 ---- 330	2.15E-5	1	0.000858									
	06000 ---- 337	0.0011	1	0.044451									
	11000 ---- 2754	0.0005	1	0.016									
111	03000 ---- 2902	2.73E-5	1	0.001091									
	04001 ---- 301	0.0005	1	0.018334									
	05001 ---- 330	2.85E-5	1	0.001133									
	06000 ---- 337	0.0006	1	0.020394									
	11000 ----	0.0052	1	0.18									

			2754											
		112	03000 ---- 2902	3.91E-5	1	0.001518								
			04001 ---- 301	0.0006	1	0.022201								
			05001 ---- 330	3.78E-5	1	0.00149								
			06000 ---- 337	0.0008	1	0.027714								
			11000 ---- 2754	0.0052	1	0.18								
		113	03000 ---- 2902	3.56E-5	1	0.001357								
			04001 ---- 301	0.0007	1	0.023852								
			05001 ---- 330	3.09E-5	1	0.001206								
			06000 ---- 337	0.0006	1	0.021172								
			11000 ---- 2754	0.0052	1	0.18								
		114	03000 ---- 2902	2.86E-5	1	0.00108								
			04001 ---- 301	0.0004	1	0.015478								
			05001 ---- 330	2.64E-5	1	0.000981								
			06000 ---- 337	0.0006	1	0.020928								
			11000 ---- 2754	0.0052	1	0.18								
		115	11000 ---- 2754	2.3E-12	1	1E-9								
		116	11000 ---- 2754	3E-7	1	1E-8								

120	03000 ---- 2902	3E-5	1	0.001123										
	04001 ---- 301	0.0006	1	0.022448										
	05001 ---- 330	2E-5	1	0.00092										
	06000 ---- 337	0.0016	1	0.058972										
	11000 ---- 2754	0.0016	1	0.0567										
121	03000 ---- 2902	2E-5	1	0.001267										
	04001 ---- 301	0.0006	1	0.021344										
	05001 ---- 330	3E-5	1	0.001012										
	06000 ---- 337	0.0017	1	0.060168										
	11000 ---- 2754	0.0016	1	0.0567										
122	11000 ---- 2754	7.1E-13	1	3.9E-10										
123	11000 ---- 2754	9E-8	1	3E-9										
124	03000 ---- 2902	5.66E-5	1	0.002081										
	04001 ---- 301	0.0005	1	0.019886										
	05001 ---- 330	3.44E-5	1	0.001342										
	06000 ---- 337	0.0008	1	0.02806										
	11000 ---- 2754	0.0052	1	0.18										
125	03000	6.02E-5	1	0.002314										

	---- 2902												
	04001 ---- 301	0.0006	1	0.0217									
	05001 ---- 330	4.76E-5	1	0.00182									
	06000 ---- 337	0.0009	1	0.03136									
	11000 ---- 2754	0.0052	1	0.18									
126	03000 ---- 2902	5.97E-5	1	0.002248									
	04001 ---- 301	0.0005	1	0.019176									
	05001 ---- 330	4.86E-5	1	0.001904									
	06000 ---- 337	0.0009	1	0.031416									
	11000 ---- 2754	0.0052	1	0.18									
127	03000 ---- 2902	6.57E-5	1	0.002451									
	04001 ---- 301	0.0006	1	0.022922									
	05001 ---- 330	5.47E-5	1	0.00219									
	06000 ---- 337	0.001	1	0.035332									
	11000 ---- 2754	0.0052	1	0.18									
128	11000 ---- 2754	2.3E-12	1	1E-9									
129	11000 ---- 2754	3E-7	1	1E-8									
130	03000 ----	6E-5	1	0.002437									

	2902												
	04001 ---- 301	0.0061	1	0.056265									
	05001 ---- 330	4E-5	1	0.001485									
	06000 ---- 337	0.0003	1	0.011385									
	11000 ---- 2754	0.0069	1	0.24									
131	11000 ---- 2754	3E-12	1	2E-9									
132	11000 ---- 2754	4E-7	1	1E-8									
136	03000 ---- 2902	7.81E-5	1	0.002863									
	04001 ---- 301	0.0004	1	0.014872									
	05001 ---- 330	6.18E-5	1	0.002431									
	06000 ---- 337	0.0052	1	0.190905									
	11000 ---- 2754	0.0052	1	0.18									
137	03000 ---- 2902	7.77E-5	1	0.002928									
	04001 ---- 301	0.0006	1	0.023562									
	05001 ---- 330	5.11E-5	1	0.001989									
	06000 ---- 337	0.0036	1	0.128673									
	11000 ---- 2754	0.0052	1	0.18									
138	11000 ---- 2754	2.3E-12	1	1E-9									

139	11000 ---- 2754	3E-7	1	1E-8										
140	03000 ---- 2902	2E-5	1	0.000704										
	04001 ---- 301	0.0004	1	0.013635										
	05001 ---- 330	1E-5	1	0.00045										
	06000 ---- 337	0.0009	1	0.032805										
	11000 ---- 2754	0.001	1	0.0333										
141	11000 ---- 2754	4.2E-13	1	2.3E-10										
142	11000 ---- 2754	6E-8	1	2E-9										
143	03000 ---- 2902	2E-5	1	0.000766										
	04001 ---- 301	0.0003	1	0.012056										
	05001 ---- 330	1E-5	1	0.000528										
	06000 ---- 337	0.0009	1	0.03146										
	11000 ---- 2754	0.001	1	0.0333										
144	11000 ---- 2754	4.2E-13	1	2.3E-10										
145	11000 ---- 2754	6E-8	1	2E-9										
146	03000 ---- 2902	1.94E-5	1	0.00075										
	04001 ---- 301	0.0005	1	0.0196										
	05001	1.87E-5	1	0.00075										

			---- 330												
			06000 ---- 337	0.0018	1	0.06205									
			11000 ---- 2754	0.0008	1	0.0267									
		147	03000 ---- 2902	1.35E-5	1	0.000506									
			04001 ---- 301	0.000123	1	0.004658									
			05001 ---- 330	1.31E-5	1	0.000544									
			06000 ---- 337	0.0012	1	0.044744									
			11000 ---- 2754	0.0005	1	0.016									
		148	11000 ---- 2754	3.3E-13	1	1.9E-10									
		149	11000 ---- 2754	4E-8	1	1E-9									
		150	03000 ---- 2902	1.36E-5	1	0.000508									
			04001 ---- 301	0.0001	1	0.003976									
			05001 ---- 330	1.61E-5	1	0.000616									
			06000 ---- 337	0.0009	1	0.032228									
			11000 ---- 2754	0.0005	1	0.016									
		151	03000 ---- 2902	1.5E-5	1	0.000562									
			04001 ---- 301	0.0001	1	0.004123									
			05001 ----	1.37E-5	1	0.000558									

			330											
			06000 ---- 337	0.001	1	0.038161								
			11000 ---- 2754	0.0005	1	0.016								
		152	03000 ---- 2902	1.19E-5	1	0.000462								
			04001 ---- 301	1.19E-5	1	0.00426								
			05001 ---- 330	9.5E-6	1	0.00039								
			06000 ---- 337	0.0009	1	0.03342								
			11000 ---- 2754	0.0005	1	0.016								
		153	03000 ---- 2902	1.24E-5	1	0.000474								
			04001 ---- 301	0.0001	1	0.004379								
			05001 ---- 330	9.86E-6	1	0.000406								
			06000 ---- 337	0.0008	1	0.027347								
			11000 ---- 2754	0.0005	1	0.016								
		154	03000 ---- 2902	3E-5	1	0.000776								
			04001 ---- 301	0.001	1	0.024804								
			05001 ---- 330	2E-5	1	0.000624								
			06000 ---- 337	0.0024	1	0.057798								
			11000 ---- 2754	0.0013	1	0.0293								

156	- ---- 10226	1.5E-5	1	0.000131										
	01003 ---- 123	0.002789	1	0.004										
	01010 ---- 203	1E-6	1	3E-6										
	01104 ---- 143	0.000238	1	0.00061										
	03000 ---- 323	0.000203	1	0.000472										
	04001 ---- 301	0.00044	1	0.00072										
	06000 ---- 337	0.00214	1	0.003547										
	16000 ---- 343	0.00072	1	0.00128										
	16000 ---- 344	0.000405	1	0.00072										
	16001 ---- 342	0.000189	1	0.000336										
157	04001 ---- 301	0.004897	1	0.0081										
	06000 ---- 337	0.006856	1	0.0195										
	11000 ---- 2754	0.000685	1	0.000522										
158	03000 ---- 2902	2.5E-5	1	0.00086										
	04001 ---- 301	0.000679	1	0.004785										
	05001 ---- 330	0.000999	1	0.001508										
	06000 ---- 337	0.000541	1	0.003944										
159	04001	1.677046	1	0.35042										

	---- 301												
	06000 ---- 337	0.150304	1	0.03878									
166	03000 ---- 2902	0.000321	1	0.022292									
	04001 ---- 301	0.005783	1	4.0125									
	05001 ---- 330	0.000643	1	0.044583									
	06000 ---- 337	0.001606	1	0.111458									
	11000 ---- 2754	0.000771	1	0.0535									
167	03000 ---- 2902	0.000321	1	0.022292									
	04001 ---- 301	0.005783	1	4.0125									
	05001 ---- 330	0.000643	1	0.044583									
	06000 ---- 337	0.001606	1	0.111458									
	11000 ---- 2754	0.000771	1	0.0535									
168	11000 ---- 2754	8.2E-6	1	2.6E-7									
169	11000 ---- 2754	4.8E-6	1	1.5E-7									
170	11000 ---- 2754	1E-9	1	2E-7									
174	- ---- 10226	7E-6	1	0.000131									
	01003 ---- 123	9E-5	1	0.00078									
	01104 ----	2.4E-5	1	0.000273									

			143											
			03000 ---- 323	2.7E-5	1	0.000472								
		175	03000 ---- 10442	3.6E-5	1	1E-5								
		181	11000 ---- 2754	0.000552	1	1E-5								
		182	11000 ---- 2754	5E-7	1	1.5E-5								
		183	11000 ---- 2754	0.000489	1	1.5E-5								
		184	11000 ---- 2754	1E-6	1	2.3E-5								
		185	11000 ---- 2754	1.6E-6	1	6E-7								
		186	04001 ---- 301	1.35E-6	1	0.0011								
			06000 ---- 337	5.7E-5	1	0.030356								
			11000 ---- 2754	3.4E-6	1	0.000283								
		187	04001 ---- 301	1.33E-6	1	0.001083								
			06000 ---- 337	5.7E-5	1	0.029881								
			11000 ---- 2754	3.3E-6	1	0.000279								
		188	04001 ---- 301	1.32E-6	1	0.001078								
			06000 ---- 337	5.6E-5	1	0.029763								
			11000 ---- 2754	3.3E-6	1	0.000278								
		189	04001 ---- 301	1.3E-6	1	0.00068								

			06000 ---- 337	0.0002235	1	0.03									
			11000 ---- 2754	4E-7	1	0.000175									
		190	03000 ---- 2902		1	0.00125									
			03004 ---- 328		1	0.000125									
			04001 ---- 301		1	0.018903									
			06000 ---- 337		1	0.116708									
			11000 ---- 2754		1	.0924051									
		191	03000 ---- 2902		1	0.007166									
			03004 ---- 328		1	0.007166									
			04001 ---- 301		1	0.031268									
			04002 ---- 304		1	.0001386									
			04003 ---- 303		1	1E-7									
			05001 ---- 330		1	0.004476									
			06000 ---- 337		1	0.065904									
			11000 ---- 2754		1	.0091977									
			12000 ---- 410		1	0.000347									
			13101 ---- 703		1	3.1E-5									
		192	03000		1	0.003909									

			---- 2902											
			03004 ---- 328		1	0.003909								
			04001 ---- 301		1	0.017131								
			04002 ---- 304		1	7.525E-5								
			04003 ---- 303		1	8E-8								
			06000 ---- 337		1	0.037018								
			11000 ---- 2754		1	.0052194								
			12000 ---- 410		1	0.000196								
			13101 ---- 703		1	3E-6								
		193	03000 ---- 2902		1	0.007166								
			03004 ---- 328		1	0.007166								
			04001 ---- 301		1	0.031268								
			04002 ---- 304		1	0.000139								
			04003 ---- 303		1	1.2E-8								
			05001 ---- 330		1	0.004476								
			06000 ---- 337		1	0.065904								
			11000 ---- 2754		1	.00919768								
			12000 ----		1	0.000347								

			410											
			13101 ---- 703		1	3.1E-5								
		200	03000 ---- 2902		1	0.000474								
			03004 ---- 328		1	0.000474								
			04001 ---- 301		1	0.04333								
			06000 ---- 337		1	0.21772								
			11000 ------- 2754		1	0.018768 997								
		201	05002 ---- 333		1	2E-9								
			11000 ---- 2754		1	7.2E-7								
			11000 ---- 10312		1	1.1E-9								
		202	05002 ---- 333		1	2.9E-10								
			11000 ---- 2754		1	4.9E-7								
			11000 ---- 10312		1	4.9E-10								
		203	05002 ---- 333		1	2.2E-9								
			11000 ---- 2754		1	7.7E-7								
			11000 ---- 10312		1	1.2E-9								
		204	05002 ---- 333		1	9.5E-10								
			11000 ---- 2754		1	3.4E-7								

			11000 ---- 10312		1	5.1E-10								
		205	05002 ---- 333		1	3.9E-7								
			11000 ---- 2754		1	0.00014								
			11000 ---- 10312		1	2.1E-7								
		206	05002 ---- 333		1	4.4E-6								
			11000 ---- 2754		1	0.0073								
			11000 ---- 10312		1	7.3E-6								
		207	05002 ---- 333		1	3.9E-7								
			11000 ---- 2754		1	0.00014								
			11000 ---- 10312		1	2.1E-7								
		208	05002 ---- 333		1	6.2E-5								
			11000 ---- 2754		1	0.00014								
			11000 ---- 10312		1	2.1E-7								
		209	05002 ---- 333		1	6.2E-5								
			11000 ---- 2754		1	0.022								
			11000 ---- 10312		1	3.3E-5								
		210	05002 ---- 333		1	1.2E-10								
			11000		1	1.9E-7								

			---- 2754												
			11000 ---- 10312		1	1.9E-10									
		211	05002 ---- 333		1	6.2E-5									
			11000 ---- 2754		1	0.022									
			11000 ---- 10312		1	3.3E-5									
		212	05002 ---- 333		1	6.2E-5									
			11000 ---- 2754		1	0.022									
			11000 ---- 10312		1	3.3E-5									
		213	03000 ---- 2902		1	.0119047									
			03004 ---- 328		1	.0119047									
			04001 ---- 301		1	0.32									
			05001 ---- 330		1	0.1									
			06000 ---- 337		1	0.258333									
			11000 ---- 2754		1	.0690476									
			11049 ---- 1325		1	0.002857									
			13101 ---- 703		1	2.8E-7									
		214	05002 ---- 333		1	5.6E-11									
			11000 ----		1	2E-8									

			2754												
			11000 ---- 10312		1	3E-11									
		215	05002 ---- 333		1	3.9E-7									
			11000 ---- 2754		1	0.00014									
			11000 ---- 10312		1	2.1E-6									
		216	03000 ---- 2902		1	0.0119									
			03004 ---- 328		1	0.0119									
			04001 ---- 301		1	0.32									
			05001 ---- 330		1	0.1									
			06000 ---- 337		1	0.2583									
			11000 ---- 2754		1	0.069									
			11049 ---- 1325		1	0.0029									
			13101 ---- 703		1	2.9E-7									
		217	05002 ---- 333		1	5.6E-11									
			11000 ---- 2754		1	2E-8									
			11000 ---- 10312		1	3E-11									
		218	05002 ---- 333		1	3.9E-7									
			11000 ---- 2754		1	0.00014									

			11000 ---- 10312		1	2.1E-7									
		219	03000 ---- 2902		1	0.000125									
			03004 ---- 328		1	0.000125									
			04001 ---- 301		1	0.018903									
			06000 ---- 337		1	0.116708									
			11000 ---- 2754		1	.0131912									
		220	03000 ---- 2902		1	0.003257									
			03004 ---- 328		1	0.003257									
			04001 ---- 301		1	0.01402									
			04002 ---- 304		1	5.6E-5									
			05001 ---- 330		1	0.002021									
			06000 ---- 337		1	0.02552									
			11000 ---- 2754		1	0.003835									
			12000 ---- 410		1	0.000165									
			13101 ---- 703		1	1.4E-5									

TABLE 5. Description of harmful substances

Substance code	Substance name	MPC	Coefficient of ordered sedimentation
- ------- 150	Sodium hydroxide (lye, caustic soda)	0.01	1
- ------- 10226	Titanium dioxide	0.5	1
01002 ------- 110	Vanadium and its compounds (in terms of vanadium pentoxide)	0.02	1
01003 ------- 123	Iron and its compounds (in terms of iron)	0.4	1
01009 ------- 184	Lead and its compounds (in terms of lead)	0.00 1	1
01010 ------- 203	Chromium and its compounds (in terms of chromium trioxide)	0.00 2	1
01104 ------- 143	Mangan and its compounds (in terms of mangan)	0.01	1
03000 ------- 323	Substances in the form of suspended solid particles (microparticles and fibres)	0.02	1
03000 ------- 2902	Substances in the form of suspended solid particles (microparticles and fibres)	0.5	1
03000 ------- 10368	Substances in the form of suspended solid particles (microparticles and fibres)	0.6	1
03000 ------- 10442	Substances in the form of suspended solid particles (microparticles and fibres)	0	1
03004	Soot	0,15	1
05002 ------- 333	Hydrogen sulphide (H2S)	0.00 8	1
05004 ------- 322	Sulfuric acid (H2S04) (sulphuric acid)	0.3	1
06000 ------- 337	Carbon oxide	5	1
07000 ------- 11812	Carbon dioxide	0	1
11000 ------- 514	Non-methane volatile organic compounds (NMVOC):	0.1	1
11000 ------- 1042	Non-methane volatile organic compounds (NMVOC):	0.1	1
11000 ------- 1056	Non-methane volatile organic compounds (NMVOC):	0.05	1
11000 ------- 1061	Non-methane volatile organic compounds (NMVOC):	5	1

11000 ------- 1319	Non-methane volatile organic compounds (NMVOC):	0.05	1
11000 ------- 2704	Non-methane volatile organic compounds (NMVOC):	5	1
11000 ------- 2732	Non-methane volatile organic compounds (NMVOC):	1.2	1
11000 ------- 2735	Non-methane volatile organic compounds (NMVOC):	0.05	1
11000 ------- 2750	Non-methane volatile organic compounds (NMVOC):	0.2	1
11000 ------- 2752	Non-methane volatile organic compounds (NMVOC):	1	1
11000 ------- 2754	Non-methane volatile organic compounds (NMVOC):	1	1
11000 ------- 10312	Non-methane volatile organic compounds (NMVOC):	0	1
11000 ------- 10411	Non-methane volatile organic compounds (NMVOC):	0	1
11001 ------- 2001	Acrylonitrile	0.3	1
11007 ------- 1401	Acetone	0.35	1
11009 ------- 1210	Butyl acetate	0.1	1
11020 ------- 1246	Ethylcellosolve	0.7	1
11021 ------- 1240	Ethyl acetate	0.1	1
11030 ------- 616	Xylene	0.2	1
11037 ------- 620	Styrene	0.04	1
11041 ------- 621	Toluene	0.6	1
11049 ------- 1325	Formaldehyde	0.035	1
12000 ------- 410	Methane	50	1
13101 ------- 703	Benzo[a]pyrene	0.0001	1
16000 ------- 343	Fluor and its compounds (in terms of fluor)	0.03	1
16000 ------- 344	Fluor and its compounds (in terms of fluor)	0.2	1

16001 ------- 342	Hydrogen fluoride	0.02	1

TABLE 6. Description of harmful substances summation groups

Group code	Substances comprising the summation groups (codes)										Coefficient potent.
	1	2	3	4	5	6	7	8	9	10	
3	04003 ------- 303	05002 ------- 333									1
4	04003 ------- 303	05002 ------- 333	11049 ------- 1325								1
5	04003 ------- 303	11049 ------- 1325									1
10	01002 ------- 110	01104 ------- 143									1
11	01002 ------- 110	05001 ------- 330									1
12	01002 ------- 110	01010 ------- 203									1
27	01009 ------- 184	05001 ------- 330									1
28	05004 ------- 322	05001 ------- 330									1
30	05001 ------- 330	05002 ------- 333									1
31	04001 ------- 301	05001 ------- 330									1
35	05001 ------- 330	16001 ------- 342									1
37	04001 ------- 301	04003 ------- 303	04002 ------- 304	05001 ------- 330							1
39	05002 ------- 333	11049 ------- 1325									1
11002	16001 ------- 342	16000 ------- 344									1

TABLE 7. Description of background concentrations distribution (U - wind speed m/sec)

City code	Substance code	Background ToR	Coordinate of observation post		Conc. (fractions of MPC), at U<=2	Concentration (fractions of MPC), at 2<U<U*, by direction							
			X, m	Y, m		N	NE	E	SE	S	SW	W	NW
1	- ---- 150	b			0.4								
	01010 ---- 203	b			0.3								
	01104 ---- 143	b			0.4								
	03000 ---- 2902	b			0.1								
	04001 ---- 301	b			0.04								
	05001 ---- 330	b			0.4								
	06000 ---- 337	b			0.08								
	11000 ---- 1042	b			0.4								
	11000 ---- 2732	b			0.4								
	11000 ---- 2752	b			0.4								
	11000 ---- 2754	b			0.4								
	11007 ---- 1401	b			0.11								
	11009 ---- 1210	b			0.4								
	11020 ---- 1246	b			0.4								
	11021 ---- 1240	b			0.4								
	11030 ----	b			0.4								

	11041 - - - - 621	b			0.4								
	16000 - - - - 343				0.4								

List of sources emissions of which comprise substances for calculation

City code	Substance code	Substance name	Production site code	Source code	Emission g/sec	Emission tones/year	Hazard class.	Coordinate of a point source, or a beginning of a line source, or a centre of symmetry of a planar source		Coordinate of an end of a line source, or length and width of a planar source, or a point source with a rectangular neck		Source height, m	Diameter of a point source, or a planar source, or velocity of PGVS for a line source,	Flow rate of PGVS, m3/sec	Temperature of PGCS (deg. C)
								X1, m	Y1, m	X2, m	Y2, m				
1	- ------- 150	Sodium hydroxide (lye, caustic soda)	1	77	0.000333	0.000346		2135	5586			7.5	0.56	1.59	16
			1	82	0.0005	0.00131		2119	5590			2	0.5	0.294	27.8
			1	85	1.8E-5	0.005776		2139	5555			7.5	0.72	0.371	19
			1	86	3.3E-5	0.003136		2138	5560			7.5	0.72	0.508	19
	- - - - - 10226	Titanium dioxide	1	20	0.000131	1.5E-5		1534	7443			9.2	0.4	0.779	18
			1	79	0.000131	0.000123		2139	5544			7.5	0.89	0.989	16
			1	80	0.000131	8.3E-5		2143	5540			2	0.5	0.294	27.8
			1	96	0.000131	1E-5		1729	7085			2	0.5	0.294	27.8
			1	156	0.000131	1.5E-5		1398	7273			10	0,15	0.559	20
			1	174	0.000131	7E-6		1234	7300			2.7	0.1	0.077	16
	01002 ------- 110	Vanadium and its compounds (in terms of vanadium pentoxide)	1	79	0.000114	3E-6		2139	5544			7.5	0.89	0.989	16
	01003 ------- 123	Iron and its compounds (in terms of iron)	1	3	0.00201	0.000607		1696	7395			8	0.25	0.557	17
			1	4	0.00138	0.000433		1704	7392			7.3	0.25	0.671	17
			1	5	0.0004	0.00026		1704	7389			7.4	0.2	0.218	17
			1	20	0.00153	0.000937		1534	7443			9.2	0.4	0.779	18
			1	79	0.0039	0.004435		2139	5544			7.5	0.89	0.989	16
			1	80	0.003973	0.048626		2143	5540			2	0.5	0.294	27.8
			1	96	0.0016	0.00012		1729	7085			2	0.5	0.294	27.8
			1	156	0.004	0.002789		1398	7273			10	0,15	0.559	20
			1	174	0.00078	9E-5		1234	7300			2.7	0.1	0.077	16
	01009 ------- 184	Lead and its compounds (in terms of lead)	1	23	6E-6	8E-7		1558	7442			10	0.5	0.794	18
	01010 ------- 203	Chromium and its compounds (in terms of chromium trioxide)	1	20	3E-6	2E-6		1534	7443			9.2	0.4	0.779	18
			1	79	0.000307	1.2E-5		2139	5544			7.5	0.89	0.989	16
			1	80	0.000307	1.4E-5		2143	5540			2	0.5	0.294	27.8
			1	156	3E-6	1E-6		1398	7273			10	0,15	0.559	20
	01104 ------- 143	Mangan and its compounds (in terms of mangan)	1	3	0.000148	5.3E-5		1696	7395			8	0.25	0.557	17
			1	4	0.000134	4.7E-5		1704	7392			7.3	0.25	0.671	17
			1	5	3.7E-5	2.6E-5		1704	7389			7.4	0.2	0.218	17

			1	20	0.0005	9.93E-5		1534	7443			9.2	0.4	0.779	18
			1	79	0.00053	0.000511		2139	5544			7.5	0.89	0.989	16
			1	80	0.00052	0.001792		2143	5540			2	0.5	0.294	27.8
			1	96	0.000435	3.3E-5		1729	7085			2	0.5	0.294	27.8
			1	156	0.00061	0.000238		1398	7273			10	0,15	0.559	20
			1	174	0.000273	2.4E-5		1234	7300			2.7	0.1	0.077	16
	03000 ------- 323	Substances in the form of suspended solid particles (microparticles and fibres)	1	20	0.000472	5.3E-5		1534	7443			9.2	0.4	0.779	18
			1	79	0.000472	0.000451		2139	5544			7.5	0.89	0.989	16
			1	80	0.000472	0.000311		2143	5540			2	0.5	0.294	27.8
			1	96	0.000472	3.5E-5		1729	7085			2	0.5	0.294	27.8
			1	156	0.000472	0.000203		1398	7273			10	0,15	0.559	20
			1	174	0.000472	2.7E-5		1234	7300			2.7	0.1	0.077	16
	03000 ------- 2902	Substances in the form of suspended solid particles (microparticles and fibres)	1	1	0.04	0.02073		1669	7423			10	0.63	1.9	15
			1	7	0.03798	0.12649		1726	7455			2	0.5	0.294	27.8
			1	8	0.03165	0.10521		1726	7442			2	0.5	0.294	27.8
			1	9	0.09207	0.22639		1708	7448			2	0.5	0.294	27.8
			1	10	0.04199	0.07367		1725	7434			2	0.5	0.294	27.8
			1	11	0.00221	3.4E-5		1595	7445			8	0.25	0.159	17
			1	16	0.00332	0.00082		1575	7447			9	0.31	0.201	19
			1	19	0.0027	0.000513		1569	7451			9.5	0.1	0.186	17
			1	22	0.0089	0.0032		1561	7442			10	0.315	0.217	18
			1	27	0.0106	0.00336		1535	7433			6.3	0.19	0.526	17
			1	30	0.0235	0.000458		1503	7424			9.1	1.9	6.25	21
			1	31	0.0248	0.000485		1503	7433			9.1	1.9	6.63	21
			1	32	0.00362	0.000651		1503	7429			9.9	0.24	0.097	118
			1	33	0.0034	0.000651		1503	7431			9.9	0.24	0.097	131
			1	34	0.029	0.000168		1503	7440			9.1	1.9	6.75	19
			1	35	0.0308	0.00017		1503	7446			9.1	1.9	6.84	19
			1	42	0.0075	3.2E-5		2196	5555			1.5	0,15	0.189	345
			1	45	0.0048	0.000172		1603	5085			1.5	0,15	0.138	278
			1	101	0.000646	2E-5		2385	9190			2.3	0.055	0.044	120
			1	104	0.002352	6E-5		2309	8222			2.3	0.16	0.164	133
			1	107	0.00162	4.24E-5		900	8357			3	0.06	0.04	129
			1	110	0.000752	2.02E-5		887	8357			2.5	0.05	0.033	72
			1	111	0.001091	2.73E-5		1284	7293			5.5	0.095	0.103	119
			1	112	0.001518	3.91E-5		1284	7287			5.5	0.095	0.149	122
			1	113	0.001357	3.56E-5		1283	7281			5.5	0.095	0.134	97
			1	114	0.00108	2.86E-5		1283	7276			5.5	0.095	0.109	74
			1	120	0.001123	3E-5		2190	5852			4.5	0.07	0.092	165
			1	121	0.001267	2E-5		2193	5846			4.5	0.07	0.092	162
			1	124	0.002081	5.66E-5		2193	5825			4	0.095	0.122	88
			1	125	0.002314	6.02E-5		2193	5819			4	0.095	0.14	91
			1	126	0.002248	5.97E-5		2193	5813			4	0.095	0.136	89
			1	127	0.002451	6.57E-5		2193	5807			4	0.095	0.146	87

			1	130	0.002437	6E-5		2364	3939			2.3	0.16	0.165	139
			1	136	0.002863	7.81E-5		1294	3283			5.5	0.095	0.143	79
			1	137	0.002928	7.77E-5		1286	3283			5.5	0.095	0.153	91
			1	140	0.000704	2E-5		2564	2914			2.3	0.055	0.045	122
			1	143	0.000766	2E-5		2541	2339			2.3	0.055	0.044	119
			1	150	0.000508	1.36E-5		949	1988			3.5	0.055	0.028	77
			1	151	0.000562	1.5E-5		948	1997			3.5	0.055	0.031	65
			1	152	0.000462	1.19E-5		2825	11215			4	0.055	0.03	68
			1	153	0.000474	1.24E-5		2825	11214			4	0.055	0.029	69
			1	154	0.000776	3E-5		1721	7015			1.5	0.065	0.078	173
			1	158	0.00086	2.5E-5		1388	7227			3.5	0.12	0.029	158
			1	166	0.022292	0.000321		2212	6945			15.4	0.5	6.8	500
			1	167	0.022292	0.000321		2212	6958			15.4	0.5	6.8	500
			1	190	0.00125			2501	6118	560	4600	2		0	27.4
			1	191	0.00912			2281	7166	200	800	2		0	27.4
			1	192	0.003909			1912	5506	225	620	2		0	27.4
			1	193	0.007166			1318	6500	225	1500	2		0	27.4
			1	200	0.000474			1092	5402	650	4000	2		0	27.4
			1	213	0.00744			636	3832			7	0,15	1.08	630
			1	216	0.00744			630	6977			7	0,15	1.08	630
			1	219	0.000125			1267	4096	170	100	2		0	27.4
			1	220	0.003257			1233	4932			8	0.5	0.295	27.4
			1	221	0.00586			1327	6389	400	360			0	27.4
	03000 ------- 10368	Substances in the form of suspended solid particles (microparticles and fibres)	1	11	0.000134	2.2E-5		1595	7445			8	0.25	0.159	17
	03000 ------- 10442	Substances in the form of suspended solid particles (microparticles and fibres)	1	175	1E-5	3.6E-5		1696	5008			5.5	0.26	0.242	19
	03004 - - - - 328	Soot	1	190	0.000125			2501	6118	560	4600	2		0	27.4
			1	191	0.00912			2281	7166	200	800	2		0	27.4
			1	192	0.003909			1912	5506	225	620	2		0	27.4
			1	193	0.007166			1318	6500	225	1500	2		0	27.4
			1	200	0.000474			1092	5402	650	4000	2		0	27.4
			1	213	0.00744			636	3832			7	0,15	1.08	630
			1	216	0.00744			630	6977			7	0,15	1.08	630
			1	219	0.000125			1267	4096	170	100	2		0	27.4
			1	220	0.003257			1233	4932			8	0.5	0.295	27.4
			1	221	0.00586			1327	6389	400	360			0	27.4
	04001 ------- 301	Nitrogen oxides (in terms of nitrogen dioxide (NO + NO2))	1	3	0.007334	0.001523		1696	7395			8	0.25	0.557	17
			1	5	0.001833	0.000381		1704	7389			7.4	0.2	0.218	17
			1	13	0.00427	2E-6		1580	7430			8	0.2	0.103	18
			1	14	0.00439	2E-6		1580	7436			8	0.2	0.101	18
			1	15	0.0184	2.9E-5		1558	7438			8	0.35	0.427	18

1	20	0.009167	0.0001614		1534	7443			9.2	0.4	0.779	18
1	25	0.00332	0.000737		1548	7438			10	0.32	0.346	21
1	26	0.00428	1.3E-5		1535	7451			1.5	0.14	0.101	20
1	28	0.001256	0.004124		1517	7425			8.7	1.2	4.92	19
1	29	0.00011	0.000336		1519	7434			7.5	0.82	0.433	19
1	32	0.01271	0.015358		1503	7429			9.9	0.24	0.097	118
1	33	0.01426	0.016683		1503	7431			9.9	0.24	0.097	131
1	39	0.2153	1.234292		1690	7640			25	0.92	5.59	119.5
1	40	0.2108	0.110445		1690	7646			25	0.92	5.53	121.4
1	41	0.2014	1.993778		1690	7652			25	0.92	5.59	115.3
1	42	0.03667	0.004321		2196	5555			1.5	0,15	0.189	345
1	45	0.0218	0.020198		1603	5085			1.5	0,15	0.138	278
1	51	0.003102	0.002792		1684	5452			5	0.3	0.065	18
1	52	0.003102	0.002792		1684	5442			5	0.3	0.065	18
1	74	0.48892	1.484105		1560	6384			30	1	4.52	134
1	75	0.035	0.283522		1568	6380			12	0.45	0.643	136
1	76	0.0325	0.290267		1576	6379			12	0.45	0.644	138
1	79	0.009167	0.001312		2139	5544			7.5	0.89	0.989	16
1	80	0.009167	0.00909		2143	5540			2	0.5	0.294	27.8
1	104	0.047724	0.0013		2309	8222			2.3	0.16	0.164	133
1	107	0.00928	0.0003		900	8357			3	0.06	0.04	129
1	110	0.005181	0.0001		887	8357			2.5	0.05	0.033	72
1	111	0.018334	0.0005		1284	7293			5.5	0.095	0.103	119
1	112	0.022201	0.0006		1284	7287			5.5	0.095	0.149	122
1	113	0.023852	0.0007		1283	7281			5.5	0.095	0.134	97
1	114	0.015478	0.0004		1283	7276			5.5	0.095	0.109	74
1	120	0.022448	0.0006		2190	5852			4.5	0.07	0.092	165
1	121	0.021344	0.0006		2193	5846			4.5	0.07	0.092	162
1	124	0.019886	0.0005		2193	5825			4	0.095	0.122	88
1	125	0.0217	0.0006		2193	5819			4	0.095	0.14	91
1	126	0.019176	0.0005		2193	5813			4	0.095	0.136	89
1	127	0.022922	0.0006		2193	5807			4	0.095	0.146	87
1	130	0.056265	0.0061		2364	3939			2.3	0.16	0.165	139
1	136	0.014872	0.0004		1294	3283			5.5	0.095	0.143	79
1	137	0.023562	0.0006		1286	3283			5.5	0.095	0.153	91
1	140	0.013635	0.0004		2564	2914			2.3	0.055	0.045	122
1	143	0.012056	0.0003		2541	2339			2.3	0.055	0.044	119
1	150	0.003976	0.0001		949	1988			3.5	0.055	0.028	77
1	151	0.004123	0.0001		948	1997			3.5	0.055	0.031	65
1	152	0.00426	1.19E-5		2825	11215			4	0.055	0.03	68
1	153	0.004379	0.0001		2825	11214			4	0.055	0.029	69
1	154	0.024804	0.001		1721	7015			1.5	0.065	0.078	173
1	156	0.00072	0.00044		1398	7273			10	0,15	0.559	20
1	157	0.0081	0.004897		1386	7248			8	0.12	0.089	22
1	158	0.004785	0.000679		1388	7227			3.5	0.12	0.029	158
1	159	0.35042	1.677046		1560	6393			30	1	4.521	128
1	166	4.0125	0.005783		2212	6945			15.4	0.5	6.8	500
1	167	4.0125	0.005783		2212	6958			15.4	0.5	6.8	500
1	186	0.0011	1.35E-6		1596	7430			9.2	0.63	2.56	18

			1	187	0.001083	1.33E-6		1537	7435			9.2	0.63	2.52	18
			1	188	0.001078	1.32E-6		1534	7445			9.2	0.63	2.51	18
			1	189	0.00068	1.3E-6		1534	7446			9.2	0.4	0.696	18
			1	190	0.018903			2501	6118	560	4600	2		0	27.4
			1	191	0.03961			2281	7166	200	800	2		0	27.4
			1	192	0.017131			1912	5506	225	620	2		0	27.4
			1	193	0.03108			1318	6500	225	1500	2		0	27.4
			1	200	0.04333			1092	5402	650	4000	2		0	27.4
			1	213	0.2			636	3832			7	0,15	1.08	630
			1	216	0.2			630	6977			7	0,15	1.08	630
			1	219	0.018903			1267	4096	170	100	2		0	27.4
			1	220	0.01402			1233	4932			8	0.5	0.295	27.4
			1	221	0.02535			1327	6389	400	360			0	27.4
	04002 ---- 304	Nitrogen(1) Oxide (N2O)	1	191	0.00017			2281	7166	200	800	2		0	27.4
			1	192	7.525E-5			1912	5506	225	620	2		0	27.4
			1	193	0.000139			1318	6500	225	1500	2		0	27.4
			1	220	5.6E-5			1233	4932			8	0.5	0.295	27.4
			1	221	0.00011			1327	6389	400	360			0	27.4
	04002 ---- 11815	Nitrogen(1) Oxide (N2O)	1	32	8.78E-6	0.000277		1503	7429			9.9	0.24	0.097	118
			1	33	8.78E-6	0.000277		1503	7431			9.9	0.24	0.097	131
	04003 ---- 303	Ammonia	1	191	1E-7			2281	7166	200	800	2		0	27.4
			1	192	8E-8			1912	5506	225	620	2		0	27.4
			1	193	1.2E-8			1318	6500	225	1500	2		0	27.4
			1	221	4E-8			1327	6389	400	360			0	27.4
	05001 ---- 330	Sulphur dioxide	1	23	2E-7	3E-7		1558	7442			10	0.5	0.794	18
			1	32	0.00378	0.02604		1503	7429			9.9	0.24	0.097	118
			1	33	0.00427	0.02604		1503	7431			9.9	0.24	0.097	131
			1	42	0.01229	0.002124		2196	5555			1.5	0,15	0.189	345
			1	45	0.01035	0.011439		1603	5085			1.5	0,15	0.138	278
			1	101	0.000396	1E-5		2385	9190			2.3	0.055	0.044	120
			1	104	0.00164	4E-5		2309	8222			2.3	0.16	0.164	133
			1	107	0.00164	4.24E-5		900	8357			3	0.06	0.04	129
			1	110	0.000858	2.15E-5		887	8357			2.5	0.05	0.033	72
			1	111	0.001133	2.85E-5		1284	7293			5.5	0.095	0.103	119
			1	112	0.00149	3.78E-5		1284	7287			5.5	0.095	0.149	122
			1	113	0.001206	3.09E-5		1283	7281			5.5	0.095	0.134	97
			1	114	0.000981	2.64E-5		1283	7276			5.5	0.095	0.109	74
			1	120	0.00092	2E-5		2190	5852			4.5	0.07	0.092	165
			1	121	0.001012	3E-5		2193	5846			4.5	0.07	0.092	162
			1	124	0.001342	3.44E-5		2193	5825			4	0.095	0.122	88
			1	125	0.00182	4.76E-5		2193	5819			4	0.095	0.14	91
			1	126	0.001904	4.86E-5		2193	5813			4	0.095	0.136	89

			1	127	0.00219	5.47E-5		2193	5807			4	0.095	0.146	87
			1	130	0.001485	4E-5		2364	3939			2.3	0.16	0.165	139
			1	136	0.002431	6.18E-5		1294	3283			5.5	0.095	0.143	79
			1	137	0.001989	5.11E-5		1286	3283			5.5	0.095	0.153	91
			1	140	0.00045	1E-5		2564	2914			2.3	0.055	0.045	122
			1	143	0.000528	1E-5		2541	2339			2.3	0.055	0.044	119
			1	150	0.000616	1.61E-5		949	1988			3.5	0.055	0.028	77
			1	151	0.000558	1.37E-5		948	1997			3.5	0.055	0.031	65
			1	152	0.00039	9.5E-6		2825	11215			4	0.055	0.03	68
			1	153	0.000406	9.86E-6		2825	11214			4	0.055	0.029	69
			1	154	0.000624	2E-5		1721	7015			1.5	0.065	0.078	173
			1	158	0.001508	0.000999		1388	7227			3.5	0.12	0.029	158
			1	166	0.044583	0.000643		2212	6945			15.4	0.5	6.8	500
			1	167	0.044583	0.000643		2212	6958			15.4	0.5	6.8	500
			1	191	0.00569			2281	7166	200	800	2		0	27.4
			1	193	0.004476			1318	6500	225	1500	2		0	27.4
			1	213	0.0625			636	3832			7	0,15	1.08	630
			1	216	0.0625			630	6977			7	0,15	1.08	630
			1	220	0.002021			1233	4932			8	0.5	0.295	27.4
			1	221	0.00356			1327	6389	400	360			0	27.4
	05002 - - - - 333	Hydrogen sulphide (H2S)	1	201	2E-9			1621	5584			5	0.05	0	27.4
			1	202	2.9E-10			1621	5576			5	0.05	0	27.4
			1	203	2.2E-9			1621	5566			5	0.05	0	27.4
			1	204	9.5E-10			1621	5560			5	0.05	0	27.4
			1	205	3.9E-7			1621	5582			4	0.5	0	27.4
			1	206	4.4E-6			1621	5578			4	0.5	0	27.4
			1	207	3.9E-7			1621	5562			4	0.5	0	27.4
			1	208	6.2E-5			1621	5564			4	0.5	0	27.4
			1	209	6.2E-5			1620	5584			1.5	0.1	0	27.4
			1	210	1.2E-10			1622	5584			1.5	0.1	0	27.4
			1	211	6.2E-5			1620	5559			1.5	0.1	0	27.4
			1	212	6.2E-5			1622	5559			1.5	0.1	0	27.4
			1	214	2.8E-11			636	3828			7	0.05	0	27.4
			1	215	3.9E-7			636	3823			4	0.5	0	27.4
			1	217	2.8E-11			630	6969			7	0.05	0	27.4
			1	218	3.9E-7			630	6960			4	0.5	0	27.7
	05004 ------- 322	Sulfuric acid (H2S04) (sulphuric acid)	1	24	0.000378	0.000843		1550	7437			10	0.315	0.211	18
			1	78	0.000261	0.001019		2141	5580			7.5	0.29	0.596	19
			1	81	0.002739	0.021913		2144	5565			2	0.5	0.294	27.8
			1	83	0.002331	0.01867		1538	6204			2	0.5	0.294	27.8
			1	84	0.004014	0.066263		1524	6178			2	0.5	0.294	27.8
			1	97	0.000188	0.000266		1702	7078			11	0.42	0.906	19
	06000 - - - - 337	Carbon oxide	1	3	0.000666	0.00012		1696	7395			8	0.25	0.557	17
			1	5	0.000167	3E-5		1704	7389			7.4	0.2	0.218	17

1	13	0.065	0.000237		1580	7430			8	0.2	0.103	18
1	14	0.064	0.000237		1580	7436			8	0.2	0.101	18
1	15	0.188	0.001123		1558	7438			8	0.35	0.427	18
1	20	0.000411	0.000293		1534	7443			9.2	0.4	0.779	18
1	23	3E-7	4E-7		1558	7442			10	0.5	0.794	18
1	25	0.00433	0.001032		1548	7438			10	0.32	0.346	21
1	26	0.064	0.002089		1535	7451			1.5	0.14	0.101	20
1	28	0.037684	0.018454		1517	7425			8.7	1.2	4.92	19
1	29	0.003316	0.001624		1519	7434			7.5	0.82	0.433	19
1	32	0.10185	0.126294		1503	7429			9.9	0.24	0.097	118
1	33	0.09719	0.116627		1503	7431			9.9	0.24	0.097	131
1	39	0.0041	0.023956		1690	7640			25	0.92	5.59	119.5
1	40	0.004	0.0027		1690	7646			25	0.92	5.53	121.4
1	41	0.0041	0.037157		1690	7652			25	0.92	5.59	115.3
1	42	0.165	0.20289		2196	5555			1.5	0,15	0.189	345
1	45	0.1718	0.162544		1603	5085			1.5	0,15	0.138	278
1	51	0.116843	0.105159		1684	5452			5	0.3	0.065	18
1	52	0.116843	0.105159		1684	5442			5	0.3	0.065	18
1	74	0.02705	0.071406		1560	6384			30	1	4.52	134
1	75	0.0017	0.018927		1568	6380			12	0.45	0.643	136
1	76	0.0017	0.020315		1576	6379			12	0.45	0.644	138
1	79	0.00355	0.000615		2139	5544			7.5	0.89	0.989	16
1	80	0.00355	0.009922		2143	5540			2	0.5	0.294	27.8
1	101	0.033396	0.0009		2385	9190			2.3	0.055	0.044	120
1	104	0.016072	0.0004		2309	8222			2.3	0.16	0.164	133
1	107	0.10432	0.0028		900	8357			3	0.06	0.04	129
1	110	0.044451	0.0011		887	8357			2.5	0.05	0.033	72
1	111	0.020394	0.0006		1284	7293			5.5	0.095	0.103	119
1	112	0.027714	0.0008		1284	7287			5.5	0.095	0.149	122
1	113	0.021172	0.0006		1283	7281			5.5	0.095	0.134	97
1	114	0.020928	0.0006		1283	7276			5.5	0.095	0.109	74
1	120	0.058972	0.0016		2190	5852			4.5	0.07	0.092	165
1	121	0.060168	0.0017		2193	5846			4.5	0.07	0.092	162
1	124	0.02806	0.0008		2193	5825			4	0.095	0.122	88
1	125	0.03136	0.0009		2193	5819			4	0.095	0.14	91
1	126	0.031416	0.0009		2193	5813			4	0.095	0.136	89
1	127	0.035332	0.001		2193	5807			4	0.095	0.146	87
1	130	0.011385	0.0003		2364	3939			2.3	0.16	0.165	139
1	136	0.190905	0.0052		1294	3283			5.5	0.095	0.143	79
1	137	0.128673	0.0036		1286	3283			5.5	0.095	0.153	91
1	140	0.032805	0.0009		2564	2914			2.3	0.055	0.045	122
1	143	0.03146	0.0009		2541	2339			2.3	0.055	0.044	119
1	150	0.032228	0.0009		949	1988			3.5	0.055	0.028	77
1	151	0.038161	0.001		948	1997			3.5	0.055	0.031	65
1	152	0.03342	0.0009		2825	11215			4	0.055	0.03	68
1	153	0.027347	0.0008		2825	11214			4	0.055	0.029	69
1	154	0.057798	0.0024		1721	7015			1.5	0.065	0.078	173
1	156	0.003547	0.00214		1398	7273			10	0,15	0.559	20
1	157	0.0195	0.006856		1386	7248			8	0.12	0.089	22

		1	158	0.003944	0.000541		1388	7227			3.5	0.12	0.029	158
		1	159	0.03878	0.150304		1560	6393			30	1	4.521	128
		1	166	0.111458	0.001606		2212	6945			15.4	0.5	6.8	500
		1	167	0.111458	0.001606		2212	6958			15.4	0.5	6.8	500
		1	186	0.030356	5.7E-5		1596	7430			9.2	0.63	2.56	18
		1	187	0.029881	5.7E-5		1537	7435			9.2	0.63	2.52	18
		1	188	0.029763	5.6E-5		1534	7445			9.2	0.63	2.51	18
		1	189	0.03	0.0002235		1534	7446			9.2	0.4	0.696	18
		1	190	0.116708			2501	6118	560	4600	2		0	27.4
		1	191	0.08156			2281	7166	200	800	2		0	27.4
		1	192	0.037018			1912	5506	225	620	2		0	27.4
		1	193	0.06288			1318	6500	225	1500	2		0	27.4
		1	200	0.21772			1092	5402	650	4000	2		0	27.4
		1	213	0.161458			636	3832			7	0,15	1.08	630
		1	216	0.1615			630	6977			7	0,15	1.08	630
		1	219	0.116708			1267	4096	170	100	2		0	27.4
		1	220	0.02552			1233	4932			8	0.5	0.295	27.4
		1	221	0.0493			1327	6389	400	360			0	27.4
07000 - - - - 11812	Carbon dioxide	1	32	0.65	20.507		1503	7429			9.9	0.24	0.097	118
		1	33	0.65	20.507		1503	7431			9.9	0.24	0.097	131
11000 ------- 514	Non-methane volatile organic compounds (NMVOC):	1	23	7E-6	1E-5		1558	7442			10	0.5	0.794	18
11000 ------- 1042	Non-methane volatile organic compounds (NMVOC):	1	12	0.0123	0.001305		1581	7420			10	0,15	0.552	20
		1	30	0.043	0.007407		1503	7424			9.1	1.9	6.25	21
		1	31	0.045	0.007858		1503	7433			9.1	1.9	6.63	21
		1	36	0.000303	0.000218		1503	7451			9.1	0.18	0.243	19
		1	37	0.00083	0.000193		1502	7453			9.1	0.11	0.215	19
		1	38	0.000143	0.000103		1503	7452			8.3	0.25	0.543	19
11000 ------- 1056	Non-methane volatile organic compounds (NMVOC):	1	95	0.000917	0.00143		1695	5004			5.5	0.26	0.221	19
11000 ------- 1061	Non-methane volatile organic compounds (NMVOC):	1	12	0.0081	0.001958		1581	7420			10	0,15	0.552	20
		1	18	0.000956	0.001376		1568	7439			10	0.5	0.877	18
		1	30	0.066	0.001384		1503	7424			9.1	1.9	6.25	21
		1	31	0.069	0.001467		1503	7433			9.1	1.9	6.63	21
		1	36	5.7E-5	4.1E-5		1503	7451			9.1	0.18	0.243	19
		1	37	0.0014	3.6E-5		1502	7453			9.1	0.11	0.215	19
		1	38	2.3E-5	1.9E-5		1503	7452			8.3	0.25	0.543	19
11000 ------- 1319	Non-methane volatile organic compounds (NMVOC):	1	18	0.000956	0.001376		1568	7439			10	0.5	0.877	18
11000 -------	Non-methane volatile organic compounds (NMVOC)	1	23	0.0214	0.03075		1558	7442			10	0.5	0.794	18

2704														
		1	53	0.006773	0.000203		1514	7305			1	0.1	0	27.8
		1	54	0.013163	0.41511		1516	7298			3	0.05	0	27.8
		1	55	0.003483	0.000834		1507	7306			1	0.1	0	27.8
		1	56	0.001391	8.5E-6		1519	7305			1	0.1	0	27.8
		1	57	0.002703	0.085226		1518	7298			3	0.05	0	27.8
		1	58	0.000709	3.5E-5		1525	7306			1	0.1	0	27.8
		1	62	0.005911	0.000154		1514	7322			3	0.05	0	27.8
		1	63	0.011488	0.362287		1500	7325			1	0.1	0	27.8
		1	64	0.00304	0.000635		1508	7319			1	0.1	0	27.8
11000 ------- 2732	Non-methane volatile organic compounds (NMVOC):	1	12	0.0348	0.020256		1581	7420			10	0,15	0.552	20
		1	17	0.131	0.00844		1581	7456			8	0,15	0.568	19
		1	18	0.00446	0.006423		1568	7439			10	0.5	0.877	18
		1	43	1E-6	2E-10		2224	5554			3	0.05	0	27.8
		1	44	1E-7	2E-10		2233	5554			3	0.05	0	27.8
		1	46	5E-6	7E-9		1600	5068			1	0.1	0	27.8
		1	47	3E-6	4.3E-5		1608	5068			3	0.05	0	27.8
		1	94	0.0096	0.0894		1689	5013			5.5	0.37	0.308	19
11000 ------- 2735	Non-methane volatile organic compounds (NMVOC):	1	18	0.0003	1.1E-5		1568	7439			10	0.5	0.877	18
		1	94	0.000222	0.000383		1689	5013			5.5	0.37	0.308	19
11000 ------- 2750	Non-methane volatile organic compounds (NMVOC):	1	30	0.005171	0.006645		1503	7424			9.1	1.9	6.25	21
		1	31	0.005485	0.00705		1503	7433			9.1	1.9	6.63	21
		1	36	0.000272	0.000196		1503	7451			9.1	0.18	0.243	19
		1	37	0.0014	0.000173		1502	7453			9.1	0.11	0.215	19
		1	38	0.000128	9.2E-5		1503	7452			8.3	0.25	0.543	19
11000 ------- 2752	Non-methane volatile organic compounds (NMVOC):	1	30	0.204	0.023394		1503	7424			9.1	1.9	6.25	21
		1	31	0.217	0.024816		1503	7433			9.1	1.9	6.63	21
		1	36	0.000957	0.000689		1503	7451			9.1	0.18	0.243	19
		1	37	0.0014	0.00061		1502	7453			9.1	0.11	0.215	19
		1	38	0.000451	0.000325		1503	7452			8.3	0.25	0.543	19
11000 ------- 2754	Non-methane volatile organic compounds (NMVOC):	1	6	1E-8	4E-8		2303	8206			1	0.1	0	27.8
		1	13	0.00034	4E-7		1580	7430			8	0.2	0.103	18
		1	14	0.00034	4E-7		1580	7436			8	0.2	0.101	18
		1	15	0.000544	4.2E-6		1558	7438			8	0.35	0.427	18
		1	23	1.6E-5	2.3E-5		1558	7442			10	0.5	0.794	18
		1	25	0.000478	0.000103		1548	7438			10	0.32	0.346	21
		1	26	0.00034	1.8E-6		1535	7451			1.5	0.14	0.101	20
		1	28	0.000176	0.000577		1517	7425			8.7	1.2	4.92	19
		1	29	1.5E-5	5.1E-5		1519	7434			7.5	0.82	0.433	19
		1	48	6E-7	1.8E-5		1735	7679			3	0.05	0	27.8

1	49	6E-7	6E-9		1734	7679			1	0.1	0	27.8
1	51	0.000435	0.000391		1684	5452			5	0.3	0.065	18
1	52	0.000435	0.000391		1684	5442			5	0.3	0.065	18
1	59	5E-6	4E-7		1520	7302			3	0.05	0	27.8
1	60	3E-6	9.6E-5		1502	7326			3	0.05	0	27.8
1	61	2.5E-6	1.6E-6		1525	7319			1	0.1	0	27.8
1	65	3E-6	1.6E-7		1496	7321			1	0.1	0	27.8
1	66	2.1E-6	6.6E-5		1498	7325			3	0.05	0	27.8
1	67	2E-6	1.7E-6		1491	7318			1	0.1	0	27.8
1	101	0.0333	0.001		2385	9190			2.3	0.055	0.044	120
1	102	2.3E-10	4.2E-13		2399	9199			1	0.1	0	27.8
1	103	2E-9	6E-8		2390	9200			3	0.05	0	27.8
1	104	0.24	0.0069		2309	8222			2.3	0.16	0.164	133
1	105	2E-9	3E-12		2293	8205			2	0.051	0.007	27.8
1	107	0.0267	0.0008		900	8357			3	0.06	0.04	129
1	108	1.9E-10	3.3E-13		901	8324			1	0.1	0	27.8
1	109	1E-9	4E-8		900	8313			3	0.05	0	27.8
1	110	0.016	0.0005		887	8357			2.5	0.05	0.033	72
1	111	0.18	0.0052		1284	7293			5.5	0.095	0.103	119
1	112	0.18	0.0052		1284	7287			5.5	0.095	0.149	122
1	113	0.18	0.0052		1283	7281			5.5	0.095	0.134	97
1	114	0.18	0.0052		1283	7276			5.5	0.095	0.109	74
1	115	1E-9	2.3E-12		1288	7301			1	0.1	0	27.8
1	116	1E-8	3E-7		1295	7301			3	0.05	0	27.8
1	120	0.0567	0.0016		2190	5852			4.5	0.07	0.092	165
1	121	0.0567	0.0016		2193	5846			4.5	0.07	0.092	162
1	122	3.9E-10	7.1E-13		2201	5846			1	0.1	0	27.8
1	123	3E-9	9E-8		2209	5846			3	0.05	0	27.8
1	124	0.18	0.0052		2193	5825			4	0.095	0.122	88
1	125	0.18	0.0052		2193	5819			4	0.095	0.14	91
1	126	0.18	0.0052		2193	5813			4	0.095	0.136	89
1	127	0.18	0.0052		2193	5807			4	0.095	0.146	87
1	128	1E-9	2.3E-12		2203	5819			1	0.1	0	27.8
1	129	1E-8	3E-7		2205	5825			3	0.05	0	27.8
1	130	0.24	0.0069		2364	3939			2.3	0.16	0.165	139
1	131	2E-9	3E-12		2351	3925			1	0.1	0	27.8
1	132	1E-8	4E-7		2359	3925			3	0.05	0	27.8
1	136	0.18	0.0052		1294	3283			5.5	0.095	0.143	79
1	137	0.18	0.0052		1286	3283			5.5	0.095	0.153	91
1	138	1E-9	2.3E-12		1321	3283			1	0.1	0	27.8
1	139	1E-8	3E-7		1310	3283			3	0.05	0	27.8
1	140	0.0333	0.001		2564	2914			2.3	0.055	0.045	122
1	141	2.3E-10	4.2E-13		2574	2925			1	0.1	0	27.8
1	142	2E-9	6E-8		2583	2925			3	0.05	0	27.8
1	143	0.0333	0.001		2541	2339			2.3	0.055	0.044	119
1	144	2.3E-10	4.2E-13		2561	2324			1	0.1	0	27.8
1	145	2E-9	6E-8		2552	2348			3	0.05	0	27.8
1	150	0.016	0.0005		949	1988			3.5	0.055	0.028	77
1	151	0.016	0.0005		948	1997			3.5	0.055	0.031	65

			1	152	0.016	0.0005		2825	11215			4	0.055	0.03	68
			1	153	0.016	0.0005		2825	11214			4	0.055	0.029	69
			1	154	0.0293	0.0013		1721	7015			1.5	0.065	0.078	173
			1	157	0.000522	0.000685		1386	7248			8	0.12	0.089	22
			1	166	0.0535	0.000771		2212	6945			15.4	0.5	6.8	500
			1	167	0.0535	0.000771		2212	6958			15.4	0.5	6.8	500
			1	168	2.6E-7	8.2E-6		2224	6952			3	0.05	0	27.8
			1	169	1.5E-7	4.8E-6		2200	6877			3	0.05	0	27.8
			1	170	2E-7	1E-9		2200	6888			1	0.1	0	27.8
			1	181	1E-5	0.000552		2213	7650			3	0.05	0	27.4
			1	182	1.5E-5	5E-7		2213	6751			1	0.1	0	27.4
			1	183	1.5E-5	0.000489		2217	7650			3	0.05	0	27.4
			1	184	2.3E-5	1E-6		2217	7651			1	0.1	0	27.4
			1	185	6E-7	1.6E-6		2220	7651			1	0.1	0	27.4
			1	186	0.000283	3.4E-6		1596	7430			9.2	0.63	2.56	18
			1	187	0.000279	3.3E-6		1537	7435			9.2	0.63	2.52	18
			1	188	0.000278	3.3E-6		1534	7445			9.2	0.63	2.51	18
			1	189	0.000175	4E-7		1534	7446			9.2	0.4	0.696	18
			1	190	0.0924051			2501	6118	560	4600	2		0	27.4
			1	191	0.0115			2281	7166	200	800	2		0	27.4
			1	192	0.0052194			1912	5506	225	620	2		0	27.4
			1	193	0.00839			1318	6500	225	1500	2		0	27.4
			1	200	0.018768997			1092	5402	650	4000	2		0	27.4
			1	201	7.2E-7			1621	5584			5	0.05	0	27.4
			1	202	4.9E-7			1621	5576			5	0.05	0	27.4
			1	203	7.7E-7			1621	5566			5	0.05	0	27.4
			1	204	3.4E-7			1621	5560			5	0.05	0	27.4
			1	205	0.00014			1621	5582			4	0.5	0	27.4
			1	206	0.0073			1621	5578			4	0.5	0	27.4
			1	207	0.00014			1621	5562			4	0.5	0	27.4
			1	208	0.00014			1621	5564			4	0.5	0	27.4
			1	209	0.022			1620	5584			1.5	0.1	0	27.4
			1	210	1.9E-7			1622	5584			1.5	0.1	0	27.4
			1	211	0.022			1620	5559			1.5	0.1	0	27.4
			1	212	0.022			1622	5559			1.5	0.1	0	27.4
			1	213	0.043155			636	3832			7	0,15	1.08	630
			1	214	1E-8			636	3828			7	0.05	0	27.4
			1	215	0.00014			636	3823			4	0.5	0	27.4
			1	216	0.0432			630	6977			7	0,15	1.08	630
			1	217	1E-8			630	6969			7	0.05	0	27.4
			1	218	0.00014			630	6960			4	0.5	0	27.7
			1	219	0.0131912			1267	4096	170	100	2		0	27.4
			1	220	0.003835			1233	4932			8	0.5	0.295	27.4
			1	221	0.00705			1327	6389	400	360			0	27.4
	11000 ------- 10312	Non-methane volatile organic compounds (NMVOC):	1	201	1.1E-9			1621	5584			5	0.05	0	27.4
			1	202	4.9E-10			1621	5576			5	0.05	0	27.4

		1	203	1.2E-9			1621	5566			5	0.05	0	27.4
		1	204	5.1E-10			1621	5560			5	0.05	0	27.4
		1	205	2.1E-7			1621	5582			4	0.5	0	27.4
		1	206	7.3E-6			1621	5578			4	0.5	0	27.4
		1	207	2.1E-7			1621	5562			4	0.5	0	27.4
		1	208	2.1E-7			1621	5564			4	0.5	0	27.4
		1	209	3.3E-5			1620	5584			1.5	0.1	0	27.4
		1	210	1.9E-10			1622	5584			1.5	0.1	0	27.4
		1	211	3.3E-5			1620	5559			1.5	0.1	0	27.4
		1	212	3.3E-5			1622	5559			1.5	0.1	0	27.4
		1	214	1.5E-11			636	3828			7	0.05	0	27.4
		1	215	2.1E-6			636	3823			4	0.5	0	27.4
		1	217	1.5E-11			630	6969			7	0.05	0	27.4
		1	218	2.1E-7			630	6960			4	0.5	0	27.7
11000 ------- 10411	Non-methane volatile organic compounds (NMVOC):	1	30	0.005719	0.00735		1503	7424			9.1	1.9	6.25	21
		1	31	0.006067	0.007797		1503	7433			9.1	1.9	6.63	21
		1	36	0.0003	0.000216		1503	7451			9.1	0.18	0.243	19
		1	37	0.00083	0.000192		1502	7453			9.1	0.11	0.215	19
		1	38	0.000142	0.000102		1503	7452			8.3	0.25	0.543	19
11001 - - - - 2001	Acrylonitrile	1	23	2E-6	3E-6		1558	7442			10	0.5	0.794	18
11007 - - - - 1401	Acetone	1	12	0.00361	0.000914		1581	7420			10	0,15	0.552	20
		1	30	0.0221	0.000553		1503	7424			9.1	1.9	6.25	21
		1	31	0.0227	0.000587		1503	7433			9.1	1.9	6.63	21
		1	36	2.2E-5	1.6E-5		1503	7451			9.1	0.18	0.243	19
		1	37	0.0027	1.4E-5		1502	7453			9.1	0.11	0.215	19
		1	38	1.1E-5	8E-6		1503	7452			8.3	0.25	0.543	19
11009 ------- 1210	Butyl acetate	1	12	0.0083	0.001305		1581	7420			10	0,15	0.552	20
		1	30	0.041	0.023228		1503	7424			9.1	1.9	6.25	21
		1	31	0.042	0.02464		1503	7433			9.1	1.9	6.63	21
		1	36	0.00095	0.000684		1503	7451			9.1	0.18	0.243	19
		1	37	0.00055	0.000605		1502	7453			9.1	0.11	0.215	19
		1	38	0.000447	0.000322		1503	7452			8.3	0.25	0.543	19
11020 - - - - 1246	Ethylcellosolve	1	12	0.0052	0.001044		1581	7420			10	0,15	0.552	20
		1	30	0.0381	0.003255		1503	7424			9.1	1.9	6.25	21
		1	31	0.04	0.003453		1503	7433			9.1	1.9	6.63	21
		1	36	0.000133	9.6E-5		1503	7451			9.1	0.18	0.243	19
		1	37	0.00055	8.4E-5		1502	7453			9.1	0.11	0.215	19
		1	38	6.3E-5	4.5E-5		1503	7452			8.3	0.25	0.543	19
		1	95	0.0019	0.00296		1695	5004			5.5	0.26	0.221	19
11021	Ethyl acetate	1	30	0.0338	0.00638		1503	7424			9.1	1.9	6.25	21

---- 1240														
		1	31	0.0351	0.006767		1503	7433			9.1	1.9	6.63	21
		1	36	0.000261	0.000188		1503	7451			9.1	0.18	0.243	19
		1	37	0.00083	0.000166		1502	7453			9.1	0.11	0.215	19
		1	38	0.000124	8.9E-5		1503	7452			8.3	0.25	0.543	19
11030 ---- 616	Xylene	1	30	0.066	0.027389		1503	7424			9.1	1.9	6.25	21
		1	31	0.07	0.029054		1503	7433			9.1	1.9	6.63	21
		1	36	0.001121	0.000807		1503	7451			9.1	0.18	0.243	19
		1	37	0.00083	0.000714		1502	7453			9.1	0.11	0.215	19
		1	38	0.000528	0.00038		1503	7452			8.3	0.25	0.543	19
11037 ---- 620	Styrene	1	34	0.0096	0.005588		1503	7440			9.1	1.9	6.75	19
		1	35	0.0097	0.005662		1503	7446			9.1	1.9	6.84	19
11041 ---- 621	Toluene	1	12	0.0188	0.006525		1581	7420			10	0,15	0.552	20
		1	30	0.0325	0.015264		1503	7424			9.1	1.9	6.25	21
		1	31	0.0345	0.016193		1503	7433			9.1	1.9	6.63	21
		1	36	0.000624	0.000449		1503	7451			9.1	0.18	0.243	19
		1	37	0.0014	0.000398		1502	7453			9.1	0.11	0.215	19
		1	38	0.000294	0.000212		1503	7452			8.3	0.25	0.543	19
11049 ---- 1325	Formaldehyde	1	213	0.001786			636	3832			7	0,15	1.08	630
		1	216	0.0018			630	6977			7	0,15	1.08	630
12000 ---- 410	Methane	1	32	2.6E-5	0.000832		1503	7429			9.9	0.24	0.097	118
		1	33	9.5E-5	0.000832		1503	7431			9.9	0.24	0.097	131
		1	191	0.00045			2281	7166	200	800	2		0	27.4
		1	192	0.000196			1912	5506	225	620	2		0	27.4
		1	193	0.00031			1318	6500	225	1500	2		0	27.4
		1	220	0.000165			1233	4932			8	0.5	0.295	27.4
		1	221	0.00028			1327	6389	400	360			0	27.4
13101 ---- 703	Benzo[a]pyrene	1	191	4E-5			2281	7166	200	800	2		0	27.4
		1	192	3E-6			1912	5506	225	620	2		0	27.4
		1	193	3E-5			1318	6500	225	1500	2		0	27.4
		1	213	2E-7			636	3832			7	0,15	1.08	630
		1	216	2E-7			630	6977			7	0,15	1.08	630
		1	220	1.4E-5			1233	4932			8	0.5	0.295	27.4
		1	221	3E-5			1327	6389	400	360			0	27.4
16000 ------- 343	Fluor and its compounds (in terms of fluor)	1	79	0.00128	2.44E-5		2139	5544			7.5	0.89	0.989	16
		1	80	0.00128	2.45E-5		2143	5540			2	0.5	0.294	27.8

			1	156	0.00128	0.00072		1398	7273			10	0,15	0.559	20
	16000 ------- 344	Fluor and its compounds (in terms of fluor)	1	79	0.00072	3.5E-5		2139	5544			7.5	0.89	0.989	16
			1	80	0.00072	4E-5		2143	5540			2	0.5	0.294	27.8
			1	156	0.00072	0.000405		1398	7273			10	0,15	0.559	20
	16001 - - - - 342	Hydrogen fluoride	1	79	0.000499	2.2E-5		2139	5544			7.5	0.89	0.989	16
			1	80	0.000336	1.4E-5		2143	5540			2	0.5	0.294	27.8
			1	156	0.000336	0.000189		1398	7273			10	0,15	0.559	20

List of sources emissions of which comprise substances from summation groups for calculation

City code	Summation group code	Codes of substance included in the summation group	Production site code	Source code	Emission g/sec	Emission tones/year	Hazard class.	Coordinate of a point source, or a beginning of a line source, or a centre of symmetry of a planar source		Coordinate of an end of a line source, or length and width of a planar source, or a point source with a rectangular neck		Source height, m	Diameter of a point source, or a planar source, or velocity of PGVS for a line source,	Flow rate of PGVS, m3/sec	Temperature of PGCS (deg. C)
								X1, m	Y1, m	X2, m	Y2, m				
1	3	4003 / 303 5002 / 333	1	191	1E-7			2281	7166	200	800	2		0	27.4
			1	192	8E-8			1912	5506	225	620	2		0	27.4
			1	193	1.2E-8			1318	6500	225	1500	2		0	27.4
			1	201	2E-9			1621	5584			5	0.05	0	27.4
			1	202	2.9E-10			1621	5576			5	0.05	0	27.4
			1	203	2.2E-9			1621	5566			5	0.05	0	27.4
			1	204	9.5E-10			1621	5560			5	0.05	0	27.4
			1	205	3.9E-7			1621	5582			4	0.5	0	27.4
			1	206	4.4E-6			1621	5578			4	0.5	0	27.4
			1	207	3.9E-7			1621	5562			4	0.5	0	27.4
			1	208	6.2E-5			1621	5564			4	0.5	0	27.4
			1	209	6.2E-5			1620	5584			1.5	0.1	0	27.4
			1	210	1.2E-10			1622	5584			1.5	0.1	0	27.4
			1	211	6.2E-5			1620	5559			1.5	0.1	0	27.4
			1	212	6.2E-5			1622	5559			1.5	0.1	0	27.4
			1	214	2.8E-11			636	3828			7	0.05	0	27.4
			1	215	3.9E-7			636	3823			4	0.5	0	27.4
			1	217	2.8E-11			630	6969			7	0.05	0	27.4
			1	218	3.9E-7			630	6960			4	0.5	0	27.7
			1	221	4E-8			1327	6389	400	360			0	27.4
	4	4003 / 303 5002 / 333 11049 / 1325	1	191	1E-7			2281	7166	200	800	2		0	27.4
			1	192	8E-8			1912	5506	225	620	2		0	27.4
			1	193	1.2E-8			1318	6500	225	1500	2		0	27.4
			1	201	2E-9			1621	5584			5	0.05	0	27.4
			1	202	2.9E-10			1621	5576			5	0.05	0	27.4
			1	203	2.2E-9			1621	5566			5	0.05	0	27.4
			1	204	9.5E-10			1621	5560			5	0.05	0	27.4
			1	205	3.9E-7			1621	5582			4	0.5	0	27.4
			1	206	4.4E-6			1621	5578			4	0.5	0	27.4
			1	207	3.9E-7			1621	5562			4	0.5	0	27.4
			1	208	6.2E-5			1621	5564			4	0.5	0	27.4
			1	209	6.2E-5			1620	5584			1.5	0.1	0	27.4
			1	210	1.2E-10			1622	5584			1.5	0.1	0	27.4
			1	211	6.2E-5			1620	5559			1.5	0.1	0	27.4
			1	212	6.2E-5			1622	5559			1.5	0.1	0	27.4
			1	213	0.001786			636	3832			7	0,15	1.08	630
			1	214	2.8E-11			636	3828			7	0.05	0	27.4
			1	215	3.9E-7			636	3823			4	0.5	0	27.4
			1	216	0.0018			630	6977			7	0,15	1.08	630

			1	152	0.00039	9.5E-6		2825	11215			4	0.055	0.03	68
			1	153	0.000406	9.86E-6		2825	11214			4	0.055	0.029	69
			1	154	0.000624	2E-5		1721	7015			1.5	0.065	0.078	173
			1	158	0.001508	0.000999		1388	7227			3.5	0.12	0.029	158
			1	166	0.044583	0.000643		2212	6945			15.4	0.5	6.8	500
			1	167	0.044583	0.000643		2212	6958			15.4	0.5	6.8	500
			1	191	0.004476			2281	7166	200	800	2		0	27.4
			1	193	0.003264			1318	6500	225	1500	2		0	27.4
	12	1002 / 110 1010 / 203	1	20	3E-6	2E-6		1534	7443			9.2	0.4	0.779	18
			1	79	0.000421	1.5E-5		2139	5544			7.5	0.89	0.989	16
			1	80	0.000307	1.4E-5		2143	5540			2	0.5	0.294	27.8
			1	156	3E-6	1E-6		1398	7273			10	0,15	0.559	20
	27	1009 / 184 5001 / 330	1	23	6.2E-6	1.1E-6		1558	7442			10	0.5	0.794	18
			1	32	0.00378	0.02604		1503	7429			9.9	0.24	0.097	118
			1	33	0.00427	0.02604		1503	7431			9.9	0.24	0.097	131
			1	42	0.01229	0.002124		2196	5555			1.5	0,15	0.189	345
			1	45	0.01035	0.011439		1603	5085			1.5	0,15	0.138	278
			1	101	0.000396	1E-5		2385	9190			2.3	0.055	0.044	120
			1	104	0.00164	4E-5		2309	8222			2.3	0.16	0.164	133
			1	107	0.00164	4.24E-5		900	8357			3	0.06	0.04	129
			1	110	0.000858	2.15E-5		887	8357			2.5	0.05	0.033	72
			1	111	0.001133	2.85E-5		1284	7293			5.5	0.095	0.103	119
			1	112	0.00149	3.78E-5		1284	7287			5.5	0.095	0.149	122
			1	113	0.001206	3.09E-5		1283	7281			5.5	0.095	0.134	97
			1	114	0.000981	2.64E-5		1283	7276			5.5	0.095	0.109	74
			1	117	0.001032	2.5E-5		743	6942			4	0.09	0.043	128
			1	120	0.00092	2E-5		2190	5852			4.5	0.07	0.092	165
			1	121	0.001012	3E-5		2193	5846			4.5	0.07	0.092	162
			1	124	0.001342	3.44E-5		2193	5825			4	0.095	0.122	88
			1	125	0.00182	4.76E-5		2193	5819			4	0.095	0.14	91
			1	126	0.001904	4.86E-5		2193	5813			4	0.095	0.136	89
			1	127	0.00219	5.47E-5		2193	5807			4	0.095	0.146	87
			1	130	0.001485	4E-5		2364	3939			2.3	0.16	0.165	139
			1	133	0.001271	3.38E-5		702	3844			4	0.06	0.041	99
			1	136	0.002431	6.18E-5		1294	3283			5.5	0.095	0.143	79
			1	137	0.001989	5.11E-5		1286	3283			5.5	0.095	0.153	91
			1	140	0.00045	1E-5		2564	2914			2.3	0.055	0.045	122
			1	143	0.000528	1E-5		2541	2339			2.3	0.055	0.044	119
			1	146	0.00075	1.87E-5		917	2446			4	0.075	0.05	93
			1	147	0.000544	1.31E-5		931	2446			4.4	0.055	0.034	60
			1	150	0.000616	1.61E-5		949	1988			3.5	0.055	0.028	77
			1	151	0.000558	1.37E-5		948	1997			3.5	0.055	0.031	65
			1	152	0.00039	9.5E-6		2825	11215			4	0.055	0.03	68
			1	153	0.000406	9.86E-6		2825	11214			4	0.055	0.029	69
			1	154	0.000624	2E-5		1721	7015			1.5	0.065	0.078	173
			1	158	0.001508	0.000999		1388	7227			3.5	0.12	0.029	158

			1	166	0.044583	0.000643		2212	6945			15.4	0.5	6.8	500
			1	167	0.044583	0.000643		2212	6958			15.4	0.5	6.8	500
			1	191	0.004476			2281	7166	200	800	2		0	27.4
			1	193	0.003264			1318	6500	225	1500	2		0	27.4
	28	5004 / 322 5001 / 330	1	23	2E-7	3E-7		1558	7442			10	0.5	0.794	18
			1	24	0.000378	0.000843		1550	7437			10	0.315	0.211	18
			1	32	0.00378	0.02604		1503	7429			9.9	0.24	0.097	118
			1	33	0.00427	0.02604		1503	7431			9.9	0.24	0.097	131
			1	42	0.01229	0.002124		2196	5555			1.5	0,15	0.189	345
			1	45	0.01035	0.011439		1603	5085			1.5	0,15	0.138	278
			1	78	0.000261	0.001019		2141	5580			7.5	0.29	0.596	19
			1	81	0.002739	0.021913		2144	5565			2	0.5	0.294	27.8
			1	83	0.002331	0.01867		1538	6204			2	0.5	0.294	27.8
			1	84	0.004014	0.066263		1524	6178			2	0.5	0.294	27.8
			1	97	0.000188	0.000266		1702	7078			11	0.42	0.906	19
			1	101	0.000396	1E-5		2385	9190			2.3	0.055	0.044	120
			1	104	0.00164	4E-5		2309	8222			2.3	0.16	0.164	133
			1	107	0.00164	4.24E-5		900	8357			3	0.06	0.04	129
			1	110	0.000858	2.15E-5		887	8357			2.5	0.05	0.033	72
			1	111	0.001133	2.85E-5		1284	7293			5.5	0.095	0.103	119
			1	112	0.00149	3.78E-5		1284	7287			5.5	0.095	0.149	122
			1	113	0.001206	3.09E-5		1283	7281			5.5	0.095	0.134	97
			1	114	0.000981	2.64E-5		1283	7276			5.5	0.095	0.109	74
			1	117	0.001032	2.5E-5		743	6942			4	0.09	0.043	128
			1	120	0.00092	2E-5		2190	5852			4.5	0.07	0.092	165
			1	121	0.001012	3E-5		2193	5846			4.5	0.07	0.092	162
			1	124	0.001342	3.44E-5		2193	5825			4	0.095	0.122	88
			1	125	0.00182	4.76E-5		2193	5819			4	0.095	0.14	91
			1	126	0.001904	4.86E-5		2193	5813			4	0.095	0.136	89
			1	127	0.00219	5.47E-5		2193	5807			4	0.095	0.146	87
			1	130	0.001485	4E-5		2364	3939			2.3	0.16	0.165	139
			1	133	0.001271	3.38E-5		702	3844			4	0.06	0.041	99
			1	136	0.002431	6.18E-5		1294	3283			5.5	0.095	0.143	79
			1	137	0.001989	5.11E-5		1286	3283			5.5	0.095	0.153	91
			1	140	0.00045	1E-5		2564	2914			2.3	0.055	0.045	122
			1	143	0.000528	1E-5		2541	2339			2.3	0.055	0.044	119
			1	146	0.00075	1.87E-5		917	2446			4	0.075	0.05	93
			1	147	0.000544	1.31E-5		931	2446			4.4	0.055	0.034	60
			1	150	0.000616	1.61E-5		949	1988			3.5	0.055	0.028	77
			1	151	0.000558	1.37E-5		948	1997			3.5	0.055	0.031	65
			1	152	0.00039	9.5E-6		2825	11215			4	0.055	0.03	68
			1	153	0.000406	9.86E-6		2825	11214			4	0.055	0.029	69
			1	154	0.000624	2E-5		1721	7015			1.5	0.065	0.078	173
			1	158	0.001508	0.000999		1388	7227			3.5	0.12	0.029	158
			1	166	0.044583	0.000643		2212	6945			15.4	0.5	6.8	500
			1	167	0.044583	0.000643		2212	6958			15.4	0.5	6.8	500
			1	191	0.004476			2281	7166	200	800	2		0	27.4
			1	193	0.003264			1318	6500	225	1500	2		0	27.4

	31	4001 / 301 5001 / 330	1	3	0.007334	0.001523		1696	7395			8	0.25	0.557	17
			1	5	0.001833	0.000381		1704	7389			7.4	0.2	0.218	17
			1	13	0.00427	2E-6		1580	7430			8	0.2	0.103	18
			1	14	0.00439	2E-6		1580	7436			8	0.2	0.101	18
			1	15	0.0184	2.9E-5		1558	7438			8	0.35	0.427	18
			1	20	0.009167	0.0001614		1534	7443			9.2	0.4	0.779	18
			1	23	2E-7	3E-7		1558	7442			10	0.5	0.794	18
			1	25	0.00332	0.000737		1548	7438			10	0.32	0.346	21
			1	26	0.00428	1.3E-5		1535	7451			1.5	0.14	0.101	20
			1	28	0.001256	0.004124		1517	7425			8.7	1.2	4.92	19
			1	29	0.00011	0.000336		1519	7434			7.5	0.82	0.433	19
			1	32	0.01649	0.041398		1503	7429			9.9	0.24	0.097	118
			1	33	0.01853	0.042723		1503	7431			9.9	0.24	0.097	131
			1	39	0.2153	1.234292		1690	7640			25	0.92	5.59	119.5
			1	40	0.2108	0.110445		1690	7646			25	0.92	5.53	121.4
			1	41	0.2014	1.993778		1690	7652			25	0.92	5.59	115.3
			1	42	0.04896	0.006445		2196	5555			1.5	0,15	0.189	345
			1	45	0.03215	0.031637		1603	5085			1.5	0,15	0.138	278
			1	51	0.003102	0.002792		1684	5452			5	0.3	0.065	18
			1	52	0.003102	0.002792		1684	5442			5	0.3	0.065	18
			1	74	0.48892	1.484105		1560	6384			30	1	4.52	134
			1	75	0.035	0.283522		1568	6380			12	0.45	0.643	136
			1	76	0.0325	0.290267		1576	6379			12	0.45	0.644	138
			1	79	0.009167	0.001312		2139	5544			7.5	0.89	0.989	16
			1	80	0.009167	0.00909		2143	5540			2	0.5	0.294	27.8
			1	101	0.000396	1E-5		2385	9190			2.3	0.055	0.044	120
			1	104	0.049364	0.00134		2309	8222			2.3	0.16	0.164	133
			1	107	0.01092	0.0003424		900	8357			3	0.06	0.04	129
			1	110	0.006039	0.0001215		887	8357			2.5	0.05	0.033	72
			1	111	0.019467	0.0005285		1284	7293			5.5	0.095	0.103	119
			1	112	0.023691	0.0006378		1284	7287			5.5	0.095	0.149	122
			1	113	0.025058	0.0007309		1283	7281			5.5	0.095	0.134	97
			1	114	0.016459	0.0004264		1283	7276			5.5	0.095	0.109	74
			1	117	0.009761	0.000225		743	6942			4	0.09	0.043	128
			1	120	0.023368	0.00062		2190	5852			4.5	0.07	0.092	165
			1	121	0.022356	0.00063		2193	5846			4.5	0.07	0.092	162
			1	124	0.021228	0.0005344		2193	5825			4	0.095	0.122	88
			1	125	0.02352	0.0006476		2193	5819			4	0.095	0.14	91
			1	126	0.02108	0.0005486		2193	5813			4	0.095	0.136	89
			1	127	0.025112	0.0006547		2193	5807			4	0.095	0.146	87
			1	130	0.05775	0.00614		2364	3939			2.3	0.16	0.165	139
			1	133	0.014104	0.0003338		702	3844			4	0.06	0.041	99
			1	136	0.017303	0.0004618		1294	3283			5.5	0.095	0.143	79
			1	137	0.025551	0.0006511		1286	3283			5.5	0.095	0.153	91
			1	140	0.014085	0.00041		2564	2914			2.3	0.055	0.045	122
			1	143	0.012584	0.00031		2541	2339			2.3	0.055	0.044	119
			1	146	0.02035	0.0005187		917	2446			4	0.075	0.05	93
			1	147	0.005202	0.0001361		931	2446			4.4	0.055	0.034	60

			1	150	0.004592	0.0001161		949	1988			3.5	0.055	0.028	77
			1	151	0.004681	0.0001137		948	1997			3.5	0.055	0.031	65
			1	152	0.00465	2.14E-5		2825	11215			4	0.055	0.03	68
			1	153	0.004785	0.00010986		2825	11214			4	0.055	0.029	69
			1	154	0.025428	0.00102		1721	7015			1.5	0.065	0.078	173
			1	156	0.00072	0.00044		1398	7273			10	0,15	0.559	20
			1	157	0.0081	0.004897		1386	7248			8	0.12	0.089	22
			1	158	0.006293	0.001678		1388	7227			3.5	0.12	0.029	158
			1	159	0.35042	1.677046		1560	6393			30	1	4.521	128
			1	166	4.057083	0.006426		2212	6945			15.4	0.5	6.8	500
			1	167	4.057083	0.006426		2212	6958			15.4	0.5	6.8	500
			1	186	0.0011	1.35E-6		1596	7430			9.2	0.63	2.56	18
			1	187	0.001083	1.33E-6		1537	7435			9.2	0.63	2.52	18
			1	188	0.001078	1.32E-6		1534	7445			9.2	0.63	2.51	18
			1	189	0.00068	1.3E-6		1534	7446			9.2	0.4	0.696	18
			1	190	0.095591			2501	6118	560	4600	2		0	27.4
			1	191	0.035744			2281	7166	200	800	2		0	27.4
			1	192	0.017131			1912	5506	225	620	2		0	27.4
			1	193	0.026192			1318	6500	225	1500	2		0	27.4
			1	200	0.13598			1092	5402	650	4000	2		0	27.4
	35	5001 / 330 16001 / 342	1	23	2E-7	3E-7		1558	7442			10	0.5	0.794	18
			1	32	0.00378	0.02604		1503	7429			9.9	0.24	0.097	118
			1	33	0.00427	0.02604		1503	7431			9.9	0.24	0.097	131
			1	42	0.01229	0.002124		2196	5555			1.5	0,15	0.189	345
			1	45	0.01035	0.011439		1603	5085			1.5	0,15	0.138	278
			1	79	0.000499	2.2E-5		2139	5544			7.5	0.89	0.989	16
			1	80	0.000336	1.4E-5		2143	5540			2	0.5	0.294	27.8
			1	101	0.000396	1E-5		2385	9190			2.3	0.055	0.044	120
			1	104	0.00164	4E-5		2309	8222			2.3	0.16	0.164	133
			1	107	0.00164	4.24E-5		900	8357			3	0.06	0.04	129
			1	110	0.000858	2.15E-5		887	8357			2.5	0.05	0.033	72
			1	111	0.001133	2.85E-5		1284	7293			5.5	0.095	0.103	119
			1	112	0.00149	3.78E-5		1284	7287			5.5	0.095	0.149	122
			1	113	0.001206	3.09E-5		1283	7281			5.5	0.095	0.134	97
			1	114	0.000981	2.64E-5		1283	7276			5.5	0.095	0.109	74
			1	117	0.001032	2.5E-5		743	6942			4	0.09	0.043	128
			1	120	0.00092	2E-5		2190	5852			4.5	0.07	0.092	165
			1	121	0.001012	3E-5		2193	5846			4.5	0.07	0.092	162
			1	124	0.001342	3.44E-5		2193	5825			4	0.095	0.122	88
			1	125	0.00182	4.76E-5		2193	5819			4	0.095	0.14	91
			1	126	0.001904	4.86E-5		2193	5813			4	0.095	0.136	89
			1	127	0.00219	5.47E-5		2193	5807			4	0.095	0.146	87
			1	130	0.001485	4E-5		2364	3939			2.3	0.16	0.165	139
			1	133	0.001271	3.38E-5		702	3844			4	0.06	0.041	99
			1	136	0.002431	6.18E-5		1294	3283			5.5	0.095	0.143	79
			1	137	0.001989	5.11E-5		1286	3283			5.5	0.095	0.153	91
			1	140	0.00045	1E-5		2564	2914			2.3	0.055	0.045	122
			1	143	0.000528	1E-5		2541	2339			2.3	0.055	0.044	119

			1	146	0.00075	1.87E-5		917	2446			4	0.075	0.05	93
			1	147	0.000544	1.31E-5		931	2446			4.4	0.055	0.034	60
			1	150	0.000616	1.61E-5		949	1988			3.5	0.055	0.028	77
			1	151	0.000558	1.37E-5		948	1997			3.5	0.055	0.031	65
			1	152	0.00039	9.5E-6		2825	11215			4	0.055	0.03	68
			1	153	0.000406	9.86E-6		2825	11214			4	0.055	0.029	69
			1	154	0.000624	2E-5		1721	7015			1.5	0.065	0.078	173
			1	156	0.000336	0.000189		1398	7273			10	0,15	0.559	20
			1	158	0.001508	0.000999		1388	7227			3.5	0.12	0.029	158
			1	166	0.044583	0.000643		2212	6945			15.4	0.5	6.8	500
			1	167	0.044583	0.000643		2212	6958			15.4	0.5	6.8	500
			1	191	0.004476			2281	7166	200	800	2		0	27.4
			1	193	0.003264			1318	6500	225	1500	2		0	27.4
	37	4001 / 301 4003 / 303 4002 / 304 5001 / 330	1	3	0.007334	0.001523		1696	7395			8	0.25	0.557	17
			1	5	0.001833	0.000381		1704	7389			7.4	0.2	0.218	17
			1	13	0.00427	2E-6		1580	7430			8	0.2	0.103	18
			1	14	0.00439	2E-6		1580	7436			8	0.2	0.101	18
			1	15	0.0184	2.9E-5		1558	7438			8	0.35	0.427	18
			1	20	0.009167	0.0001614		1534	7443			9.2	0.4	0.779	18
			1	23	2E-7	3E-7		1558	7442			10	0.5	0.794	18
			1	25	0.00332	0.000737		1548	7438			10	0.32	0.346	21
			1	26	0.00428	1.3E-5		1535	7451			1.5	0.14	0.101	20
			1	28	0.001256	0.004124		1517	7425			8.7	1.2	4.92	19
			1	29	0.00011	0.000336		1519	7434			7.5	0.82	0.433	19
			1	32	0.01649	0.041398		1503	7429			9.9	0.24	0.097	118
			1	33	0.01853	0.042723		1503	7431			9.9	0.24	0.097	131
			1	39	0.2153	1.234292		1690	7640			25	0.92	5.59	119.5
			1	40	0.2108	0.110445		1690	7646			25	0.92	5.53	121.4
			1	41	0.2014	1.993778		1690	7652			25	0.92	5.59	115.3
			1	42	0.04896	0.006445		2196	5555			1.5	0,15	0.189	345
			1	45	0.03215	0.031637		1603	5085			1.5	0,15	0.138	278
			1	51	0.003102	0.002792		1684	5452			5	0.3	0.065	18
			1	52	0.003102	0.002792		1684	5442			5	0.3	0.065	18
			1	74	0.48892	1.484105		1560	6384			30	1	4.52	134
			1	75	0.035	0.283522		1568	6380			12	0.45	0.643	136
			1	76	0.0325	0.290267		1576	6379			12	0.45	0.644	138
			1	79	0.009167	0.001312		2139	5544			7.5	0.89	0.989	16
			1	80	0.009167	0.00909		2143	5540			2	0.5	0.294	27.8
			1	101	0.000396	1E-5		2385	9190			2.3	0.055	0.044	120
			1	104	0.049364	0.00134		2309	8222			2.3	0.16	0.164	133
			1	107	0.01092	0.0003424		900	8357			3	0.06	0.04	129
			1	110	0.006039	0.0001215		887	8357			2.5	0.05	0.033	72
			1	111	0.019467	0.0005285		1284	7293			5.5	0.095	0.103	119
			1	112	0.023691	0.0006378		1284	7287			5.5	0.095	0.149	122
			1	113	0.025058	0.0007309		1283	7281			5.5	0.095	0.134	97
			1	114	0.016459	0.0004264		1283	7276			5.5	0.095	0.109	74
			1	117	0.009761	0.000225		743	6942			4	0.09	0.043	128
			1	120	0.023368	0.00062		2190	5852			4.5	0.07	0.092	165
			1	121	0.022356	0.00063		2193	5846			4.5	0.07	0.092	162

			1	124	0.021228	0.0005344		2193	5825			4	0.095	0.122	88
			1	125	0.02352	0.0006476		2193	5819			4	0.095	0.14	91
			1	126	0.02108	0.0005486		2193	5813			4	0.095	0.136	89
			1	127	0.025112	0.0006547		2193	5807			4	0.095	0.146	87
			1	130	0.05775	0.00614		2364	3939			2.3	0.16	0.165	139
			1	133	0.014104	0.0003338		702	3844			4	0.06	0.041	99
			1	136	0.017303	0.0004618		1294	3283			5.5	0.095	0.143	79
			1	137	0.025551	0.0006511		1286	3283			5.5	0.095	0.153	91
			1	140	0.014085	0.00041		2564	2914			2.3	0.055	0.045	122
			1	143	0.012584	0.00031		2541	2339			2.3	0.055	0.044	119
			1	146	0.02035	0.0005187		917	2446			4	0.075	0.05	93
			1	147	0.005202	0.0001361		931	2446			4.4	0.055	0.034	60
			1	150	0.004592	0.0001161		949	1988			3.5	0.055	0.028	77
			1	151	0.004681	0.0001137		948	1997			3.5	0.055	0.031	65
			1	152	0.00465	2.14E-5		2825	11215			4	0.055	0.03	68
			1	153	0.004785	0.00010986		2825	11214			4	0.055	0.029	69
			1	154	0.025428	0.00102		1721	7015			1.5	0.065	0.078	173
			1	156	0.00072	0.00044		1398	7273			10	0,15	0.559	20
			1	157	0.0081	0.004897		1386	7248			8	0.12	0.089	22
			1	158	0.006293	0.001678		1388	7227			3.5	0.12	0.029	158
			1	159	0.35042	1.677046		1560	6393			30	1	4.521	128
			1	166	4.057083	0.006426		2212	6945			15.4	0.5	6.8	500
			1	167	4.057083	0.006426		2212	6958			15.4	0.5	6.8	500
			1	186	0.0011	1.35E-6		1596	7430			9.2	0.63	2.56	18
			1	187	0.001083	1.33E-6		1537	7435			9.2	0.63	2.52	18
			1	188	0.001078	1.32E-6		1534	7445			9.2	0.63	2.51	18
			1	189	0.00068	1.3E-6		1534	7446			9.2	0.4	0.696	18
			1	190	0.095591			2501	6118	560	4600	2		0	27.4
			1	191	0.0358827			2281	7166	200	800	2		0	27.4
			1	192	0.01720633			1912	5506	225	620	2		0	27.4
			1	193	0.02724212			1318	6500	225	1500	2		0	27.4
			1	200	0.13598			1092	5402	650	4000	2		0	27.4
	11002	16001 / 342 16000 / 344	1	79	0.001219	5.7E-5		2139	5544			7.5	0.89	0.989	16
			1	80	0.001056	5.4E-5		2143	5540			2	0.5	0.294	27.8
			1	156	0.001056	0.000594		1398	7273			10	0,15	0.559	20

Production suites and summation groups for calculation

City code	Production site code	Production site name	Summation group code	Codes of substances included in the summation group	Emission rate (g/sec)
1	1	Production site	3	4003 / 303 5002 / 333	0.000254197616
			4	4003 / 303 5002 / 333 11049 / 1325	0.003840197616
			5	4003 / 303 11049 / 1325	0.003586232
			10	1002 / 110 1104 / 143	0.003301
			11	1002 / 110 5001 / 330	0.2902342
			12	1002 / 110 1010 / 203	0.000734
			27	1009 / 184 5001 / 330	0.2901262
			28	5004 / 322 5001 / 330	0.3000312
			30	5001 / 330 5002 / 333	0.290374165616
			31	4001 / 301 5001 / 330	11.0711292
			35	5001 / 330 16001 / 342	0.2912912
			37	4001 / 301 4003 / 303 4002 / 304 5001 / 330	11.071679682
			39	5002 / 333 11049 / 1325	0.003839965616
			11002	16001 / 342 16000 / 344	0.003331

CALCULATION OF CONCENTRATION AT THE BORDER OF RESIDENTIAL AREA:

Concentration at the set points

4002 / 11815 Nitrogen (1) oxide (N2O)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
4540	3970	NAN	INF	140.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
-2580	4538	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
4333	6544	NAN	INF	110.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
256	8930	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
2883	9352	NAN	INF	40.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
733	9820	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00

Concentration at the set points

7000 / 11812 Carbon dioxide

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
4540	3970	NAN	INF	140.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
-2580	4538	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
4333	6544	NAN	INF	110.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
256	8930	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
2883	9352	NAN	INF	40.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00
733	9820	NAN	INF	0.00	0.50	33	NAN	32	NAN	0	0.00	0	0.00	0	0.00

Concentration at the set points

3000 / 10442 Substances in the form of suspended solid particles (microparticles and fibres)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	NAN	INF	0.00	0.50	175	NAN	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	NAN	INF	120.00	0.50	175	NAN	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	NAN	INF	0.00	0.50	175	NAN	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	NAN	INF	60.00	0.50	175	NAN	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	NAN	INF	0.00	0.50	175	NAN	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	NAN	INF	20.00	0.50	175	NAN	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	NAN	INF	0.00	0.50	175	NAN	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

11000 / 10411 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	NAN	INF	0.00	0.50	38	NAN	37	NAN	36	NAN	31	NAN	30	NAN
4540	3970	NAN	INF	140.00	0.50	38	NAN	37	NAN	36	NAN	31	NAN	30	NAN
-2580	4538	NAN	INF	0.00	0.50	38	NAN	37	NAN	36	NAN	31	NAN	30	NAN
4333	6544	NAN	INF	110.00	0.50	38	NAN	37	NAN	36	NAN	31	NAN	30	NAN
256	8930	NAN	INF	0.00	0.50	38	NAN	37	NAN	36	NAN	31	NAN	30	NAN
2883	9352	NAN	INF	40.00	0.50	38	NAN	37	NAN	36	NAN	31	NAN	30	NAN
733	9820	NAN	INF	0.00	0.50	38	NAN	37	NAN	36	NAN	31	NAN	30	NAN

Concentration at the set points

11000 / 10312 Non-methane volatile organic compounds (NMVOC)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

3000 / 10368 Substances in the form of suspended solid particles (microparticles and fibres)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	4.91E-007	0.000001	290.00	0.75	11	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.000001	0.000001	230.00	0.75	11	100.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	4.73E-007	0.000001	330.00	0.75	11	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.000001	0.000002	200.00	0.75	11	100.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	0.000001	0.000003	50.00	0.75	11	100.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	0.000001	0.000003	120.00	0.75	11	100.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.000001	0.000002	70.00	0.75	11	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

0 / 10226 Titanium dioxide

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000009	0.000022	300.00	0.50	80	40.12	96	29.69	174	16.16	79	7.52	20	3.61
4540	3970	0.000011	0.000028	220.00	0.75	80	41.23	96	26.73	174	17.43	79	8.05	20	3.38
-2580	4538	0.000007	0.000019	330.00	0.50	96	37.08	174	25.43	80	23.83	20	5.04	79	4.40
4333	6544	0.000010	0.000026	180.00	0.50	96	42.58	174	22.22	80	22.13	79	4.44	20	4.44
256	8930	0.000017	0.000044	60.00	0.75	174	31.39	96	30.99	80	21.61	156	6.10	20	5.83
2883	9352	0.000013	0.000032	120.00	0.50	96	42.74	174	25.53	80	16.31	20	7.13	156	5.23
733	9820	0.000014	0.000035	70.00	0.75	96	36.55	174	24.09	80	23.08	20	6.76	156	5.22

Concentration at the set points

3000 / 2902 Substances in the form of suspended solid particles (microparticles and fibres)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.053490	0.133726	290.00	0.81	9	33.61	10	15.34	7	13.83	8	11.55	193	2.53
4540	3970	0.053891	0.134727	230.00	0.81	9	34.91	10	16.00	7	14.40	8	12.04	191	2.90
-2580	4538	0.053227	0.133066	330.00	0.81	9	34.92	10	15.97	7	14.36	8	12.01	191	2.54
4333	6544	0.056058	0.140144	200.00	0.81	9	36.88	10	16.94	7	15.31	8	12.77	191	3.37
256	8930	0.058202	0.145506	50.00	0.81	9	35.51	10	15.99	7	14.44	8	12.04	1	2.44
2883	9352	0.057673	0.144182	120.00	0.81	9	36.41	10	16.64	7	15.16	8	12.58	1	2.31
733	9820	0.056747	0.141868	70.00	0.81	9	35.62	10	16.07	7	14.61	8	12.14	1	2.26

Concentration at the set points

11000 / 2754 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.400000	0.500000	100.00	0.50	150	57.07	151	42.93	221	0.00	220	0.00	219	0.00
4540	3970	0.400000	0.500000	0.00	0.50	221	NAN	220	NAN	219	NAN	218	NAN	217	NAN
-2580	4538	0.400000	0.500000	120.00	0.50	150	56.03	151	43.97	221	0.00	220	0.00	219	0.00
4333	6544	0.400000	0.500000	330.00	0.50	153	50.12	152	49.88	221	0.00	220	0.00	219	0.00
256	8930	0.400000	0.500000	260.00	0.50	153	50.09	152	49.91	221	0.00	220	0.00	219	0.00
2883	9352	0.400593	0.500741	270.00	0.50	153	50.26	152	49.74	221	0.00	220	0.00	219	0.00
733	9820	0.400037	0.500046	290.00	0.50	153	50.17	152	49.83	221	0.00	220	0.00	219	0.00

Concentration at the set points

11000 / 2752 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.400753	0.500941	290.00	0.92	31	50.72	30	48.58	37	0.34	36	0.23	38	0.12
4540	3970	0.400851	0.501064	230.00	0.92	31	50.76	30	48.54	37	0.34	36	0.23	38	0.12
-2580	4538	0.400732	0.500915	320.00	0.92	31	50.80	30	48.50	37	0.34	36	0.23	38	0.12
4333	6544	0.401429	0.501787	200.00	0.92	31	50.91	30	48.40	37	0.34	36	0.23	38	0.12
256	8930	0.402539	0.503174	50.00	0.92	31	51.14	30	48.18	37	0.34	36	0.23	38	0.12
2883	9352	0.401856	0.502320	130.00	0.92	31	51.11	30	48.19	37	0.34	36	0.23	38	0.12
733	9820	0.401780	0.502225	70.00	0.92	31	51.05	30	48.26	37	0.34	36	0.23	38	0.12

Concentration at the set points

11000 / 2750 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000037	0.000232	290.00	0.89	31	43.32	30	41.68	37	11.57	36	2.25	38	1.18
4540	3970	0.000042	0.000262	230.00	0.89	31	43.35	30	41.64	37	11.58	36	2.25	38	1.18
-2580	4538	0.000036	0.000226	320.00	0.89	31	43.34	30	41.56	37	11.65	36	2.26	38	1.19
4333	6544	0.000070	0.000440	200.00	0.89	31	43.51	30	41.56	37	11.53	36	2.24	38	1.17
256	8930	0.000125	0.000778	50.00	0.89	31	43.74	30	41.40	37	11.48	36	2.23	38	1.15
2883	9352	0.000091	0.000572	130.00	0.89	31	43.64	30	41.33	37	11.61	36	2.25	38	1.17
733	9820	0.000088	0.000548	70.00	0.89	31	43.60	30	41.40	37	11.59	36	2.25	38	1.17

Concentration at the set points

11000 / 2735 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000003	0.000070	300.00	0.75	94	77.13	18	22.87	0	0.00	0	0.00	0	0.00
4540	3970	0.000002	0.000060	210.00	0.50	94	78.62	18	21.38	0	0.00	0	0.00	0	0.00
-2580	4538	0.000002	0.000044	350.00	0.50	94	82.88	18	17.12	0	0.00	0	0.00	0	0.00
4333	6544	0.000002	0.000057	150.00	0.75	94	99.97	18	0.03	0	0.00	0	0.00	0	0.00
256	8930	0.000003	0.000085	60.00	0.50	18	60.49	94	39.51	0	0.00	0	0.00	0	0.00
2883	9352	0.000003	0.000076	120.00	0.75	18	69.20	94	30.80	0	0.00	0	0.00	0	0.00
733	9820	0.000003	0.000078	70.00	0.75	18	62.85	94	37.15	0	0.00	0	0.00	0	0.00

Concentration at the set points

11000 / 2732 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.480000	0.500000	210.00	0.50	17	80.26	12	16.89	18	2.85	94	0.00	47	0.00
4540	3970	0.480000	0.500000	310.00	0.50	17	84.76	12	13.48	18	1.75	94	0.00	47	0.00
-2580	4538	0.480000	0.500000	250.00	0.50	17	82.54	12	14.87	18	2.58	94	0.00	47	0.00
4333	6544	0.480001	0.500001	250.00	0.50	17	81.72	12	15.86	18	2.42	94	0.00	47	0.00
256	8930	0.480000	0.500000	170.00	0.50	94	NAN	47	NAN	46	NAN	44	NAN	43	NAN
2883	9352	0.480000	0.500000	200.00	0.50	17	85.36	12	12.01	18	2.63	94	0.00	47	0.00
733	9820	0.480000	0.500000	170.00	0.50	94	NAN	47	NAN	46	NAN	44	NAN	43	NAN

Concentration at the set points

11000 / 2704 Non-methane volatile organic compounds (NMVOC)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	2.16E-030	5.41E-031	320.00	0.50	23	100.00	64	0.00	63	0.00	62	0.00	58	0.00
2883	9352	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

11001 / 2001 Acrylonitrile

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	5.59E-009	2.33E-008	290.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	6.38E-009	2.66E-008	230.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	5.41E-009	2.26E-008	320.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	1.08E-008	4.51E-008	200.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	1.80E-008	7.50E-008	50.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	1.39E-008	5.78E-008	120.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	1.31E-008	5.46E-008	70.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

11007 / 1401 Acetone

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.038590	0.137823	290.00	0.91	31	44.20	30	43.86	12	6.39	37	5.48	36	0.04
4540	3970	0.038602	0.137865	230.00	0.91	31	44.18	30	43.78	12	6.49	37	5.48	36	0.04
-2580	4538	0.038588	0.137814	320.00	0.91	31	44.33	30	43.86	12	6.20	37	5.53	36	0.05
4333	6544	0.038672	0.138114	200.00	0.91	31	44.24	30	43.58	12	6.67	37	5.44	36	0.04
256	8930	0.038804	0.138585	50.00	0.91	31	44.65	30	43.59	12	6.25	37	5.44	36	0.04
2883	9352	0.038723	0.138295	130.00	0.91	31	44.56	30	43.54	12	6.33	37	5.50	36	0.04
733	9820	0.038714	0.138263	70.00	0.91	31	44.46	30	43.56	12	6.43	37	5.49	36	0.04

Concentration at the set points

11000 / 1319 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000003	0.000067	290.00	0.75	18	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.000003	0.000076	230.00	0.75	18	100.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	0.000003	0.000065	330.00	0.75	18	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.000005	0.000130	200.00	0.75	18	100.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	0.000009	0.000214	50.00	0.75	18	100.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	0.000007	0.000167	120.00	0.75	18	100.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.000006	0.000156	70.00	0.75	18	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

11020 / 1246 Ethylcellosolve

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.280154	0.500275	290.00	0.91	31	45.66	30	44.35	12	5.40	95	3.69	37	0.66
4540	3970	0.280169	0.500301	230.00	0.91	31	47.22	30	45.79	12	5.67	37	0.68	95	0.40
-2580	4538	0.280144	0.500258	320.00	0.91	31	47.51	30	46.00	12	5.43	37	0.69	36	0.17
4333	6544	0.280282	0.500504	200.00	0.91	31	47.46	30	45.76	12	5.85	37	0.68	36	0.16
256	8930	0.280502	0.500896	50.00	0.91	31	47.61	30	45.49	12	5.45	37	0.67	95	0.53
2883	9352	0.280367	0.500655	130.00	0.91	31	47.64	30	45.56	12	5.54	37	0.68	95	0.33
733	9820	0.280356	0.500636	70.00	0.91	31	46.95	30	45.01	12	5.55	95	1.57	37	0.67

Concentration at the set points

11021 / 1240 Ethyl acetate

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.040125	0.501558	290.00	0.92	31	49.56	30	48.63	37	1.22	36	0.38	38	0.20
4540	3970	0.040141	0.501761	230.00	0.92	31	49.60	30	48.59	37	1.22	36	0.38	38	0.20
-2580	4538	0.040121	0.501515	320.00	0.92	31	49.63	30	48.54	37	1.23	36	0.39	38	0.21
4333	6544	0.040237	0.502957	200.00	0.92	31	49.75	30	48.46	37	1.21	36	0.38	38	0.20
256	8930	0.040420	0.505252	50.00	0.92	31	49.98	30	48.24	37	1.21	36	0.38	38	0.20
2883	9352	0.040307	0.503839	130.00	0.92	31	49.95	30	48.24	37	1.22	36	0.38	38	0.20
733	9820	0.040295	0.503683	70.00	0.92	31	49.88	30	48.31	37	1.22	36	0.38	38	0.20

Concentration at the set points

11009 / 1210 Butyl acetate

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.040164	0.502055	290.00	0.92	31	44.96	30	44.73	12	8.08	36	1.06	37	0.61
4540	3970	0.040186	0.502326	230.00	0.92	31	44.94	30	44.63	12	8.21	36	1.06	37	0.61
-2580	4538	0.040159	0.501994	320.00	0.92	31	45.14	30	44.76	12	7.84	36	1.07	37	0.62
4333	6544	0.040313	0.503914	200.00	0.92	31	44.96	30	44.40	12	8.42	36	1.05	37	0.61
256	8930	0.040553	0.506910	50.00	0.92	31	45.44	30	44.46	12	7.90	36	1.05	37	0.61
2883	9352	0.040405	0.505059	130.00	0.92	31	45.35	30	44.41	12	8.01	36	1.06	37	0.62
733	9820	0.040389	0.504859	70.00	0.92	31	45.24	30	44.42	12	8.12	36	1.06	37	0.61

Concentration at the set points

11000 / 1061 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000428	0.000107	290.00	0.92	31	47.24	30	46.05	12	5.04	37	1.00	18	0.61
4540	3970	0.000485	0.000121	230.00	0.92	31	47.24	30	45.97	12	5.12	37	1.00	18	0.62
-2580	4538	0.000416	0.000104	320.00	0.92	31	47.40	30	46.04	12	4.89	37	1.01	18	0.60
4333	6544	0.000815	0.000204	200.00	0.92	31	47.30	30	45.76	12	5.26	37	0.99	18	0.63
256	8930	0.001442	0.000361	50.00	0.92	31	47.70	30	45.73	12	4.93	37	0.99	18	0.59
2883	9352	0.001055	0.000264	130.00	0.92	31	47.63	30	45.70	12	5.00	37	1.00	18	0.61
733	9820	0.001013	0.000253	70.00	0.92	31	47.53	30	45.73	12	5.07	37	1.00	18	0.61

Concentration at the set points

11000 / 1056 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000009	0.000235	310.00	0.75	95	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.000010	0.000240	200.00	0.75	95	100.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	0.000006	0.000158	350.00	0.75	95	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.000009	0.000237	150.00	0.75	95	100.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	0.000007	0.000168	70.00	0.75	95	100.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	0.000006	0.000147	110.00	0.75	95	100.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.000006	0.000140	80.00	0.75	95	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

11000 / 1042 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.040178	0.502230	290.00	0.92	31	44.40	30	43.23	12	11.03	37	0.85	36	0.31
4540	3970	0.040202	0.502525	230.00	0.92	31	44.35	30	43.12	12	11.20	37	0.85	36	0.31
-2580	4538	0.040173	0.502160	320.00	0.92	31	44.62	30	43.31	12	10.73	37	0.86	36	0.31
4333	6544	0.040340	0.504253	200.00	0.92	31	44.34	30	42.86	12	11.49	37	0.84	36	0.31
256	8930	0.040600	0.507495	50.00	0.92	31	44.89	30	42.99	12	10.80	37	0.85	36	0.31
2883	9352	0.040439	0.505488	130.00	0.92	31	44.79	30	42.94	12	10.94	37	0.86	36	0.31
733	9820	0.040422	0.505274	70.00	0.92	31	44.66	30	42.92	12	11.09	37	0.85	36	0.31

Concentration at the set points

13101 / 703 Benzo[a]pyrene

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000002	0.024370	290.00	0.78	221	32.00	193	31.44	191	29.55	220	4.58	192	2.29
4540	3970	0.000002	0.022700	220.00	0.78	221	33.99	193	31.98	191	29.21	192	3.71	220	1.09
-2580	4538	0.000002	0.021637	330.00	0.78	191	34.46	221	32.18	193	30.87	192	1.49	220	0.96
4333	6544	0.000003	0.033329	190.00	0.26	191	50.48	221	24.01	193	23.60	192	1.29	220	0.61
256	8930	0.000003	0.031495	60.00	0.26	191	33.23	193	32.72	221	30.30	192	2.15	220	1.57
2883	9352	0.000003	0.036536	110.00	0.78	191	51.24	221	22.87	193	21.91	192	2.04	220	1.93
733	9820	0.000002	0.027017	70.00	0.78	191	40.11	193	28.99	221	26.82	192	2.49	220	1.57

Concentration at the set points

11041 / 621 Toluene

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.240153	0.500320	290.00	0.92	31	39.58	30	38.00	12	19.61	37	1.67	36	0.75
4540	3970	0.240174	0.500362	230.00	0.92	31	39.48	30	37.84	12	19.88	37	1.67	36	0.74
-2580	4538	0.240148	0.500309	320.00	0.92	31	39.88	30	38.16	12	19.11	37	1.70	36	0.76
4333	6544	0.240294	0.500612	200.00	0.92	31	39.37	30	37.52	12	20.34	37	1.65	36	0.74
256	8930	0.240514	0.501072	50.00	0.92	31	40.10	30	37.87	12	19.23	37	1.67	36	0.74
2883	9352	0.240377	0.500786	130.00	0.92	31	39.96	30	37.77	12	19.46	37	1.68	36	0.75
733	9820	0.240363	0.500756	70.00	0.92	31	39.79	30	37.70	12	19.70	37	1.67	36	0.75

Concentration at the set points

11049 / 1325 Formaldehyde

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000037	0.001311	300.00	6.73	213	99.98	216	0.02	0	0.00	0	0.00	0	0.00
4540	3970	0.000006	0.000218	180.00	6.73	213	100.00	216	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	0.000008	0.000276	10.00	6.73	213	100.00	216	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.000006	0.000212	190.00	6.73	216	100.00	213	0.00	0	0.00	0	0.00	0	0.00
256	8930	0.000023	0.000811	80.00	6.73	216	88.12	213	11.88	0	0.00	0	0.00	0	0.00
2883	9352	0.000007	0.000256	130.00	6.73	216	99.66	213	0.34	0	0.00	0	0.00	0	0.00
733	9820	0.000014	0.000487	90.00	6.73	216	73.92	213	26.08	0	0.00	0	0.00	0	0.00

Concentration at the set points

11037 / 620 Styrene

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.016034	0.501050	290.00	0.98	35	50.12	34	49.88	0	0.00	0	0.00	0	0.00
4540	3970	0.016038	0.501190	230.00	0.98	35	50.14	34	49.86	0	0.00	0	0.00	0	0.00
-2580	4538	0.016033	0.501023	320.00	0.98	35	50.18	34	49.82	0	0.00	0	0.00	0	0.00
4333	6544	0.016064	0.502015	200.00	0.98	35	50.20	34	49.80	0	0.00	0	0.00	0	0.00
256	8930	0.016116	0.503638	50.00	0.98	35	50.30	34	49.70	0	0.00	0	0.00	0	0.00
2883	9352	0.016085	0.502647	130.00	0.98	35	50.32	34	49.68	0	0.00	0	0.00	0	0.00

733	9820	0.016081	0.502535	70.00	0.98	35	50.28	34	49.72	0	0.00	0	0.00	0	0.00

Concentration at the set points

11030 / 616 Xylene

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.080246	0.501539	290.00	0.92	31	50.04	30	48.07	36	0.83	37	0.62	38	0.44
4540	3970	0.080278	0.501739	230.00	0.92	31	50.08	30	48.03	36	0.83	37	0.62	38	0.44
-2580	4538	0.080239	0.501496	320.00	0.92	31	50.11	30	47.99	36	0.84	37	0.62	38	0.44
4333	6544	0.080467	0.502920	200.00	0.92	31	50.22	30	47.90	36	0.83	37	0.61	38	0.43
256	8930	0.080830	0.505187	50.00	0.92	31	50.46	30	47.68	36	0.83	37	0.61	38	0.43
2883	9352	0.080607	0.503792	130.00	0.92	31	50.42	30	47.69	36	0.84	37	0.62	38	0.43
733	9820	0.080582	0.503638	70.00	0.92	31	50.36	30	47.75	36	0.83	37	0.62	38	0.43

Concentration at the set points

11000 / 514 Non-methane volatile organic compounds (NMVOC):

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	1.96E-008	2.45E-007	290.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	2.23E-008	2.79E-007	230.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	1.90E-008	2.37E-007	320.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	3.79E-008	4.73E-007	200.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	6.30E-008	0.000001	50.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	4.86E-008	0.000001	120.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	4.59E-008	0.000001	70.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

12000 / 410 Methane

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000023	0.000001	300.00	0.87	191	31.52	193	21.63	221	20.18	192	19.67	220	5.42
4540	3970	0.000023	0.000001	220.00	0.87	193	26.74	221	25.79	191	25.27	192	19.22	33	1.68
-2580	4538	0.000020	0.000001	340.00	0.87	191	28.77	193	26.17	221	25.71	192	15.43	220	2.47
4333	6544	0.000030	0.000001	180.00	0.29	191	41.02	193	22.74	221	21.63	192	11.52	33	1.48
256	8930	0.000029	0.000001	60.00	0.29	191	30.43	193	28.42	221	23.79	192	11.95	33	3.00
2883	9352	0.000035	0.000001	110.00	0.87	191	48.60	193	18.70	221	17.79	192	11.18	220	1.86
733	9820	0.000027	0.000001	70.00	0.87	191	36.35	193	24.26	221	20.20	192	13.45	33	3.39

Concentration at the set points

16000 / 344 Fluor and its compounds (in terms of fluor)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000026	0.000163	310.00	0.75	80	82.15	79	15.55	156	2.30	0	0.00	0	0.00
4540	3970	0.000034	0.000215	210.00	0.75	80	80.83	79	15.75	156	3.43	0	0.00	0	0.00
-2580	4538	0.000020	0.000125	350.00	0.75	80	82.38	79	15.25	156	2.37	0	0.00	0	0.00
4333	6544	0.000039	0.000245	160.00	0.75	80	82.97	79	16.65	156	0.38	0	0.00	0	0.00
256	8930	0.000030	0.000190	60.00	0.75	80	67.97	156	19.18	79	12.84	0	0.00	0	0.00
2883	9352	0.000025	0.000159	100.00	0.75	80	81.13	79	15.31	156	3.56	0	0.00	0	0.00
733	9820	0.000025	0.000156	70.00	0.75	80	70.79	156	16.02	79	13.19	0	0.00	0	0.00

Concentration at the set points

16000 / 343 Fluor and its compounds (in terms of fluor)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000046	0.001928	310.00	0.75	80	82.15	79	15.55	156	2.30	0	0.00	0	0.00
4540	3970	0.000061	0.002548	210.00	0.75	80	80.83	79	15.75	156	3.43	0	0.00	0	0.00
-2580	4538	0.000035	0.001476	350.00	0.75	80	82.38	79	15.25	156	2.37	0	0.00	0	0.00
4333	6544	0.000070	0.002908	160.00	0.75	80	82.97	79	16.65	156	0.38	0	0.00	0	0.00
256	8930	0.000054	0.002256	60.00	0.75	80	67.97	156	19.18	79	12.84	0	0.00	0	0.00
2883	9352	0.000045	0.001888	100.00	0.75	80	81.13	79	15.31	156	3.56	0	0.00	0	0.00
733	9820	0.000044	0.001848	70.00	0.75	80	70.79	156	16.02	79	13.19	0	0.00	0	0.00

Concentration at the set points

16001 / 342 Hydrogen fluoride

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000013	0.000817	310.00	0.75	80	76.39	79	21.48	156	2.14	0	0.00	0	0.00
4540	3970	0.000017	0.001080	210.00	0.75	80	75.09	79	21.73	156	3.18	0	0.00	0	0.00
-2580	4538	0.000010	0.000624	350.00	0.75	80	76.70	79	21.09	156	2.20	0	0.00	0	0.00
4333	6544	0.000020	0.001238	160.00	0.75	80	76.77	79	22.88	156	0.35	0	0.00	0	0.00
256	8930	0.000015	0.000944	60.00	0.75	80	63.99	156	18.06	79	17.95	0	0.00	0	0.00
2883	9352	0.000013	0.000799	100.00	0.75	80	75.52	79	21.17	156	3.31	0	0.00	0	0.00
733	9820	0.000012	0.000774	70.00	0.75	80	66.53	79	18.41	156	15.06	0	0.00	0	0.00

Concentration at the set points

6000 / 337 Carbon oxide

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.420079	0.105020	300.00	0.96	200	16.57	219	10.80	213	9.96	45	8.71	42	5.97
4540	3970	0.414407	0.103602	220.00	0.96	42	12.45	200	8.94	190	6.92	193	5.22	26	4.72
-2580	4538	0.410932	0.102733	340.00	0.50	200	13.89	45	10.14	190	6.08	42	5.70	193	4.82
4333	6544	0.413537	0.103384	160.00	0.96	42	17.36	200	13.02	45	10.90	190	6.57	51	6.18
256	8930	0.425092	0.106273	50.00	0.96	107	19.98	110	10.31	26	8.47	191	5.05	15	5.01
2883	9352	0.420216	0.105054	110.00	0.96	200	11.04	191	9.39	190	8.55	45	5.74	219	5.38
733	9820	0.423499	0.105875	80.00	0.96	107	13.29	200	11.24	110	6.62	26	5.63	45	4.69

Concentration at the set points

5001 / 330 Sulphur dioxide

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.201315	0.503289	300.00	1.62	213	60.43	45	10.05	42	5.49	191	4.13	166	3.47
4540	3970	0.200629	0.501573	220.00	0.81	42	23.06	216	13.29	193	8.30	191	7.10	221	7.02
-2580	4538	0.200465	0.501162	330.00	0.81	216	23.73	191	11.02	193	10.33	221	8.57	42	7.73
4333	6544	0.200722	0.501804	190.00	1.62	166	21.88	167	21.79	216	19.06	191	14.73	193	6.00
256	8930	0.200911	0.502277	70.00	0.81	216	37.10	42	9.14	193	9.02	45	8.54	221	7.21
2883	9352	0.200833	0.502083	110.00	0.81	191	15.41	42	10.17	167	9.37	166	9.32	45	8.28
733	9820	0.200821	0.502052	80.00	0.81	216	20.32	42	8.84	193	8.43	45	7.92	221	6.38

Concentration at the set points

3004 / 328 Soot

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000687	0.005721	300.00	1.10	213	26.67	191	22.39	193	16.39	221	13.90	192	13.63
4540	3970	0.000491	0.004091	220.00	1.10	193	29.18	221	25.80	191	21.11	192	17.21	216	4.95
-2580	4538	0.000451	0.003760	330.00	1.10	191	31.75	193	29.03	221	25.02	216	6.81	192	5.70
4333	6544	0.000607	0.005061	190.00	1.10	191	52.68	193	22.60	221	16.82	216	6.62	200	0.63
256	8930	0.000640	0.005330	70.00	1.10	193	35.05	221	29.47	216	14.29	192	12.92	191	2.47
2883	9352	0.000765	0.006378	110.00	1.10	191	46.61	193	19.35	221	17.06	192	10.41	213	2.25

733	9820	0.000559	0.004662	80.00	1.10	193	34.78	221	27.05	192	12.76	191	11.47	216	7.61

Concentration at the set points

5004 / 322 Sulfuric acid (H2S04) (sulphuric acid)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000244	0.001017	300.00	0.75	84	43.34	81	30.61	83	24.99	78	0.55	24	0.33
4540	3970	0.000287	0.001195	220.00	0.75	84	40.65	81	34.43	83	23.74	78	0.64	24	0.35
-2580	4538	0.000216	0.000899	340.00	0.75	84	46.57	83	26.85	81	25.64	78	0.46	24	0.30
4333	6544	0.000336	0.001401	170.00	0.75	84	47.04	83	27.33	81	24.95	78	0.49	97	0.11
256	8930	0.000309	0.001285	60.00	0.75	84	45.68	83	26.95	81	25.70	24	0.86	78	0.46
2883	9352	0.000273	0.001138	110.00	0.75	84	46.75	83	27.41	81	24.42	24	0.62	78	0.44
733	9820	0.000251	0.001047	80.00	0.75	84	47.49	83	27.67	81	23.29	24	0.83	78	0.41

Concentration at the set points

4002 / 304 Nitrogen (1) oxide (N2O)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000009	0.000028	290.00	0.75	193	31.24	191	27.05	221	25.16	192	12.54	220	4.00
4540	3970	0.000009	0.000028	220.00	0.75	193	29.82	191	25.39	221	25.04	192	18.82	220	0.93
-2580	4538	0.000008	0.000025	340.00	0.75	193	29.67	191	27.65	221	25.31	192	15.04	220	2.34
4333	6544	0.000012	0.000039	180.00	0.25	191	40.42	193	25.51	221	21.13	192	11.85	220	1.08
256	8930	0.000012	0.000037	60.00	0.25	193	32.57	191	30.66	221	23.86	192	11.56	220	1.35
2883	9352	0.000013	0.000042	110.00	0.75	191	47.02	193	22.07	221	18.17	192	11.06	220	1.68
733	9820	0.000010	0.000032	70.00	0.75	191	36.17	193	28.45	221	20.85	192	13.17	220	1.36

Concentration at the set points

4003 / 303 Ammonia

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	3.49E-009	2.18E-008	300.00	0.50	192	42.33	191	36.33	221	16.51	193	4.83	0	0.00
4540	3970	3.64E-009	2.27E-008	220.00	0.50	192	42.35	191	34.54	221	17.96	193	5.15	0	0.00
-2580	4538	2.89E-009	1.80E-008	340.00	0.50	191	37.28	192	36.47	221	20.44	193	5.81	0	0.00
4333	6544	4.19E-009	2.62E-008	180.00	0.50	191	50.87	192	22.11	221	21.17	193	5.84	0	0.00
256	8930	4.15E-009	2.59E-008	50.00	0.50	191	53.52	192	25.54	221	15.52	193	5.42	0	0.00
2883	9352	5.25E-009	3.28E-008	110.00	0.50	191	57.25	192	24.50	221	14.08	193	4.17	0	0.00

733	9820	3.91E-009	2.45E-008	70.00	0.50	191	48.09	192	29.44	221	17.01	193	5.46	0	0.00

Concentration at the set points

4001 / 301 Nitrogen oxides (in terms of nitrogen dioxide (NO + NO2))

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.030904	0.193152	300.00	1.36	166	27.31	167	27.17	213	16.27	200	3.43	191	2.24
4540	3970	0.032695	0.204342	230.00	1.36	166	38.92	167	38.69	191	2.64	154	1.37	74	1.23
-2580	4538	0.021664	0.135403	330.00	1.36	167	33.87	166	33.83	216	3.33	191	3.05	193	2.73
4333	6544	0.057160	0.357250	190.00	1.36	166	42.98	167	42.83	191	2.38	216	1.64	154	1.28
256	8930	0.047177	0.294854	50.00	1.36	166	36.97	167	36.85	191	2.04	39	1.74	40	1.69
2883	9352	0.053644	0.335278	110.00	1.36	167	37.07	166	36.77	104	4.43	191	2.91	74	1.51
733	9820	0.038882	0.243010	60.00	1.36	167	39.89	166	39.62	191	3.07	39	1.59	104	1.59

Concentration at the set points

1010 / 203 Chromium and its compounds (in terms of chromium trioxide)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000607	0.379070	310.00	0.75	80	84.04	79	15.91	20	0.03	156	0.02	0	0.00
4540	3970	0.000609	0.380316	210.00	0.75	80	83.64	79	16.29	156	0.03	20	0.03	0	0.00
-2580	4538	0.000605	0.378114	350.00	0.75	80	84.34	79	15.62	20	0.02	156	0.02	0	0.00
4333	6544	0.000610	0.381256	160.00	0.75	80	83.29	79	16.71	156	0.00	20	0.00	0	0.00
256	8930	0.000606	0.378955	60.00	0.75	80	83.73	79	15.82	156	0.23	20	0.22	0	0.00
2883	9352	0.000606	0.378935	100.00	0.75	80	84.05	79	15.86	20	0.05	156	0.04	0	0.00
733	9820	0.000605	0.378364	70.00	0.75	80	83.94	79	15.64	20	0.24	156	0.19	0	0.00

Concentration at the set points

1009 / 184 Lead and its compounds (in terms of lead)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	1.68E-008	0.000021	290.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	1.91E-008	0.000024	230.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	1.62E-008	0.000020	320.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	3.24E-008	0.000041	200.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	5.40E-008	0.000067	50.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	4.16E-008	0.000052	120.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	3.93E-008	0.000049	70.00	0.75	23	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

1007 / 183 Mercury and its compounds (in terms of mercury)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-293	2579	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4830	3813	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2042	4447	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4592	4606	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-910	8272	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
815	8887	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3282	9306	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

0 / 150 Sodium hydroxide (lye, caustic soda)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.004010	0.501243	310.00	0.75	82	87.96	77	10.32	86	1.11	85	0.61	0	0.00
4540	3970	0.004013	0.501611	210.00	0.75	82	87.57	77	10.66	86	1.15	85	0.63	0	0.00
-2580	4538	0.004008	0.500965	350.00	0.75	82	88.30	77	10.03	86	1.08	85	0.59	0	0.00
4333	6544	0.004016	0.501986	160.00	0.75	82	87.27	77	10.97	86	1.14	85	0.62	0	0.00
256	8930	0.004010	0.501243	60.00	0.75	82	88.08	77	10.25	86	1.09	85	0.59	0	0.00
2883	9352	0.004010	0.501235	100.00	0.75	82	88.04	77	10.28	86	1.09	85	0.59	0	0.00
733	9820	0.004008	0.501055	70.00	0.75	82	88.22	77	10.11	86	1.08	85	0.59	0	0.00

Concentration at the set points

1104 / 143 Mangan and its compounds (in terms of mangan)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.004019	0.502383	300.00	0.50	80	44.20	96	27.36	174	9.34	79	8.44	20	3.82
4540	3970	0.004024	0.503058	220.00	0.75	80	45.60	96	24.73	174	10.12	79	9.07	156	4.11
-2580	4538	0.004016	0.501964	340.00	0.50	80	39.88	96	30.04	174	10.99	79	7.47	156	4.28
4333	6544	0.004021	0.502669	180.00	0.25	96	34.06	80	32.16	174	11.64	79	6.80	156	6.17
256	8930	0.004035	0.504376	60.00	0.75	96	30.74	80	25.63	174	19.54	156	8.48	20	6.65
2883	9352	0.004027	0.503341	120.00	0.50	96	41.07	80	18.72	174	15.39	20	7.87	156	7.05
733	9820	0.004029	0.503648	70.00	0.75	96	34.73	80	26.21	174	14.36	20	7.38	156	6.96

Concentration at the set points

1003 / 123 Iron and its compounds (in terms of iron)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000191	0.000596	300.00	0.75	80	56.71	96	16.67	79	10.59	156	4.10	174	3.94
4540	3970	0.000247	0.000772	220.00	0.75	80	57.52	96	15.02	79	11.02	174	4.78	156	4.45
-2580	4538	0.000152	0.000475	340.00	0.50	80	52.47	96	19.02	79	9.46	174	5.41	156	4.84
4333	6544	0.000226	0.000705	160.00	0.50	80	77.13	79	14.85	96	5.00	174	1.02	156	1.00
256	8930	0.000306	0.000956	60.00	0.75	80	37.33	96	21.55	174	10.64	156	10.61	79	6.92
2883	9352	0.000243	0.000761	110.00	0.50	80	40.04	96	26.18	79	7.34	156	6.28	3	6.05
733	9820	0.000261	0.000817	70.00	0.75	80	37.26	96	23.76	156	8.49	174	7.63	79	6.81

Concentration at the set points

1002 / 110 Vanadium and its compounds (in terms of vanadium pentoxide)

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.000001	0.000040	310.00	0.75	79	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.000001	0.000054	210.00	0.75	79	100.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	4.81E-007	0.000030	350.00	0.75	79	100.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.000001	0.000065	160.00	0.75	79	100.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	0.000001	0.000039	60.00	0.75	79	100.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	0.000001	0.000039	100.00	0.75	79	100.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.000001	0.000033	70.00	0.75	79	100.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

Summation group No. 39

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
256	8930	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2883	9352	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

Concentration at the set points

Summation group No. 37

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.618463	300.00	1.38	166	6.51	167	6.48	213	4.36	200	0.82	191	0.57
4540	3970	0.00E+000	0.622943	230.00	1.38	166	9.38	167	9.32	191	0.67	154	0.33	74	0.30
-2580	4538	0.00E+000	0.581576	330.00	1.38	167	7.97	166	7.96	216	0.87	191	0.77	193	0.68
4333	6544	0.00E+000	0.716481	190.00	1.38	166	10.55	167	10.52	191	0.61	216	0.44	154	0.32
256	8930	0.00E+000	0.678026	50.00	1.38	166	9.02	167	8.99	191	0.52	39	0.43	154	0.42
2883	9352	0.00E+000	0.702898	110.00	1.38	167	9.08	166	9.00	104	1.10	191	0.75	74	0.37
733	9820	0.00E+000	0.646141	60.00	1.38	167	9.69	166	9.62	191	0.79	39	0.39	104	0.39

Concentration at the set points

Summation group No. 35

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.503900	300.00	1.59	213	0.66	45	0.11	80	0.08	42	0.06	191	0.04
4540	3970	0.00E+000	0.502587	220.00	0.79	80	0,15	42	0.12	216	0.07	193	0.04	79	0.04
-2580	4538	0.00E+000	0.501715	340.00	0.79	80	0.08	42	0.06	216	0.05	45	0.04	193	0.04
4333	6544	0.00E+000	0.502602	160.00	0.79	80	0.19	42	0.16	45	0.07	79	0.06	213	0.04
256	8930	0.00E+000	0.503208	60.00	0.79	216	0.14	80	0.12	42	0.09	193	0.07	45	0.05
2883	9352	0.00E+000	0.502788	110.00	0.79	191	0.11	80	0.10	42	0.07	167	0.06	166	0.06
733	9820	0.00E+000	0.502727	80.00	0.79	216	0.14	80	0.09	42	0.06	193	0.06	45	0.05

Concentration at the set points

Summation group No. 31

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.618446	300.00	1.38	166	13.10	167	13.03	213	8.77	200	1.65	191	1.14
4540	3970	0.00E+000	0.622930	230.00	1.38	166	18.94	167	18.83	191	1.36	154	0.68	74	0.60
-2580	4538	0.00E+000	0.581562	330.00	1.38	167	16.19	166	16.17	216	1.77	191	1.55	193	1.39
4333	6544	0.00E+000	0.716462	190.00	1.38	166	21.21	167	21.14	191	1.23	216	0.88	154	0.63
256	8930	0.00E+000	0.678011	50.00	1.38	166	18.15	167	18.09	191	1.05	39	0.86	154	0.84
2883	9352	0.00E+000	0.702874	110.00	1.38	167	18.25	166	18.09	104	2.21	191	1.51	74	0.75

733	9820	0.00E+000	0.646128	60.00	1.38	167	19.54	166	19.40	191	1.59	39	0.79	104	0.78

Concentration at the set points

Summation group No. 30

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.500091	40.00	0.50	150	0.02	151	0.01	143	0.00	140	0.00	136	0.00
4540	3970	0.00E+000	0.500000	310.00	0.50	153	0.00	152	0.00	101	0.00	104	0.00	191	0.00
-2580	4538	0.00E+000	0.500000	110.00	0.50	150	0.00	151	0.00	143	0.00	218	0.00	217	0.00
4333	6544	0.00E+000	0.500004	280.00	0.50	153	0.00	152	0.00	101	0.00	104	0.00	107	0.00
256	8930	0.00E+000	0.500024	330.00	0.50	153	0.00	101	0.00	152	0.00	104	0.00	191	0.00
2883	9352	0.00E+000	0.500037	270.00	0.50	153	0.01	152	0.01	218	0.00	217	0.00	215	0.00
733	9820	0.00E+000	0.500026	330.00	0.50	153	0.00	152	0.00	101	0.00	104	0.00	191	0.00

Concentration at the set points

Summation group No. 28

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.504318	300.00	1.16	213	48.34	45	5.85	84	4.78	42	4.18	81	3.33
4540	3970	0.00E+000	0.502264	220.00	1.16	216	10.46	42	10.43	84	9.04	81	7.43	83	5.30
-2580	4538	0.00E+000	0.501633	340.00	1.16	84	10.82	216	7.67	42	6.91	83	6.23	45	5.70
4333	6544	0.00E+000	0.502243	170.00	0.58	84	12.64	42	8.94	81	7.44	83	7.35	45	5.30
256	8930	0.00E+000	0.503109	70.00	1.16	216	30.52	84	8.48	45	5.76	193	5.58	83	4.88
2883	9352	0.00E+000	0.502889	110.00	1.16	191	9.54	167	8.52	166	8.46	84	8.28	213	6.18
733	9820	0.00E+000	0.502733	80.00	1.16	216	15.89	84	8.24	193	5.54	45	5.50	83	4.79

Concentration at the set points

Summation group No. 27

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.503294	300.00	1.62	213	60.22	45	10.02	42	5.47	191	4.12	166	3.46
4540	3970	0.00E+000	0.501585	220.00	0.81	42	22.73	216	13.10	193	8.17	191	6.99	221	6.92
-2580	4538	0.00E+000	0.501174	330.00	0.81	216	23.25	191	10.79	193	10.12	221	8.40	42	7.57
4333	6544	0.00E+000	0.501820	190.00	1.62	166	21.49	167	21.40	216	18.71	191	14.47	193	5.89
256	8930	0.00E+000	0.502296	60.00	0.81	216	17.96	42	11.23	193	8.78	45	6.39	221	6.39
2883	9352	0.00E+000	0.502103	110.00	0.81	191	15.13	42	9.98	167	9.20	166	9.14	45	8.12

733	9820	0.00E+000	0.502076	80.00	0.81	216	19.84	42	8.64	193	8.24	45	7.74	221	6.23

Concentration at the set points

Summation group No. 12

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.379094	310.00	0.75	80	83.06	79	16.31	20	0.03	156	0.02	0	0.00
4540	3970	0.00E+000	0.380348	210.00	0.75	80	82.64	79	16.69	156	0.03	20	0.03	0	0.00
-2580	4538	0.00E+000	0.378132	350.00	0.75	80	83.37	79	16.01	20	0.02	156	0.02	0	0.00
4333	6544	0.00E+000	0.381295	160.00	0.75	80	82.26	79	17.12	156	0.00	20	0.00	0	0.00
256	8930	0.00E+000	0.378978	60.00	0.75	80	82.76	79	16.21	156	0.23	20	0.22	0	0.00
2883	9352	0.00E+000	0.378958	100.00	0.75	80	83.07	79	16.26	20	0.05	156	0.04	0	0.00
733	9820	0.00E+000	0.378384	70.00	0.75	80	82.97	79	16.03	20	0.24	156	0.18	0	0.00

Concentration at the set points

Summation group No. 11

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.503306	300.00	1.62	213	59.82	45	9.95	42	5.44	191	4.09	166	3.43
4540	3970	0.00E+000	0.501603	220.00	0.81	42	22.23	216	12.81	193	8.00	191	6.84	221	6.77
-2580	4538	0.00E+000	0.501170	330.00	0.81	216	23.40	191	10.87	193	10.18	221	8.45	42	7.63
4333	6544	0.00E+000	0.501804	190.00	1.62	166	21.88	167	21.79	216	19.06	191	14.73	193	6.00
256	8930	0.00E+000	0.502296	70.00	0.81	216	36.48	42	8.99	193	8.87	45	8.40	221	7.09
2883	9352	0.00E+000	0.502102	110.00	0.81	191	15.13	42	9.98	167	9.20	166	9.14	45	8.13
733	9820	0.00E+000	0.502069	80.00	0.81	216	19.99	42	8.70	193	8.30	45	7.79	221	6.28

Concentration at the set points

Summation group No. 10

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.502404	300.00	0.50	80	43.41	96	26.87	79	9.18	174	9.17	20	3.75
4540	3970	0.00E+000	0.503088	220.00	0.75	80	44.73	96	24.26	174	9.93	79	9.85	156	4.03
-2580	4538	0.00E+000	0.501980	340.00	0.50	80	39.25	96	29.56	174	10.82	79	8.14	156	4.21
4333	6544	0.00E+000	0.502688	180.00	0.25	96	33.57	80	31.70	174	11.47	79	7.42	156	6.09

256	8930	0.00E+000	0.504399	60.00	0.75	96	30.41	80	25.36	174	19.34	156	8.40	20	6.58
2883	9352	0.00E+000	0.503354	120.00	0.50	96	40.76	80	18.58	174	15.27	20	7.81	156	6.99
733	9820	0.00E+000	0.503668	70.00	0.75	96	34.36	80	25.94	174	14.21	20	7.30	156	6.89

Concentration at the set points

Summation group No. 5

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.001311	300.00	6.73	213	99.98	216	0.02	192	0.00	191	0.00	221	0.00
4540	3970	0.00E+000	0.000218	180.00	6.73	213	100.00	216	0.00	192	0.00	193	0.00	221	0.00
-2580	4538	0.00E+000	0.000276	10.00	6.73	213	100.00	192	0.00	216	0.00	193	0.00	221	0.00
4333	6544	0.00E+000	0.000212	190.00	6.73	216	99.99	191	0.00	193	0.00	221	0.00	213	0.00
256	8930	0.00E+000	0.000811	80.00	6.73	216	88.12	213	11.88	221	0.00	193	0.00	192	0.00
2883	9352	0.00E+000	0.000256	130.00	6.73	216	99.66	213	0.34	221	0.00	193	0.00	191	0.00
733	9820	0.00E+000	0.000487	90.00	6.73	216	73.92	213	26.08	221	0.00	193	0.00	192	0.00

Concentration at the set points

Summation group No. 4

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.00E+000	1.01E-017	310.00	0.50	191	33.33	193	0.00	216	0.00	213	0.00	218	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.00E+000	1.00E-018	280.00	0.50	191	33.33	193	0.00	216	0.00	213	0.00	218	0.00
256	8930	0.00E+000	3.31E-015	330.00	0.50	191	33.33	193	0.00	216	0.00	213	0.00	218	0.00
2883	9352	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
733	9820	0.00E+000	3.38E-019	340.00	0.50	191	33.33	216	0.00	213	0.00	218	0.00	217	0.00

Concentration at the set points

Summation group No. 3

Calculation site 1

Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4540	3970	0.00E+000	1.01E-017	310.00	0.50	191	50.00	193	0.00	218	0.00	217	0.00	215	0.00
-2580	4538	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4333	6544	0.00E+000	1.00E-018	280.00	0.50	191	50.00	193	0.00	218	0.00	217	0.00	215	0.00
256	8930	0.00E+000	3.31E-015	330.00	0.50	191	50.00	193	0.00	218	0.00	217	0.00	215	0.00
2883	9352	0.00E+000	0.00E+000	0.00	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

733	9820	0.00E+000	3.38E-019	340.00	0.50	191	50.00	218	0.00	217	0.00	215	0.00	214	0.00

Concentration at the set points

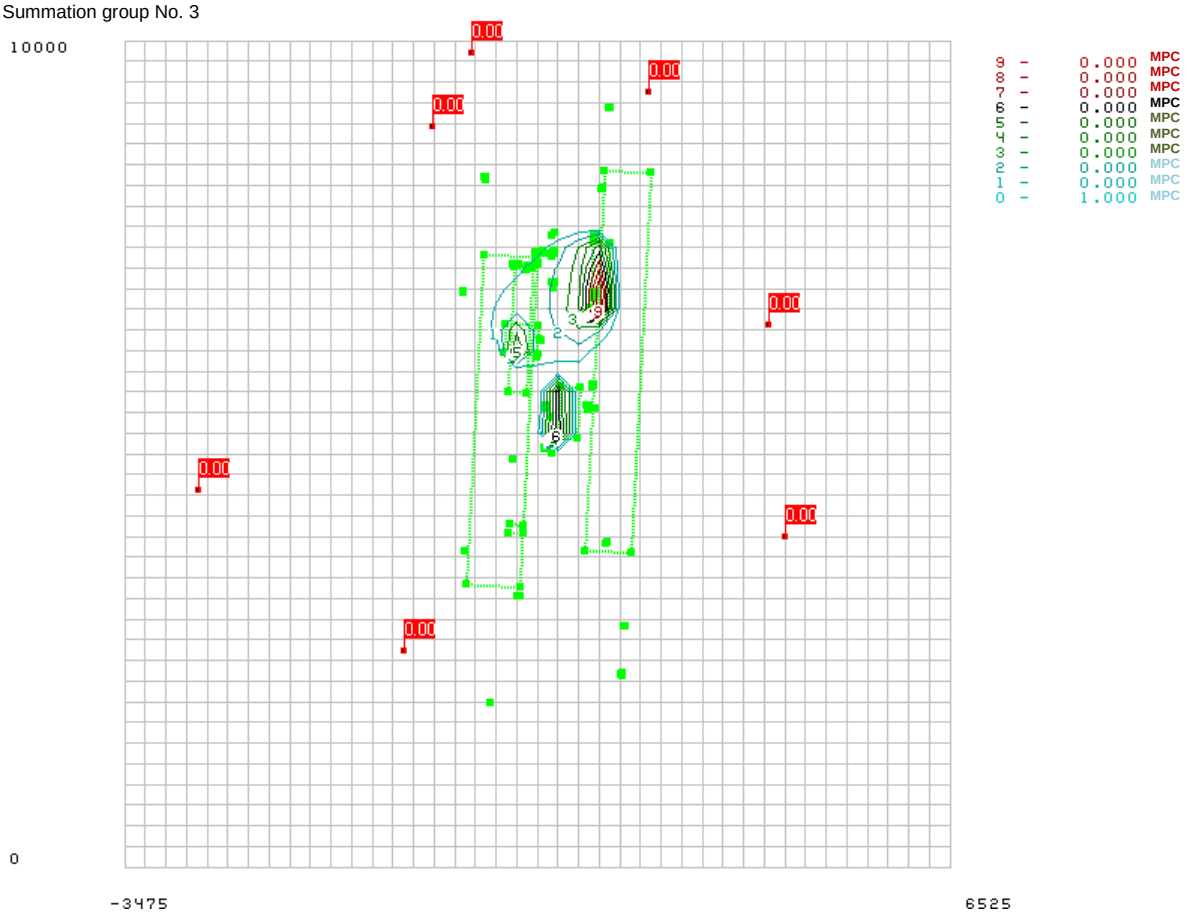
Summation group No. 11002

Calculation site 1

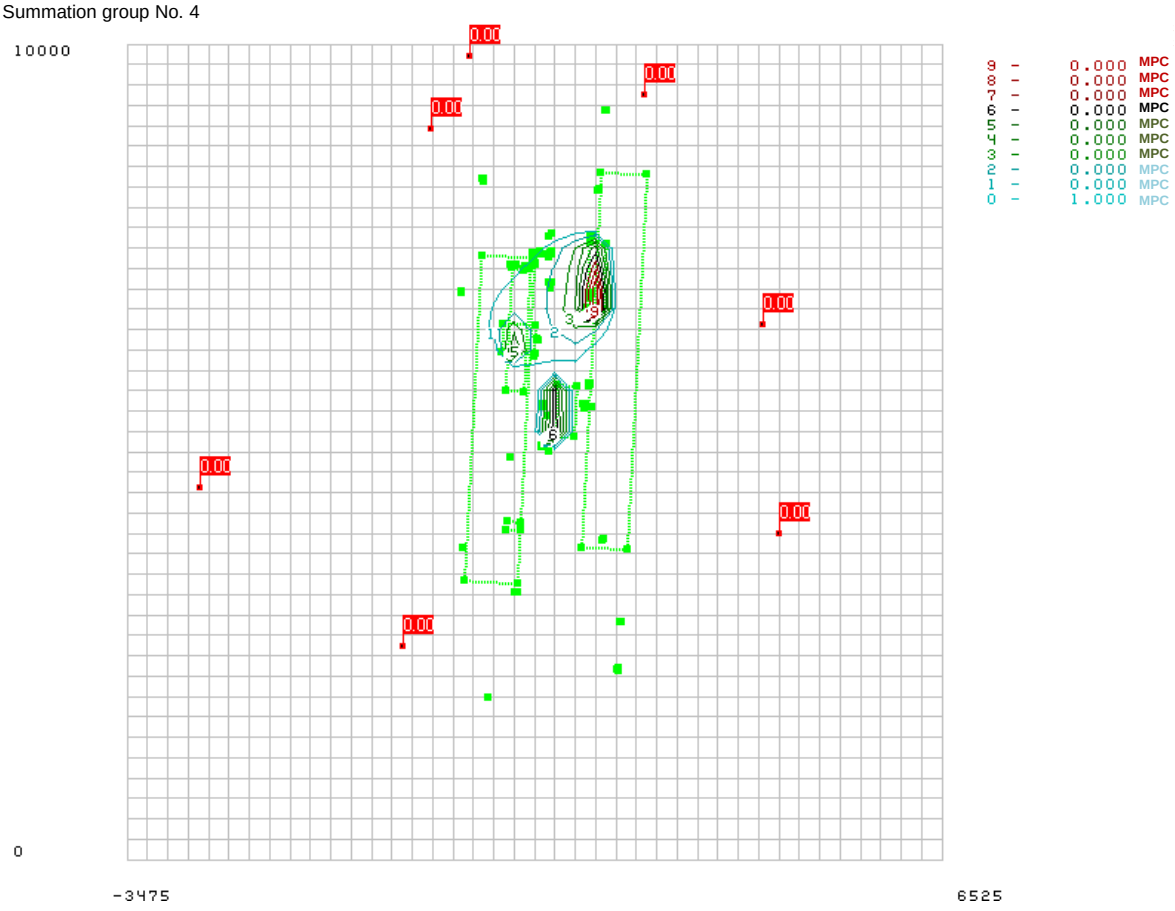
Coord.X, m	Coord.Y, m	Conc. at a point, mg/m3	Conc. at a point, fractions of MPC	Wind direction, deg.	Wind speed, m/sec	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %	Source code	Contribution, %
-82	2587	0.00E+000	0.000979	310.00	0.75	80	42.18	79	11.18	156	1.18	0	0.00	0	0.00
4540	3970	0.00E+000	0.001295	210.00	0.75	80	41.46	79	11.30	156	1.76	0	0.00	0	0.00
-2580	4538	0.00E+000	0.000749	350.00	0.75	80	42.35	79	10.97	156	1.22	0	0.00	0	0.00
4333	6544	0.00E+000	0.001483	160.00	0.75	80	42.40	79	11.91	156	0.20	0	0.00	0	0.00
256	8930	0.00E+000	0.001134	60.00	0.75	80	35.29	156	9.96	79	9.33	0	0.00	0	0.00
2883	9352	0.00E+000	0.000958	100.00	0.75	80	41.69	79	11.01	156	1.83	0	0.00	0	0.00
733	9820	0.00E+000	0.000930	70.00	0.75	80	36.70	79	9.57	156	8.31	0	0.00	0	0.00

CONCENTRATION DISTRIBUTION MAPS

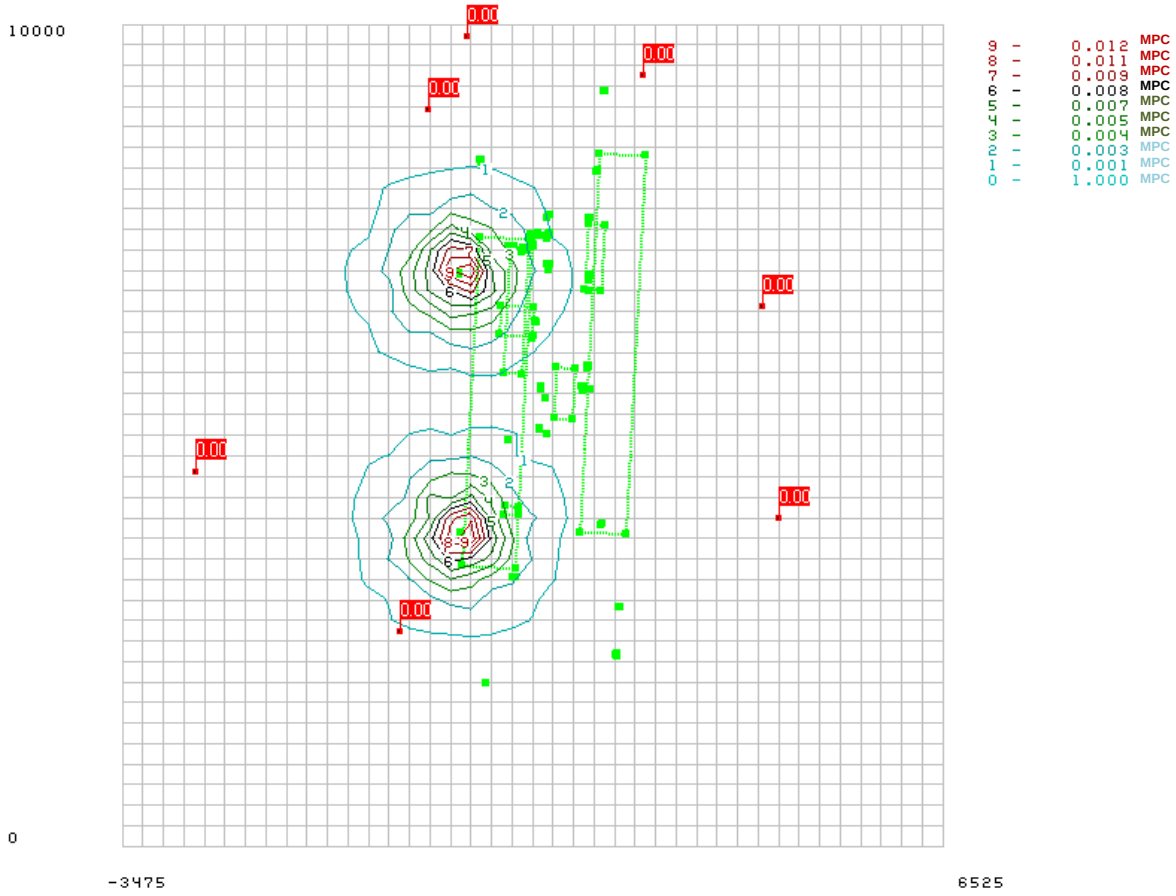
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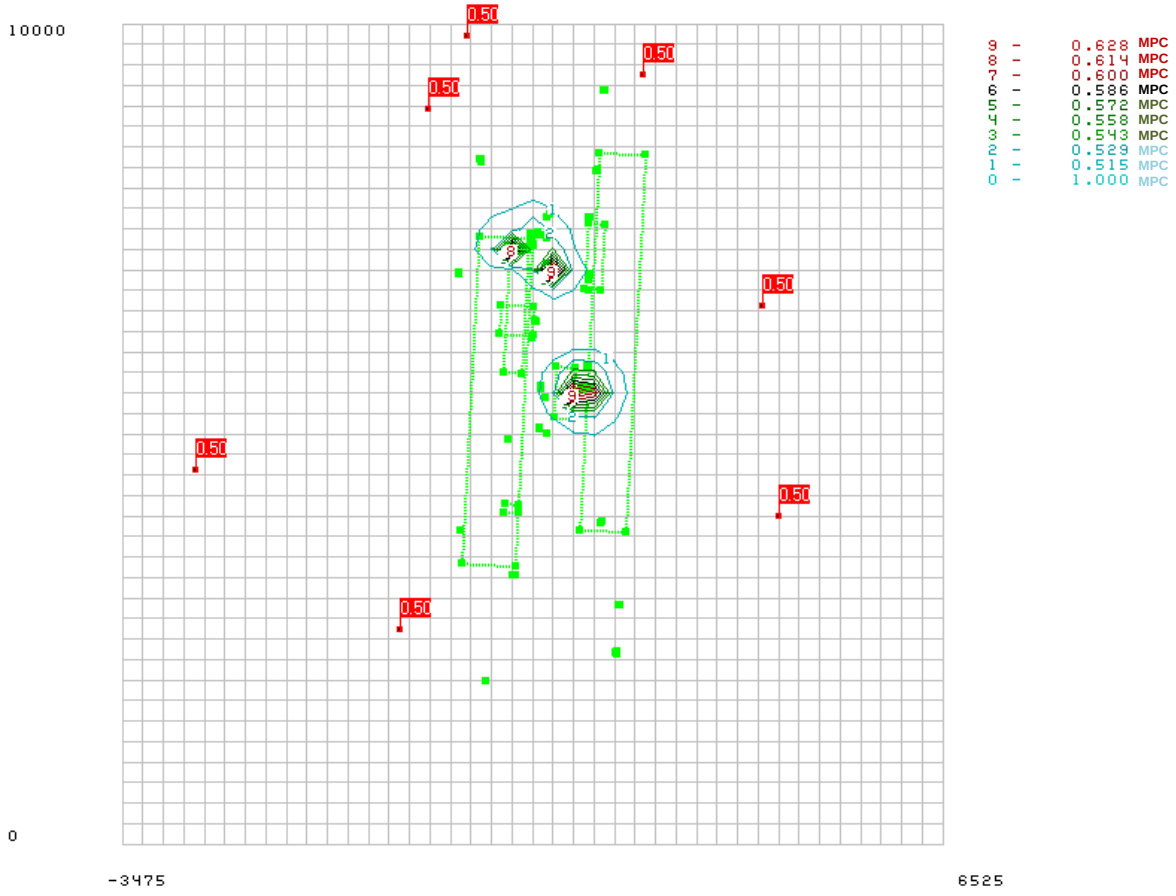
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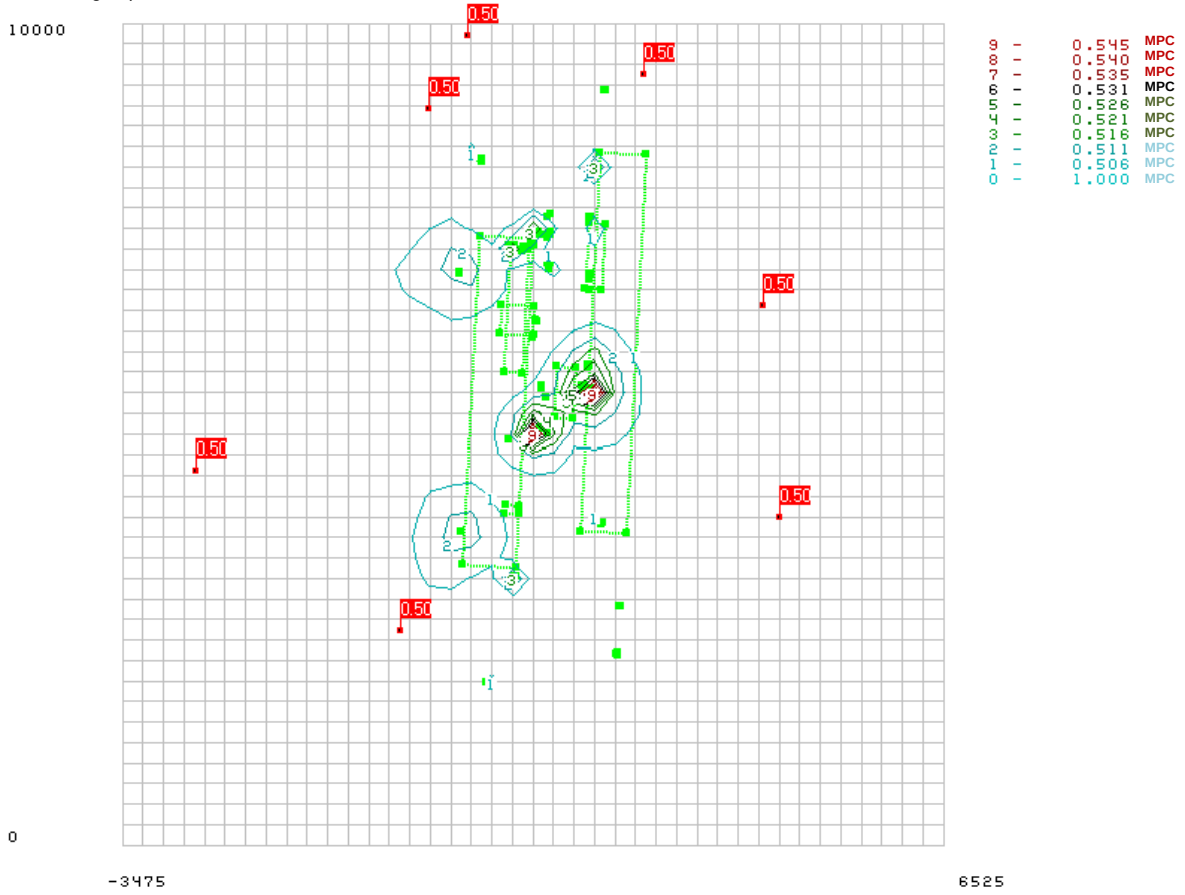
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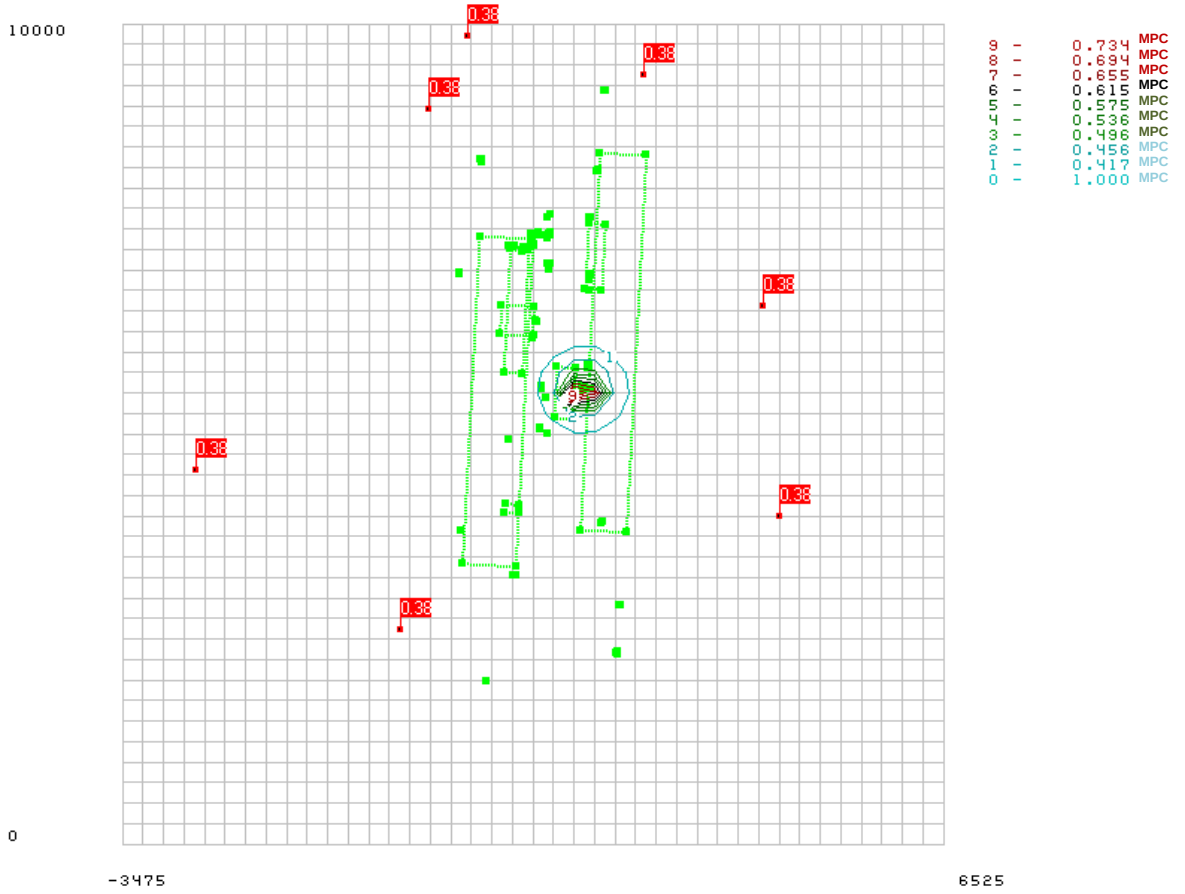
Summation group No. 10



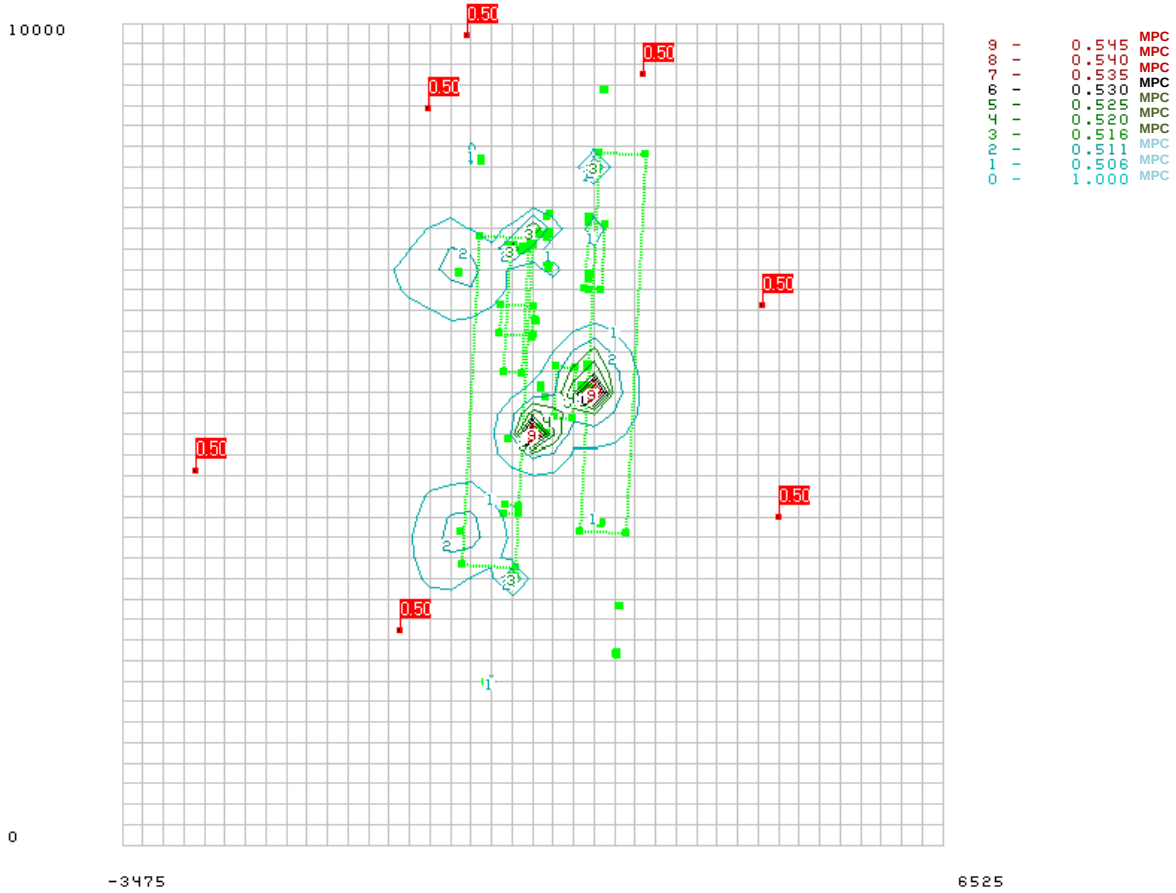
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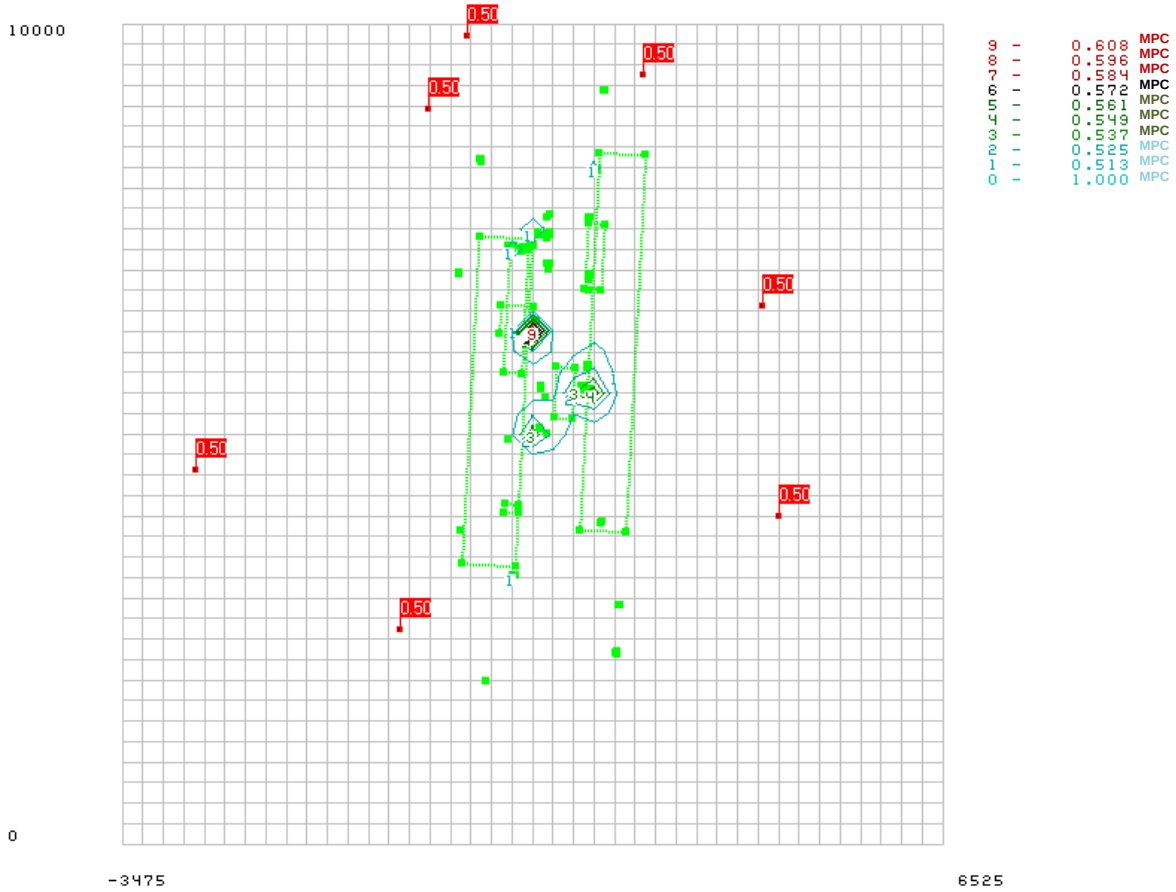
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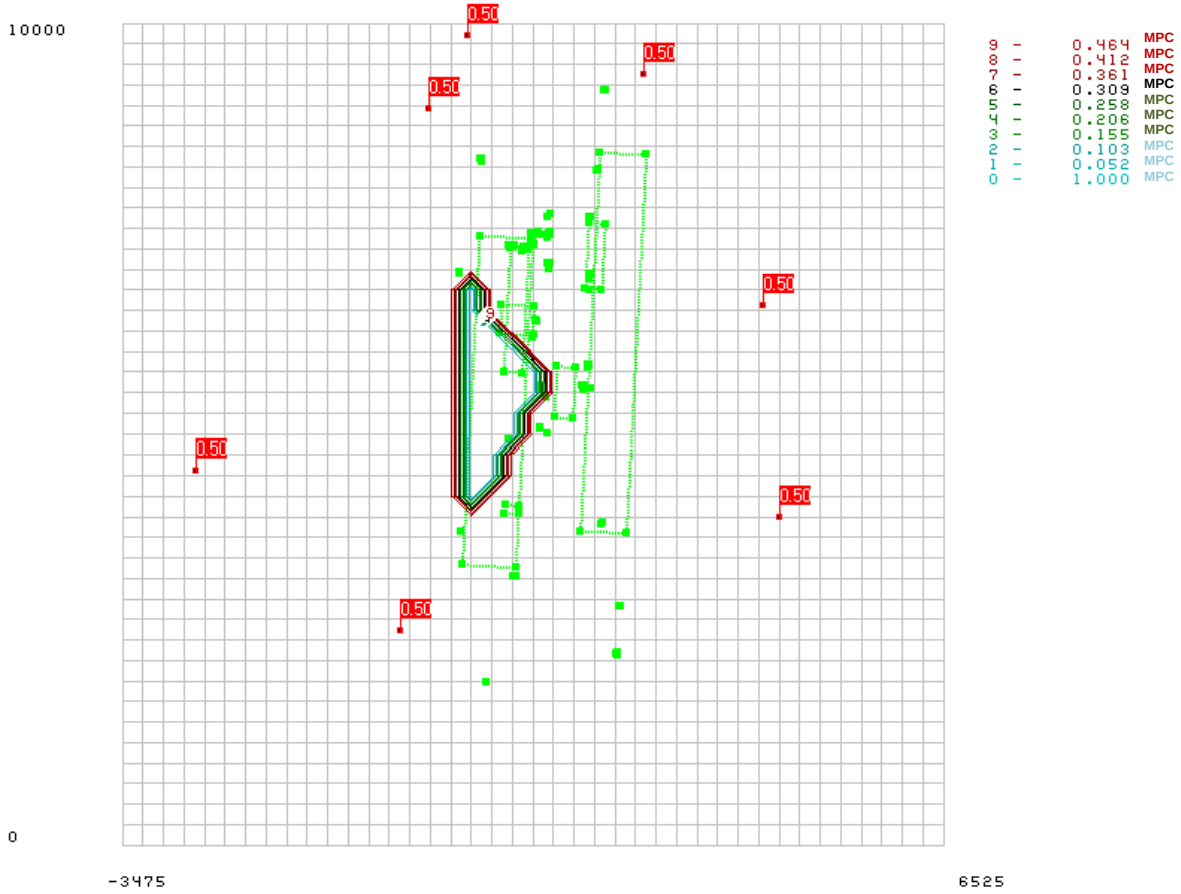
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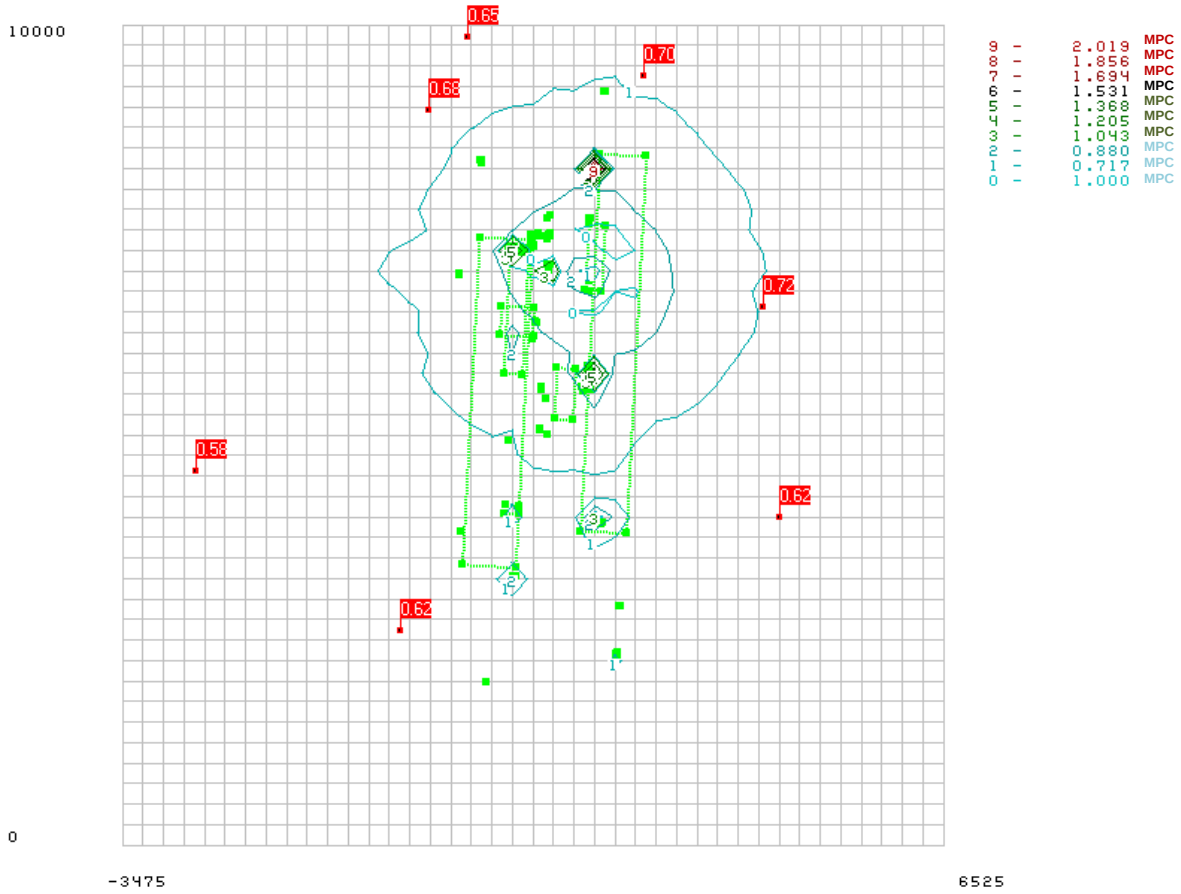
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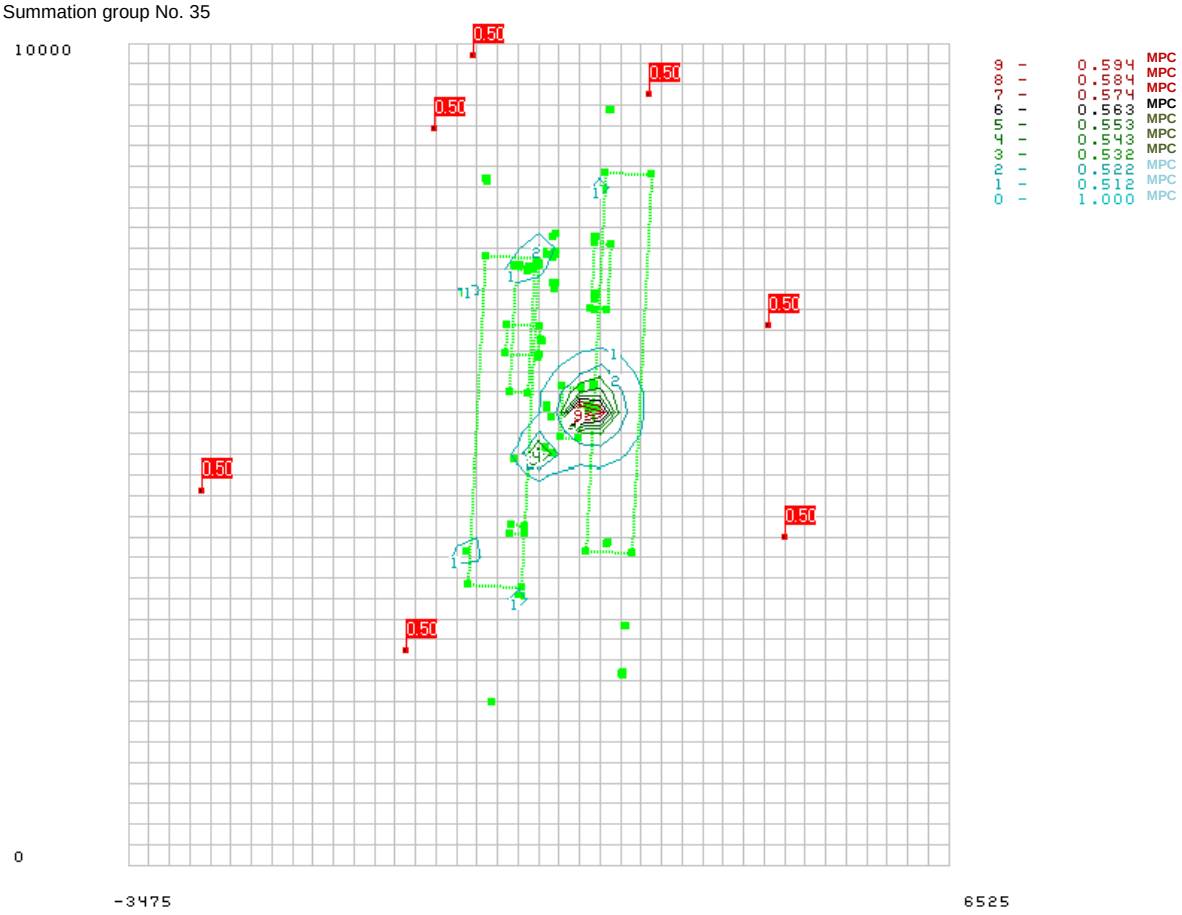
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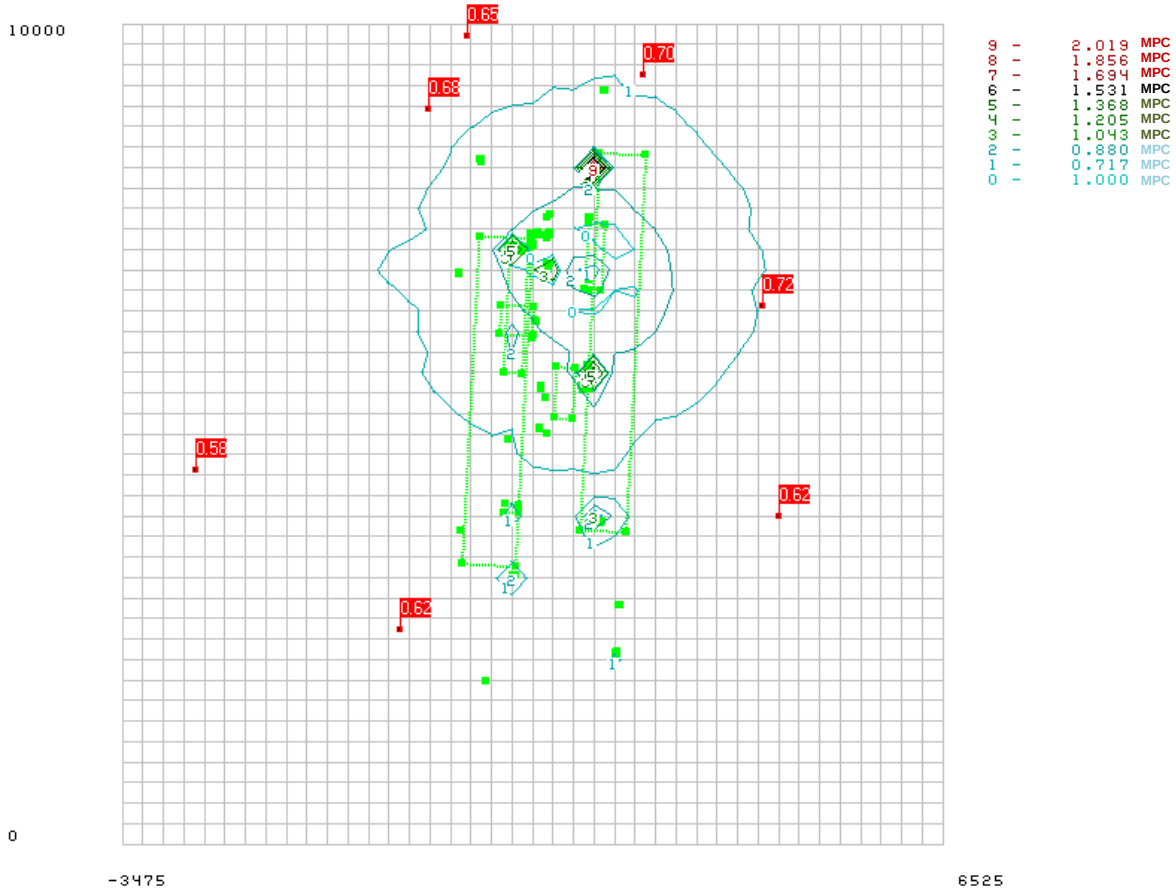
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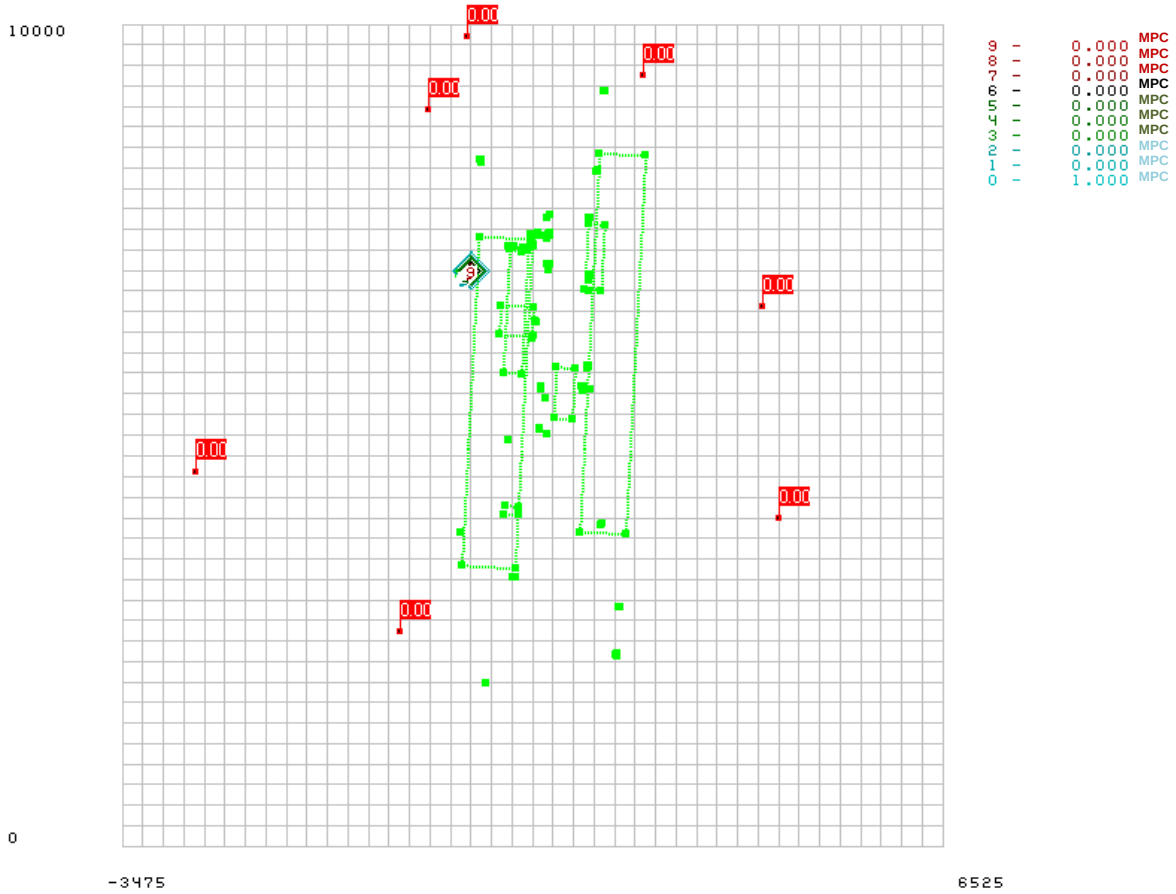
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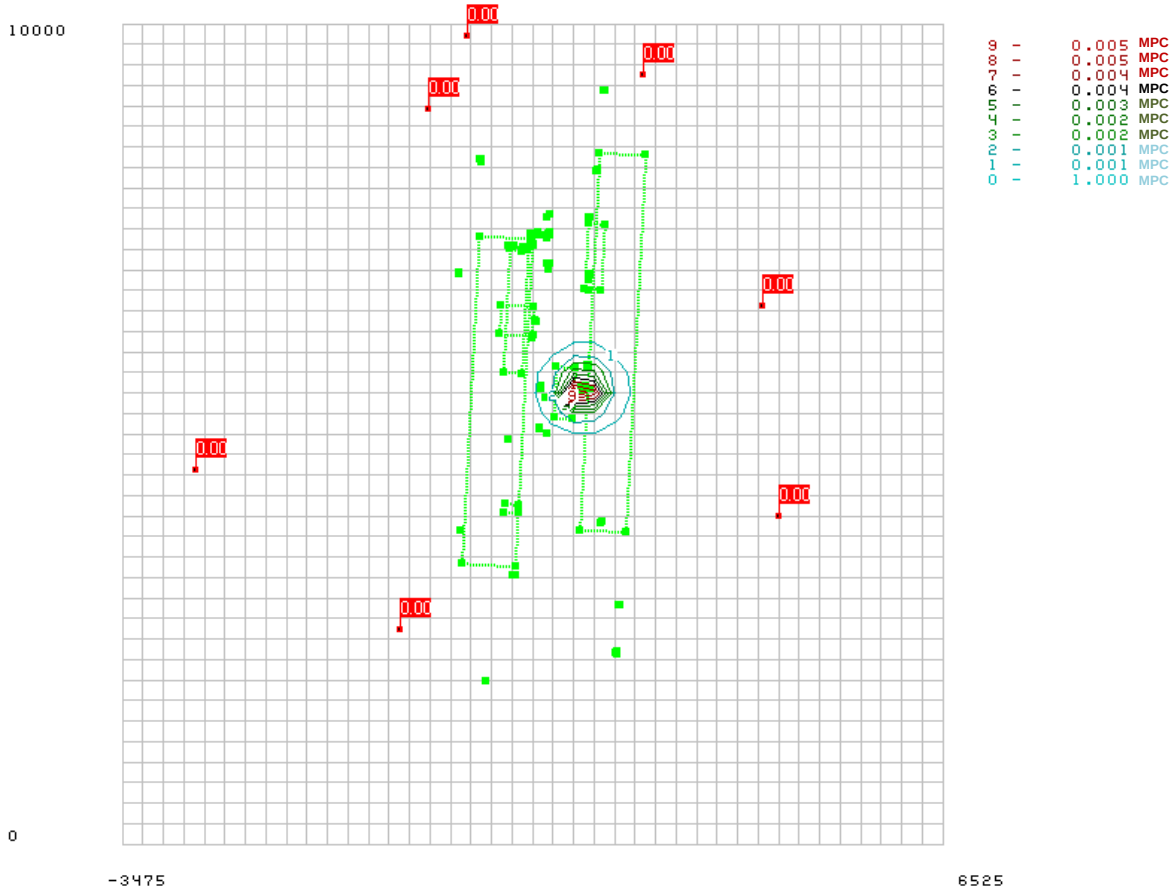
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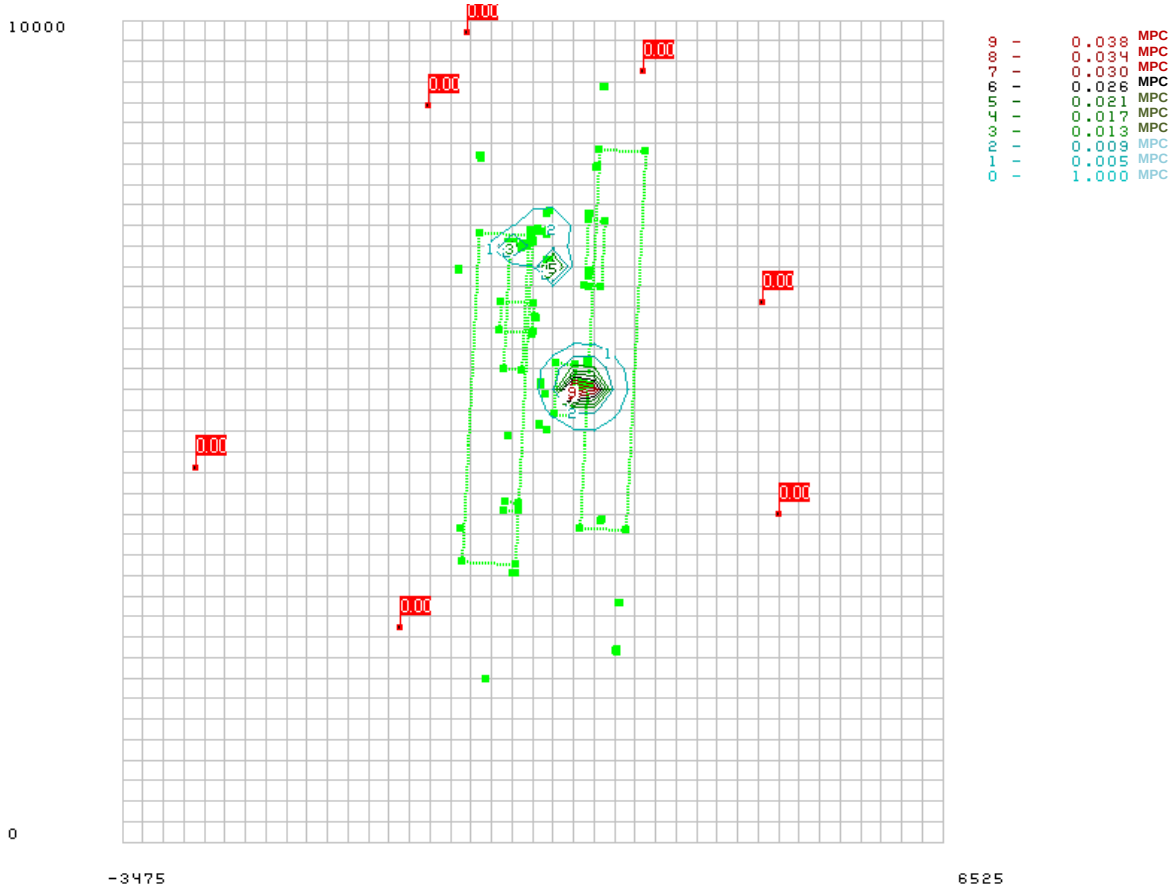
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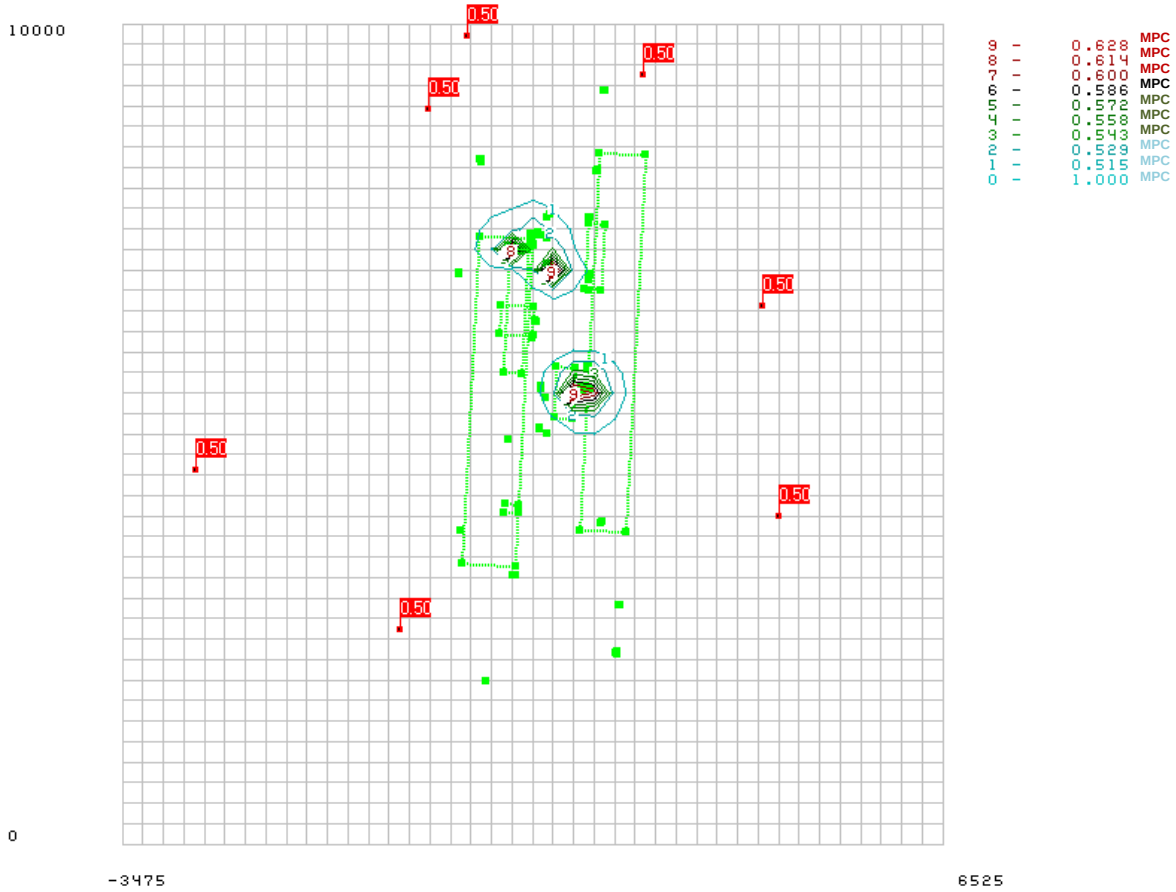
Substance 01002 / 110 Vanadium and its compounds (in terms of vanadium pentoxide)



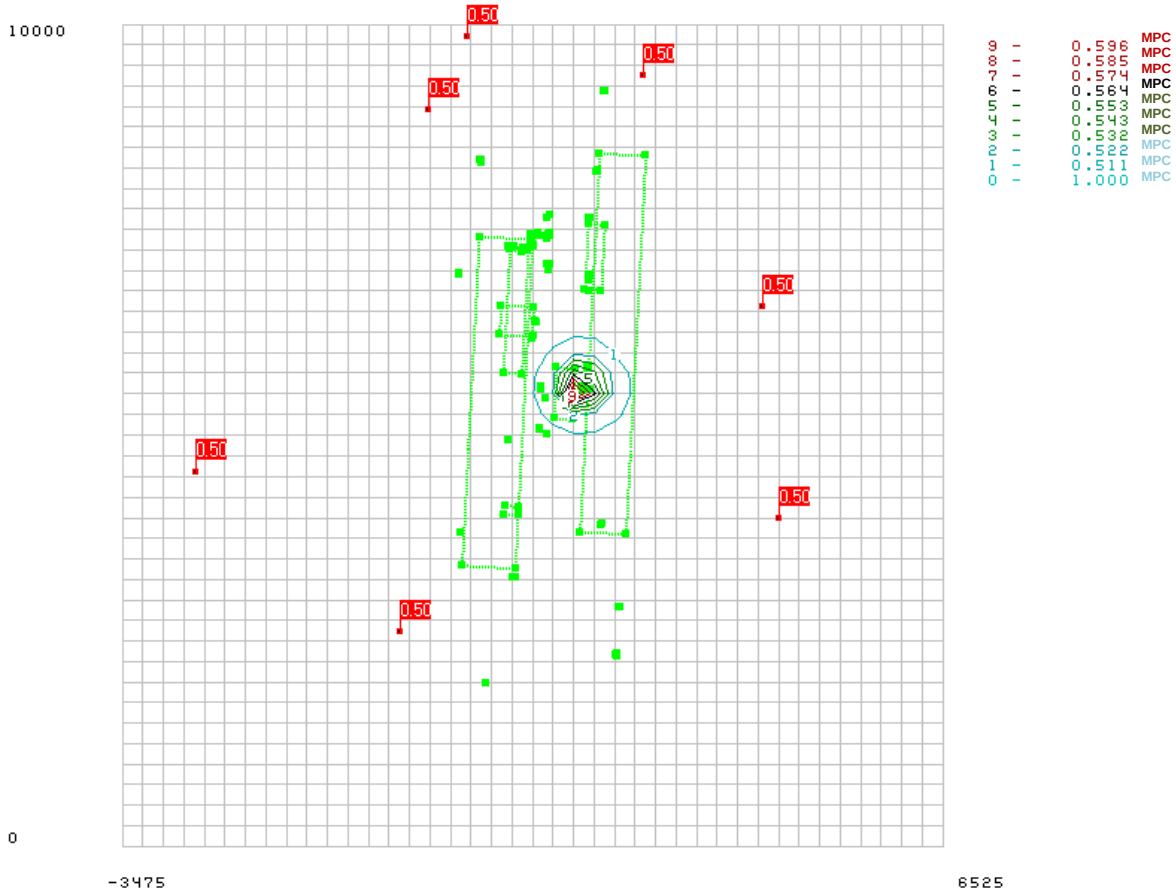
Substance 01003 / 123 iron and its compounds (in terms of iron)



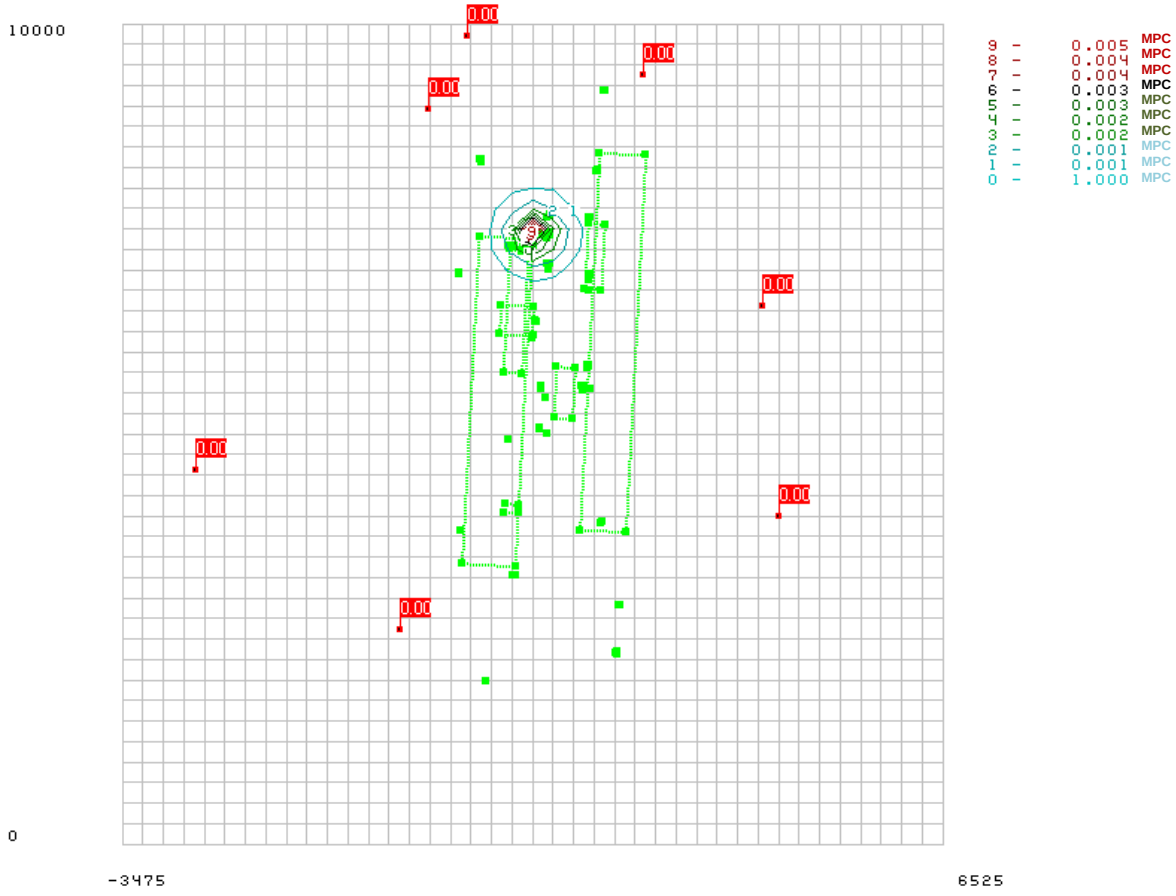
Substance 01104 / 143 Mangan and its compounds (in terms of mangan)



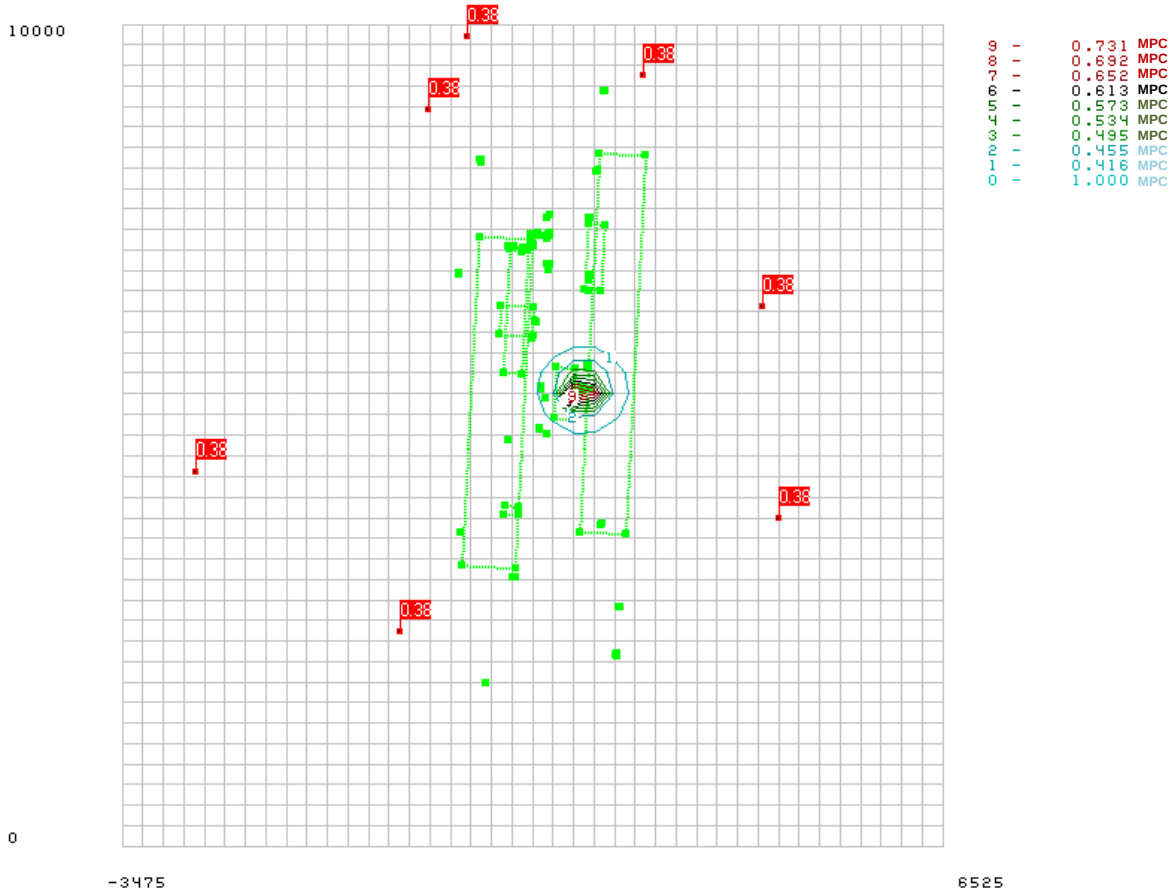
Substance - / 150 Sodium hydroxide (lye, caustic soda)



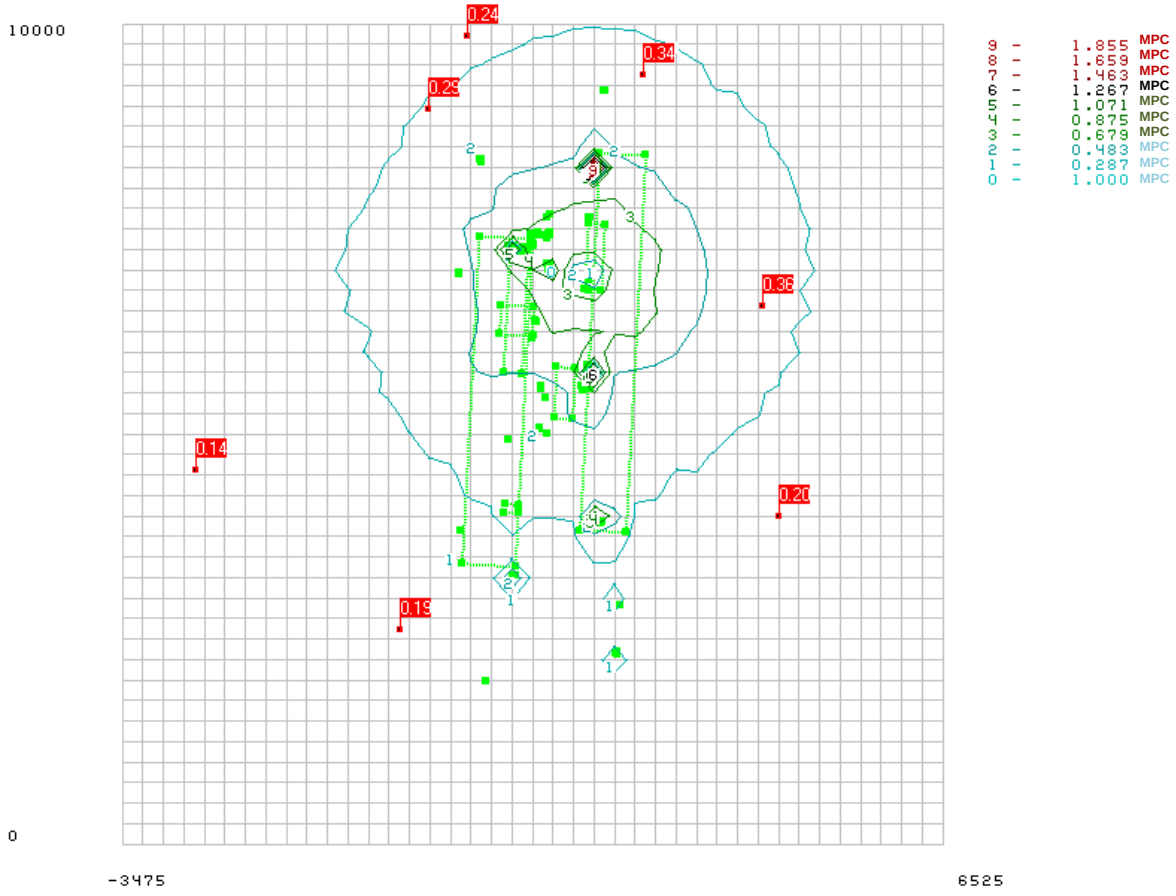
Substance 01009/ 184 Lead and its compounds (in terms of lead)



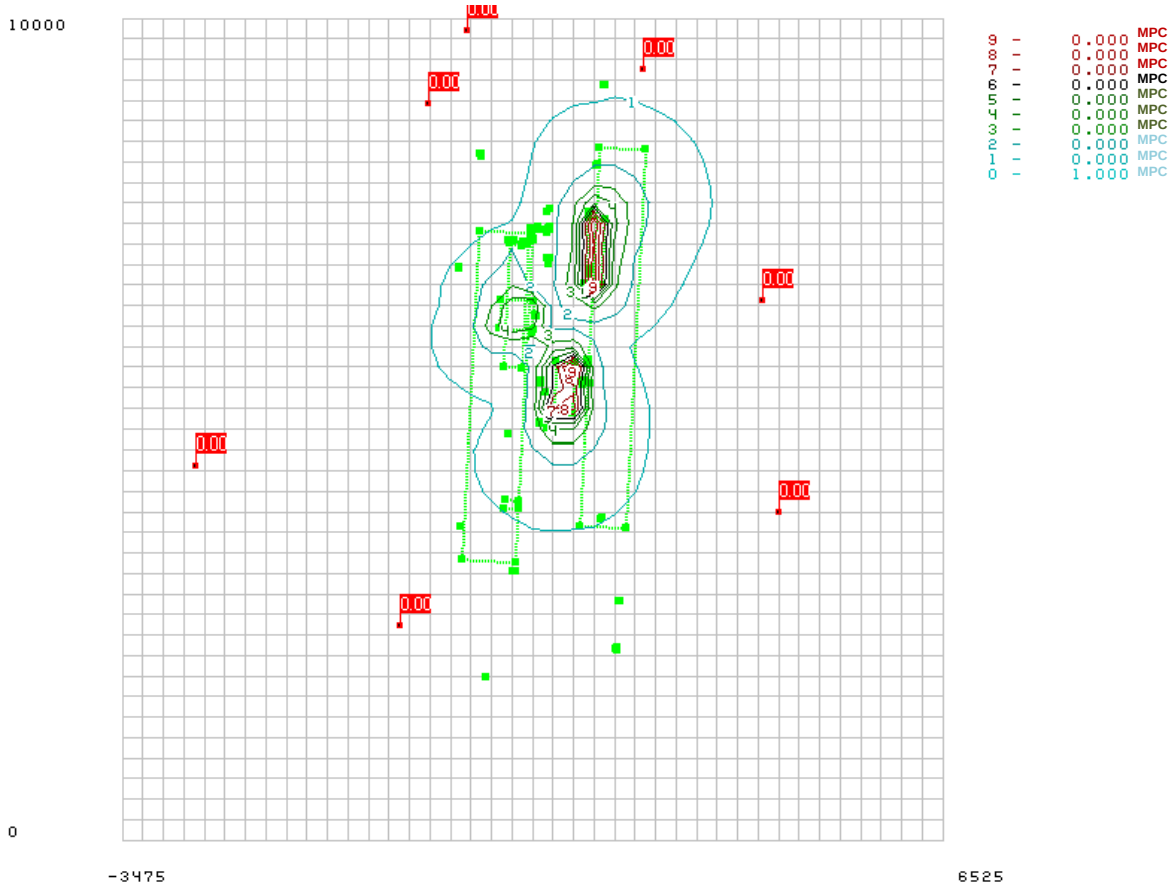
Substance 01010 / 203 Chromium and its compounds (in terms of chromium trioxide)



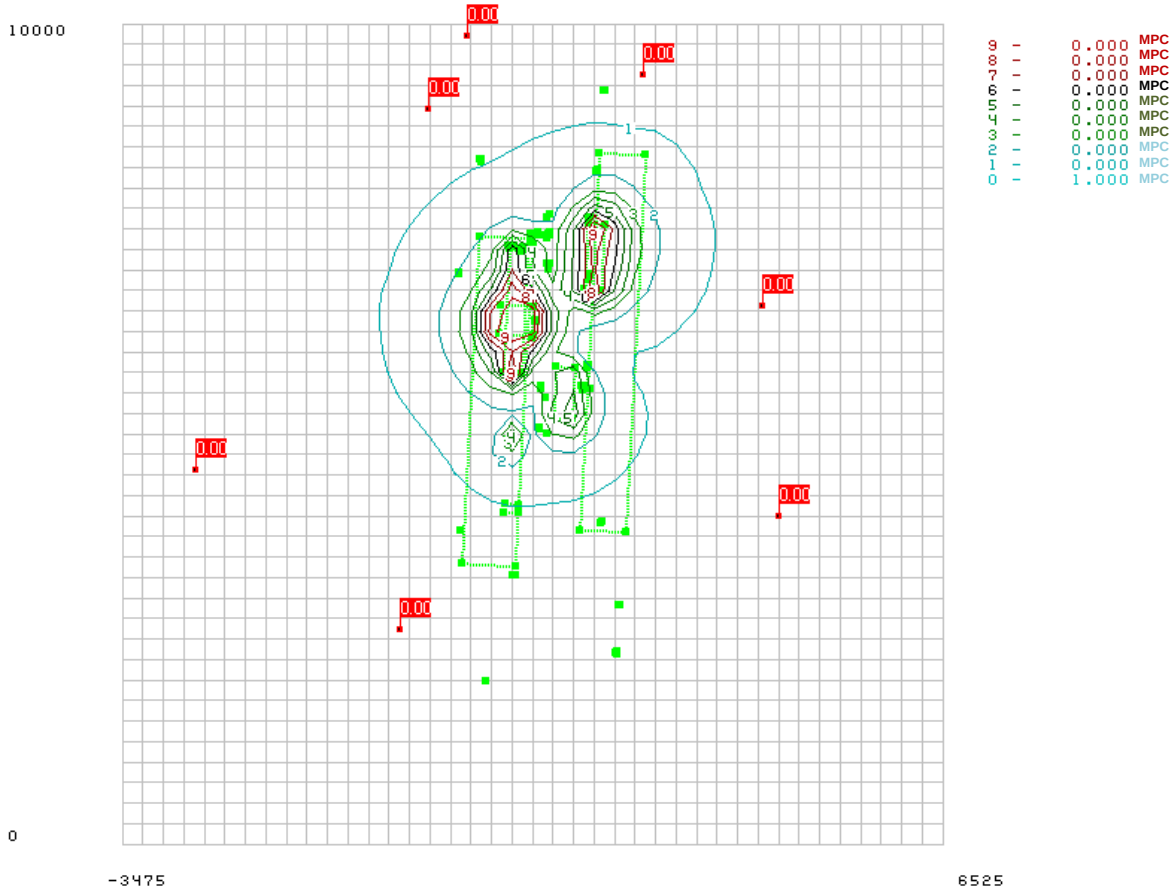
Substance 04001 / 301 Nitrogen oxides (in terms of nitrogen dioxide (NO + NO2))



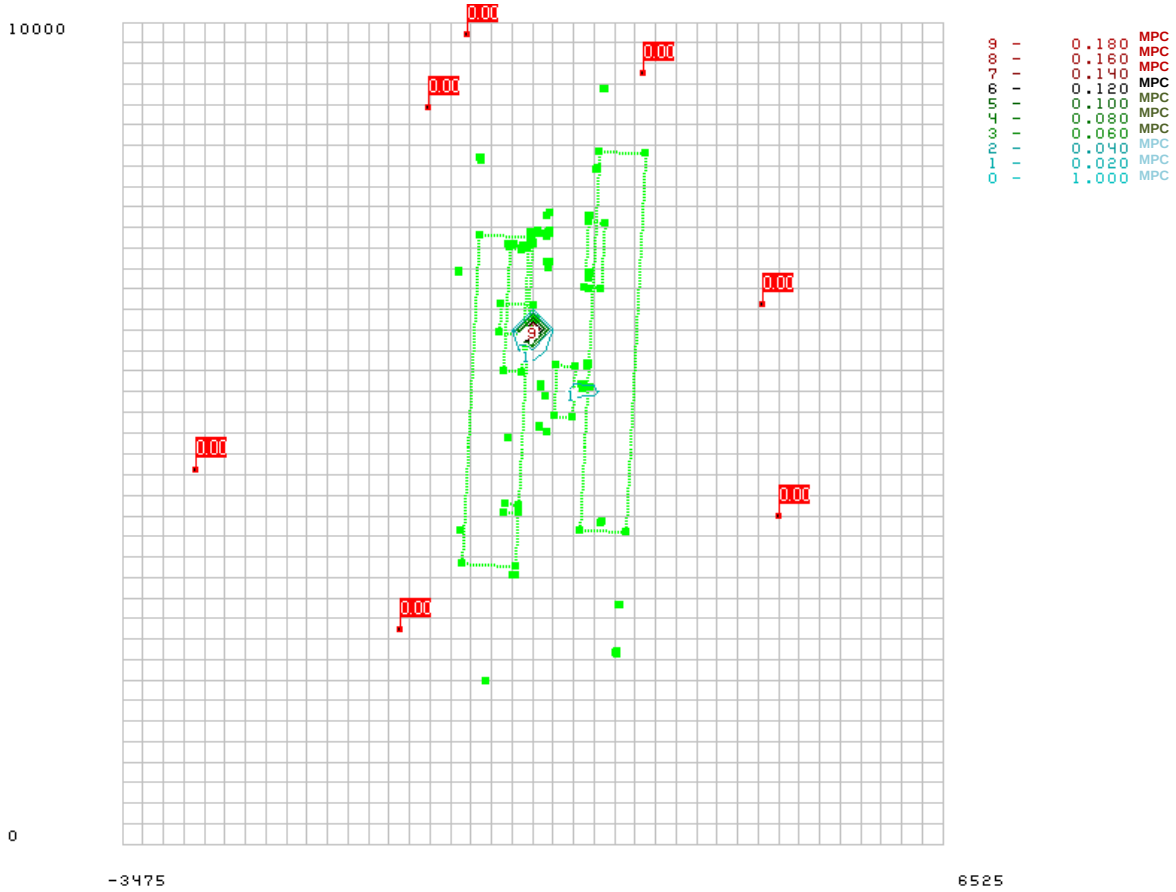
Substance 04003 / 303 Ammonia



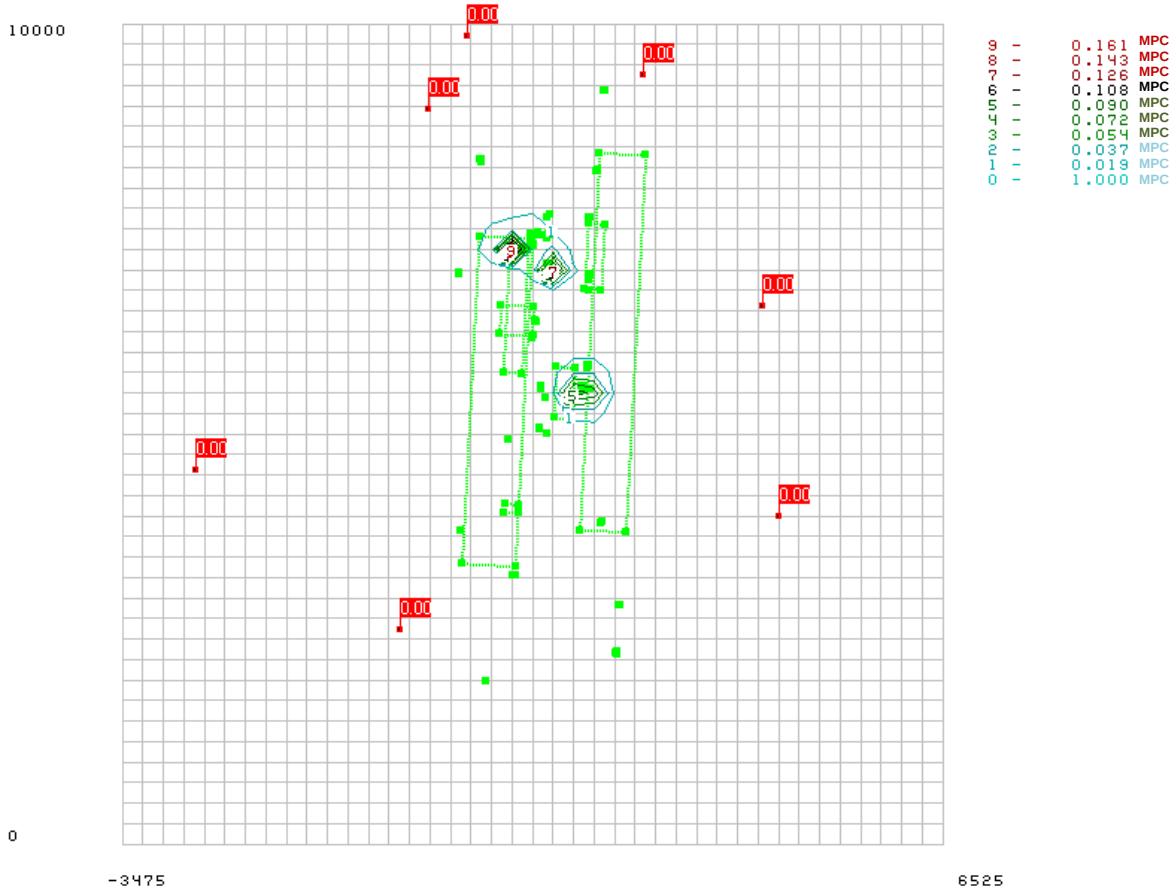
Substance 04002 / 304 Nitrogen(1) oxide (N2O)



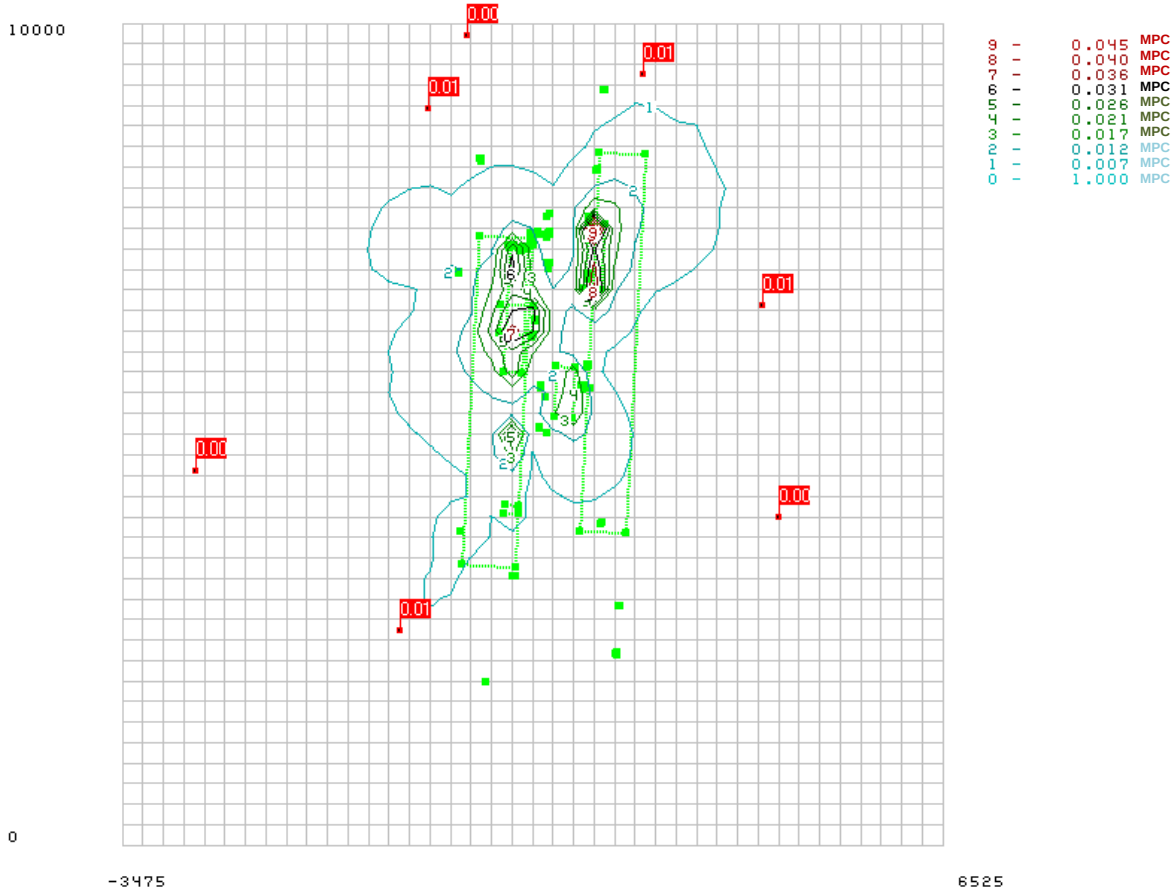
Substance 05004/ 322 Sulfuric acid (H2S04) (sulphuric acid)



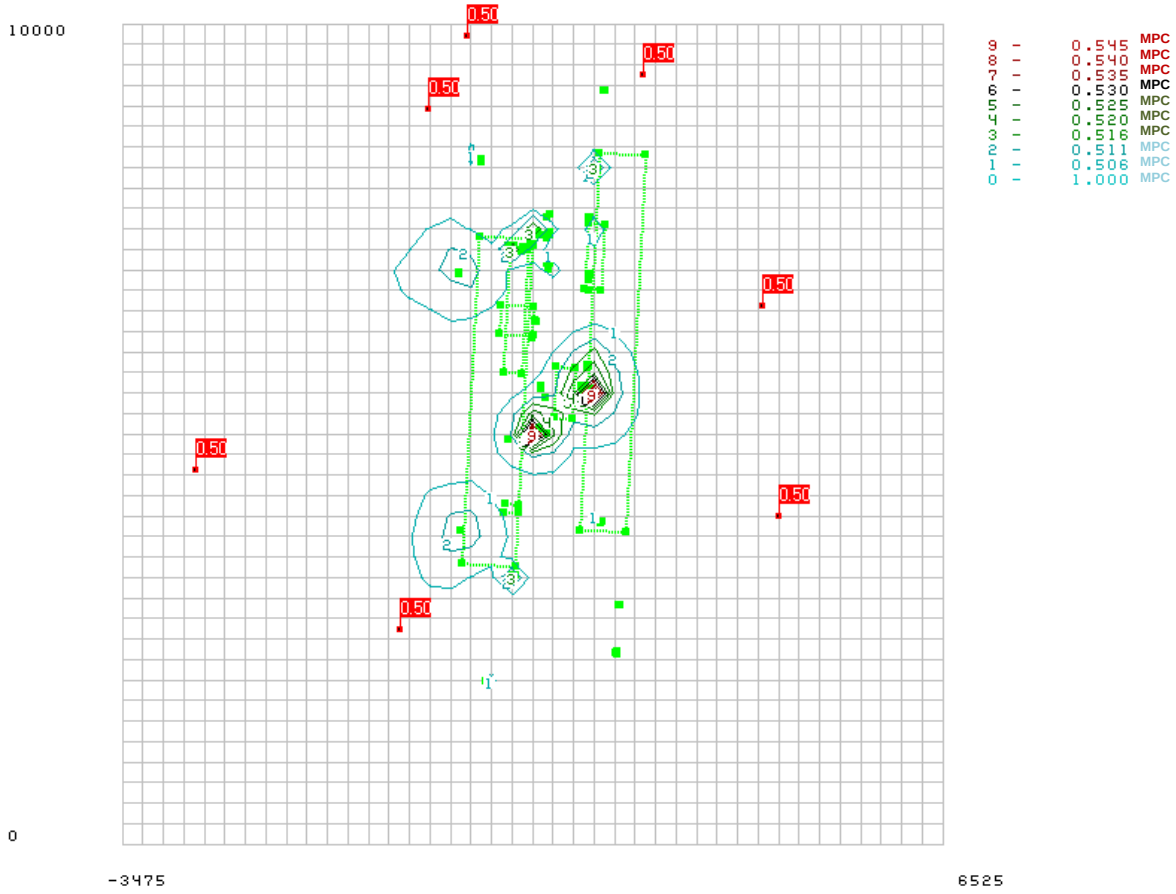
Substance 03000 / 323 Substances in the form of suspended solid particles (microparticles and fibres)



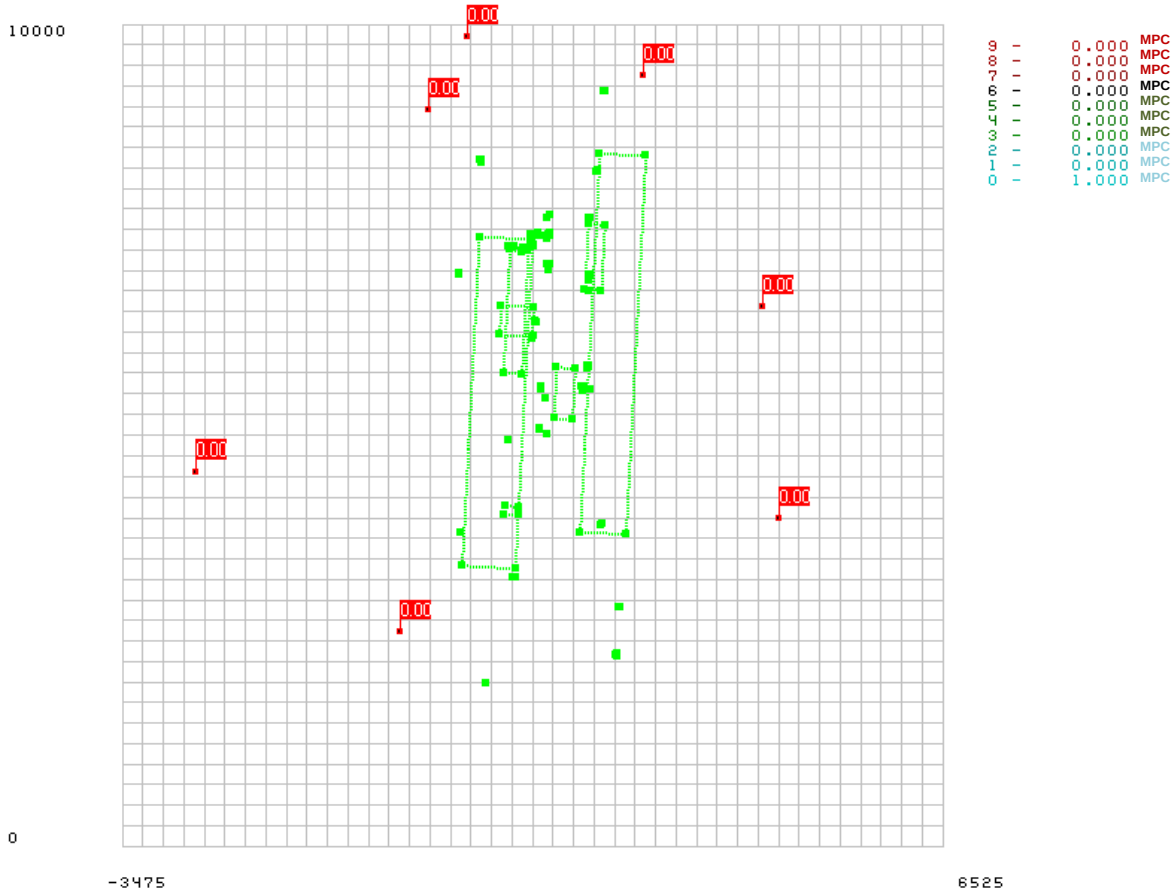
Substance 03004 / 328 Soot



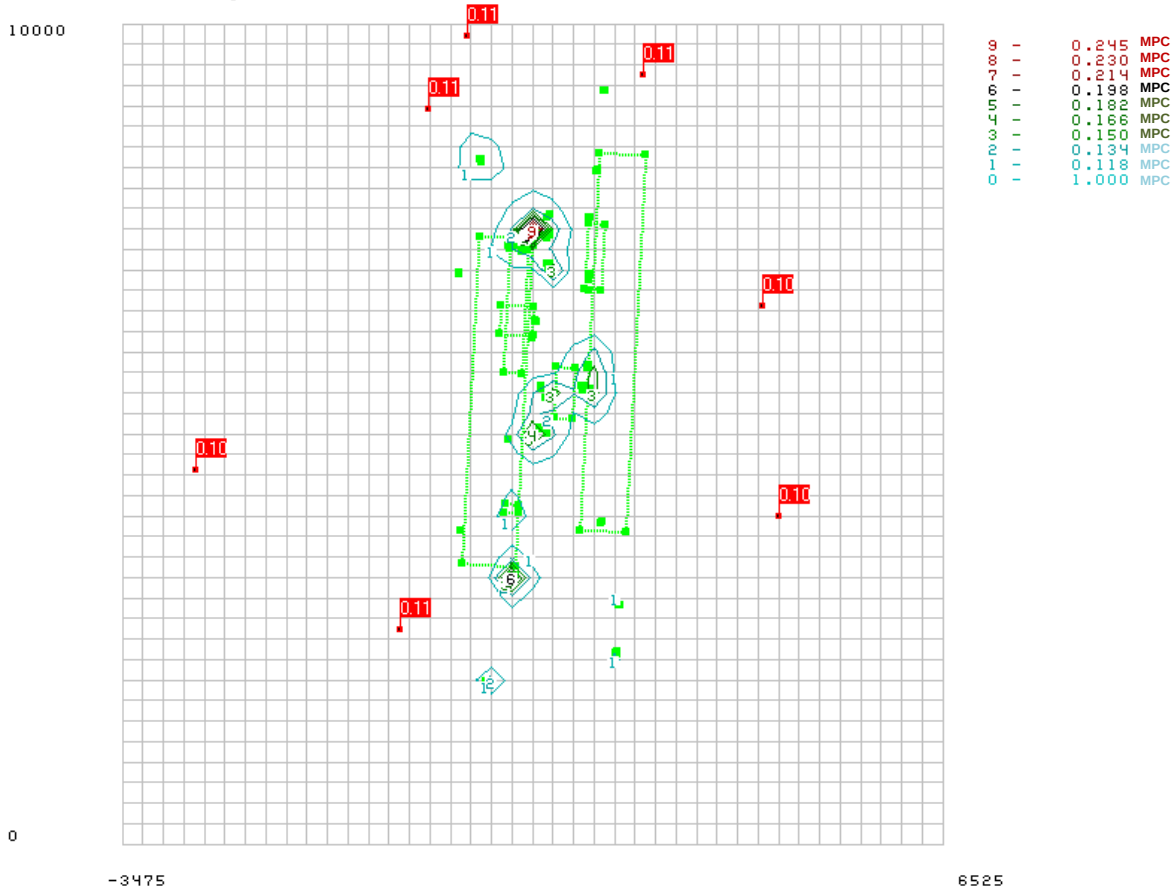
Substance 05001 / 330 Sulphur dioxide



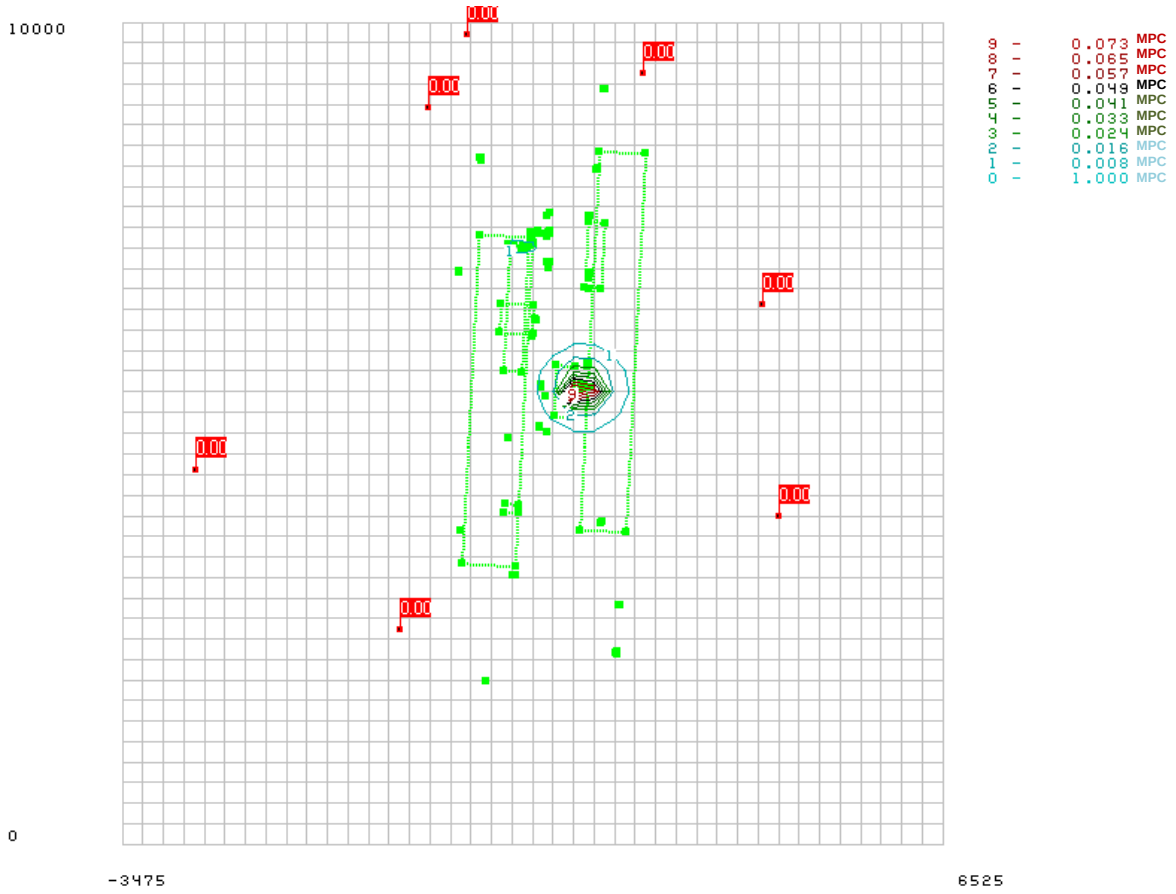
Substance 05002 / 333 Hydrogen sulphide (H2S)



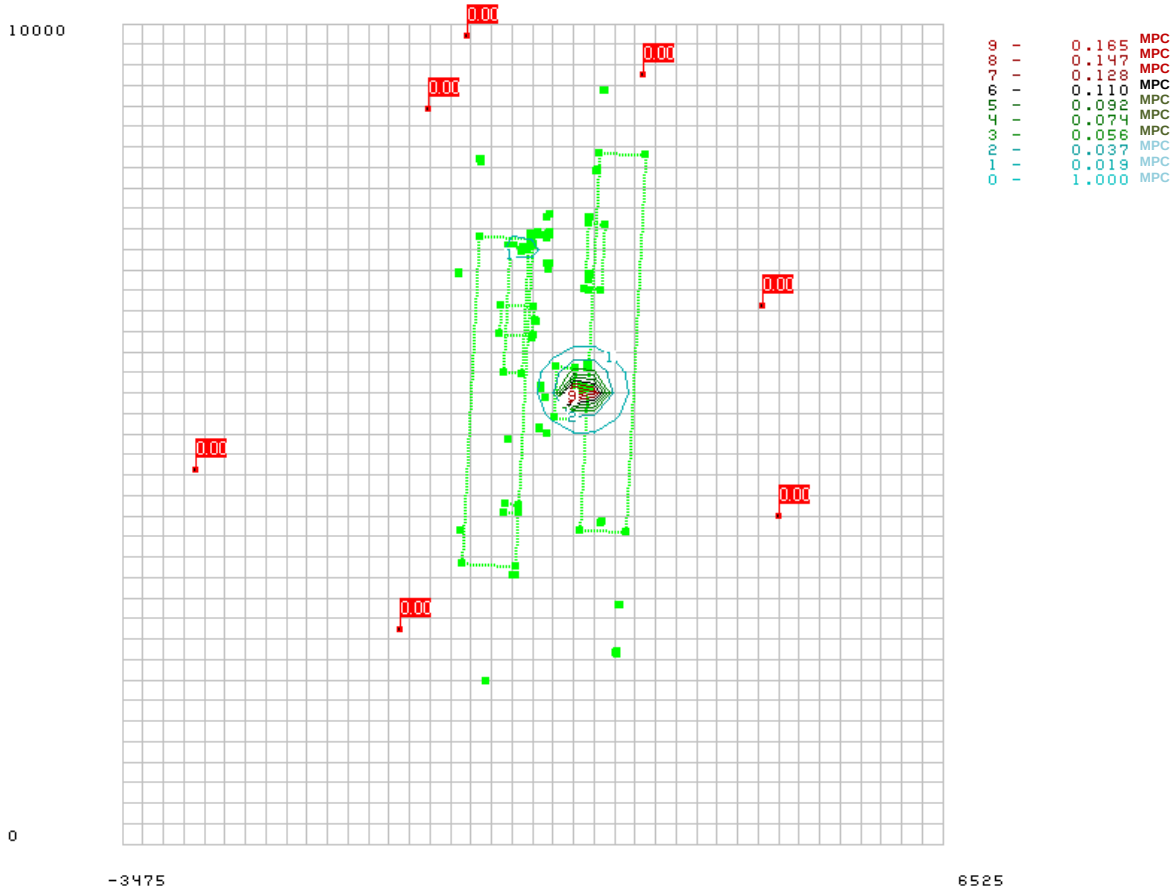
Substance 06000 / 337 Carbon oxide



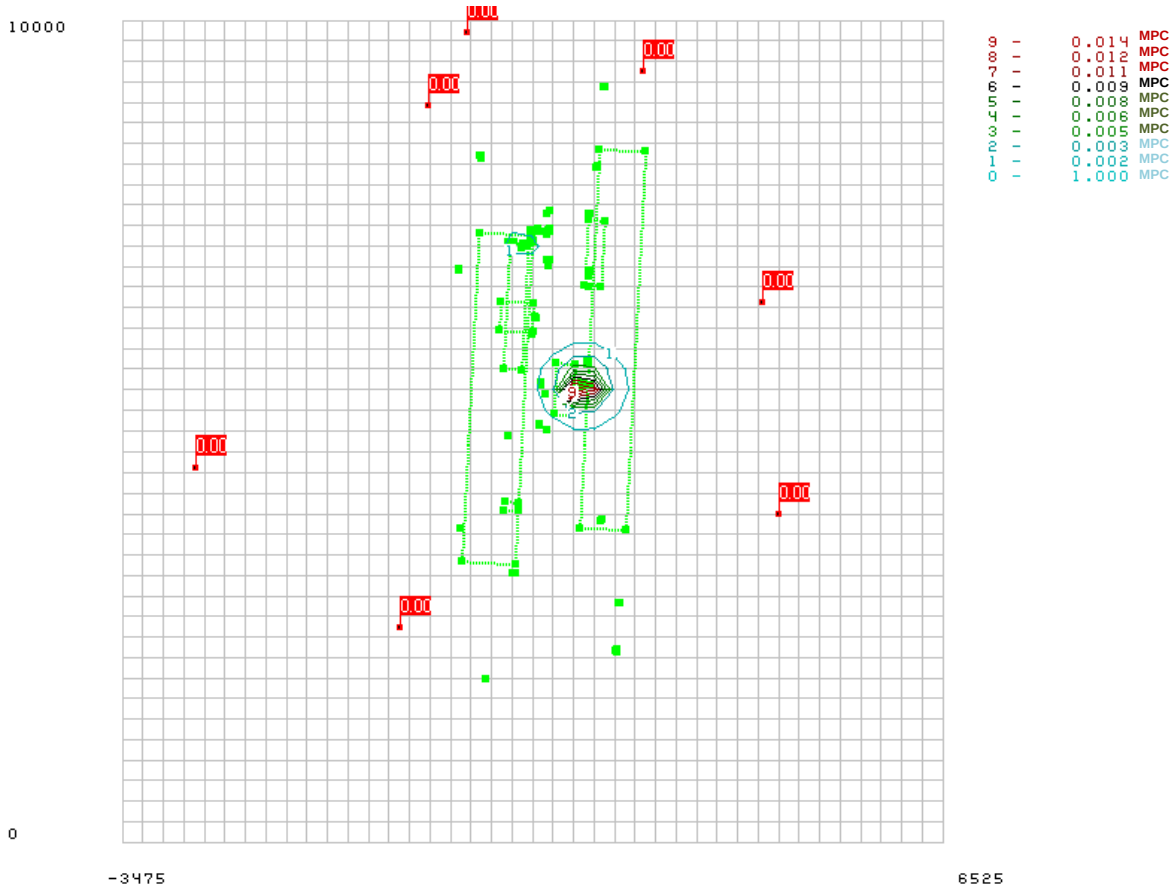
Substance 16001 / 342 Hydrogen fluoride



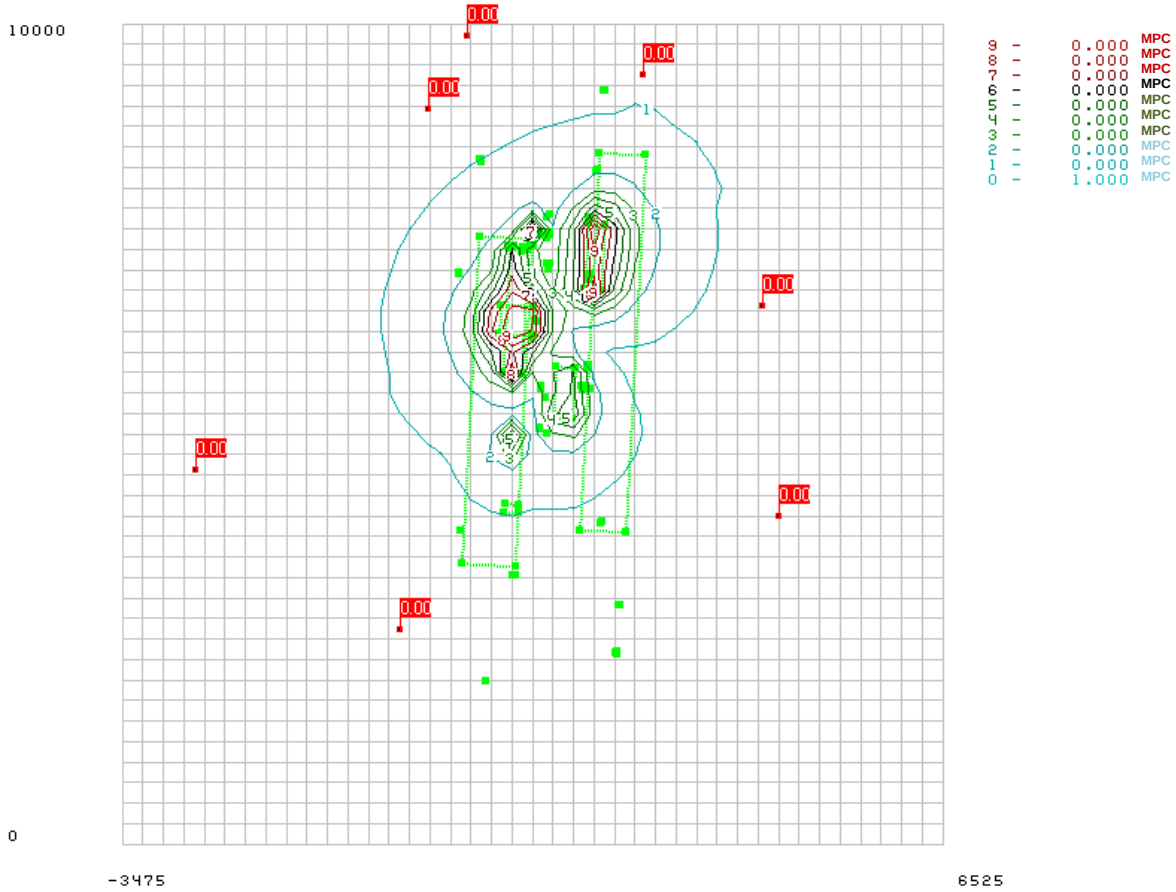
Substance 16000/ 343 Fluor and its compounds (in terms of fluor)



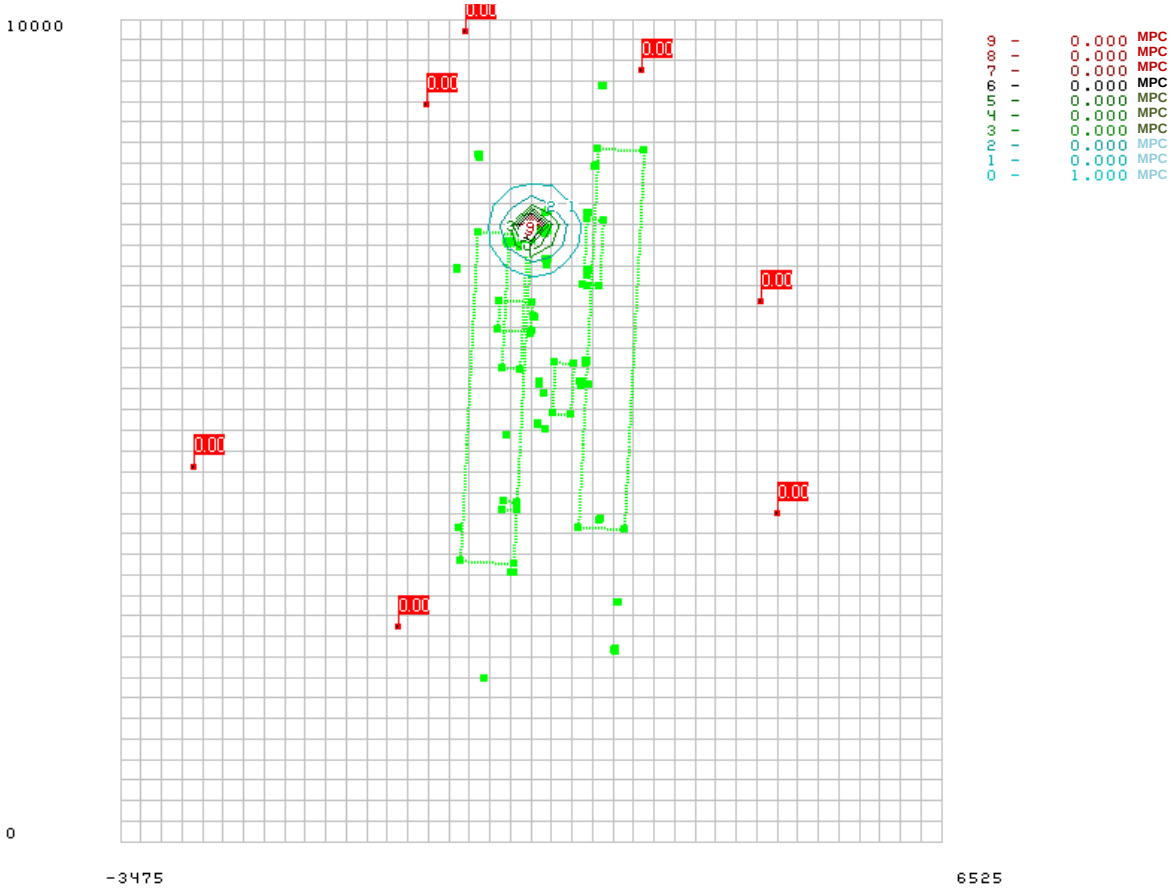
Substance 16000/ 344 Fluor and its compounds (in terms of fluor)



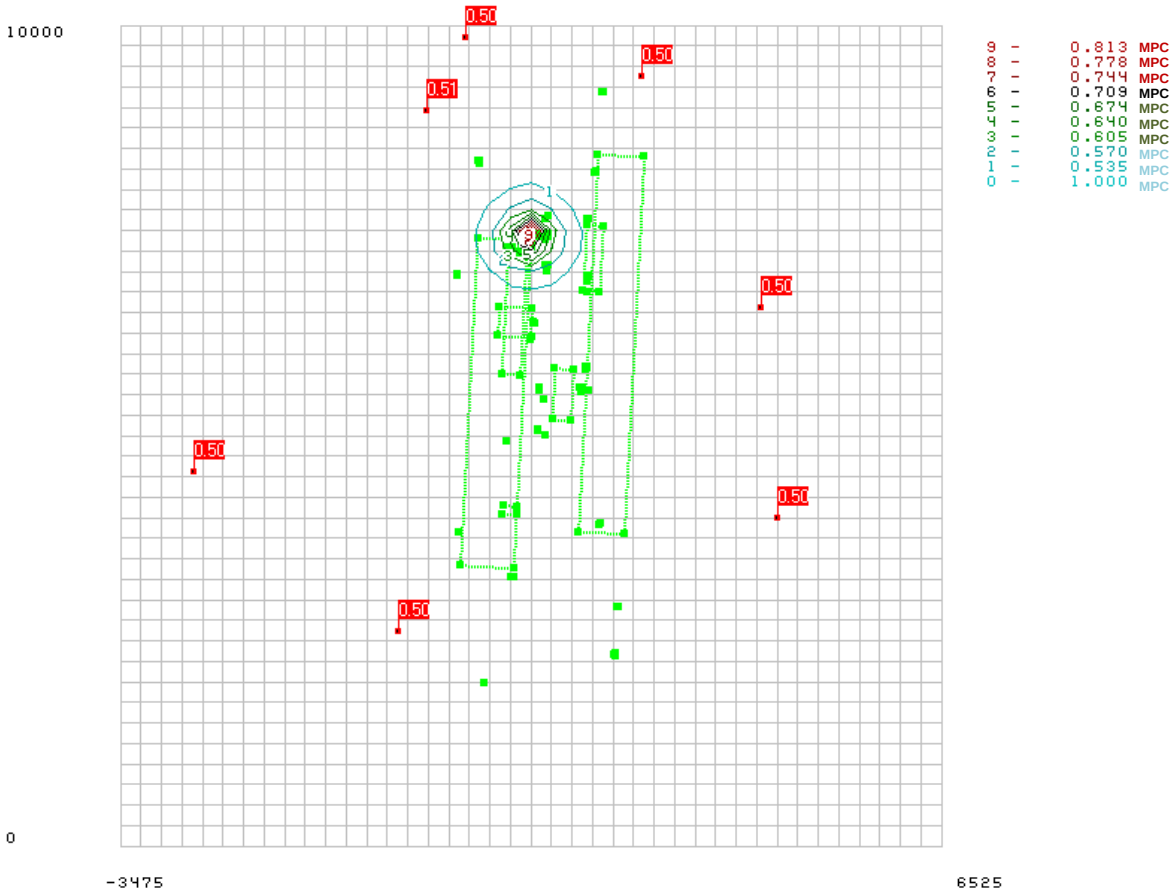
Substance 12000 / 410 Methane



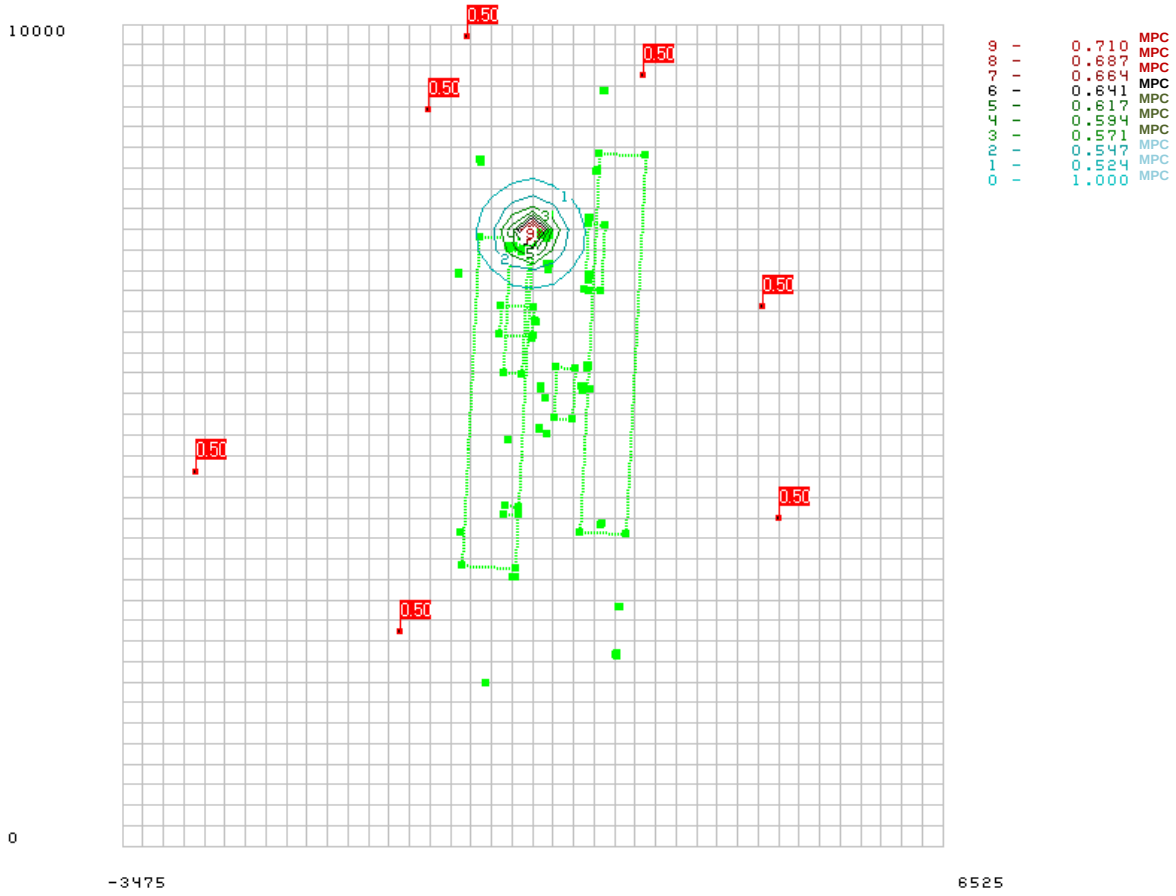
Substance 11000 / 514 Non-methane volatile organic compounds (NMVOC)



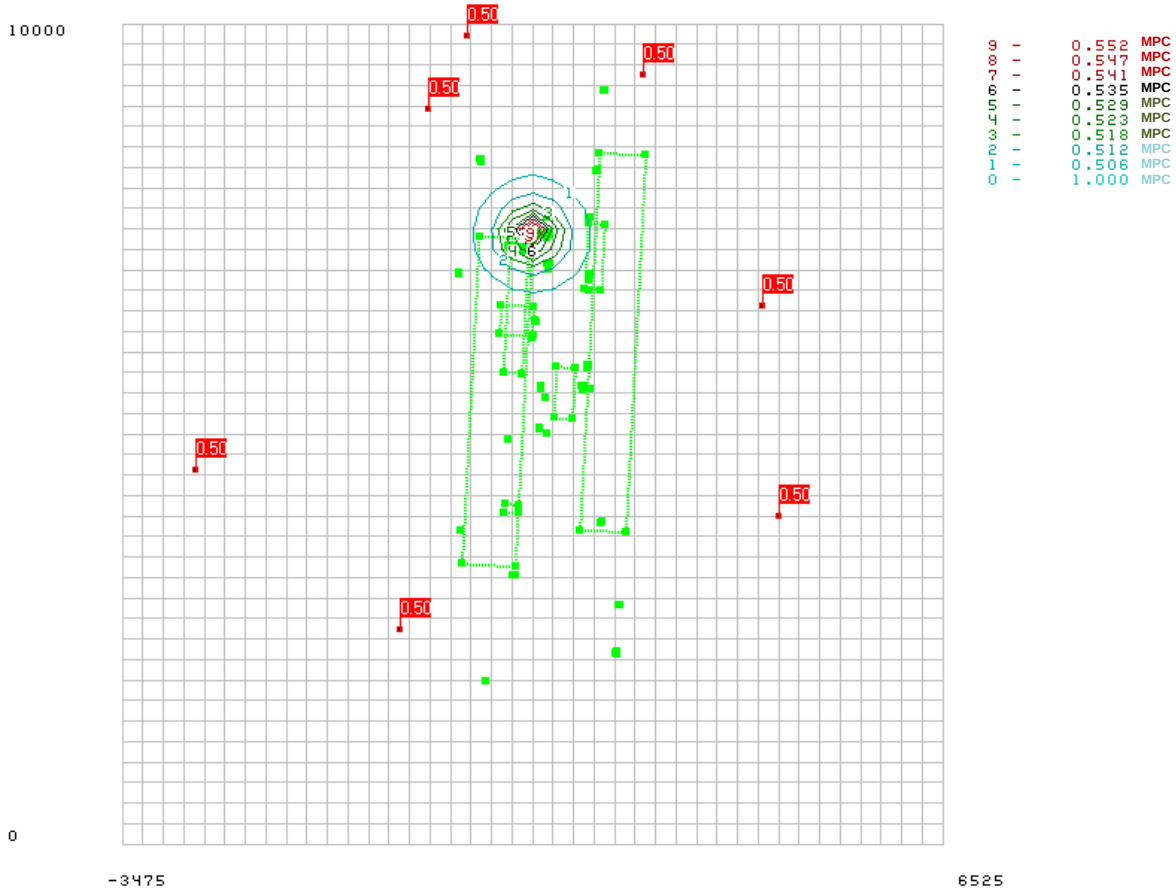
Substance 11030 / 616 Xylene



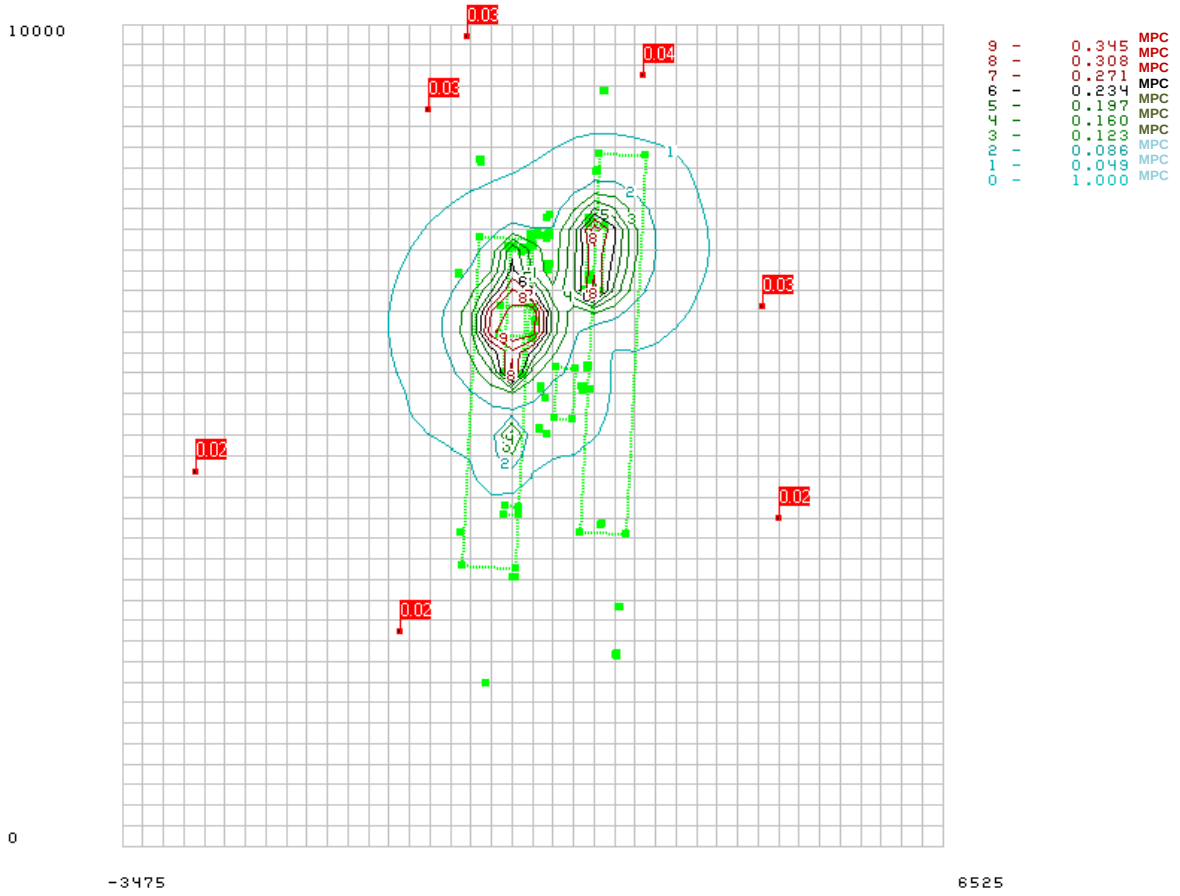
Substance 11037 / 620 Styrene



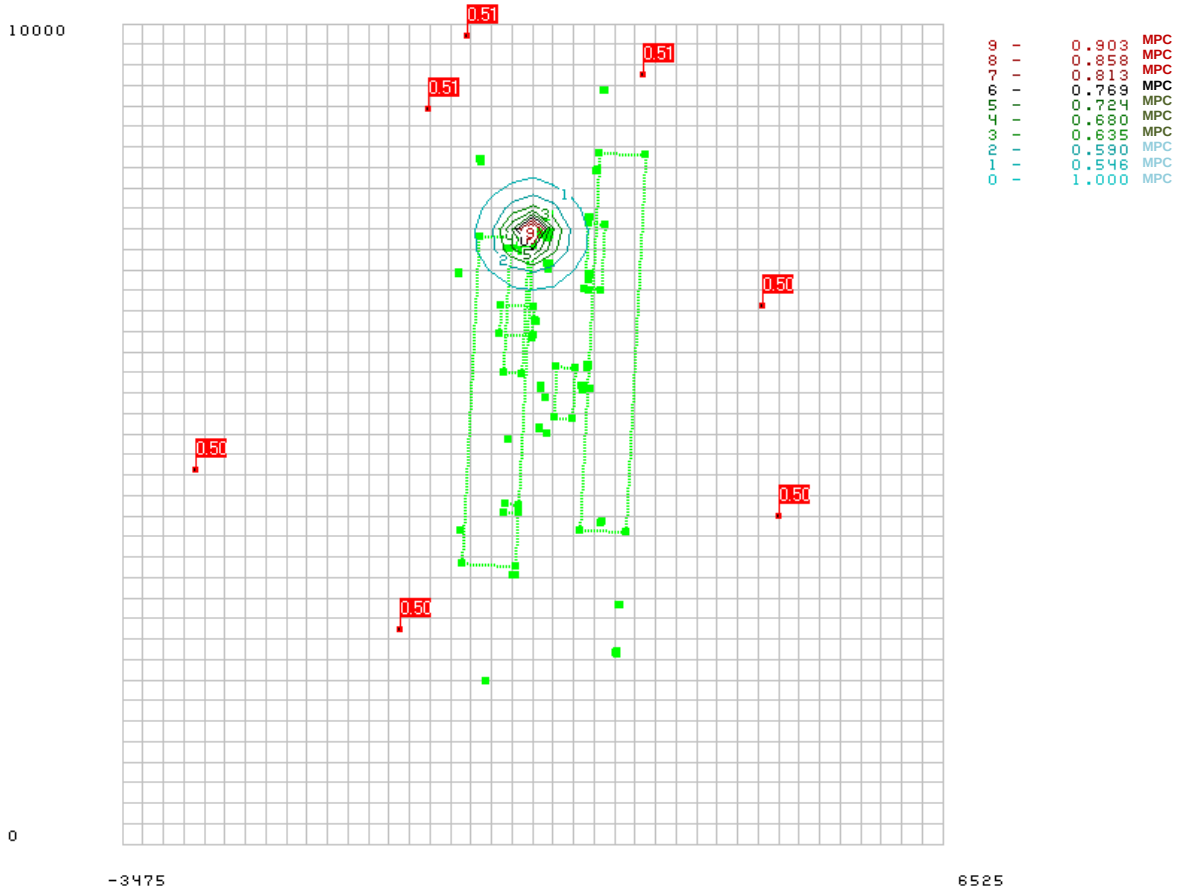
Substance 11041 / 621 Toluene



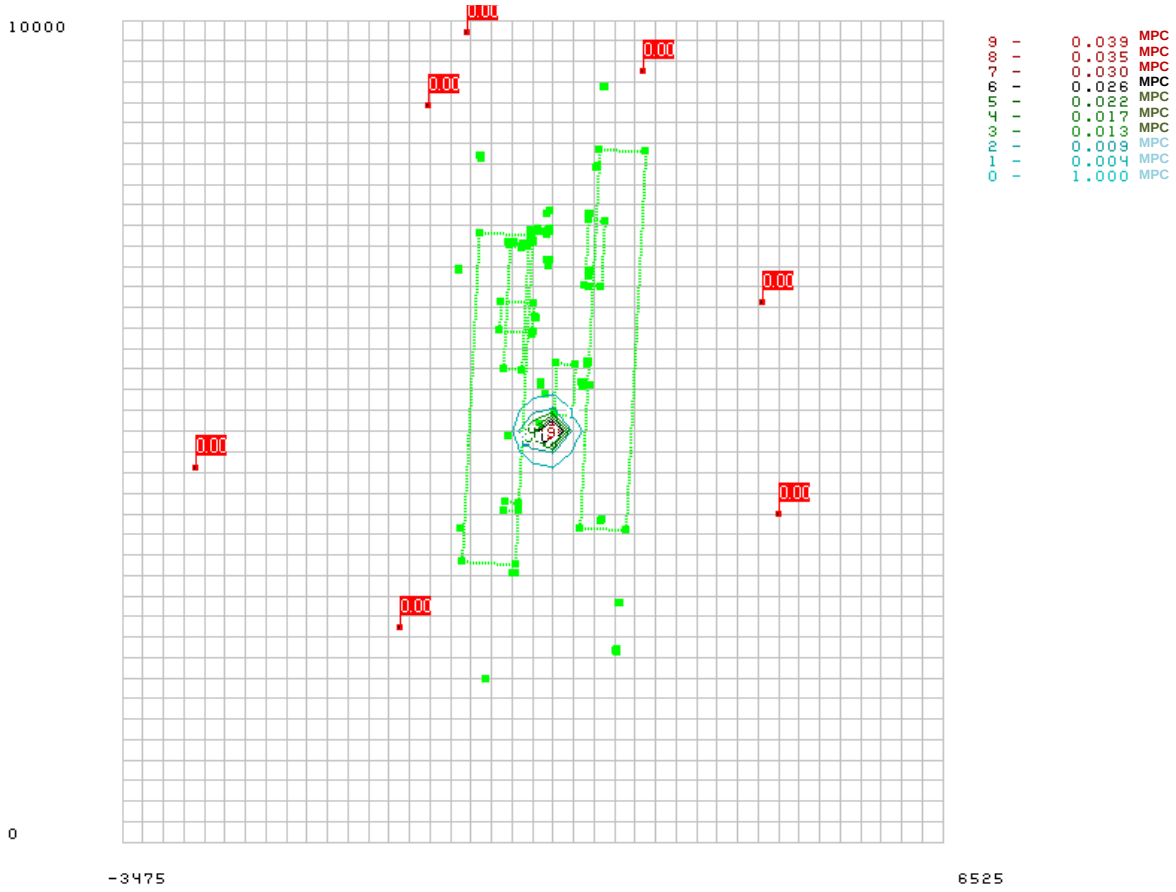
Substance 13101 / 703 Benzo[a]pyrene



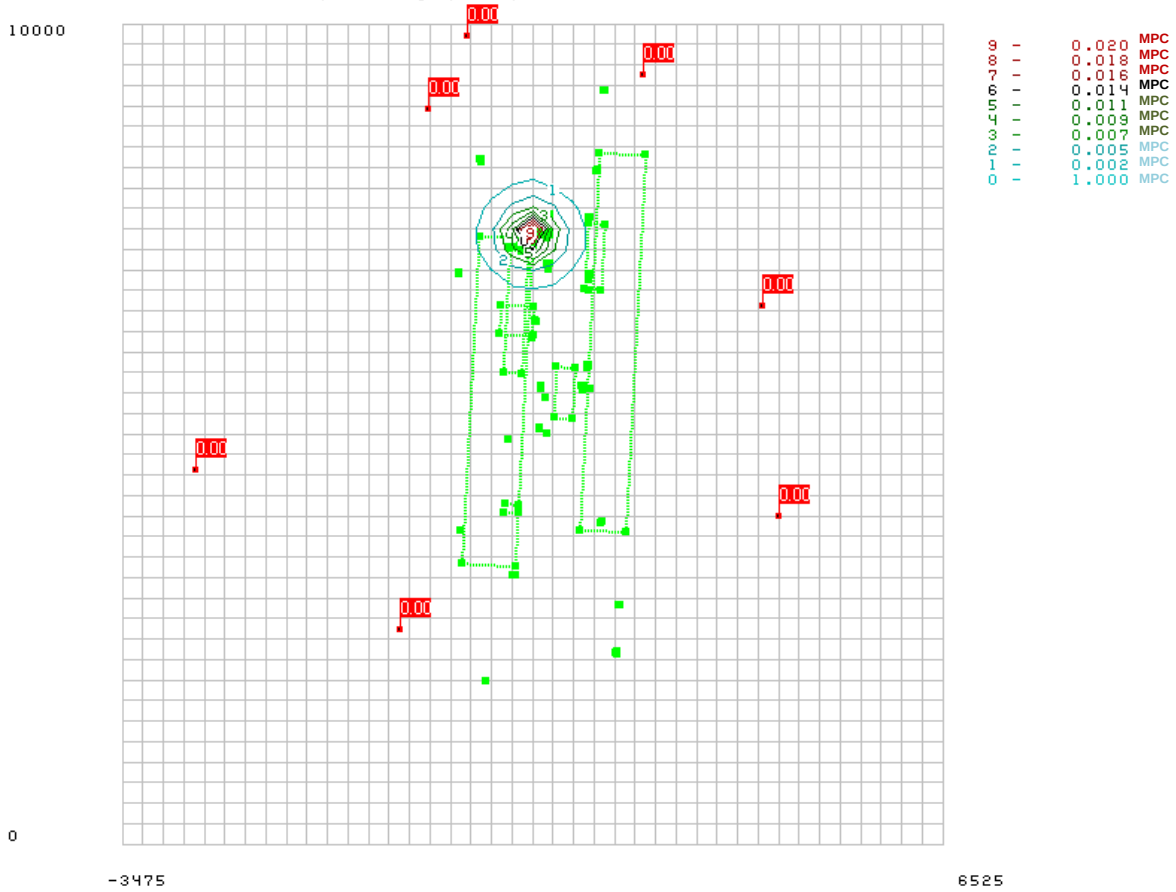
Substance 11000 / 1042 Non-methane volatile organic compounds (NMVOC)



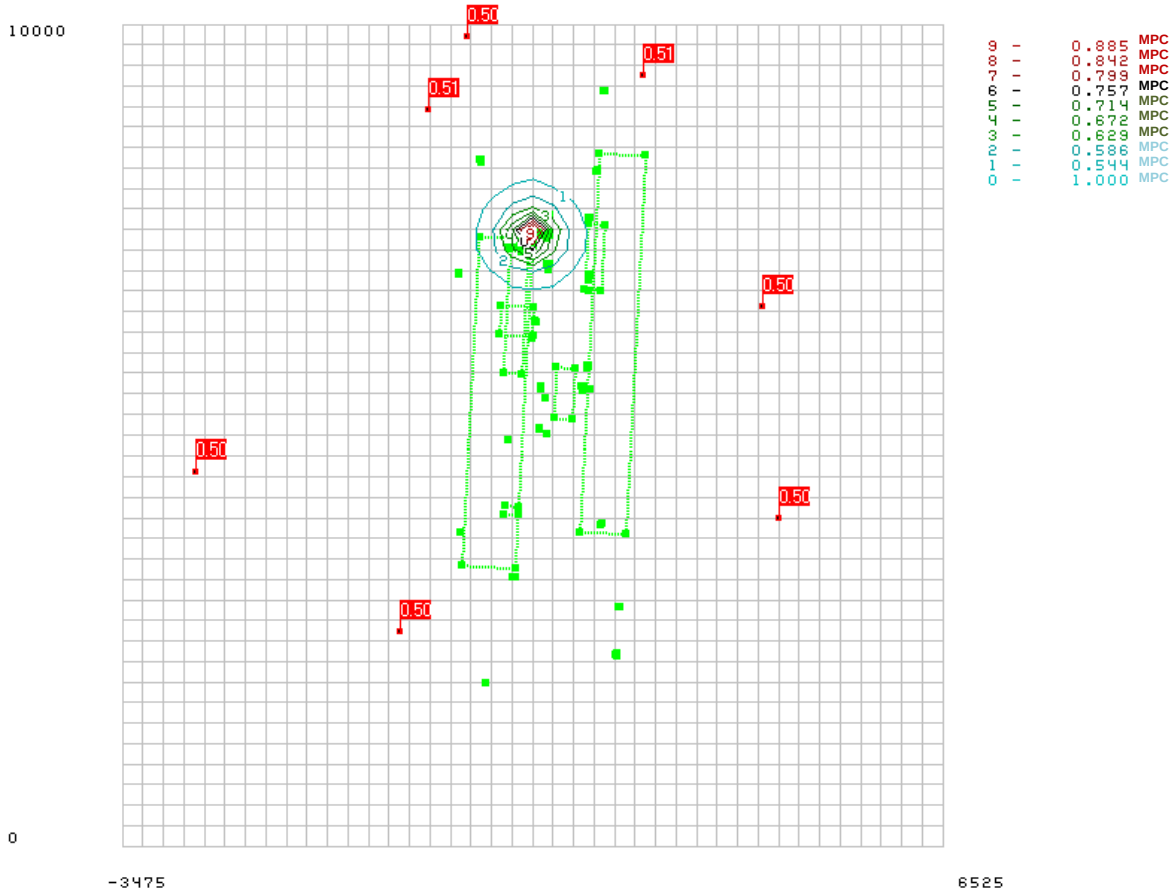
Substance 11000 / 1056 Non-methane volatile organic compounds (NMVOC)



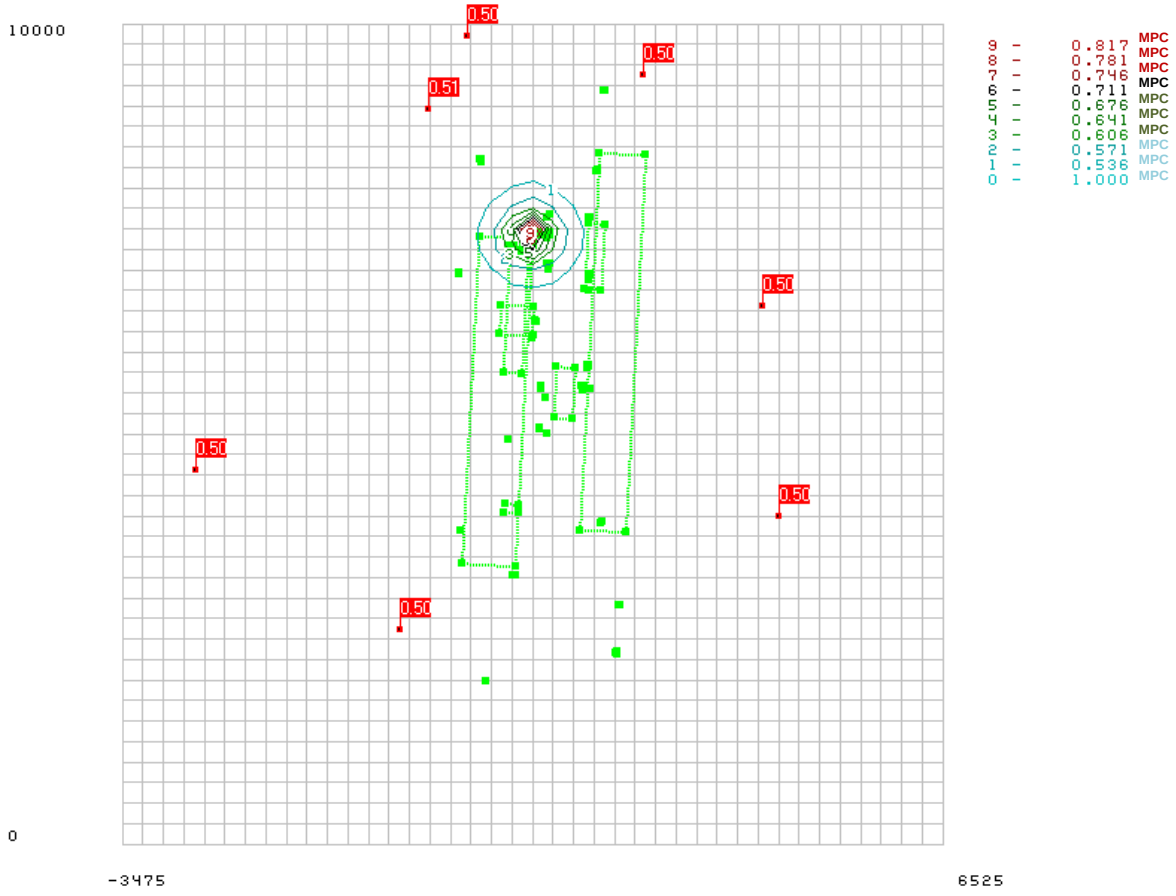
Substance 11000 / 1061 Non-methane volatile organic compounds (NMVOC)



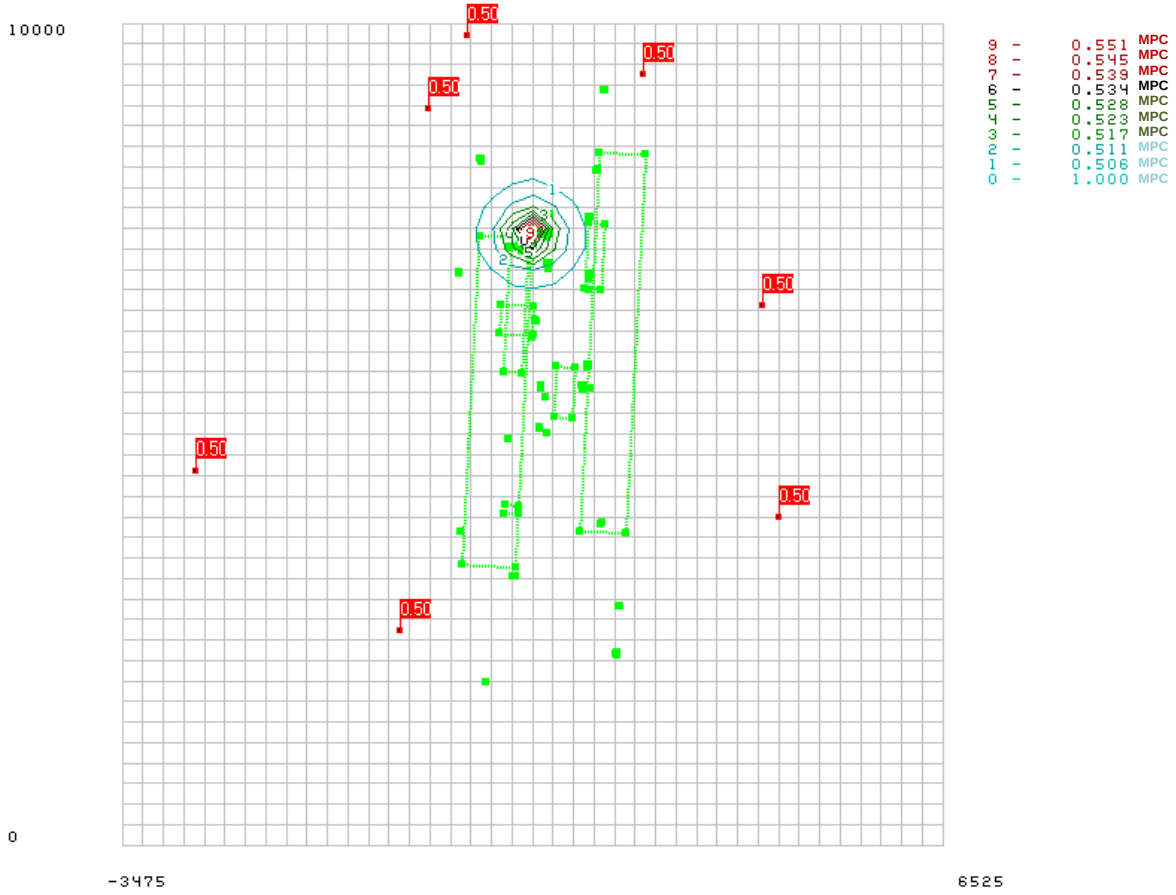
Substance 11009 / 1210 Butyl acetate



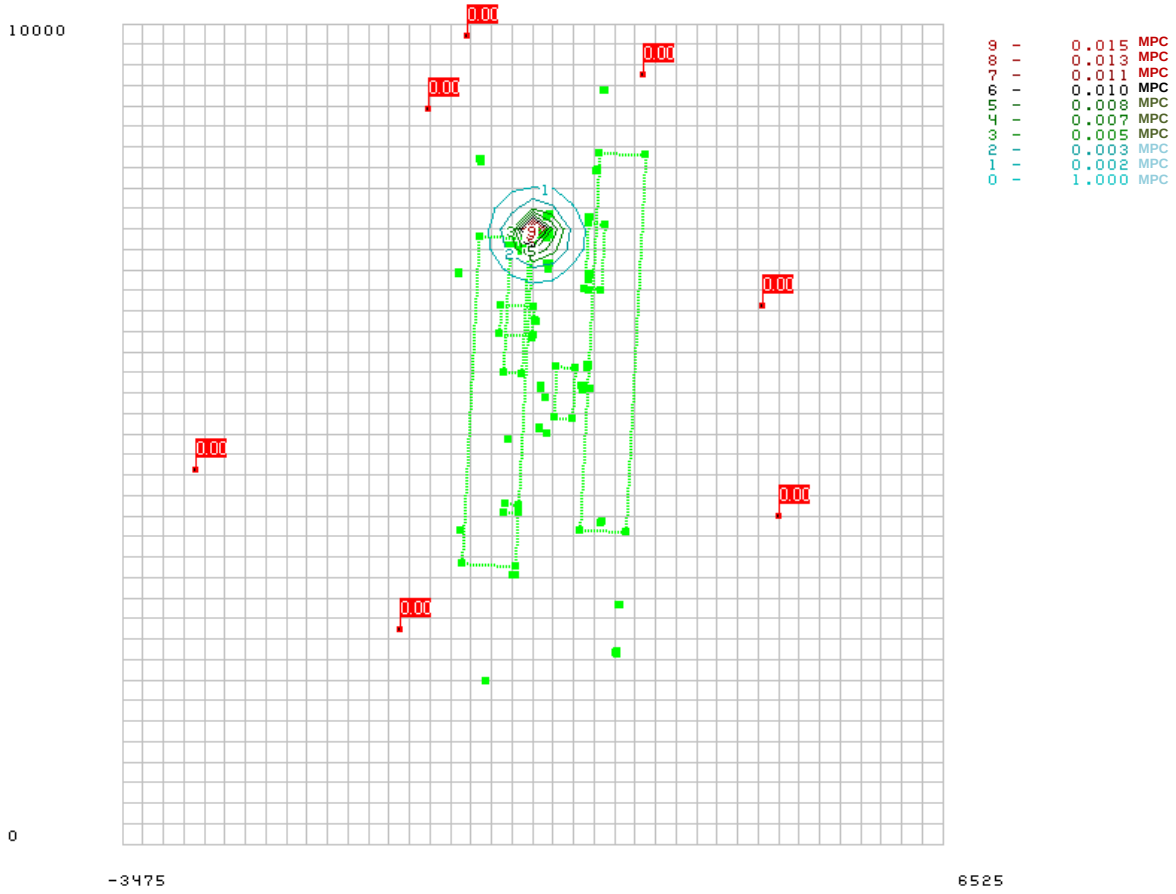
Substance 11021 / 1240 Ethyl acetate



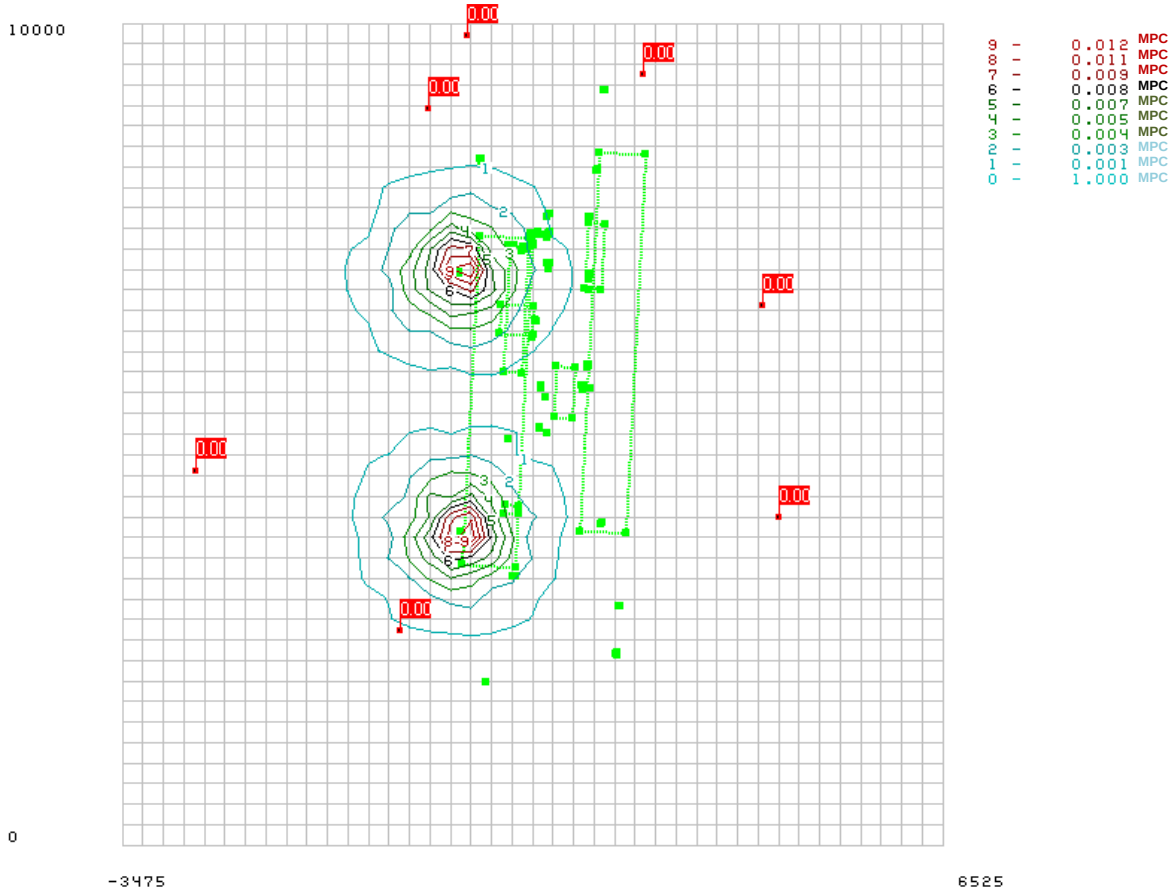
Substance 11020 / 1246 Ethylcellosolve



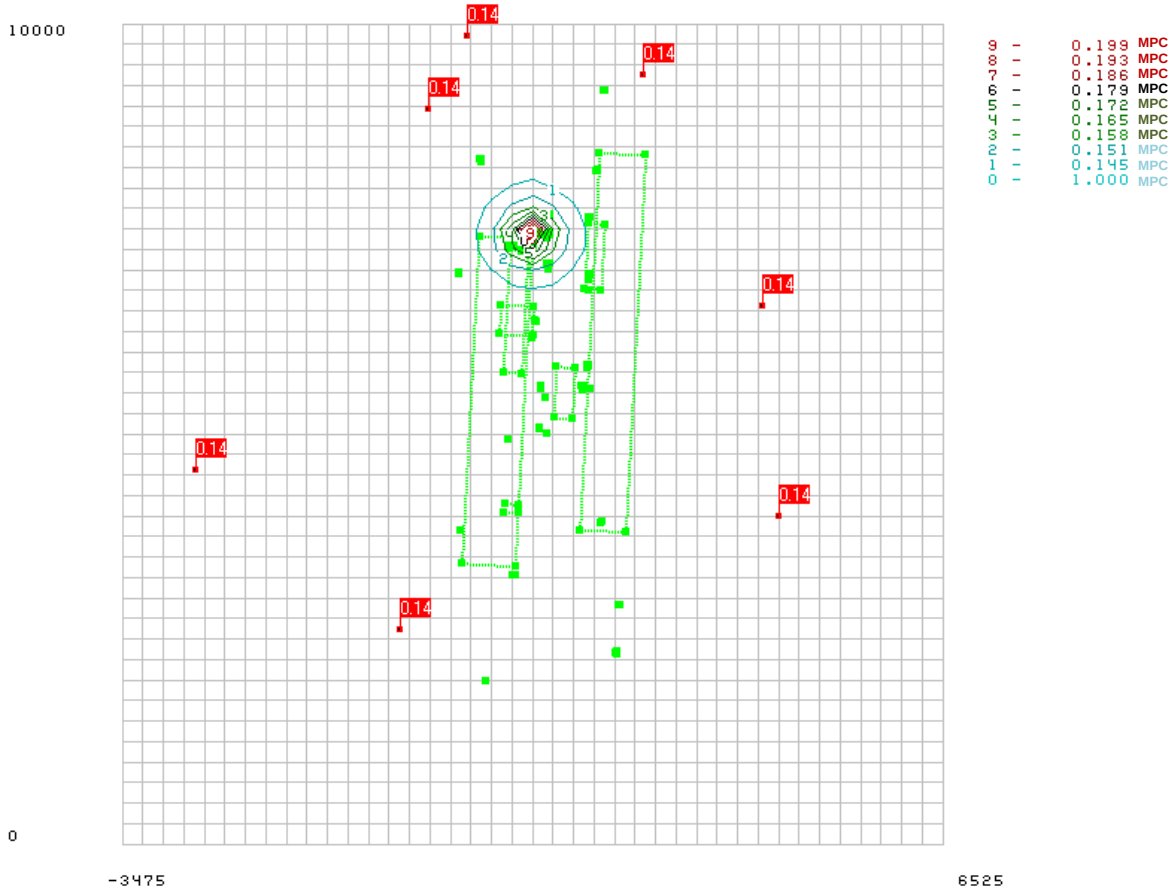
Substance 11000 / 1319 Non-methane volatile organic compounds (NMVOC)



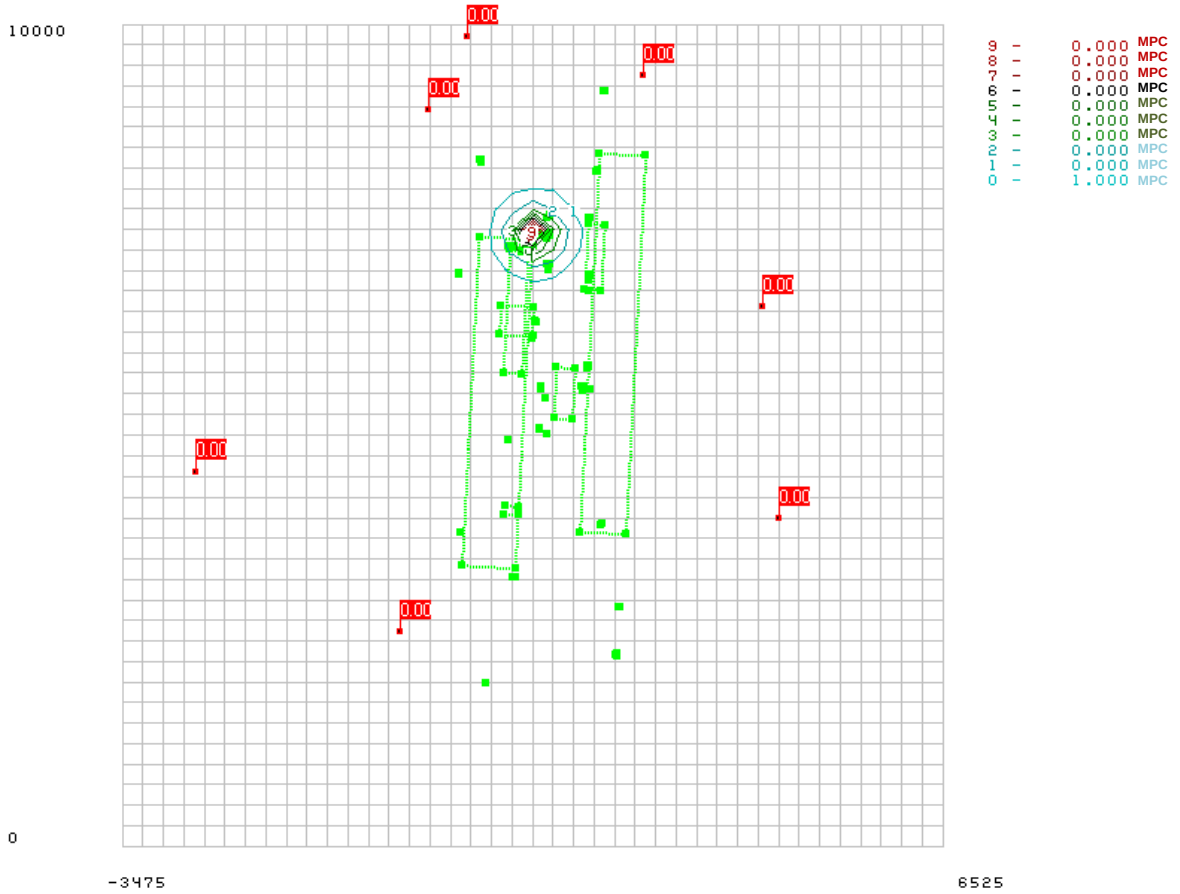
Substance 11049 / 1325 Formaldehyde



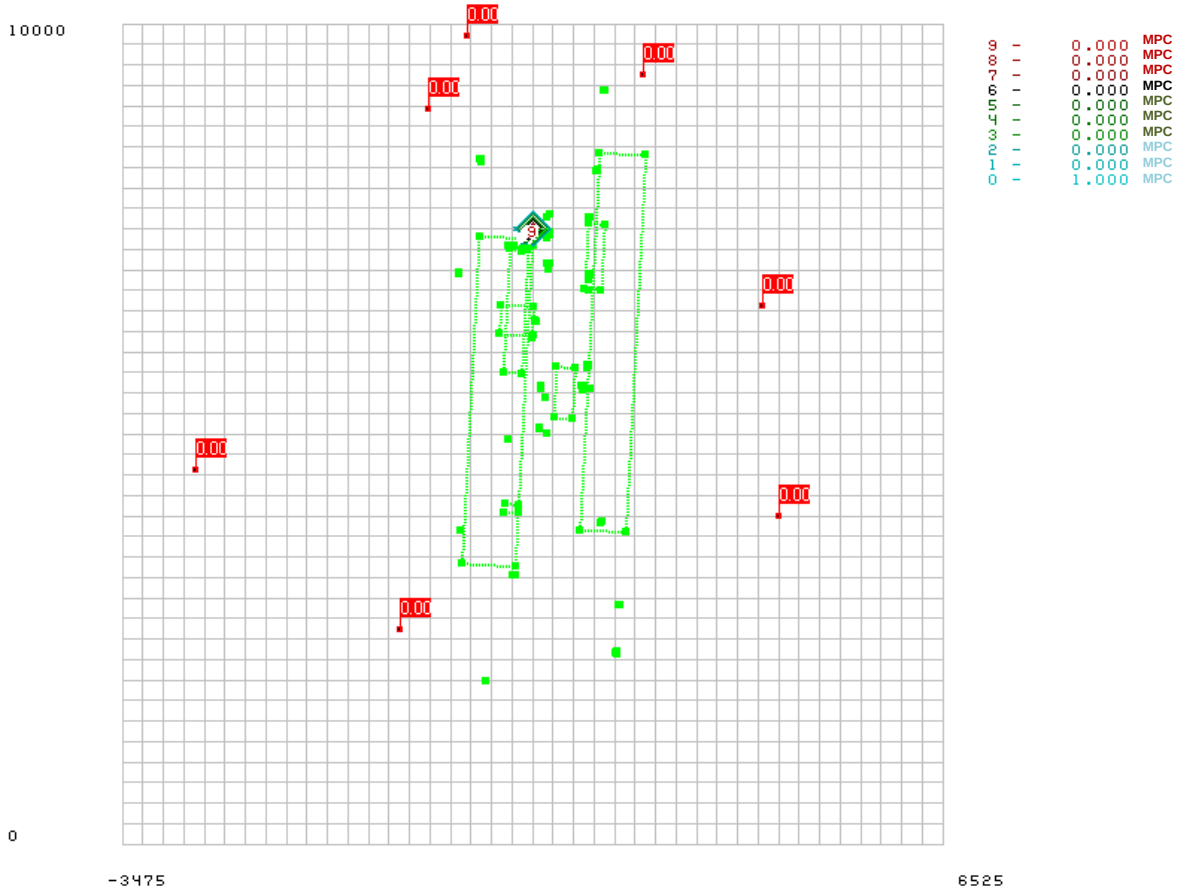
Substance 11007 / 1401 Acetone



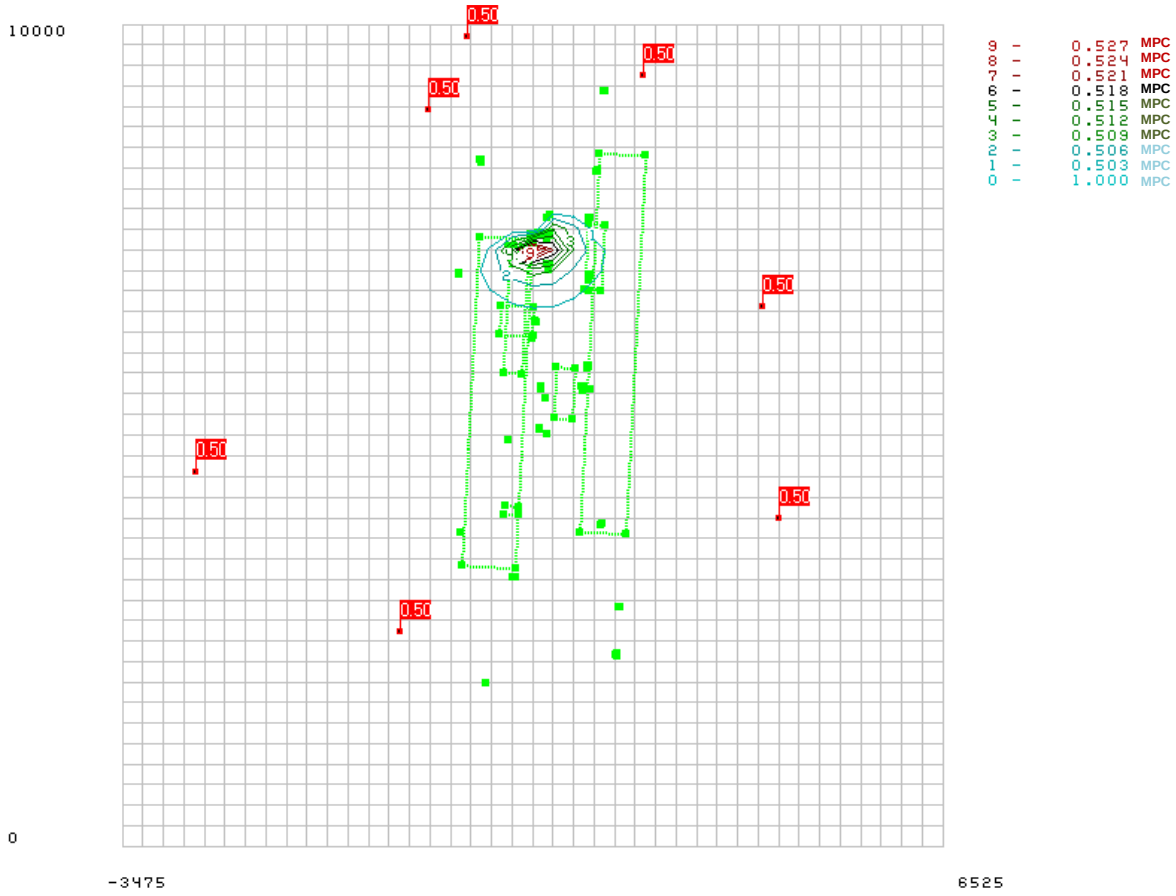
Substance 11001 / 2001 Acrylonitrile



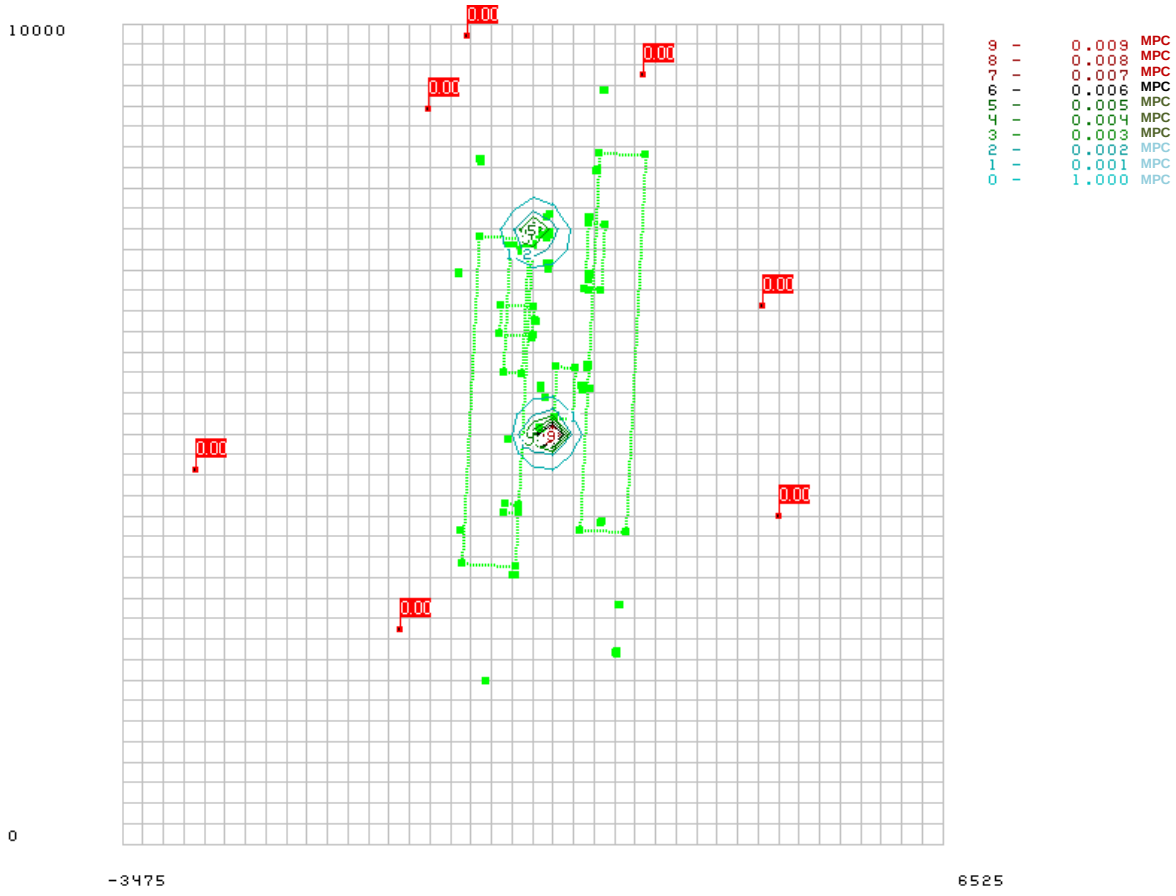
Substance 11000 / 2704 Non-methane volatile organic compounds (NMVOC)



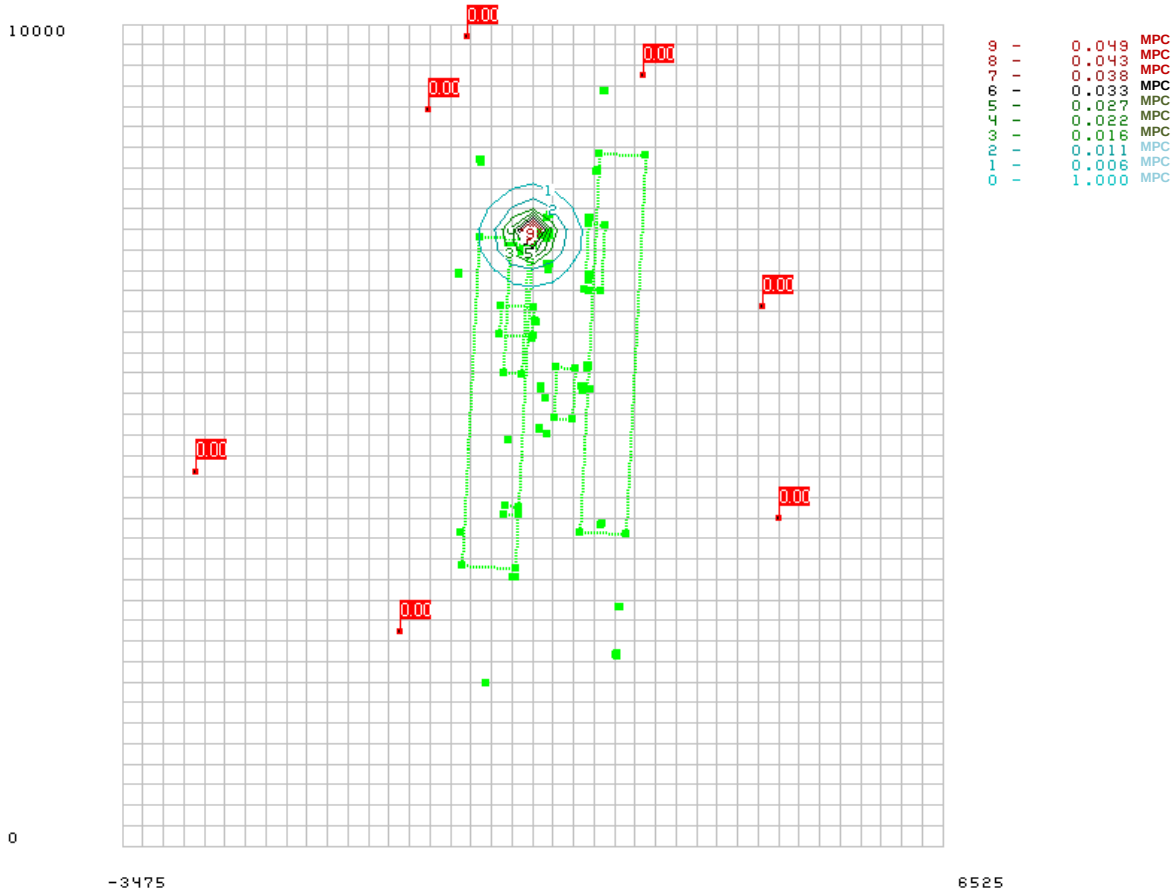
Substance 11000 / 2732 Non-methane volatile organic compounds (NMVOC)



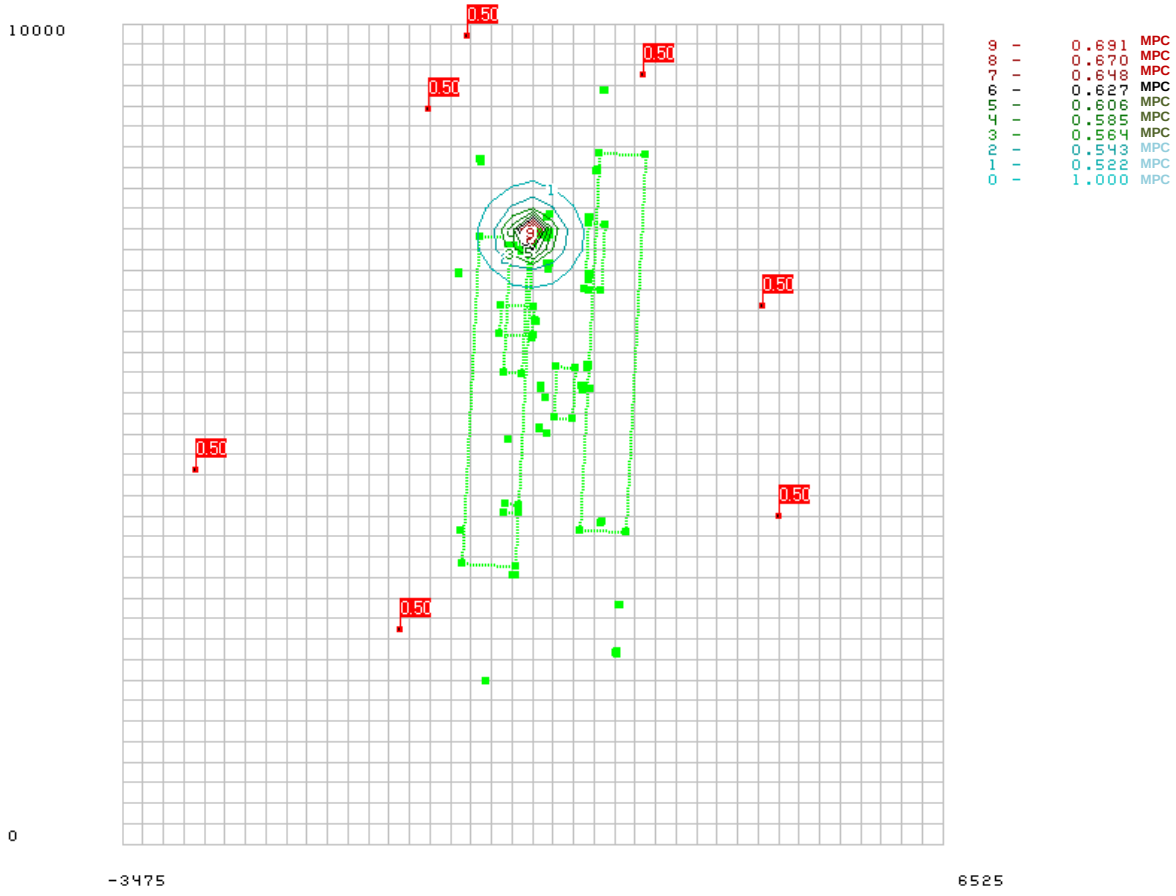
Substance 11000 / 2735 Non-methane volatile organic compounds (NMVOC)



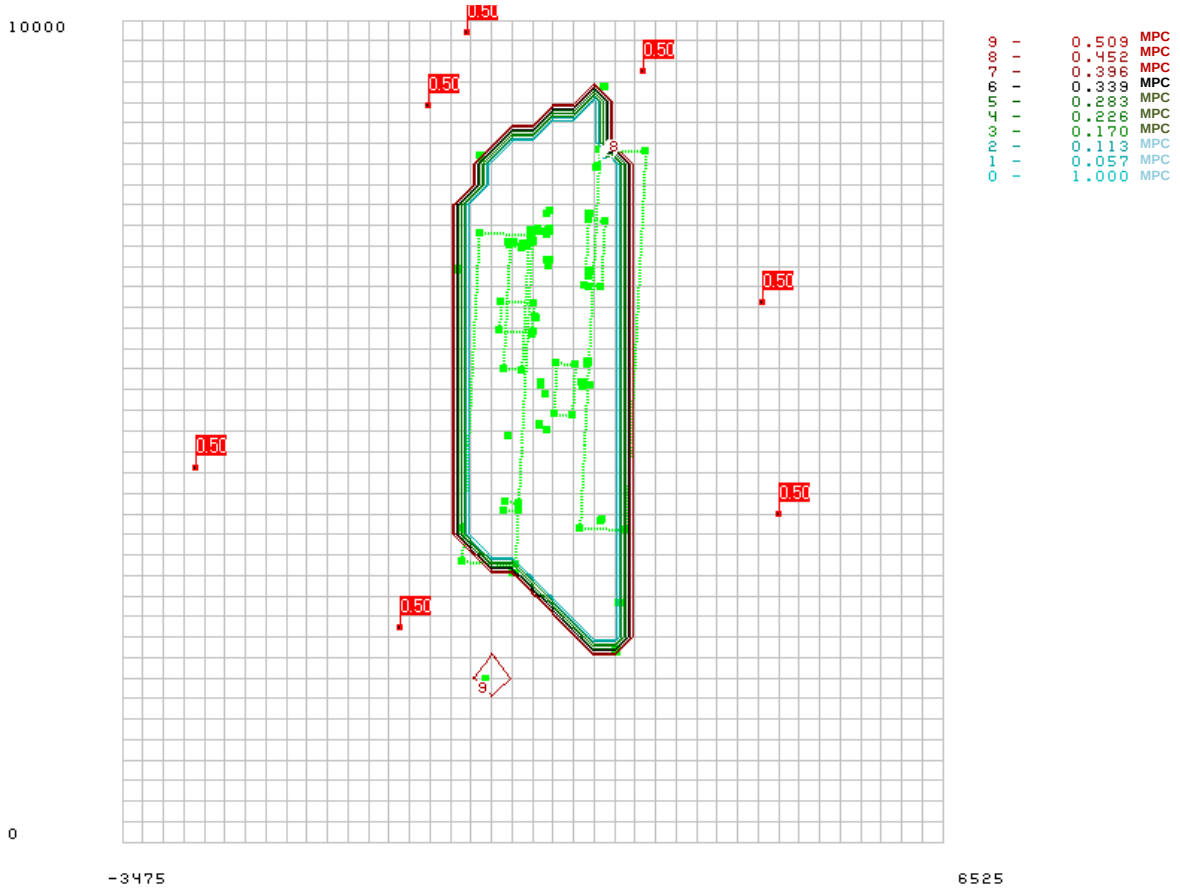
Substance 11000 / 2750 Non-methane volatile organic compounds (NMVOC)



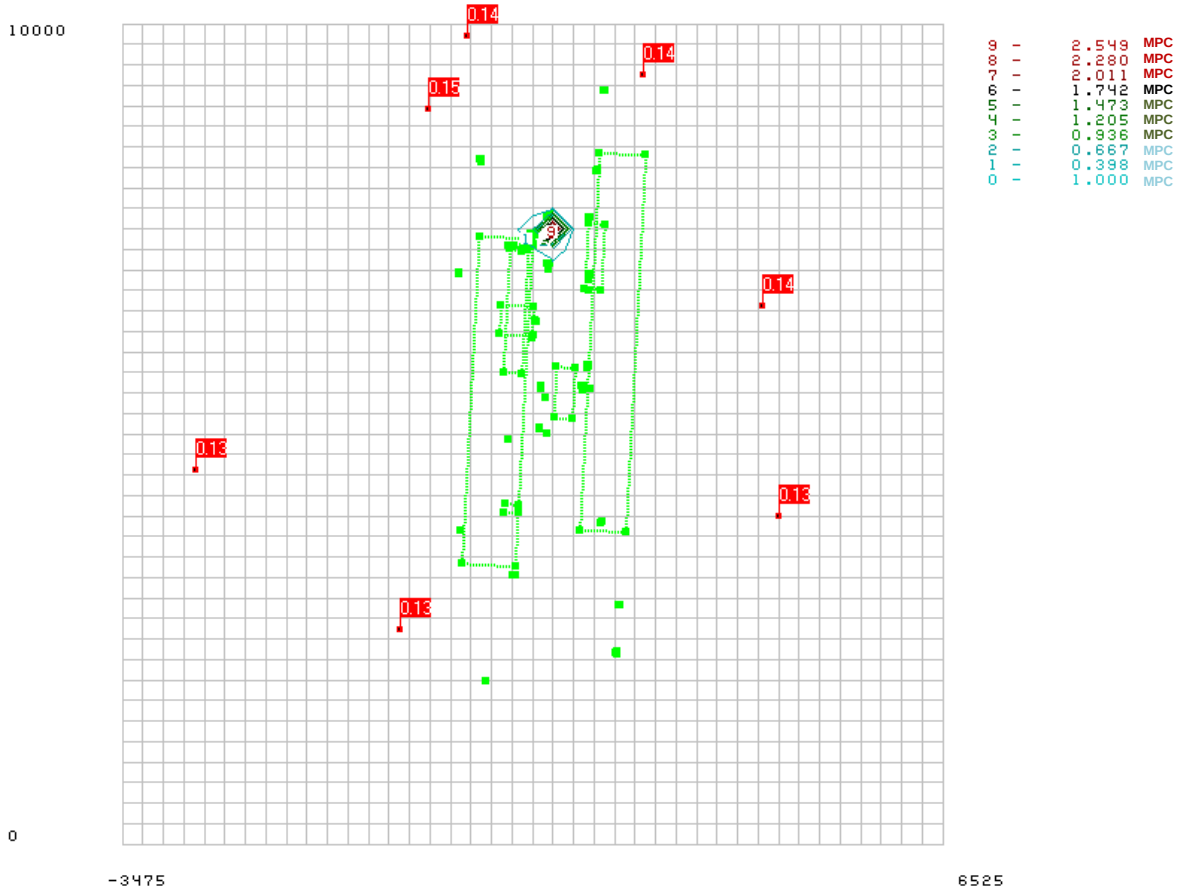
Substance 11000 / 2752 Non-methane volatile organic compounds (NMVOC)



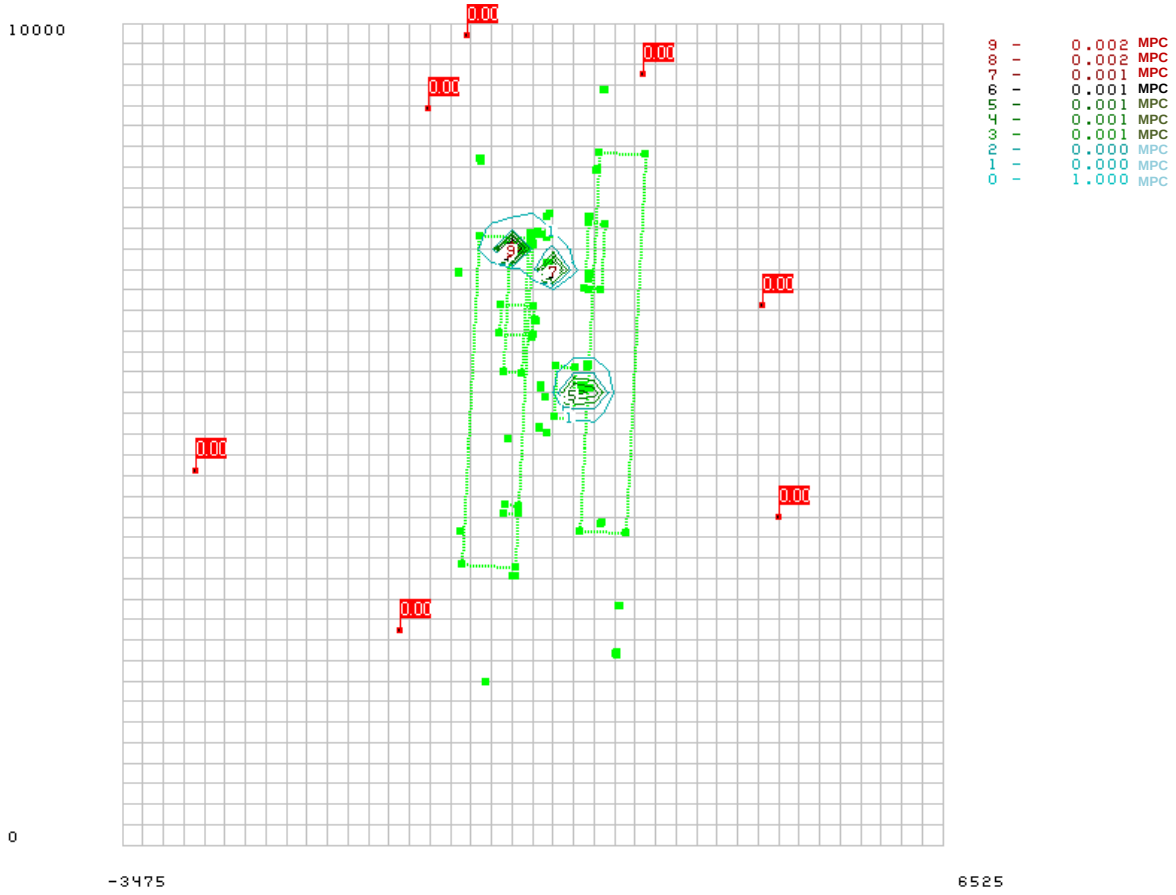
Substance 11000 / 2754 Non-methane volatile organic compounds (NMVOC)



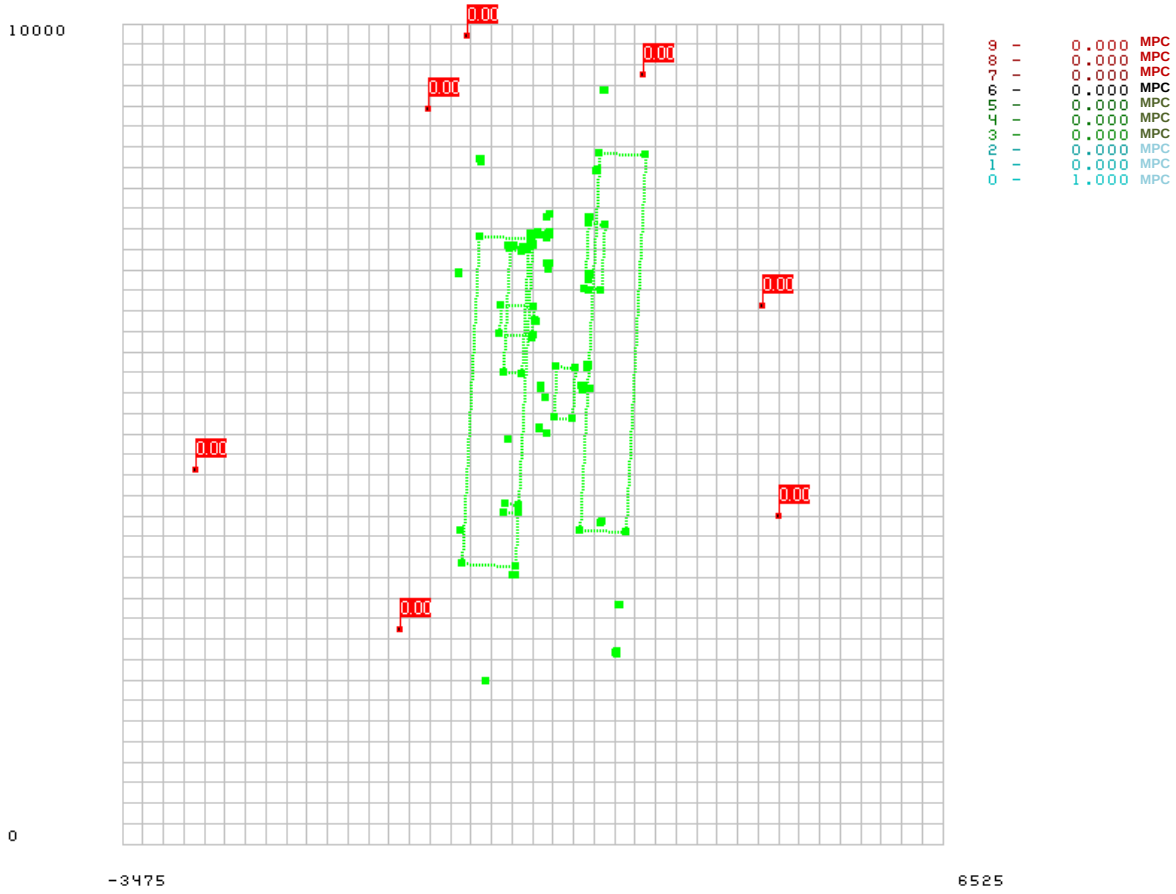
Substance 03000 / 2902 Substances in the form of suspended solid particles (microparticles and fibres)



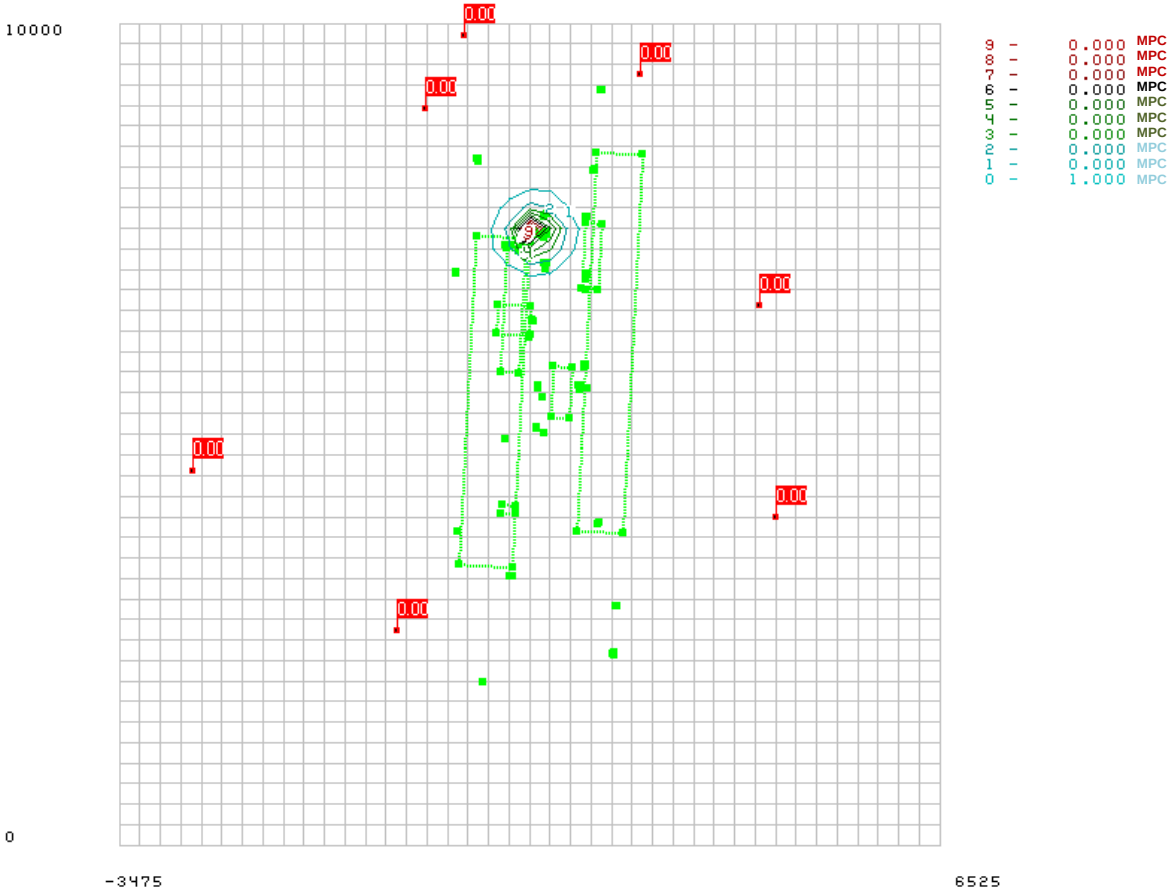
Substance - / 10226 Titanium dioxide



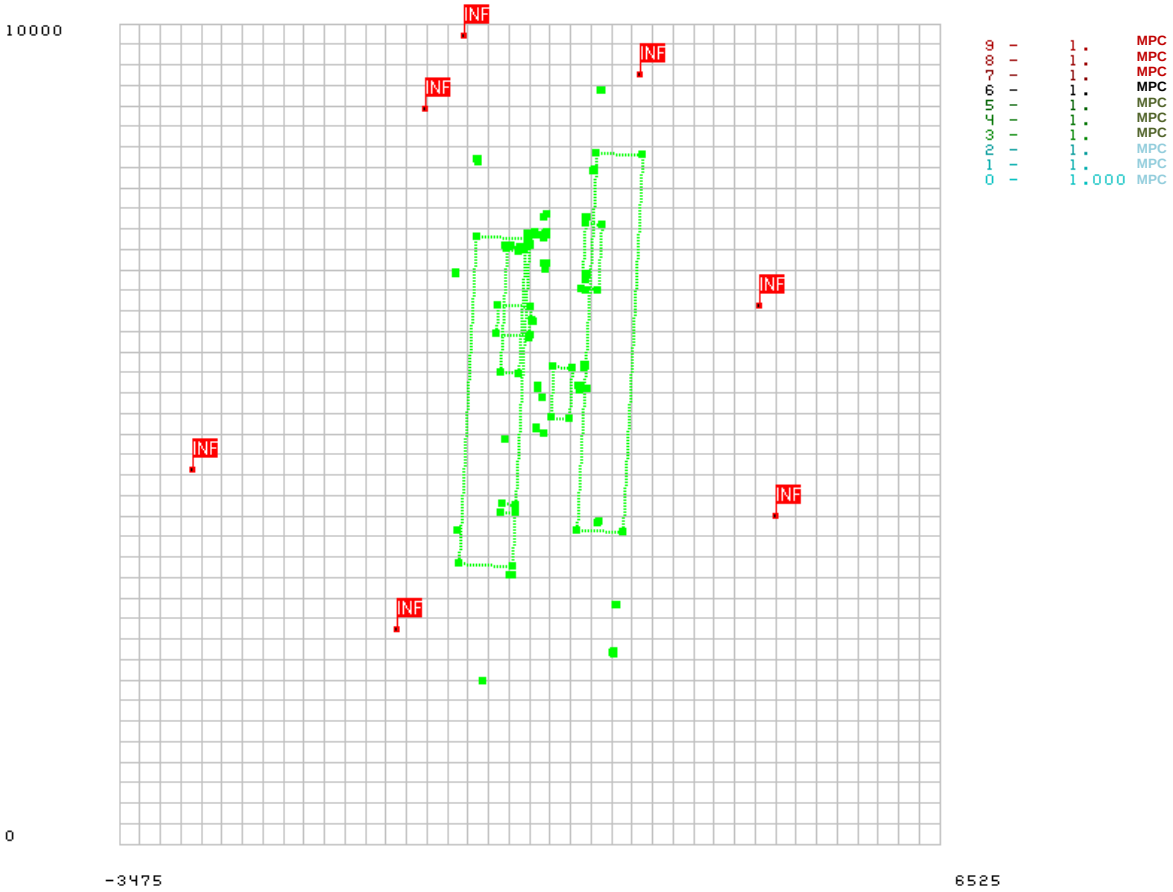
Substance 11000 / 10312 Non-methane volatile organic compounds (NMVOC)



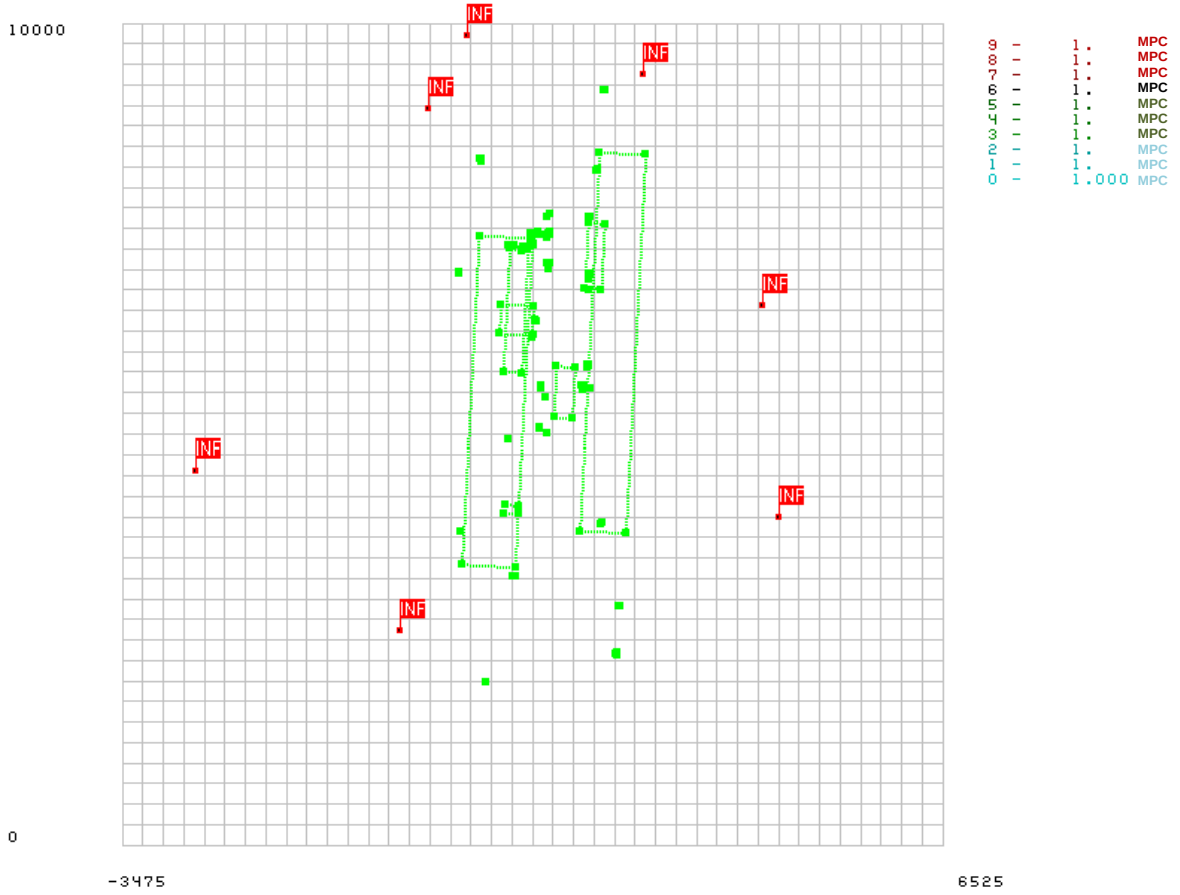
Substance 03000 / 10368 Substances in the form of suspended solid particles (microparticles and fibres)



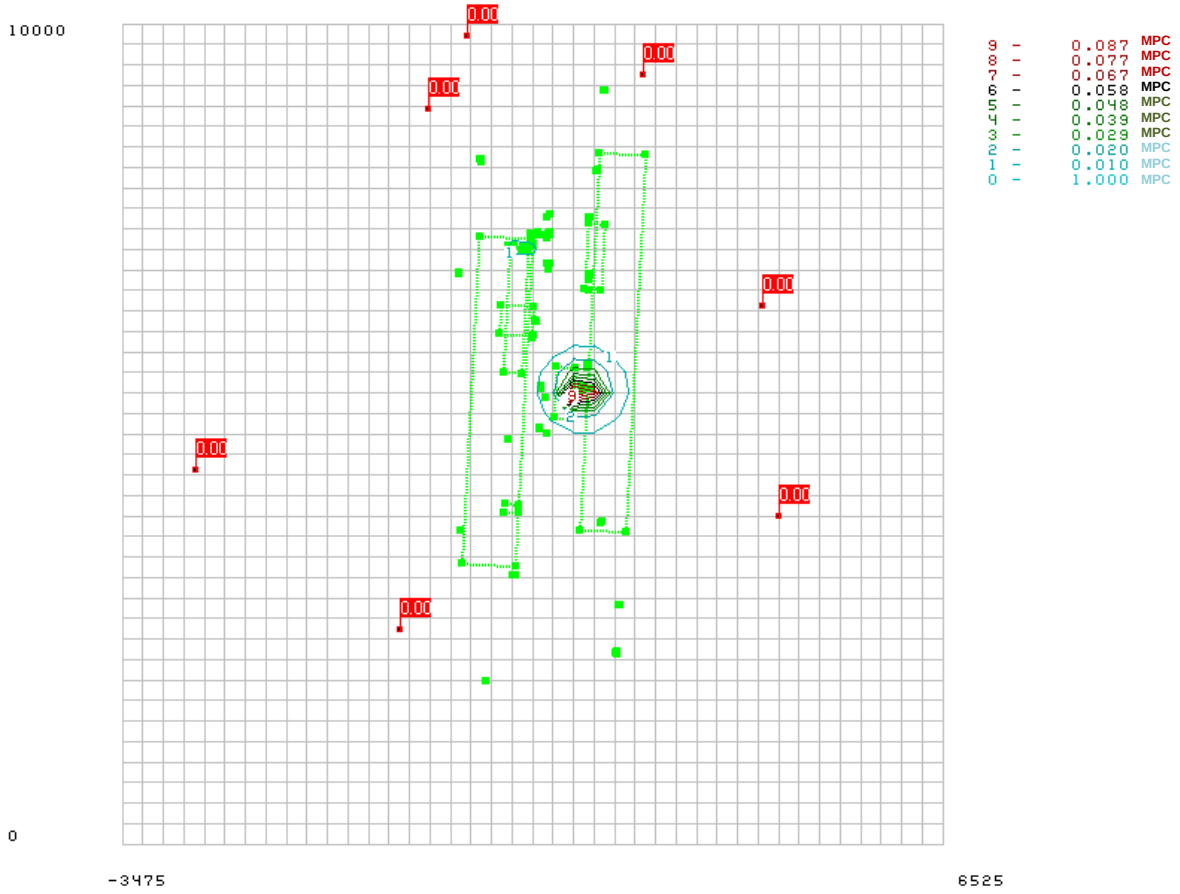
Substance 11000 / 10411 Non-methane volatile organic compounds (NMVOC)



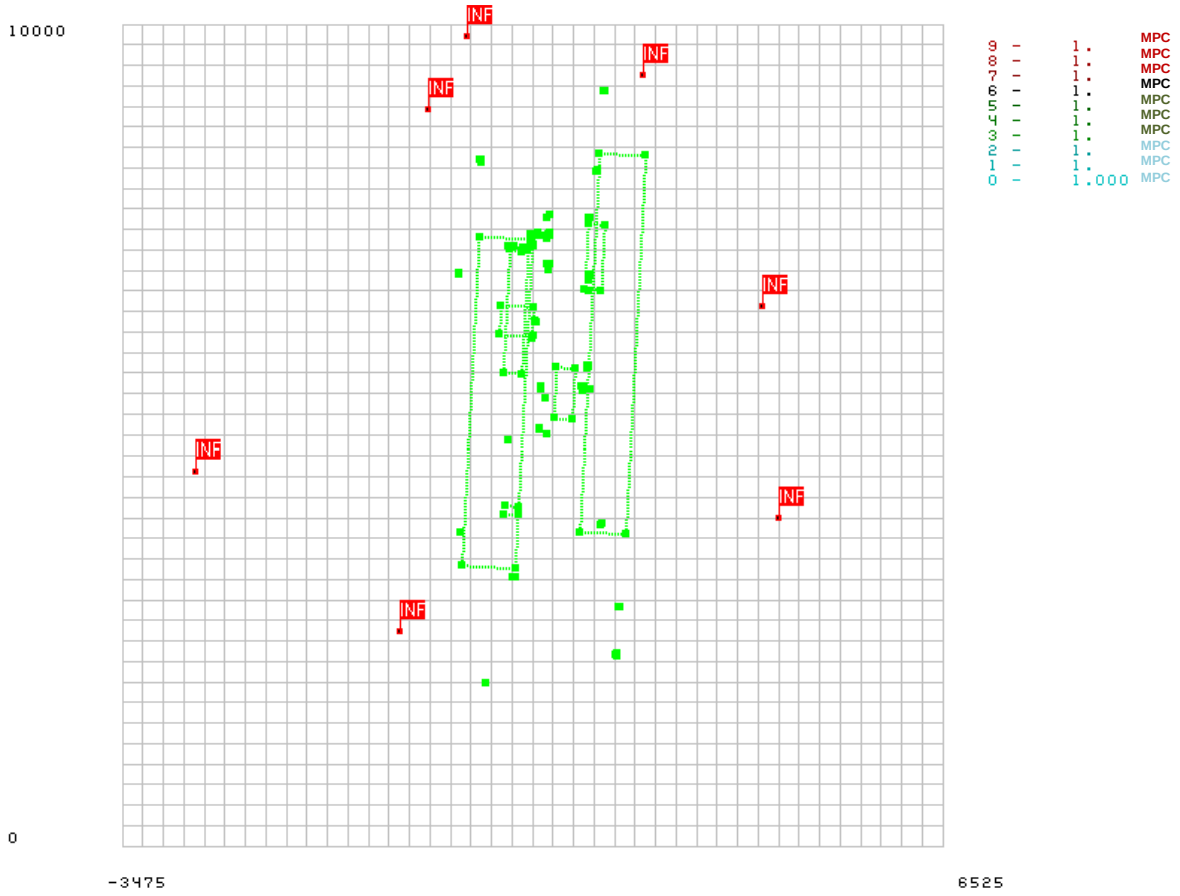
Substance 03000 / 10442 Substances in the form of suspended solid particles (microparticles and fibres)



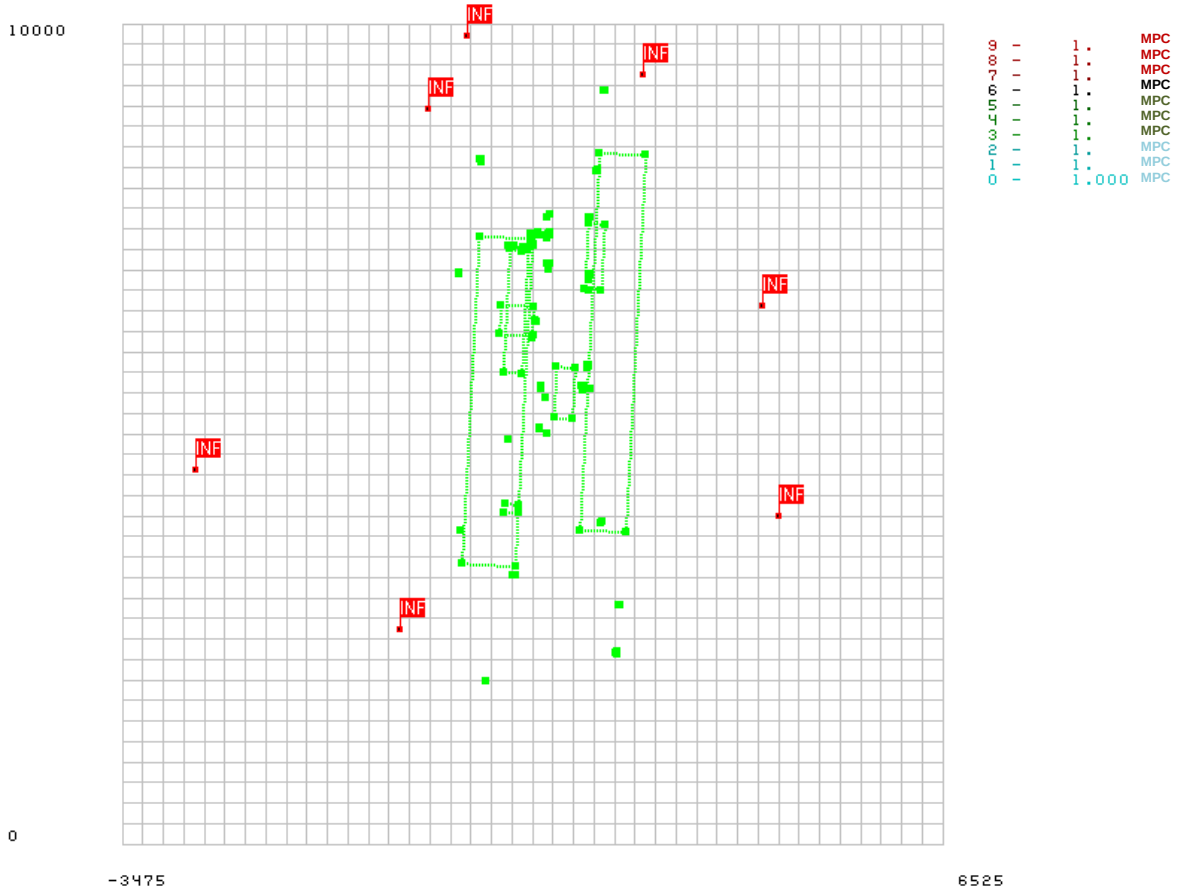
Summation group No. 11002



Substance 07000 / 11812 Carbon dioxide



Substance 04002 / 11815 Nitrogen(1) oxide (N20)



Legend
1 Airport- terminal B
2 Landside
3 Airport- terminal A
4 Police station building
5 Hotel
6 Health care centre
7 Airport management building
8 Catering shop
9 Watermoto
10 AS "Telros" centre
11 Parcel post service building
12 Commercial warehouse
13 Storage vessel
14 Weather radar
15 Emergency-and-rescue station
16 Temporary waste incinerator plant
17 Customs building
18 VIP building (Terminal S)
19 Cargo storage
20 Boiler house
21 Main ARS of the airport
22 Aircraft maintenance base
23 Hangar
24 Specialized fleet depot of Siwle Aitline Company "Mukhini Ukraini"
25 Administration and amenity buildings of the airport
26 Warehouse of RAS UPR "Siwla"
27 Warehouses of the airport
28 Warehouses of Siwle Aitline Company "Mukhini Ukraini"
29 CMS building
30 Warehouses
31 Cooperative building society area
32 Private cars maintenance area
33 The airport repair and construction area
34 Airport aerodrome yard
35 Specialized vehicle service of the airport
36 Territory of RSP "KYIVTSENTROAERO"
37 Territory of RSP "KYIVTSENTROAERO"
38 Territory of "Aerospetsmontazh"
39 Technocen crews and apron mechanization building
40 Sanitary wastewater SPS
41 "KYIVTSENTROAERO" motor fleet
42 Service area of units of the National Committee for national border control
43 Customs motor fleet
44 TSZD warehouse
45 Control tower
46 CT antenna field
47 Specialized vehicles maintenance centre
48 Warehouse of "Kyivmani"
49 SPS No 1
50 Area CMNDB 18L
51 Area MMNDB 18L
52 Area LLZLS 410 36R
53 TS BBINI 18L with plant room
54 Area GPILS 410 18L
55 Area PRL RP-5 F
56 Area GPILS 410 36L
57 TS BBI No 2 36R with plant room
58 Area LLZLS 410 18L
59 Area MMNDB 36R
60 Area VOR/DME
61 Area CMNDB 36R
62 Launch ARS No 1
63 Launch ARS No 2
64 Storage vessel
65 APT pump station
66 Blind-type RC fencing 658L topped with barbed wire
67 Metal fencing made of welded mesh panels M48 on RC posts
68 Storage vessel TS
69 Storage vessel SPS
70 Transformer substation of ERS No 1
71 Packaged transformer substation of ERS No 2
72 TS39 under DP
73 DP-2
74 TS-49
75 TS-23 with plant room
76 TS-29 (SPD) with DG
77 TS-31 with DG
78 TS-49 with DG
79 TS-30 (SPD) with DG
80 TS-24 with plant room
81 TS-28 BPRM with plant room
82 TS-28 with plant room
83 TS-25 with plant room
84 BPRM (VR 18R)
85 KRM (MK 36L)
86 SDP 18R
87 GRM 18R
88 PRL PR-36
89 PRL PR-4G
90 RSBN-4N
91 TRC-2
92 Transformer substation
93 Warehouse keeper house at apron (FFS-2)
94 MSSA repair shops
95 TS-24 building
96 INDB building on ARM-2
97 Terminal D building
98 Terminal F building
99 Temporary storage warehouse STZ No 6,7
100 TS-1b building
101 Technical building of the aerodrome yard
102 TS-102b building
103 Prefab panel house
104 Warehouse
105 AMB laboratory building
106 Building 3/9
107 Pump station building
108 ERS-1 building
109 BATO headquarters and paramedic storage
ES-1 ES-2 ES-3 ES-4 ES-5 ES-6 ES-7 ES-8 ES-9 ES-10 ES-11 ES-12 ES-13 ES-14 ES-15 ES-16 ES-17 ES-18 ES-19 ES-20 ES-21 ES-22 ES-23 ES-24 ES-25 ES-26 ES-27 ES-28 ES-29 ES-30 ES-31 ES-32 ES-33 ES-34 ES-35 ES-36 ES-37 ES-38 ES-39 ES-40 ES-41 ES-42 ES-43 ES-44 ES-45 ES-46 ES-47 ES-48 ES-49 ES-50 ES-51 ES-52 ES-53 ES-54 ES-55 ES-56 ES-57 ES-58 ES-59 ES-60 ES-61 ES-62 ES-63 ES-64 ES-65 ES-66 ES-67 ES-68 ES-69 ES-70 ES-71 ES-72 ES-73 ES-74 ES-75 ES-76 ES-77 ES-78 ES-79 ES-80 ES-81 ES-82 ES-83 ES-84 ES-85 ES-86 ES-87 ES-88 ES-89 ES-90 ES-91 ES-92 ES-93 ES-94 ES-95 ES-96 ES-97 ES-98 ES-99 ES-100 ES-101 ES-102 ES-103 ES-104 ES-105 ES-106 ES-107 ES-108 ES-109 ES-110 ES-111 ES-112 ES-113 ES-114 ES-115 ES-116 ES-117 ES-118 ES-119 ES-120 ES-121 ES-122 ES-123 ES-124 ES-125 ES-126 ES-127 ES-128 ES-129 ES-130 ES-131 ES-132 ES-133 ES-134 ES-135 ES-136 ES-137 ES-138 ES-139 ES-140 ES-141 ES-142 ES-143 ES-144 ES-145 ES-146 ES-147 ES-148 ES-149 ES-150 ES-151 ES-152 ES-153 ES-154 ES-155 ES-156 ES-157 ES-158 ES-159 ES-160 ES-161 ES-162 ES-163 ES-164 ES-165 ES-166 ES-167 ES-168 ES-169 ES-170 ES-171 ES-172 ES-173 ES-174 ES-175 ES-176 ES-177 ES-178 ES-179 ES-180 ES-181 ES-182 ES-183 ES-184 ES-185 ES-186 ES-187 ES-188 ES-189 ES-190 ES-191 ES-192 ES-193 ES-200 ES-201 ES-202 ES-203 ES-204 ES-205 ES-206 ES-207 ES-208 ES-209 ES-210 ES-211 ES-212 ES-213 ES-214 ES-215 ES-216 ES-217 ES-218 ES-219 ES-220 ES-221 ES-2
1 landside
2 Airport- terminal A
3 Airport- terminal B
4 Hotel
5 Police station building
6 Health care centre
7 Airport management building
8 Catering shop
9 Watermoto
10 AS "Telros" centre
11 Parcel post service building
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13 Storage vessel
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26 Warehouse of RAS UPR "Siwla"
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103 Prefab panel house
104 Warehouse
105 AMB laboratory building
106 Building 3/9
107 Pump station building
108 ERS-1 building
109 BATO headquarters and paramedic storage
1* Emergency-and-rescue station (ERS) with fire pump station
2* Transformer substation (TS) ERS 3*
4* Lighting equipment TS LE (1023N)
(1024N) 5* Distribution point (DP)
6* Transformer substation (TS) of aircraft parking stands (AC)
7* Transformer substation (TS) of apron "S" 8* Fuel filling station (FFS)
9* Lighting equipment TS LE (1023)
10* Slom water treatment facilities with SPS and TS
11* Glide slope beacon GSB-I+DME -36°
12* Glide slope beacon GSB-II+DME -18° 13*
14* Localizer LOC-I -18° 15* Weather equipment
15* Localizer LOC-I -36°
16* AOP and TRC installation location
17* Slom water sewage pump station 18* Underground tanks for used anti-icing
18* Fluid, 75m^ - 2 pcs
19* Operational base for deicing
20* Civil defence shelter for fire equipment and duty guards; 21* Patrol road
22* Aiidrome fence with intrusion alarm system and video surveillance system

2000

ES-151

ES-150

ES-№ indicates atmospheric pollutant emission sources

ES-№ indicates newly formed emission sources of atmospheric pollutants

ES-№ indicates areal emission sources of atmospheric pollutants

- indicates wire fencing located on the premises.

- buildings and structures located on the premises

indicates existing sanitary protection area

Rev. K.d. GIP GA P

Drawn by

Checked by

Compliance assessment

Sheet

Signature

Date

BORYSPIL INTERNATIONAL AIRPORT STATE ENTERPRISE

General layout

Stage Sheet Sheets

1

S 1:5000

Size 2A1



Legend

ДВ-№ - indicates atmospheric pollutant emission sources.

ДВ-№ - indicates newly formed sources of atmospheric pollutant emissions

ДВ-№ - indicates areal sources of atmospheric pollutant emissions

- indicates wire fencing located on the premises.

- buildings and structures located on the premises.

- indicates existing sanitary protection area

					BORYSPIL INTERNATIONAL AIRPORT STATE ENTERPRISE
					Situational map
Rev.	K.d.	Sheet	Doc. No	date	
GIP	.				
GAP	.				
Drawn by	.				S 1:20000
Checked by					
Compliance assessment					

Stage	Sheet	Sheets
	1	

Trident – National Emblem of Ukraine

STATE SERVICE OF UKRAINE
FOR FOOD SAFETY AND CONSUMER PROTECTION

1 B.Hrinchenka Str., Kyiv, 01001, tel.: 279-12-70, 279-75-58, fax: 279-48-83, e-mail: info@consumer.gov.ua

APPROVED

Head of the State Service of Ukraine for Food Safety and Consumer Protection
Lapa V. I.
(surname, name, patronymic)
/Signature/
(signature)
Round Seal:
State Service of Ukraine for Food Safety and Consumer Protection

SANITARY AND EPIDEMIOLOGICAL EXAMINATION CERTIFICATE

Date: November 23, 2018 No.602-123-20-1/47294

Object of examination: BioSan preparation
is produced in line with the Technical Specifications of Ukraine 20.1-32430604-005:2013 "Kronozym Preparations" as amended (version No. 1)
(Technical Specifications, State Standards of Ukraine, GOST standards)

Code according to DKPP (State Classifier of Goods and Services) or UKTZED (Ukrainian Commodity Coding System), item number: 20.14.64-70.00

Scope of use and sale of the object of examination: The preparation is used as a biodestructor for destruction of organic waste; for biological treatment of municipal, agricultural and industrial wastewater; biological treatment of water at centralized and local treatment facilities; biological treatment of settling tanks, lagoons, pit latrines; biological treatment of food waste, including those containing fat; biological treatment of sediments of wastewater, filtration fields.

Country of production: Kronos Agro Private Enterprise, Ukraine, 07834, Kyiv region, Borodianka district, Ozera village, 18-B Shevchenka Str., ilya@kronosagro.net, www kronos-agro.com.ua; address of the production site: 07834, Kyiv region, Borodianka district, Ozera village, 18-B Shevchenka Str., tel.: +38 (044) 273-20-87, EDRPOU (USREOU) code: 32430604
(address, location, telephone number, fax, e-mail, website)

Examination applicant: Kronos Agro Private Enterprise, Ukraine, 07834, Kyiv region, Borodianka district, Ozera village, 18-B Shevchenka Str., ilya@kronosagro.net, www kronos-agro.com.ua, tel.: +38 (044) 273-20-87, EDRPOU (USREOU) code: 32430604
(address, location, telephone number, fax, e-mail, website)

Information on the contract of supply of the item to Ukraine: domestic product

The object of examination meets the established medical safety criteria/indicators: based on the results of identification and assessment of risks for the human health, as well as the results of inspection of the applicant's sample of the examination object within the scope of accreditation (Accreditation Certificate No. 2H375 dated 09.08.2018 in line with DSTU ISO/IEC 17025: 2006 standards), it was established that in the process of using the product the concentration of glucose in the air of the working zone should not exceed the maximum short-term exposure limit of 10.0 mg/m^3 (hazard class 4), concentration of amylase and lipase – 1.0 mg m^3 (hazard class 2), concentration of proteases – 0.5 mg/m^3 (hazard class 2), concentration of cellulase – 2.0 mg/m^3 (hazard class 3), concentration of Bacillus subtilis – 1000 cells/m^3 (hazard class 3) (GOST 12.1.005-88 "Occupational Safety Standards System. General Sanitary and Hygienic Requirements to the Working Zone Air), the preparation should not contain any pathogenic microorganisms, including salmonella and L. monocytogenes (in a sample of 25 g).

Required conditions of use/application, storage, transportation, disposal, destruction: a list of required conditions that ensure prevention of risks caused by the impact of adverse factors on the human health when using the object under examination: people working with this material must follow the safety rules and work safety instructions of the corresponding sphere of production in accordance with the applicable regulatory and technical documentation. When using the product, the staff must wear personal protective equipment for the skin, eyes and respiratory system. People using the product must follow the instructions for use. Waste disposal is carried out in accordance with the requirements of applicable legislation of Ukraine. Store in closed storehouse facilities. Shipping marking: according to the GOST standard 14192-96 "Marking of freight".

Based on the results of the state sanitary and epidemiological examination, the object of examination, BioSan preparation (analyzed in the form of a sample provided by the applicant), meets the requirements of the applicable sanitation legislation of Ukraine and can be used in the declared sphere of use subject to complying with the requirements contained herein.

Shelf life: guaranteed by the manufacturer.

Information on the label, instructions, rules, etc.: the label in the Ukrainian language must be placed on each package unit of product; marking is carried out in accordance with the applicable legislation of Ukraine.

This certificate remains valid within the period of validity of the regulatory document – Technical Specifications of Ukraine 20.1-32430604-005:2013 "Kronozym Preparations" as amended (version No. 1).

The applicant is responsible for complying with the requirements of this certificate.

Safety indicators to be controlled at the border: domestic product.

Safety indicators to be controlled in the process of customs clearance: domestic product.

The current state sanitary and epidemiological surveillance is carried out in accordance with the requirements of this certificate: on a selective basis, control of compliance with the established medical safety criteria – concentration of glucose, amylase, lipase, proteases, cellulase and Bacillus subtilis in the working zone air (GOST 12.1.005-88 "Occupational Safety Standards System. General Sanitary and Hygienic Requirements to the Working Zone Air) and compliance with the conditions of use.

Commission for State Sanitary and Epidemiological Examination, 6 Heroyiv Oborony Str., Kyiv, tel.: 044 258-47-73 attached to the Office of the Chief Public Health Officer of Ukraine of L.I. Medvedya Research Center of Preventive Toxicology, Food and Chemical Safety of the Ministry of Health of Ukraine

(name, location, telephone number, fax, e-mail, website)

Examination protocol No. 3/8-A-5117-18 dated November 20, 2018

(protocol No., date of approval)

Head of the expert commission, deputy director of the Research Center /*Signature*/ O. O. Bobyliova

(signature) (initials and surname)

Round Seal:
Ministry of Health of Ukraine
Research Center of Preventive Toxicology, Food and Chemical Safety
Kyiv, Ukraine

Annex No.14

[Trident - National Emblem of Ukraine]

THE STATE AGENCY OF WATER RESOURCES OF UKRAINE
8 Velyka Vasylkivska, Kyiv, 01004, Tel./Fax: +38 (044) 235 31 92, Tel.: +38 (044) 235 61 46
E-mail: davr@davr.gov.ua, website: davr.gov.ua, EDRPOU Code 37472104

SPECIAL WATER USE PERMIT

As of 17 Feb 2020 No. 49/КВ/49д-20

This permit is issued to a water user: BORYSPIL INTERNATIONAL AIRPORT STATE ENTERPRISE, EDRPOU Code: 20572069, KYIV REGION, BORYSPIL DISTRICT, HORA village, 7 Boryspil Str.,

Postal address: 7 Boryspil Str., HORA village, BORYSPIL DISTRICT, KYIV REGION,

1. Place of effective business activity (water usage): Wells No. 2190 (1a), No. 5П, No. 950 (7), No. 2205 (8), No. 2204 (9), No. 7 (3000), No. 9 (3001) (producing), wells No. 1577П (4), No. 2190 (6), No. 2202(10) (abandoned), wells No. 4 (1/3251), No. 11, No. 13 (new, not in operation), Hora village, Boryspil district, Dnipro river, area of Dnipro river basin

Name and code of a water supply source or a water user from the water supply (drainage) system providing water supply: Underground waterbearing stratum 60/CHER/DNEPR/DNIPRO RIVER

Code and name of water-resources regions within which water supply sources, return (waste) and other water receivers are located: M5.1.2.03 – Dnipro river from the Kyiv Reservoir dam to the Kaniv Reservoir dam (including rivers of Desna and Trubizh)

2. Place of effective business activity (water usage): city of Boryspil, water supply system

Name and code of a water supply source or a water user from the water supply (drainage) system providing water supply: water supply system of WATER AND SEWAGE MANAGEMENT AUTHORITY BORYSPILVODOKANAL PUBLIC UTILITY COMPANY

3. Place of effective business activity (water usage): city of Boryspil, water supply system

Name and code of a water supply source or a water user from the water supply (drainage) system providing water supply: water supply system of Amik Ukraine Private Company

[Stamp]:

Boryspil Airport	
Our Ref. 01-16-1355 25.02.2020	Number of pages 8

4. Place of effective business activity (water drainage): outside Lenenivka village, Boryspil district, local waste treatment plants for mechanical and biological purification with the capacity of 1,935.8 thous. cub. m per year

Name, type and code of a return (waste) water receiver or a water user whose water drainage systems are used for return (waste) water discharge: River 20/CHER/DNEPR/0981/0491/0348/ IKVA RIVER

Code and name of water-resources regions within which water supply sources, return (waste) and other water receivers are located: M5.1.2.03 – Dnipro river from the Kyiv Reservoir dam to the Kaniv Reservoir dam (including rivers of Desna and Trubizh)

5. Place of effective business activity (water drainage): within the city of Boryspil, local waste treatment plants for physical and chemical purification with the capacity of 2,996.0 thous. cub. m per year

Name, type and code of a return (waste) water receiver or a water user whose water drainage systems are used for return (waste) water discharge: Channel pond, channel water reservoir (except for the Dnipro tandem reservoir system) 40/CHER/DNEPR/0981/0491/0348/ IKVA RIVER

Code and name of water-resources regions within which water supply sources, return (waste) and other water receivers are located: M5.1.2.03 – Dnipro river from the Kyiv Reservoir dam to the Kaniv Reservoir dam (including rivers of Desna and Trubizh)

6. Place of effective business activity (water drainage): within the city of Boryspil, local easte treatment plants for mechanical purification with the capacity of 31.536 thous. cub. m per year

Name, type and code of a return (waste) water receiver or a water user whose water drainage systems are used for return (waste) water discharge: Channel pond, channel water reservoir (except for the Dnipro tandem reservoir system) 40/CHER/DNEPR/0981/0491/0348/ IKVA RIVER

Code and name of water-resources regions within which water supply sources, return (waste) and other water receivers are located: M5.1.2.03 – Dnipro river from the Kyiv Reservoir dam to the Kaniv Reservoir dam (including rivers of Desna and Trubizh)

7. Place of effective business activity (water drainage): within the city of Boryspil

Name, type and code of a return (waste) water receiver or a water user whose water drainage systems are used for return (waste) water discharge: drainage systems (Code: 95) of WATER AND SEWAGE MANAGEMENT AUTHORITY BORYSPILVODOKANAL PUBLIC UTILITY COMPANY

Purpose of water use: drinking and health needs; industrial needs; water distribution to secondary users

Imposed limits

Water withdrawal limit

Indicator	Water volume	
	cub. m per day*	thous. cub. m per year
Water withdrawal, total (including):	3,016.192	854.175
- from surface sources (separately for each source)	-	-
- from underground sources (separately for each river basin)	3,016.192	854.175
DNIPRO RIVER	3,016.192	854.175

* Maximum daily withdrawal volume during the year including seasonal operation mode

Water consumption limit

Indicator	Water volume	
	Cub. m per day	Thous. cub. m per year
Internal water consumption, total (including):	2,465.51	718.968
from surface sources:	-	-
- drinking and health needs	-	-
- industrial needs	-	-
- other needs	-	-
from underground sources:	2,371.72	695.26
- drinking and health needs	237.63	81.377
- industrial needs	2,134.09	613.883
- other needs	-	-
- from other water user:	93.79	23.708
- drinking and health needs	4.7	1.692
- industrial needs	89.09	22.016
- other needs	-	-

Pollutant discharge limits (maximum allowed discharge (MAD) and actual discharge volume of substances with return (waste) water into surface water bodies (separately for each particular water discharge)):

Discharge No.1 into Ikva river; category of return (waste) waters - industrial: surface (rainwater and snowmelt); outside Lenenivka village, Boryspil district, local waste treatment plants for mechanical and biological purification with the capacity of 1,935.8 thous. cub. m per year

Allowable discharge volume: 2,748 cub. m per hour, 1,648.6 thous. cub. m per year, and actual discharge volume for return (waste) water: 2,748 cub. m per hour (according to the determined MAD standard rates)

Regulated discharge pollutants	Actual concentration, in mg per cub. dm	Actual discharge, in g per hour	Maximum allowable concentrations, in mg per cub. dm	MADs, in g per hour	MADs calculated in tons per year
Ammoniacal nitrogen	0.66	1,813.68	0.66	1,813.68	1.0881
BOD 5	5.67	15,581.16	5.67	15,581.16	9.3476
COD	25.2	69,249.60	25.2	69,249.60	41.5447
Suspended substances	12.0	32,976.00	12.0	32,976.00	19.7832
Oil products	0.12	329.76	0.12	329.76	0.1978
Nitrates	0.63	1,731.24	0.63	1,731.24	1.0386
Nitrites	0.07	192.36	0.07	192.36	0.1154
Sulphates	27.1	74,470.80	27.1	74,470.80	44.6771
Phosphates	0.16	439.68	0.16	439.68	0.2638
Chlorides	33.5	92,058.00	33.5	92,058.00	55.2281
Total iron	0.22	604.56	0.22	604.56	0.3627
Salinity	290	796,920.00	290	796,920.00	478.094

Other indicators and return (waste) water characteristics (separately for each particular water discharge): Reaction (pH) 6.5-8.5; summer water temperature after discharge should not increase to more than by 3^0 C compared to an average monthly temperature during the warmest month of the year for the last 10 years; dissolved oxygen should not be less than 4 g/cub. m at any period of the year in a sample taken till 12 a.m.

Discharge No.2 in an unnamed pond; category of return (waste) water - surface (rainwater and snowmelt); within the city of Boryspil, local waste treatment plants for physical and chemical purification with the capacity of 2,996.0 thous. cub. m per year

Allowable discharge volume: 160 cub. m per hour, 5,710 thous. cub. m per year, and actual discharge volume for return (waste) water: 160 cub. m per hour (according to the determined MAD standard rates)

Regulated discharge pollutants	Actual concentration, in mg per cub. dm	Actual discharge, in g per hour	Maximum allowable concentrations, in mg per cub. dm	MADs, in g per hour	MADs calculated in tons per year
Ammoniacal nitrogen	0.58	92.80	0.58	92.80	0.00331
BOD 5	6.13	980.80	6.13	980.80	0.03500
COD	29.2	4,672.00	29.2	4,672.00	0.16673
Suspended substances	10.2	1,632.00	10.2	1,632.00	0.05824
Oil products	0.30	48.00	0.30	48.00	0.00171
Nitrates	0.58	92.80	0.58	92.80	0.00331
Nitrites	0.22	35.20	0.22	35.20	0.00126
Sulphates	22.3	3,568.00	22.3	3,568.00	0.12733

Phosphates	0.23	36.80	0.23	36.80	0.00131
Chlorides	26.8	4,288.00	26.8	4,288.00	0.15303
Total iron	0.30	48.00	0.30	48.00	0.00171
Salinity	202	32,320.00	202	32,320.00	1.15342

Other indicators and return (waste) water characteristics (separately for each particular water discharge): Reaction (pH) 6.5-8.5; summer water temperature after discharge should not increase to more than by 3^0 C compared to an average monthly temperature during the warmest month of the year for the last 10 years; dissolved oxygen should not be less than 4 g/cub. m at any period of the year in a sample taken till 12 a.m.

Discharge No.3 in an unnamed pond; category of return (waste) water - surface (rainwater and snowmelt); within the city of Boryspil, local waste treatment plants for mechanical purification with the capacity of 31,536 thous. cub. m per year

Allowable discharge volume: 275 cub. m per hour, 13,850 thous. cub. m per year, and actual discharge volume for return (waste) water: 275 cub. m per hour (according to the determined MAD standard rates)

Regulated discharge pollutants	Actual concentration, in mg per cub. dm	Actual discharge, in g per hour	Maximum allowable concentrations, in mg per cub. dm	MADs, in g per hour	MADs calculated in tons per year
Ammoniacal nitrogen	0.58	159.50	0.58	159.50	0.00803
BOD 5	5.82	1,600.50	5.82	1,600.50	0.08061
COD	28.7	7,892.50	28.7	7,892.50	0.39750
Suspended substances	10.5	2,887.50	10.5	2,887.50	0.14543
Oil products	0.30	82.50	0.30	82.50	0.00416
Nitrates	0.79	217.25	0.79	217.25	0.01094
Nitrites	0.21	57.75	0.21	57.75	0.00291
Sulphates	24.1	6,627.50	24.1	6,627.50	0.33379
Phosphates	0.25	68.75	0.25	68.75	0.00346
Chlorides	32.4	8,910.00	32.4	8,910.00	0.44874
Total iron	0.30	82.50	0.30	82.50	0.00416
Salinity	204	56,100.0	204	56,100.0	2.82540

Other indicators and return (waste) water characteristics (separately for each particular water discharge): Reaction (pH) 6.5-8.5; summer water temperature after discharge should not increase to more than by 3^0 C compared to an average monthly temperature during the warmest month of the year for the last 10 years; dissolved oxygen should not be less than 4 g/cub. m at any period of the year in a sample taken till 12 a.m.

Other features of special water use

Indicator	Cub. m per day	Thous. cub. m per year
Received from the other water user	93.79	23.708
Return (waste) water received from the other water user	486.936	152.266
Water distribution, total (including):	644.472	158.915
- to households	-	-
- to secondary water users (without consumption)	644.472	158.915
- to secondary water users (after consumption)	-	-
Return (waste) water discharge, total (including):	5,456.105	2,396.231
- into a surface water body	3,183.0	1,668.095
- to filter fields	-	-
- distribution to the other water user	2,273.105	728.136
- into a storage lagoon		-
- into a cesspool	-	-
- into the other receiver	-	-
Water use in water supply systems:	-	-
- reverse	-	-
- recycling	-	-
Losses in water supply systems	-	-

Terms and conditions of special water use:

1. Water withdrawal over the specified limit is prohibited.
2. Waste water discharge using the terrain relief is prohibited.
3. In compliance with the Procedure for State Registration of Water Use approved by Decree No. 78 as of 16 March 2015 by the Ministry of Ecology and Natural Resources of Ukraine, the report on water use according to 2TPvodogosp (2ТПводгосп) annual form should be filed annually not later than the on the 1st of February of the year following the reporting period.
4. Water law requirements, in particular the provisions of Article 44 of the Water Code of Ukraine in terms of water users' obligations should be met.

The terms and conditions specified by the State Service of Geology and Mineral Resources of Ukraine in the Conclusion No.1681/01/10-20 as of 4 February 2020:
1. Water for drinking needs should be used provided that the water quality is in conformity with the requirements of the State Sanitary Standards and Regulations (DSanPiN) 2.2.4-171-10.
2. Each water abstraction intake should be equipped with a water flow meter. Water withdrawal, water quality and level depth in each water abstraction intake should be regularly recorded.
3. Fencing for zones which are protected by special health regulations, water flow meters, water sampling cocks should be installed.
4. Sanitary technical standards for maintenance of an operational water abstraction intake and water distribution pipelines should be met.
5. Development of new wells and building of new facilities that may have negative impact on the quality of underground waters should be commissioned in accordance with duly developed and approved projects.

6. According to Article 17 of the Law of Ukraine “On Potable water, Drinking Water Supply and Drainage” and Article 19 of the Natural Resources Code of Ukraine, in case of using underground waters for drinking water supply, the business entity should obtain a special permit for the use of natural resources subject to the specifics of the provisions of Article 23 of the Natural Resources Code of Ukraine.
7. Data of the monitoring observations, actual water abstraction intake value, and chemical test data should be filed according to 7-GR (7-ГР) Form, annually till the 20th January of the year following the reporting year, to Kyiv Hydrogeological Expedition (10 Geofizykiv Lane, Kyiv 02088) and the State Informational Geological Fund of Ukraine, State Research and Production Enterprise (16 Antona Tsedika Str., Kyiv 03057).

Information on environmental measures

No.	List of environmental measures	Completion deadline	Performance criteria (indicators)
1	Rational use of water resources and systematic primary water use accounting	On a continuous basis	Protection of underground waters against depletion
2	Zones of the water abstraction intake (wells) which are protected by special health regulations should be kept in proper sanitary conditions	On a continuous basis	Protection of underground waters against pollution and clogging
3	Sites for return water discharge should be kept in proper sanitary conditions	On a continuous basis	Protection of underground and surface waters against pollution

* The environmental measures are aimed to protect waters, reduce the level of pollution and ensure rational use of the water and other natural resources and provide for measurable performance criteria (indicators) and completion deadlines.

According to Article 45 of the Water Code of Ukraine, in case of low water level, epidemic and epizootic threats, as well as other cases prescribed by law, rights of water users may be limited or terms and conditions of water use changed to ensure human health safety and other public interests.

Validity period of the permit: from 17 February 2020 till 17 February 2023

First Deputy Head of the Agency [*Signature affixed*] Mykhailo KHORYEV
(Full name)

[Seal: THE STATE AGENCY OF WATER RESOURCES OF UKRAINE * Identification Code 37472104 * AGENCY FOR PUBLIC COMMUNICATIONS AND INFORMATION PROTECTION]

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Project Feasibility Study
(revised)

"Reconstruction of Landing Area No. 2 of Boryspil IA SE"

Volume No.3

UA- KBP-02-TEO-CCO

UA- KBP-02-TEO-ETP

UA- KBP-02-TEO-E3

UA- KBP-02-TEO-AP

Lighting Facilities
Energy supply
Transformer substations
Platform illumination
Architectural and construction solutions

Contract No. 37-14.3/5-30
Copy No._____

Kyiv, 2020

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Lighting Facilities
Power supply
Transformer substations
Platform illumination
Architectural and construction solutions

Customer Boryspil International Airport State Enterprise

Designer <*Signed*> Institute Ukrdorproekt LLC
Director S.S. Koretskyi

Head of the Department for
Aerodrome Complexes Design <*Signed*> M.I. Belov

Chief Project Engineer <*Signed*> H.I. Pelikhov

[Seal]: m. Kyiv*Ukrayina*Tovarystvo z Obmezhenoyu Vidpovidalnistiu*INSTYTUT URKDORPROEKT*Identyfikatsiinyi Kod 37355642

Contract No. 37-14.3/5-30
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Kyiv, 2020

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Lighting facilities

1. General conditions and input data

This Section of the Project Feasibility Study (PFS) is prepared on the basis of the following:

- Tasks for the development of the Project Feasibility Study for the reconstruction of Landing Area No. 2 of Boryspil IA SE;
- Specifications No. 48-25/1-3 dated 15.02.2018;
- Master Layout;
- Operating norms, rules and standards, including the ICAO regulations.

The designed lighting facilities (LF) include:

- Lighting system;
- cable channel system for LF;
- Two new LF substations –TS-1023н and TS-1024н (substations description is contained in the Explanatory Note for electric power supply arch.UA- KBP-02-TEO-ETP);
- LF control system.

With regard to its power supply reliability the designed LF belongs to the special category I group.

The preparatory works presuppose the dismantling of LF at the old artificial runway No. 2 and installation of the new LF based on the LED lights.

All works with LF and lighting TS are performed during the 1 tier 3 start-up facility.

2. Technical parameters

The network of substations of Boryspil IA SE is used as an electrical power resource for LF.

The rated capacity of LF is 337kW.

Annual consumption of electric power is: 1,516.5ths.kWh

Remark. *The LF capacity shall be defined more exactly at the stage of the design development and operating documents elaboration.*

3. Lighting facilities

Lighting facilities shall be installed in two landing directions:

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Inv. No.		Elab. by		Kozlov			04.19	Explanatory Note
		Chair of the Dpt.		Belov			04.19	
		ChPrEng		Pelikhov			04.19	

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- under III-B Category standard with the magnetic bearing to landing – 18П;
- under III-B Category standard with the magnetic bearing to landing – 36Л.



Fig.1 Precision approach under III-a category standard

The lighting facilities system includes the following subsystems of lights:

- central approach lights and side approach lights with two crossbars under III-B category ICAO standard with magnetic bearing to landing-18П and magnetic bearing to landing-36Л;
- flashing approach lights with magnetic bearing to landing-18П and magnetic bearing to landing-36Л
- entrance and restriction lights on both landing directions;
- side lights of artificial runway;
- centerline lights of artificial runway;
- landing area lights with magnetic bearing to landing-18П and magnetic bearing to landing-36Л;
- glideslope visual indication lights with magnetic bearing to landing-18П and magnetic bearing to landing-36Л;
- indicator lights of high-speed turn-off taxiway
- runway protection lights
- centerline taxiway lights;

- “stop” line lights
- aerodrome signs.

The light-reflecting poles on the flexible bases are installed on all ground artificial runway and taxiway lights. All buried lights shall have the bump height over pavement not more than 6.35mm.

3.1. ***Approach lights with magnetic bearing to landing-18П and magnetic bearing to landing-36Л***



Fig.2 LED approach and crossbar light

Under III-B Category ICAO standard the system of approach lights shall be installed with the magnetic bearing to landing-18П and magnetic bearing to landing-36Л for the precision approach.

The system of approach lights is composed of the central line bar lights installed on the continuation of runway centerline along 900 meters from the artificial runway threshold with 30 meters of lengthwise intervals, and is complemented by the side bar lights of approach and two crossbars 150 and 300 meters away from the artificial runway threshold.

Each bar light is composed of four fixtures, the distance between the fixtures in the bar light is 1.5 meters.

Side bar lights of approach are composed of three single lights in one bar light and are located in two rows on both sides of the continuation of artificial runway centerline along 270 meters from the runway threshold with the lengthwise interval 30 meters. The distance between the inner lights of the bar light rows is 18 meters.

30 meters wide crossbar is formed 300 meters away from the artificial runway threshold.

The crossbar is formed at the distance of 150 meters from the artificial runway with the lights placed between the rows of the center and side approach lights.

The LED lights with the minimum average intensity of light 20,000cd are used as the central row approach lights and the LED lights with the minimum average intensity of light 5,000cd are used as the side approach lights.

Light emission color of the central row approach lights and crossbars is white and that of the side approach lights is red.

The central row approach lights at the distance of 300-900 meters starting from the artificial runway threshold are complemented by flashing approach LED lights.

3.2. Runway lights

The following light subsystems are installed on the runway:

- side lights of artificial runway;
- entrance lights;
- restriction lights;
- artificial runway centerline lights;
- landing area lights.

The side lights of artificial runway are placed lengthwise the artificial runway in two parallel rows at the same distance, from the axial line (1 meter from the operating surface edge) of the artificial runway. The lights shall be placed at the interval not more than 60 meters.

The ground side lights are installed on the special bases. The buried side lights are used in the places of the taxiway joining the artificial runway.

The side lights of the artificial runway are white except for the last 600 meters of the runway where the lights color is yellow.

The LED ground lights are used as the side ground lights of the artificial runway and the bidirectional buried LED lights are used as the buried lights. Minimum average lighting intensity given by the side lights of the artificial runway shall be at least 10,000cd.

The green entrance lights in both landing directions are installed on the line perpendicular to the artificial runway centerline, from the outside of the artificial runway threshold at the distance of 3 meters.

The ground LED lights with the minimum average lighting intensity of 10,000cd are used as the entrance lights, emitting green light towards the landing aircraft.

The restriction lights in both landing directions are installed on the line perpendicular to the artificial runway centerline at the distance of 3.0m behind the end of the artificial runway.

The ground LED lights giving the red light towards the artificial runway are used as the restriction lights. Minimum lighting intensity of the restriction lights shall be 2,500cd.

All ground lights are installed on the special bases with the application of the breakaway couplings.



Fig. 4 LED entrance and restriction runway side light

The centerline lights are installed on the artificial runway centerline or on the line parallel to the artificial runway centerline which is shifted from it by 0.6 meters, lengthwise of centerline at the interval of 15 meters.

The bidirectional LED lights are used as the buried centerline lights with two connection outlets.

The centerline lights emit the following light:

- red light within the area of 300 meters from the end of the artificial runway;
- alternating red and white light within the area of 300-900 meters from the end of the artificial runway;
- white light on the remaining runway.

The lighting intensity of the centerline lights shall be at least 5,000cd.



Fig. 4 Buried LED light of the artificial runway centerline

The white landing area lights are installed within first 900 meters from the artificial runway threshold in the form of two rows of bar lights symmetrical to the artificial runway centerline. The distance between the internal lights of the bar light rows corresponds to the distance between the daylight marking signs and is 18 meters.

Each bar light is composed of three fixtures the distance between them being 1.5 meters. The longitudinal distance between the lights is 30 meters.

The unidirectional buried LED lights with the minimum average lighting intensity of 5,000cd emitting white light towards the landing aircraft are used as the landing area lights.



Fig. 5 Buried LED light of the landing area

3.3. Light of the glideslope visual indication

The artificial runway is equipped with the glideslope visual indication PAPI on both landing directions.

The PAPI system is composed of four LED lights installed leftwards from the artificial runway in the aircraft landing direction at the distance 15 meters from the edge of the artificial runway operating surface and 9 meters distance between the lights.

There are no objects protruding above the anti-barrier surface for PAPI light system installed on the new artificial runway.



Fig. 6 PAPI glideslope visual indication lights

3.4. Artificial runway protection lights (RGL)

The artificial runway protection LED lights are provided on all taxiways crossing the artificial runway**.** The lights are installed in both directions of taxiways at the distance of 4.0 meters from the operating surface near the daylight marking of the holding area in front of the runway.

Each light is composed of four alternating LED lights, emits yellow light only towards the aircraft moving to the runway. The flashing rate shall be 45-50 flashes per minute.

The runway protection lights are the ground lights installed with the application of breakaway couplings.



3.5. Taxiway centerline lights

All taxiways providing for the aircraft taxi from the parking aprons to the artificial runways for takeoff as well as the taxi routes from the artificial runways after landing to the parking aprons are equipped with the centerline lights.

The buried bidirectional LED lights with two connection outlets are used as the centerline lights.

The lights are installed along the taxiway centerline marking at the intervals not exceeding 15 meters on the straight-line segments and 7.5 meters on the rounded segments. The 7.5 meter intervals are preserved at the distance of 60 meters before and after the rounding.

The high-speed taxiways are equipped with the LED centerline taxiway lights installed at the intervals of not more than 15 meters.

The color of centerline taxiway lights during the aircraft moving towards the artificial runway, during the movement from the artificial runway is alternating yellow and green. The alternating yellow and green colors start from the artificial runway and finish near the RBS critical area boundary, with the last light near the critical area boundary being yellow.

3.6. Stop line lights

The stop line lights are installed on the boundary of RBS critical area in the holding positions in front of the artificial runway and borderline holding points.

The stop line lights are installed across the taxiways, at the distance at least 120 meters from the artificial runway centerline, not less than six lights at the intervals of 3 meters between the lights. The stop line lights emit red light towards the aircraft moving to the artificial runway.

The buried LED lights with the minimum average lighting intensity of 200cd are used as the stop line lights.

In both ends the stop-line is complemented by double LED ground lights installed with the use of breakaway couplings and complete bases 4 meters way from the boundary of the taxiway operating surface.

During the work of the Stop line lights, the taxiway centerline lights located along the taxi route shall be shut off at the interval 90 m behind the Stop line and vice versa. This is provided through the light-by-light control and remote control of the lighting facilities.



Fig. 8 LED buried Stop line light

3.7. Aerodrome signs

The installation of the LED identification signs of the artificial runway, taxiway identification, movement direction, takeoff from the crossing point, turning off the runway, destination signs is provided on the taxiways and artificial runway.

The artificial runway (magnetic course) identification signs are installed on the turn-off taxiways near the daylight marking of the holding point in front of the runway and are made up of white symbols on red background. The signs are installed on both sides of taxiways and are complemented by the taxiway identification signs from the outside. Identification of taxiways for turning off the runway is provided through turning off the runway signs (black symbol on the yellow background).

On the taxiway crossing the signs are installed before the said crossing and next to the marking of the interim holding point. The sign indicating turning off the runway is placed before the runway turnoff point in the place located at least 60 m before the touch point. The sign indicating takeoff from the crossing point is installed leftwards from the entrance taxiway. The distance between the sign and the runway centerline is at least 60 m. The signs are installed at the distance of 15 meters from the taxiway boundary and 12 meters from the boundary of the artificial runway.

The signs are installed on the special foundations with the help of the breakaway couplings.

3.8. *High-speed turn-off taxiway identification lights*

The high-speed turn-off taxiway identification lights (RETILS) are installed 300 meters before the place of connection of the taxiway centerline lights and runway centerline lights every 100 meters before the taxiway centerline lights. The RETILS lights are composed of three lights with 2m distance between the lights at 300m section, two lights with the distance 2m-200m between the lights and one light – 100m.

The buried LED lights giving the permanent yellow light towards the aircraft are used the high-speed turn-off taxiway identification lights.

3.9. Power supply of the lighting facilities system

The power supply of the lighting facilities system is provided through the high-voltage and low-voltage cable lines in the cable channels, in the pipes buried in the artificial pavement of the runway and taxiways.

For the power supply of the aerodrome lighting facilities system the sequential circuit through the isolating transformer is used.

The primary windings of the isolating light transformers are combined with sections of single-wire shielded cable into a series circuit whose terminals are connected to the brightness controller. The series circuit provides for constant current in all cable ring lights maintaining the permanent lighting intensity of all lights and allowing applying the single-wire cable.

The necessity of changing the lighting intensity depending on the weather conditions and insurance of the constant current in the cable ring during the variation of voltage in the network condition the application of the special current stabilizers (brightness controllers).

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Rated output current of the brightness controllers does not exceed 10A, therefore, the cable section in the series connection of lights is chosen not based on the current but on conditions of mechanical strength. In reality, the lighting facilities systems apply the special cable with the copper core, section 1x6mm2 and 5kW voltage.

The lights and aerodrome signs are directly connected through the isolating transformers.

The cable channels are made of the polyethylene pipes of low pressure type C with 110mm diameter. When laying the cable channels outside the aerodrome pavements, the pipes laid in the pits are concreted to protect the cable channel in case of the aircraft runoff outside the artificial runway and taxiways.

To place the isolating transformers the cable pits of three typical sizes are provided: type A – 1190x1190x1150mm; type B – 1800x1190x1150mm, type D – 2500x2000x2500mm.

Besides, the D pit is used to lay the cable ducts through the artificial runways and taxiways.

The A and B pits are prefabricated, and D pits are laid on site with the help of formwork.

The construction of pits and their covers presuppose the aircraft straddling during the aircraft runoff outside the artificial runway and taxiways. The construction of the pits cover presupposes the maintenance with equipment available at the Maintenance Department (crane lift).

3.10. Lighting Facilities remote control

The lighting facilities control systems are installed in four places: TS-1023н, TS-1024н, at the workplace of the landing and taxing operator and in the shift engineer premises at TS-1023.

The single network is created for control, for which between four buildings the fiber-optic cable shall be laid which would provide for the high-speed data transfer within the network with the optimal protection against the electromagnetic induction. Besides, only two out of eight fibers will be used, other fibers will remain in reserve and in case of failure will allow for the rapid shifting to the reserve cables. This will provide for the redundancy line.

To reduce the amount of the lights and electrical equipment power cables in Transformer Substation the project provides for the light-by-light control system only on the centerline lights of the runway, taxiway centerline lights, stop line lights, runway protection lights, high-speed taxiway identification lights, aerodrome signs. On the remaining lights subsystems the control of the failed lights shall be provided. The computer providing for the full control of the operating condition of subsystems and elements of the lighting facilities is installed in the shift engineer's room at TS-1023. In each of the transformer substations TS-1023н and TS-1024н, one Lighting Facilities remote control post is installed, and at the workplace of the landing and taxing Operator the control computer is provided.

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The remote control posts installed at the transformer substations TS-1023н and TS-1024н, are connected to the brightness controllers of these substations.

The power supply of the remote control equipment is provided from the uninterrupted power supply switchboards.

Basically, the lighting facilities control system shall be equipped with the following functions: the function of automatic and manual taxi route charting from the aircraft parking apron to the start point and from the place of the runway clearance to the aircraft parking apron; complex and individual regulation of the lighting intensity of the lights and aerodrome signs. This lighting facilities control system shall be integrated with the control system of the artificial runway lighting facilities and, if necessary, with the other systems (MLAT, airfield inspection radar, meteo, radio-technical support, electric power supply and other airport information resources) for A-SMGCS (improved Surface Movement Guidance and Control System).

Grounding

To provide for the grounding of the installed lighting facilities the laying of the grounding rails made from galvanized steel 30x3.5mm is provided, which shall be included into the lighting facilities. All metal cable structures in the pits and lights carcass shall be connected to the grounding rail, for which the copper conductor is used.

Occupational safety and health

The occupational safety and health are provided for by the technical and organizational measures according to the electrical safety code rules, application of the personal protective equipment and complying with the safety regulations.

Electrical equipment operation

The lighting facilities will be operated by the maintenance personnel of Boryspil International Airport State Enterprise.

Environment protection

The lighting facilities are environmentally safe and produce no harmful effect on the environment.

8. Energy efficiency

The energy efficiency measures are based on the application of equipment on modern element base and implementation of lighting facilities control and monitoring system.

The use of modern lighting facilities system based on LED enables substantial energy efficiency.

The design of the lighting facilities provides for the following measures to improve the energy efficiency:

1. Use of modern highly-efficient lighting resources – LED lights with the improved lighting efficiency that comply with the established lighting norms;
2. Use of modern lighting fixtures with the rational light distribution;
3. Use of lighting facilities fixtures with the dust and moisture protection level not less than IP67 allows extending the light operating period without substantial reduction of lighting output.
4. For the high-intensity lights used along the artificial precision approach runway of III B categories, the step or smooth lighting intensity control is provided in the following ratios: 100, 30, 10, 3, and 1% of the rated intensity.
5. The project presupposes the light-by-light control of the lighting facilities which allows activating the necessary lighting facilities subsystem when necessary.

Electrotechnical solutions

1. General information

This Section of the Project Feasibility Study was prepared on the basis of the following:

- Design task;
- Technical conditions of electric power supply No. 63-30-17 dated 21.03.2019 issued by the Electrical Superintendent Service of Boryspil International Airport State Enterprise;
- Operating norms, rules, and standards.

Comparative table of Project Feasibility Study (PFS)-2010 and PFS-2019

	PFS-2010	PFS-2019
Rated power	1,119.85kW	2,683.22kW
Annual electric power consumption	4,945 ths. kW/h	11,752.5 ths. kW/h
DP-10kW	No	Yes
TS-24,26,31 (existing)	Dismantling of the old equipment, installation of the new equipment	Dismantling (without the installation of the new equipment)
TS-29,30 (existing)	Dismantling	Dismantling
TS-ERSS	New	New
TS-27,28 (existing)	Not provided for by PFS	Not provided for by PFS
TS-1023 (existing)	Premises are used for the Flight Electrical and Lighting Support Service	Premises are used for the Flight Electrical and Lighting Support Service
TS-1024 (existing)	Dismantling	Dismantling
TS-1023н, TS-1024н	New lighting transformer substations	New lighting transformer substations
TS-1012	Additional cells installation	Additional cells installation
TS-SPS	Yes	Yes
PTS-SPS1, SPS2	Yes	No
TS of platform S	No	Yes
TS of parking aprons	No	Yes
Floodlighting	Anti-icing site	Anti-icing site, platform S, parking aprons
System of aerodrome TS power supply at the platform	No	Yes
Lighting facilities (LF)	MK-18-III cat., MK-36-Icat.Halogen lights	MK-18-III cat., MK-36-III cat., LED lights

2. Technical parameters:

1. Power-supply voltage 10kW; 0.4kW
2. Power supply category II, I, s.g. I category
3. Rated power: 2,683.33kW

   incl.:

   radio-technical facilities 67.7kW

   waterworks 1,500kW

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ESS (new) 230kW
Aircrafts power supply in the parking aprons 432kW
Lighting of the anti-icing site and platform 116.12kW

4. Annual electric power consumption 12,396ths.kW*h

Remark. *The capacity shall be specified at the project development and working documents elaboration stage.*

Technical data of 1 tier 1 start-up facility

1. Power supply voltage 10kW; 0.4kW
2. Power supply category II, I, I s.g. category
3. Rated power: 476.5kW
   incl.:
   Aircrafts power supply in the parking aprons II cat. 432 kW
   Warning lights, video-surveillance I s.g. 0.24kW
4. Annual power consumption 2,144ths.kW*h

Technical parameters of 1 tier 2 start-up facility

1. Power supply voltage 10kW; 0.4kW
2. Power supply category I category
3. Rated power: 2,135.1kW
   incl.:
   EAS 230kW
   LF 337.4kW
   RE 67.7
4. Annual power consumption 9,608 ths.kW*h

Technical data of 1 tier 3 start-up facility

1. Power supply voltage 10kW; 0.4kW
2. Power supply category I s.g.
3. Rated power: 11.2kW
4. Annual power consumption 50 ths.kW*h

Technical parameters of 2 tier 1 start-up facility

1. Power supply voltage 10kW; 0.4kW
2. Power supply category I category
3. Towers rated power: 71.62kW

4. Annual electric power consumption 322ths.kW*h

Technical parameters of 2 tier 2 start-up facility

1. Power supply voltage 0.4kW
2. Power supply category I category
3. Towers rated power: 5.56kW
4. Annual electric power consumption 25ths.kW*h

Technical parameters of 2 tier 3 start-up facility

1. Power supply voltage 0.4kW
2. Power supply category I category
3. Towers rated power: 5.56kW
4. Annual electric power consumption 25ths.kW*h

Technical parameters of 3 tier

1. Power supply voltage 0.4kW
2. Power supply category I, I s.g. category
3. Towers rated power: 49.23kW
4. Annual electric power consumption 222ths.kW*h

3. Electric power supply

The electric power supply resource of the designed facilities is the substation 110/10kW, at Boryspil IA SE.

The electric power is distributed to the consumers from the existing and new transformer substations of the airport.

The flow chart of the designed network 10kW is shown in page UA-KBP-02-TEO-ETP-3-1.

For the electrical power supply to the new TS in the southern part of the artificial runways a new 10kW distribution point (DP-10kW) is designed, which shall be constructed during the 1 tier 1 start-up facility for the electric power supply of the new objects of DL No.2. Power supply of the new DP-10kW is provided from the aircraft I and II BS ES-10kW “Airport” and is backed-up with two 10kW lines from the DP-22. The remote control over the DP and ST facilities is provided with the existing control system ABB MicroSCADA Pro 9.3.

To provide for the electrical power supply of the lighting facilities, radio-technical facilities and meteo-facilities the construction of two new transformer substations TS-1023H and TS-1024H with the power rooms is provided

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To provide for the electric power supply to the emergency-rescue station (ERS) the construction of the new TS-ERS is provided, to the water supply facilities – the new TS and PTS, for the electric power supply to the consumers of S platform (lighting tower, electric power supply of the aircrafts at the parking aprons, video-surveillance, and process chambers of CFS) the TS platform S is provided. For the power supply to the parking aprons, isolation place and engine testing points the TS of the parking aprons is provided.

10kW networks are planned to be made using $ААБ_{2л}$ cable in 0.7m deep trench covered by signal tape, 0.4kW networks – similarly using ВБбШв and ВВГнг cables.

The cable lines are laid as follows: in trench whose depth is 0.7m from the finished ground level covered by signal tape (for I and I s.g. category the additional tape is provided at a height 0.25m from the main tape); in the cable channels of the PE pipes with D = 110mm (Technical Specifications У 22.3-31032472-003:2012,) with the construction of prefabricated reinforced concrete pits (typical size of the pits shall be determined by the project); in the places of crossing the motorways and utility networks – in HDP pipes with D=110mm. The motorways crossing is provided both with and without excavation works – using the pipe ramming method.

The cable networks are provided as follows: in the cable channels with the cables ВВГнг; in the trench using ААБ2л, ВБбШв cables,

Mutually redundant cables providing power supply to the consumers I and I s.g. category shall be laid in different trenches, the distance between the trenches being 1m. According to the power supply reliability, the power consumers of the air transport infrastructure of the reconstructed landing area No.2 belong to I, I special and II category. The power supply resource of the designed facilities is represented by the SS-110/10kW of Boryspil IA SE. The electric power is distributed from the existing and new transformer substations (hereinafter – TS)-10/0.4kW.

The Project Feasibility Study provides for the following:

I tier

1 start-up facility

- construction of the new distribution point (DP)-10kW in the northern part of the artificial runway, from which the power supply to the designed TS-10/0.4kW is provided;
- construction of TS-10/0.4kW with the transformers 2x630kVA to provide the

power to the platform S consumers (lighting tower, power supply of the aircrafts at the parking aprons, video surveillance, and process chambers of CFS).

- Installation of the lighting towers on S platform.

2 start-up facility

- reconstruction of the existing TS-1012 with the installation of additional cells 10kW to connect TS-1023H;
- Reconstruction of existing TS-1023 with the dismantling of the electrical equipment and use of a number of premises for the maintenance and control of the lighting facilities operation (hereinafter – LF) of runway-1 and runway-2, accommodation of personnel of RNF of runway-2, storage of SPTA and materials of radio-navigation and lighting facilities;
- Dismantling of TS-1024, which is not used for the needs of runway-2, TS-1029, TS-1030, TS-1031 as the high obstacles for the runway-2;
- construction of TS-1023H, TS-1024H with the 2x400kVA transformers to supply the electric power to the lighting equipment, radio-technical facilities and meteo-facilities;
- construction of TS-10/0.4kW ERS with the transformers 2x630kVA to provide power supply to the emergency rescue station.

3 start-up facility – construction of PTS-10/0.4kW with the transformers 2x400kVA for the perimeter lighting and video-surveillance;

- Installation of 65kVA diesel generator to provide uninterrupted power supply to consumers and ensure special electric reliability category.

II tier

1 start-up facility

- construction of TS-10/0.4kW with the transformers 2x630kVA for the power supply of parking aprons, isolation place and engine testing points;
- installation of the lighting towers of the aircraft parking aprons

2 start-up facility

- installation of the lighting towers of the engine testing site; 3 start-up facility – installation of the lighting towers for the isolation parking apron.
  III tier
- provision of the electric power supply of the filling station, de-icing liquid filling station, civil protection fire-fighting equipment and warding depot from TS-10/0.4kW of S platform and TS-10/0.4kWERS, installation of the diesel generator 65kVA for the civil protection depot.

10kW networks are made of ААБ2л cables, 0.4kW networks– ВБбШв and ВВГнг cables laid in the soil and cable channel. The Project Feasibility Study provides the solutions for the flood lighting of the anti-icing site and platform, barrage light of TS-10/0.4kW and ERS facility, perimeter security lighting, anti-lightning protection, electrical safety measures.

Annual total consumption: 12,396ths.kW*h

I tier – 11,802ths.kW*h

1 start-up facility – 2,144ths.kW*h
2 start-up facility – 9,608ths.kW*h
3 start-up facility – 50ths.kW*h
II tier – 372ths.kW*h
1 start-up facility – 322ths.kW*h
2 start-up facility – 25ths.kW*h
3 start-up facility – 25ths.kW*h
III tier – 222ths.kW*h

4. Transformer substations

DP10kW 1 tier 1 start-up facility

To ensure power supply of the new TS in the southern part of the artificial runway a new 10kW (DP-10kW) distribution point is designed to be built during the 1 tier 1 start-up facility to provide for the power supply of the new objects DL No.2. Power supply of the new DP-10kW is provided from I and II bus section (BS) ES-10kW "Airport" and is backed-up with two lines 10kW from the DP-22. The remote control over DP and TS facilities is executed through the existing control system ABB MicroSCADA Pro 9.3.

TS 1012 (existing) 1 tier 2 start-up facility.

To connect the design networks, the BM-1-10-31.5 У3 10kW series cells shall be installed in the existing areas to ensure power supply of the lighting TS-1023H. TS1012 shall be equipped with the electric heating with the automatic control. All these works are performed within 1 tier 3 start-up facility to provide the power supply of the new artificial runway consumers.

TS 1023(existing) 1 tier 2 start-up facility

The Project provides for the dismantling of the power and control switchboards of the existing LF, brightness controllers, diesel generator and substitution of the power switchboards with the new ones.

The premises will be used for the maintenance and control over the lighting facilities operation of runway-1 and runway-2, for the accommodation of personnel of the RNF of runway-2, besides, the additional premises are provided to keep SPTA and materials of the radio-navigation and lighting facilities.

The following works are provided for at TS-1023:

- repair of the building façade;
- repair of the existing premises;
- additional living quarters to accommodate the personnel of electrical and lighting service, and namely:
  lavatories, drying rooms;

- additional premises for the accommodation of personnel of the RNF of runway-2 exploitation group composed of 7 persons who will service the radio-navigation facilities of runway-2;
- additional premises to keep SPTA and materials of the radio-navigation and lighting facilities separately;
- automated modern premises heating system;
- roof insulation;
- from the second floor of the building the second fire exit through the ES stairs (external stairs);
- building protection against direct lightning strikes and their secondary effects;
- organized water drainage from the roof of the building;
- replacement of the gates and doors with the energy efficient ones.

TS 1024 1 tier 2 start-up facility

The Project provides for the dismantling of TS which is not used for the needs of the runway-2.

TS 1023H, TS 1024H 1 tier 2 start-up facility

The construction of the new TS with the power rooms and fuel storage tanks with the capacity of 5m3 is provided for.

ES-10kW shall be equipped with the cells of SEP-393, ES-0.4kW – shall be equipped with the switchboards similar to Schneider Electric Ukraine.

The transformers power is 2x400kVA.

The installation of 375kVA diesel generator as the third power resource is provided.

The power supply of the ground landing facilities (LF, RTF, meteo-facilites) is provided from the uninterruptible power supply board (UPSB) for I s.g.

The brightness controllers of LF complex are designed in the BC premises.

The project provides for the ventilation, air-conditioning and heating of premises, fire and security alarm, diesel generator fire extinguishing with the packaged unit.

All premises are equipped with the artificial lighting, and the premises such as switch room, power room, and BC premises apart from the working lighting have the security lighting.

TS 1029, TS1030, TS1031 1 tier 2 start-up facility

The Project provides for the dismantling of TS as the high obstacles for the runway-2.

TS-ERS1 tier 2 start-up facility

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The project provides for the construction of the transformer substation with 630kVA transformer.

ES-10kW and ES-0.4kW are to be equipped with the SEP cells and lighting tower-90. The power supply of TS-ERS is provided from the new DP10kW.

TS Platform S (1 tier 1 start-up facility)

The Project presupposes the construction of the transformer substation with the transformers 640kVA during 1 tier 1 start-up facility to provide for the power supply of S platform consumers

ES-10kW and ES-0.4kW shall be equipped with the SEP cells and LT-90. The power supply of platform S TS shall be provided by the new DP10kW in two cable lines. TS of S platform provides for the power supply of the platform and parking aprons (lighting tower, CFS process chambers, aircrafts power supply system (Annex 1), video-surveillance.)

TS of parking aprons 2 tier 1 start-up facility

The Project provides for the construction of the transformer substation with 630kVA transformers.

ES-10kW and ES-0.4kW shall be equipped with the SEP cells and LT-90 panels. The power supply of TS of parking aprons is provided from the new DP 10kW in two cable lines.

Technical record-keeping of active and reactive energy is provided at all designed TS (TS 1023н, TS 1024н, TS ERS, TS of S platform, TS of parking aprons, TS of sanitation facility, SPS PTS).

All TS, except for PTS are equipped with the artificial lighting, fire and security alarm.

Construction parameters of TS 1023H, TS 1024H: 12x19m, TS ERS), TS SPS: 6x12m.

All TS are equipped with domestic equipment, except for the diesel generators and ES-0.4kW in TS 1023н, 1024н, where the equipment that does not have domestic

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equivalents is to be used. Besides, all designed TS and PTS are equipped with the automatic heating and ventilation, fire and security alarm. All electric meters are connected to the existing PMS.

5. Launch emergency rescue station 1 tier 2 start-up facility

Main power consumers of ERS are represented by the heating and ventilation equipment, technological equipment, gates, communication and alarm equipment, food block, SPS loading, electrical lighting.

The DP 11 distribution switchboards and stackable switchboards with CB-63 are provided for the electric power distribution.

To connect I category consumers the automatic transfer switch ATS-100-10 is provided.

The project provides for the working lighting and security lighting, disconnection of the ventilation systems from the fire alarm, blocking of the grinding machine with the exhaust fan, local and remote gates control from the duty shift premises.

ERS is powered from individual TS, ERS (1 tier 3 start-up facility).

The distribution networks shall be made from five-wire (380V) and three-wire (220V)ВВГ$_{нт}$ cables.

EICAS networks are powered from the fire-proof cable with the fire resistance 30-60min.

The energy-efficient luminescent lamps shall provide premises with lighting.

The group networks are made from ВВГ$_{нт}$ cable, evacuation lighting network is made from the cable – fire resistance 30-60min.

6. Flood lighting 2 tier 1 start-up facility

The project provides for the anti-icing site lighting which is performed with the LED flood lamps 2.0kW, installed on the metal support towers.

The site lighting is 10lx.

For the energy distribution near the tower foot the outdoor lighting control switchboards are installed with the working and background lighting bus bars.

The towers are powered from ES0.4kW TS of the parking aprons, lighting control is remote – from the duty shift premises.

7. Barrage light

All designed TS, ERS facilities and floodlight towers are equipped with the barrage LED lights of low intensity obstacle type.

The automatic lights control is provided, depending upon the illumination level, with the help of photo element.

8. Security perimeter lighting

The security lighting is performed along the perimeter using the LED floodlights with the illumination intensity 5lx. The lighting power supply is provided from TS-ERS, TS-1023 and three transformer PTS with ATS. The lighting is equipped with the motion sensors and manual control from the guard point.



8. *Security measures*

8.1. Grounding

For the personnel protection against the electrical shock, all metal non-current-carrying parts of the electrical equipment are connected to PE (PEN) of the supply cable conductor.

For designed TS the common grounding facility is provided for 10kW and 0.4kW which is made of the angle steel electrodes 50x50x5mm, stripped steel connectors 40x4mm. The resistance of the ground loop shall not exceed 4Ohm.

At the ERS, floodlight towers, TS 1023н, TS 1024н the equipotential bonding system is provided: PE (PEN) supply main connectors, metal structures, lightning protection circuit are connected to the main grounding bus.

The additional equipotential bonding system is provided for the shower rooms through connecting the pipelines and metal pallets to PE bus bar, installed on the box, using the wire ПВ1 4mm2 in the PVC pipe ∅16mm.

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8.2. Lightning protection

Lightning protection of the facilities is performed in compliance with ДСТУ Б.В.2.5-38-2008. TS and ERS, according to the reliability of direct lightning protection, belong to II level, floodlight towers belong to III level.

The lightning protection of TS and ERS is provided with the help of lightning protection grid laid in the roof of the buildings. Through conductor wires the grid is connected to the lightning protection circuit laid in the trench 0.5m deep along the building perimeter.

The tower connected with the angle steel and stripped steel ground wires is used as a lightning rod for the floodlight tower.

To protect the diesel generator vent valve and fuel capacity 5m3 the lightning rod is installed which is connected to the grounding circuit through the stripped steel 40x4mm.

9. Occupational safety and health

The occupational safety and health are achieved through the fulfillment of technical organizational measures, according to the electrical safety code rules, use of personal protective equipment.

11. Exploitation of electrical equipment

The electric installation shall be operated by qualified personnel in compliance with the safety rules and use of personal protection equipment.

12. Environment protection

Electric equipment, except for the diesel-generators operating under the emergency conditions, is environmentally safe and has no harmful effect on the environment.

12. Energy efficiency

The use of equipment on modern element base is a basis for the energy efficiency measures realization.

Electro-technical solutions

1. General information

This Section of the Project is based on the following:

- general layout;
- operating norms, rules and standards;
- technical specifications No.63-30-17 dated 21.03.2019

All lighting works on platform S are performed during the 1 tier 1 start-up facility.

2. Technical parameters

1. Power supply category I, I s.g.
2. Voltage 380/220V
3. Rated (calculated) power 44.26kW
   Including I s.g. 0.8kW
4. Rated current 79.12A
5. Capacity rate 0.85
6. Grounding system TN-C-S
7. Annual power consumption 199ths.kW.h

3. Power supply

Power supply resource for the floodlight tower, located on the designed platform S, is represented by TS-platform S (General Layout No. 7).

To provide for the categorization (I tower group and I s.g. of obstacle warning lights and video-surveillance) and power distribution among the consumers, the Project provides for the lighting towers connection through two CL 0.4kW from two ES-0.4 sections of TS-platform S. The power supply of the obstacle warning lights and video-surveillance cameras is provided from the ATS with the distribution located in ES-0.4

0.4kW networks are made from copper wire cables laid in the cable channels of the polyethylene pipes ∅110mm with the prefabricated reinforced concrete pits. The number of pipes for the cable channels is determined taking into account the reserve.

For cable channels the following prefabricated reinforced concrete pits are provided: ККС, ККСр and ККСу with the super-heavy cast-iron hatches for the loading F900.

The following cables are laid in the cable channels: ВВГнг, КВВГнг and КГ,

Cable section is chosen in compliance with the permissible current intensity with the voltage loss verification.

For the reactive power compensation the Project provides for the installation of two condenser units of TS- platform S.

Technical accounting of the electric power is done on the TS-Platform.

To connect the video-surveillance the Project presupposes the installation of cutout boxes near the lighting tower.

4. The platform lighting

The Project provides for the platform lighting with the LED floodlights of lighting intensity 2000lx, installed on the tower with the lowering corona.

The lighting of the parking aprons is 20lx, the remaining part of platform – 10lx.

Near the basis of each tower UNO power and control switchboards and metal structures with control gear are installed.

The separate activation of working and background lighting is provided.

The remote control of the platform lighting is provided from the premises of shift engineer of Electrical Superintendent Service in DP-22 and the room of the Shift Electrical Technicians. Control box is placed in these premises.

The towers are equipped with the barrage lights (BL) with LED lamps.

The BL are powered from the ATS device with the distribution located in TS-Platform S.

The BL are automatically and manually controlled according to the illumination intensity from the Illumination Control Box-9602, installed in TS-Platform S.



Fig. 1 Lighting tower of Dashoguz airport.

5. Security measures

5.1. Anti-lightning protection

According to the security measures (in compliance with ДСТУ Б.В.2.5.-38-2008) the floodlight towers belong to the III anti-lightning protection level.

The metal tower connected to the angle steel ground wires 50x50x5mm 1=3m and stripped steel 40x4mm acts as the lightning rod.

5.2. Grounding

To protect the maintenance personnel from electrical shock, all metal non-current-carrying parts of the electrical equipment are connected to PE (PEN) – supply main conductor.

The grounding device resistance shall not exceed 4Ohm.

On the floodlight towers the equipotential bonding system is provided through connecting to the main grounding bus bar located in UNO switchboards, PE-conductors of supply main, metal structures and lightning protection circuit.

6. Anti-corrosion protection of cable networks 0.4kW

The make of 0.4kW cables is approved in compliance with "Unified technical instructions on the selection and application of electrical cables" for the soils with the medium and high corrosive activity.

No wandering current is observed.

Additional cables anti-corrosion protection is not required.

7. Occupational safety and health

The occupational safety and health are achieved through the fulfillment of technical and organizational measures, according to the electrical safety code rules, use of personal protective equipment.

8. Exploitation of electrical equipment

The electrical installations shall be operated only by the qualified personnel in compliance with the safety rules and wearing the personal protective equipment.

9. Environment protection

The applied equipment is environmentally safe, has no harmful emissions and does not have any harmful effect on the environment.

10.Energy efficiency

The application of equipment on modern element base is a basis for the energy efficiency measures realization.

The design of the platform lighting facilities provides for the following measures to improve the energy efficiency:

1. Use of modern highly-efficient lighting resources – LED light and floodlights with the improved lighting efficiency to comply with the established lighting norms;
2. Use of modern lighting fixtures with the rational light distribution;
3. Use of fixtures with the dust and moisture protection level IP67, allows extending the floodlights operational life without the substantial reduction of luminous power.

1. General part.

1.1. The natural and climate conditions of the construction region, engineering-geological, and hydro-geological conditions of the construction site are specified in the materials of engineering and geophysical surveys (UA-KBP-02/C-1-T3)

1.2. Fire resistance level - II (ДБН В.1.1-7-2002).

1.3. Building consequence class - CC2 (ДБН В.1.2-14-2009).

1.4. The applied building structures, items, materials and equipment are agreed upon with the customer.

1.5. Seismicity of the area – 6 points under MSK-64 scale according to the ADMS map 2004-C

2. Designed loading.

2.1. Rated winter temperature of external air is 22° C according to ДСТУ-НБВ.1.1-27:2010.

2.2. Ground snow load is 0.88kPa for the 2nd area according to ДБН В.1.2-2:2006.

2.3. Fast rated wind pressure for absolute altitude up to 10m – 0.4kPa for the 3rd area according to ДБН В.1.2-2:2006.

3. Engineering-geological and hydro-geological conditions of the construction sites

3.1.1. The engineering and geophysical surveys on the construction site were performed by the private enterprise S.A. LANA in December 2018 (UA-KBP-02/C-1-T3).

3.1.2. The rated and calculated values of physical and deformational soils characteristics are defined according to the laboratory studies of soils.

3.1.3 The basis of the TS ERS and distribution point (DP) foundations is EGE-3 fine yellow and gray sand, with the sand-clay layers and dust sand of low water saturation level.

3.1.4. The basis of the aircrafts parking aprons TS foundations, Platform S transformer substation (TS), lighting LF TS (1023H and 1024H) is represented by EGE-4, flexible sand-clay with the layers of solid sand, dust green and gray sand with the lenses and sand layers.

3.1.5. The underground waters during the drilling were not observed.

4. Architectural and design solutions

4.1.1. The architectural and design solutions of the ERS transformer substations, aircraft parking stations, Platform S transformer substation (TS),

4.1.2. Lighting LF TS and distribution point comply with the technological task.

4.1.3. The fire resistance level is II (ДБН В.1.1-7-2002).

4.1.4. The buildings of ERS transformer substation, aircraft parking aprons, S platform are rectangular, according to the design with the axle parameters 12.3x5.6. They are one-store, the height to the lower part of pavement slabs is 3.6m.

4.1.5 The buildings of the LF TS(1023H and 1024H) are rectangular, according to the design with the axle parameters21x12m. They are one-store, the height to the lower part of pavement slabs is 3.75m.

4.1.6. The Distribution point building is rectangular according to the design with the axle parameters 10.8x3.9m. One-store buildings, the height to the lower part of pavement slabs is 3.52m.

4.1.7. Walls are the bearing structures of the buildings. The walls of ERS Transformer Substations, aircraft parking aprons, S platform are made of the silica brick COP 180/75/25, according to GOST379-95, 250mm thick. The external and internal walls of the lighting TS are made of the silica brick COP 180/75/25, according to GOST379-95, 380mm thick. The walls are insulated. The insulator is EPS foam ПСБ-С-35і. Thermal resistance of the enclosing structure is 1,538m2xC˚/W and 2,108m2xC˚/W correspondingly.

4.1.8. The bearing structure of the distribution point is represented by the walls. The walls are made of the silica brick COP 180/75/25, according to GOST379-95, 380mm thick.

4.1.9. Foundation is made of the ceramic brick КР1800/75/35 according to GOST530-80.

4.1.10. The external facades arrangement is performed by the mason's whitewashing brush and façade acrylic paint.

4.1.11. The foundation is ceramic-faced.

4.1.12. The built-up plane roofing, damp-proof course is made of two layers euro-roof felt. Insulator is represented by extruded foam polystyrene. The thermal resistance of the enclosing structure is 1.72m2xC˚/W. The lightning protection grid and conductor wires shall be placed into the sand cement screed every 10m.

4.1.13. The doors are metal, insulated.

4.1.14. The flooring is made of concrete.

4.1.15. The inner arrangement of premises is approved on the basis of the

premises technological purpose.

TS 1023 I tier 2 start-up facility (reconstruction)

. The project presupposes the following works:

- Repair of the building façade;
- Repair of the existing premises;
- Additional living quarters for the electrical and lighting services department personnel, and namely, lavatories, clothes drying rooms;
- Additional premises for the accommodation of personnel of the RNF of runway-2 composed of 7 persons who will service

the radio-navigation equipment

- additional premises for keeping the personal protection equipment and materials of the radio-navigation and lighting facilities separately;
- autonomous modern premises heating system;
- roof insulation;
- from the second floor of the building the second fire exit through the ES stairs. Metal stairs shall be performed under the series 1.450.3-6;
- Building protection against the direct lightning and its secondary effects;
- Organized water discharge from the roof of the building;
- Replacement of the gates and doors with the energy efficient ones.

5. Constructive solutions.

5.1.1. The floor level of the first floor of the transformer substations and distribution point is taken as the level 0,000

5.1.2. The foundations of the transformer substations are made of the prefabricated concrete blocks according to ДСТУ Б В.2.6-108:2010, foundations of the distribution point are made of the cast reinforced concrete slab cl. C12/15

5.1.3. The flooring is made of the hollowcore slabs series 1.141.1, v.63 and 60

6. **Anticorrosion measures**.

6.1.1. The constructions anticorrosion measures are presupposed by the Project considering the demands of SNiP Construction Standards and Regulations 2.03.11-88 and ДСТУ Б.В.2.6-145:2010.

6.1.2. All metal assembly joints, unconcreted embedded reinforced concrete elements and assembly welding joints are protected by the anti-corrosion covering

0.1mm thick according to SNiP Construction Standards and Regulations 2.03.11-88, annex 15, gr 1.

6.1.3. All metal structures are covered by the ПФ115 enamel in 2 phases one coating layer ГФ-021 per each, applied to the clean surface. The welding joints and sections of the embedded elements within the structure mantling process after welding the connecting elements shall be cleaned of the scum, degreased and covered by the ПФ115 enamel in 2 phases one coating layer ГФ-021 per each.

7. Fire safety measures.

7.1.1. The building fire safety is provided as follows:

- space-planning and construction solutions of buildings and facilities in compliance with the fire-fighting norms ДБН В.1.1-7-2002;

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Signature and date

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- following the combustibility group and fire-resistance terms of the main building structures and maximum fire propagation limits, according to the building fire-resistance level: II:
- opening the doors towards the fire exit;
- closing the gaps in the walls after laying the communications.

7.1.2. The approved main constructions applied in the Project according to the fire-resistance terms and fire propagation are not lower than those determined by ДБН В.1.1-7-2002 for the building fire-resistance level: II:

7.1.3 – bearing walls: REI120, M 0;

7.1.4. – self-bearing walls: REI60, M 0;

7.1.5. flooring slabs: RE 15, M 0.

8. **Main parameters under the Project.**

Ref. No.	**Buildings**	**Building area, m2**	**Total area, m2**	**Building volume, m2**
1	TS ERS, TS of aircrafts parking aprons, TS Platform S (each)	97.74	64.32	329.2
2	Lighting TS (1023H та 1024H) (each)	313.9	232.5	1,230.0
3	Distribution point	57.47	42.12	288.77
4	TS reconstruction	143.7	116.7	517.24

[Official letterhead of Boryspil International Airport]

THE MINISTRY OF INFRASTRUCTURE OF UKRAINE
BORYSPIL INTERNATIONAL AIRPORT STATE ENTERPRISE
EXTRACT
22 December 2018 No. 01-27/5-15

of Minutes of the Meeting of the Council for Construction and Development
as of 21 December 2018 No. 01-27/5-13

Attendees:

Members of the Council: Riabikin P., Dykhne Ye., Struk O., Zubko G., Borysiuk A.
Secretary of the Council: Astakhov K.
Invitees: Deputies of the CEO, heads of structural subdivisions, and representatives of Kyivtsentraero Regional Business Unit.

Agenda:

1. Proposals of Institute Ukrdorproekt LLC with regard to the feasibility study for the construction project "Reconstruction of Maneuvering area No. 2 of Boryspil International Airport State Enterprise".

It is hereby resolved as follows:

4. It is hereby resolved as follows:

1. Based on the review of the data submitted by Institute Ukrdorproekt LLC, the following output data should be taken into consideration during the design stage of the Feasibility Study development for the construction project "Reconstruction of Maneuvering area No. 2 of Boryspil International Airport State Enterprise" (hereinafter, Feasibility Study):
1.1. Taking into account the recommendations of Airport Consulting Vienna consulting company and the information from the Kyivtsentraero Regional Business Unit representatives the length of Runway No. 2 of 3,800 m should be taken as the baseline scenario during the Feasibility Study development.
1.2. The Feasibility Study should provide for an axis of the novel Runway No. 2 shifted westwards to the utmost.
1.3. The project should include two novel parallel primary taxiways (PTW).
1.4. The aircraft (AC) de-icing site should be provided not at the runway (RW) ends but next to the apron PTW intersection
1.5. PCN value for the novel RW No.2 should be at least 120.

1.6 Institute Ukrdorproekt LLC should finalize particular design solutions to be submitted for approval to Boryspil International Airport State Enterprise with regard to:

- the width of the novel RW No.2 taking into account the updated ICAO guidelines (Annex 14),
- the location of the quarantine parking area,
- provision of 3 rapid exit taxiways that are to be distanced symmetrically to the RW No. 2 ends (altogether, 6 rapid exit taxiways). The first rapid exit taxiway should be located at least 1,800–2,000 m from the RW end, and the distance between the rapid exit taxiways should comprise 400... 600 m,
- minimizing the impact of existing and designed buildings and facilities on the operation of air navigation equipment,
- provision of hangar facilities or cargo terminals construction (the area to be specified in the Feasibility Study) in the south-eastern part of Airfield No. 2, and
- taking into account the location of treatment plants + performing hydraulic calculation of the drainage system of Maneuvering area No. 2 (based on the existing and new artificial hard pavements).

Secretary of the Council [*Signature affixed*] K.V. Astakhov

Annex 10

UKRAINE
KYIV REGIONAL STATE ADMINISTRATION
DEPARTMENT OF ECOLOGY AND NATURAL RESOURCES

PERMISSION No. 3220883201-14

for emission of pollutants into the atmosphere by stationary sources

Issued by: ***BORYSPIL INTERNATIONAL AIRPORT STATE ENTERPRISE***
(full name of the legal person or natural person – entrepreneur)

Location: ***Boryspil-7 Str., Hora village, Boryspil District, Kyiv region, 08300***

(location of the legal person or place of residence of the natural person – entrepreneur)

Identification code of the legal person or identification code of the natural person: ***20572069***

Issuing body: ***Department of Ecology and natural resources of Kyiv Regional State Administration; 1/2 A, Baseina Str., Kyiv, 01004***
(name and location of the issuing body)
Permission term: ***10 years, from August 27, 2018 till August 27, 2028***
Decision of an institution of the state public health service:
Main Administration of the State Service of Ukraine for Food Safety and Consumer Protection in Kyiv Region
(name of the institution of the state public health service)
dated ***August 17, 2018, No. 10-04.3-01/7365***

Permission date: ***August 27, 2018***
(month, day, year)

Acting Director of the Department */signature/* Andrii Volodymyrovych Andrushenko

*/stamp: KYIV REGIONAL STATE ADMINISTRATION * UKRAINE*
*Department of Ecology and Natural Resources * Identification code 38750794/*

The conditions established in the permission and permitted volumes of emission to the atmosphere by stationary sources are attached.

Annex
to permission for emission of pollutants into the
atmosphere by stationary sources

1. Contact information of the business entity

BORYSPIL INTERNATIONAL AIRPORT STATE ENTERPRISE

(full name of the legal person or natural person – entrepreneur)

20572069

(Identification code from the USREOU or identification code of the natural person from the SRNP)

Pavlo Borysovych Riabikin, General Director of SE "International Airport Boryspil", tel. (044) 281-78-54, fax (044) 281-71-22, e-mail: info@kbp.aero

(full name of the legal person head, phone, telefax, e-mail)

Boryspil-7 Str., Hora village, Boryspil District, Kyiv region, 08300

(location of the legal person or place of residence of the natural person – entrepreneur)

Boryspil-7 Str., Hora village, Boryspil District, Kyiv region, 08300

(actual location of the legal person, phone, telefax, e-mail)

Site No. 1 (Boryspil-7 Str., Hora village, Boryspil District, Kyiv region, 08300)

(facility location)

Serhii Ivanovych Leibuk, Chief Engineer of SE "International Airport Boryspil", tel. (044) 28174-62

(full name of the operator, phone, telefax, e-mail)

2. Conditions established in the permission for emissions

2.1 For emissions of pollutants (including the technical process, equipment and facilities, gas-and-dust flow treatment).

2.1.1 None of the specified permitted emissions to the atmosphere should exceed the maximum permissible emission levels given in this section and section 3. There should be no other emissions into the atmosphere with significant effect on the environment.

2.1.2 Maximum permissible concentrations for atmospheric emissions established in the Permission must be reached without air dilution and must be based on gas volume values reduced to normal conditions.

Temperature: 273 K, pressure: 101.3 kPa (without corrections for oxygen content and humidity);

In case of gaseous combustion products:

a) 3 % of oxygen for liquid fuel and gas fuel, 6 % of oxygen for solid fuel

b) 15 % of oxygen for gas turbines and diesel engines.

2.1.3 Monitoring and analysis for each type of atmospheric emissions shall be performed in accordance with section 5 hereof. Reports on the monitoring results shall be provided to the Department of Ecology and Natural Resources of Kyiv Regional State Administration.

2.2 For technical process

2.2.1 The operator (business entity) must ensure that all works at the facility are performed in a way that atmospheric emissions will not cause significant inconveniences outside the facility or significant influence on the environment.

2.2.2 The operator must control that the technical processes are performed in compliance with technological standards, process regulations and operating procedures.

2.2.3 Raw materials compliant to the state standards must be used for the manufacturing process.

2.2.4 All works must be performed only with exhaust ventilation on.

2.2.5 In order to reduce losses of engine fuel during dispensing operations at FFS and diesel-generator plants a gas-equalizing system (GES) — a system of pipelines connecting fuel storage containers to the transportation container (gasoline tanker) — must be used to provide for pressure equalizing. Fittings and couplings of the GES must provide for complete air-tightness and exclude the possibility of oil hydrocarbon emissions to the atmosphere.

2.2.6 Fuel-dispensing equipment (FDE) providing capture, deflection and recovery of vapours generated during fuelling must be used at FFS for dispensing fuel to car fuel tanks or other containers. Coaxial hoses with a system for vapours deflection and recovery should be used for the FDE. Fittings and couplings of the FDE hoses must provide for complete air-tightness and exclude the possibility of oil hydrocarbon emissions to the atmosphere.

2.2.7 Quick-disconnect couplings should be used for draining fuel from tank trucks of fuel tankers to the reservoir.

2.2.8 In case of introducing changes to the technical process, technological equipment or materials a new Permission for emission of pollutants to the atmosphere must be obtained.

2.3 For equipment and facilities

2.3.1 Equipment must be operated in accordance with the requirements of technical documentation for use thereof (technical passport) provided by the equipment manufacturer and approved in the occupational safety regulation, which will allow to avoid emergencies.

2.3.2 Permanent employees with the necessary technical background and periodically (according to the plan) undergoing assessment of knowledge concerning technological equipment operation shall be permitted to operate boiler units of diesel generators.

2.3.3 All start-ups and stops of fuel utilization equipment must be recorded in worksheets according to the approved form.

2.3.4 Scheduled inspection of fuel utilization equipment and networks must be conducted by the operations department.

2.3.5 Quality monitoring of natural gas incineration in burners (visually by the flame colour) must be performed daily.

2.3.6 Preventive maintenance (PM) of boiler units' burners must be conducted every quarter.

2.3.7 Comprehensive performance adjustment and environmental and thermotechnical testing of boiler units with drawing up reports and parameter charts to be approved under the established procedure must be performed every three years.

2.3.8 Visual inspection of equipment and locking devices, inspection of pipelines integrity, tightness of flange couplings, electric communications, state and operating condition of supply-and-exhaust and emergency ventilation, etc. must be performed daily before start of work. The result of inspection must be recorded in the corresponding logs.

2.3.9 In order to decrease losses of raw materials and ready products and avoid emissions of pollutants to the atmosphere, technical inspection and control of the equipment air-tightness must be performed along the whole production process chain.

2.3.10 Reconstruction, modernization and introduction of new manufacturing facilities at the enterprise must be carried out in accordance with the environmental legislation of Ukraine in force.

2.4 For gas-and-dust flow treatment

2.4.1 Gas-purifying equipment installed to capture pollutants during works on the technological equipment must provide for the following purification degree.

- ES No. 1 — aspiration system from 6 wood-working machines of the wood-working shop of RCS for capturing substances in the form of suspended solid particles non-differentiated by composition — cyclone dust collector from Hiprodrevprom Ts-1 (registration No. 51/1293 dated November 1, 2002) — at least 96.4 %;
- ES No. 11 — aspiration system from drilling and grinding machines of the plant shop of EVS for capturing substances in the form of suspended solid particles non-differentiated by composition (at least 95.3 %) and asbestos (chrysotile, crocidolite, amosite, anthophyllite, actinolite, tremolite) as fine dust (at least 95.95 %) — dust collector IRP-1.0 (registration No. 49 dated December 1, 2010);
- ES No. 16 — aspiration system from the grinding machine and drum lathe of the turning shop of the EVS for capturing substances in the form of suspended solid particles non-differentiated by composition — dust collector IRP-1.5 (registration No. 1577 dated January 30, 2004) — at least 91.6 %;
- ES No. 19 — aspiration system from the grinding machine of the welding shop of the EVS for capturing substances in the form of suspended solid particles non-differentiated by composition — dust collector IRP-1.5 (registration No. 50 dated December 1, 2010) — at least 91.36 %;
- ES No. 22 (V-5) — aspiration system from the grinding (buffing) machine of the curing department of the EVS for capturing substances in the form of suspended solid particles non-differentiated by composition — cyclone dust collector TsP-1000 (gas cleaning plant passport available) — at least 82.89 %;
- ES No. 27 — aspiration system from the wood-working machine of the wood-working shop of EVS for capturing substances in the form of suspended solid particles non-differentiated by composition — cyclone dust collector RISI No. 5 (registration No. 1331 dated November 1, 2002) — at least 97.7 %;
- ES No. 30 — aspiration system from the spray booth of the spraying station of the EVS for capturing substances in the form of suspended solid particles non-differentiated by composition and solvents — stage 1 — fibre filters (Italy) for capturing substances in the form of suspended solid particles non-differentiated by composition — at least 90 %; stage 2 — fibre filter + filters from activated charcoal for capturing substances in the form of suspended solid particles non-differentiated by composition — at least 90 %; solvents — at least 70 % (registration No. 1394/1 dated March 31, 2003);
- ES No. 31 — aspiration system from the spray booth of the spraying station of the EVS for capturing substances in the form of suspended solid particles non-differentiated by composition and solvents — stage 1 — fibre filters (Italy) for capturing substances in the form of suspended solid particles non-differentiated by composition — at least 90 %;

stage 2 — fibre filter + filters from activated charcoal for capturing substances in the form of suspended solid particles non-differentiated by composition — at least 90 %; solvents — at least 70 % (registration No. 1395/2 dated March 31, 2003);

- ES No. 34 — aspiration system from the spray preparation station of the EVS for capturing substances in the form of suspended solid particles non-differentiated by composition and solvents — stage 1 — fibre filters (Italy) for capturing substances in the form of suspended solid particles non-differentiated by composition — at least 90 %; stage 2 — fibre filter + filters from activated charcoal for capturing substances in the form of suspended solid particles non-differentiated by composition — at least 90 %; solvents — at least 70 % (registration No. 1396/3 dated March 31, 2003);
- ES No. 35 — aspiration system from the spray preparation station of the spraying station of the EVS for capturing substances in the form of suspended solid particles non-differentiated by composition and solvents — stage 1 — fibre filters (Italy) for capturing substances in the form of suspended solid particles non-differentiated by composition — at least 90 %; stage 2 — fibre filter + filters from activated charcoal for capturing substances in the form of suspended solid particles non-differentiated by composition — at least 90 %; solvents — at least 70 % (registration No. 1397/4 dated March 31, 2003);

2.4.2. Maintenance of gas treatment stations must be performed regularly.

2.4.3 Air-tightness of gas-purifying equipment and the system of gas pipes, as well as timely and regular cleaning of the gas cleaning plant from suspended solid particles non-differentiated by composition and replacement of filtering materials must be provided for effective operation of the gas-purifying equipment.

2.4.4 Operation of the gas cleaning plant must be carried out in accordance with the Rules of gas cleaning units operation.

2.4.5 Check conformity of actual parameters of the gas cleaning plant operation with the project parameters twice a year for hazard class I-II pollutants to be eliminated and once a year for hazard class III-IV pollutants to be eliminated. If the pollutants hazard class is not determined, review of conformity of actual gas cleaning plant operation parameters with the project parameters must be carried out at intervals established for hazard class I-II pollutants.

2.4.6 The enterprise must have passports for the gas cleaning plants (GCP).

2.4.7 Training and assessment of knowledge for engineering and technical personnel involved in operation of dust and gas cleaning plants should be carried out at least once every three years. Training and assessment of knowledge for maintenance personnel involved in operation of dust and gas cleaning plants should be carried out at least once a year.

2.5 Manufacturing supervision

2.5.1 Maximum permissible emissions to the atmosphere in this permission should be interpreted as follows.

Periodical monitoring:

(а) For any parameter, which cannot be measured in 20 minutes due to specifics of sampling/analysis, an acceptable sampling period should be established, and values obtained in such measurements must not exceed the maximum permissible value for emissions.

(б) Results of a pollutant mass concentration measurement characterizing the content of this pollutant for a twenty-minute period along the whole measuring section of the gas pipe are considered not to exceed the value of the respective maximum permissible emission standard if the values of each measurement result do not exceed the value of the established maximum permissible emission standard.

(в) For all other parameters, none of the mean parameters for 20 min should exceed the maximum permissible emission value.

2.5.2 Maximum permissible concentrations for atmospheric emissions established in the Permission, must be reached without air dilution and must be based on gas volume values reduced to the following normal conditions.

In case of gases (except combustion products)

Temperature: 273 K, pressure: 101.3 kPa (without corrections for oxygen content and humidity).

In case of gaseous combustion products:

Temperature: 273 K, pressure: 101.3 kPa, dry gas:

3 % of oxygen for liquid and gaseous fuel;

15 % of oxygen for diesel engines.

2.5.3 The operator must perform sampling, analysis, measurement, examination, maintenance and calibration in accordance with section "List of measures for monitoring of compliance with the established maximum permissible emissions of pollutants and conditions of permission for emissions".

2.5.4 The operator must equip all emission sources with sites for sampling under the requirements of GND 211.2.3.063-98.

2.5.5 The operator must provide permanent and safe access to sampling points for monitoring of emissions to the atmosphere, as well as safe access to any other sampling and monitoring points in accordance with the requirements of the Department of Ecology and Natural Resources of KRSA.

2.6. Conditions concerning administrative measures in case of industrial or natural emergencies.

2.6.1 The business entity (operator) must send notifications both by telephone and by fax (if possible) to the environmental body as soon as possible (as practically possible) after any of the following events.

2.6.2. Any accident that could create a threat of air pollution or require emergency measures. The operator should include to the notification the date and time of the accident, detailed information on the events and measures undertaken for minimization of emissions and for prevention of such accidents in future.

2.6.3 The operator must document any accidents specified in the previous item of this condition. The notification given to the environmental body must contain detailed information on the circumstances that led to the accident and on all actions undertaken for minimization of the effect on environment and minimization of the volume of generated emissions.

2.6.4 A report in no particular format on all recorded accidents must be submitted to the environmental body as a part of the Annual Environmental Report.

2.6.5 The operator must implement and maintain an environmental management system in accordance with the requirements of the Permission for emissions. This system must account for all manufacturing operations and consider all practical options for use of cleaner technologies, and cleaner manufacturing processes to minimize emissions.

2.6.6 Personnel informing and training The operator must implement and maintain procedures for determination of the necessary fields for personnel training for all employees whose work can significantly influence atmospheric pollution. Respective records on personnel training should be kept.

2.7. For fugitive sources of pollutant emission to the atmosphere

2.7.1 The operator must operate technically sound equipment with grounding in good order, perform constant monitoring of the condition of the equipment, pipelines, and shut-off valves with a record in the operations log, reflect the parameters of raw materials pumping and storage processes in the log.

2.7.2 Air-tightness of the equipment, valves and pipelines must be checked before starting up. If leakages are detected, measures for removal thereof should be taken immediately.

2.7.3 At FFS and diesel-generator units external surface of fuel storage equipment (FSE) located underground must be painted with a light-reflecting paint with heat reflection coefficient at least 70 %.

2.7.4 Leakage of reservoir equipment should not be allowed in order to avoid emissions of fuel volatile fractions.

2.7.5 Fuel storage equipment must include a system for fuel level control or overflow protection.

2.7.6 In absence of special sealing elements of car fuel tank filling neck sealing of the dispensing nozzle with the car fuel tank filling neck must be provided with a special sealing washer made of an elastic material.

2.7.7 Equipment of welding and gas-cutting machines and accumulator charging stations must have corresponding protection level depending on the environmental conditions. Design and location of this equipment, enclosures and locking must provide for impossibility of mechanical damage thereof.

2.7.8 Minimum height of the bar should be maintained during loading of bulk materials (rubble, sand, chippings).

2.7.9 Under unfavourable conditions unloading of such materials as rubble, sand and chippings should be stopped, and unsheltered warehouses for materials should be poured water on in order to decrease negative influence on the environment.

2.7.10The fire and technogenic safety rules must be strictly adhered to, and preventive measures for prevention of accidents that could lead to pollution of the environment must be taken.

3. Permitted volumes of pollutant emissions into the atmosphere

3.1. Permitted emission volumes for pollutants classified as main emission sources

Main emission sources are absent.

3.2 Permitted emission volumes for pollutants classified as other emission sources

No. 1 — Pipe (woodworking machinery, – 6 pcs.)

Table 1

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

No. 3 — Pipe (welding station)

Table 2

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:

– for iron and its compounds (in terms of iron) 0.00201 from August 27, 2018

– for mangan and its compounds (in terms of mangan dioxide) 0.000148 from August 27, 2018

– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.007334 from August 27, 2018

– for carbon monoxide 0.000666 from August 27, 2018

No. 4 — Pipe (welding station, 2 units)

Table 3

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for iron and its compounds (in terms of iron) 0.00138 from August 27, 2018
– for mangan and its compounds (in terms of mangan dioxide) 0.000134 from August 27, 2018

No. 5 — Pipe (welding station, 3 units)

Table 4

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for iron and its compounds (in terms of iron) 0.0004 from August 27, 2018
– for mangan and its compounds (in terms of mangan dioxide) 0.000037 from August 27, 2018
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.001833 from August 27, 2018
– for carbon monoxide 0.000167 from August 27, 2018

No. 11 — Pipe (grinding machine, drilling machine)

Table 5

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for asbestos (chrysotile, crocidolite, amosite, anthophyllite, actinolite, tremolite) as fine dust 0.000134 from August 27, 2018

No. 12 — Pipe (bath, 2 units)

Table 6

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Acetone	150 (total concentration for acetone, butyl acetate)	150 (total concentration for acetone, butyl acetate)	August 27, 2018
Butyl acetate			
Ethylene glycol ethyl ether	100 (total concentration for toluenes, ethylene glycol ethyl ether)	100 (total concentration for toluenes, ethylene glycol ethyl ether)	August 27, 2018
Toluenes			

No. 13 — Pipe (combustion engine, 1 pc)

Table 7

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.00427 from August 27, 2018
– for carbon monoxide 0.065 from August 27, 2018

No. 14 — Pipe (combustion engine, 1 pc)

Table 8

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.00439 from August 27, 2018
– for carbon monoxide 0.064 from August 27, 2018

No. 15 — Pipe (combustion engine, 4 pcs)

Table 9

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.0184 from August 27, 2018
– for carbon monoxide 0.188 from August 27, 2018

No. 16 — Pipe (grinding machine, drum lathe)

Table 10

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

No. 17 — Pipe

Table 11

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For kerosene, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 18 — Pipe

Table 12

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For kerosene, ethanol, dimethoxymethane (methylal, dimethylformal), emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 19 — Pipe (Grinding machine)

Table 13

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

No. 20 — Pipe (welding station, 2 units)

Table 14

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Chromium and its compounds (in terms of chromium trioxide)	5 (total concentration for chromium and its compounds in terms of chromium trioxide, mangan and its compounds in terms of mangan dioxide)	5 (total concentration for chromium and its compounds in terms of chromium trioxide, mangan and its compounds in terms of mangan dioxide)	August 27, 2018
Mangan and its compounds (in terms of mangan dioxide)			

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.009167 from August 27, 2018
– for carbon monoxide 0.000411 from August 27, 2018
– for iron and its compounds (in terms of iron) 0.00153 from August 27, 2018

No. 22 — Pipe (Grinding machine)

Table 15

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

No. 23 — Pipe (electric vulcanizer)

Table 16

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2		4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for lead and its compounds (in terms of lead) 0.000006 from August 27, 2018
– for acrylonitrile 0.000002 from August 27, 2018
– for carbon monoxide 0.0000003 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.0000002 from August 27, 2018

No. 24 — Pipe (accumulator charging station, 8 units)

Table 17

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for sulfuric acid (H2SO4) (sulphuric acid) 0.000378 from August 27, 2018

No. 25 — Pipe (combustion engine, 2 pcs)

Table 18

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2		4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.00332 from August 27, 2018
– for carbon monoxide 0.00433 from August 27, 2018

No. 26 — Pipe (combustion engine)

Table 19

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.00428 from August 27, 2018
– for carbon monoxide 0.064 from August 27, 2018

No. 27 — Pipe (woodworking machine US-2M)

Table 20

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

No. 28 — Pipe (combustion engine, 2 pcs)

Table 21

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:

– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.001256 from August 27, 2018
– for carbon monoxide 0.037684 from August 27, 2018

No. 29 — Pipe (combustion engine, 2 pcs)

Table 22

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2		4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.00011 from August 27, 2018
– for carbon monoxide 0.003316 from August 27, 2018

No. 30 — Pipe (spray booth)

Table 23

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2		4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018
Ethylene glycol ethyl ether	100 (total concentration for ethylene glycol ethyl ether, xylene, toluenes)	100 (total concentration for ethylene glycol ethyl ether, xylene, toluenes)	August 27, 2018
Xylene			
Toluenes			
Acetone	150 (total concentration for acetone, butyl acetate, ethyl acetate)	150 (total concentration for acetone, butyl acetate, ethyl acetate)	August 27, 2018
Butyl acetate			
Ethyl acetate			

No. 31 — Pipe (spray booth)

Table 24

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	1	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018
Ethylene glycol ethyl ether	100 (total concentration for ethylene glycol ethyl ether, xylene, toluenes)	100 (total concentration for ethylene glycol ethyl ether, xylene, toluenes)	August 27, 2018
Xylene			
Toluenes			
Acetone	150 (total concentration for acetone, butyl acetate, ethyl acetate)	150 (total concentration for acetone, butyl acetate, ethyl acetate)	August 27, 2018
Butyl acetate			
Ethyl acetate			

No. 32 — Pipe (heat generator Blowterm MKFL)

Table 25

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2		4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:

– – for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.01271 from August 27, 2018

– for carbon monoxide 0.10185 from August 27, 2018

– – for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.00378 from August 27, 2018

No. 33 — Pipe (heat generator Blowterm MKFL)

Table 26

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:

– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.01426 from August 27, 2018

– for carbon monoxide 0.09719 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.00427 from August 27, 2018

No. 34 — Pipe (spray preparation station)

Table 27

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for styrene 0.0096 from August 27, 2018

No. 35 — Pipe (spray preparation station)

Table 28

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for styrene 0.0097 from August 27, 2018

No. 36 — Pipe (paint preparation machine)

Table 29

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2		4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for ethylene glycol ethyl ether 0.000133 from August 27, 2018
– for xylene 0.001121 from August 27, 2018
– for toluenes 0.000624 from August 27, 2018
– for acetone 0.000022 from August 27, 2018
– for butyl acetate 0.00095 from August 27, 2018
– for ethyl acetate 0.000261 from August 27, 2018

No. 37 — Pipe (cabinet for paint storage)

Table 39

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for ethylene glycol ethyl ether 0.00055 from August 27, 2018
– for xylene 0.00083 from August 27, 2018
– for toluenes 0.0014 from August 27, 2018
– for acetone 0.0027 from August 27, 2018
– for butyl acetate 0.00055 from August 27, 2018
– for ethyl acetate 0.00083 from August 27, 2018

No. 38 — Pipe (paint preparation machine)

Table 31

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2		4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for ethylene glycol ethyl ether 0.000063 from August 27, 2018
– for xylene 0.000528 from August 27, 2018
– for toluenes 0.000294 from August 27, 2018
– for acetone 0.000011 from August 27, 2018
– for butyl acetate 0.000447 from August 27, 2018
– for ethyl acetate 0.000124 from August 27, 2018

No. 39 — Pipe (boiler unit HWK 10000 No. 1)

Table 32

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	**3**	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.2153 from August 27, 2018
– for carbon monoxide 0.0041 from August 27, 2018

No. 40 — Pipe (boiler unit HWK 10000 No. 2)

Table 33

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.2108 from August 27, 2018
– for carbon monoxide 0.004 from August 27, 2018

No. 41 — Pipe (boiler unit HWK 10000 No. 3) (if operated on natural gas)

Table 34

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.2108 from August 27, 2018
– for carbon monoxide 0.004 from August 27, 2018

No. 41 — Pipe (boiler unit HWK 10000 No. 3) (if operated on diesel oil (DO))

Table 34

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.6018 from August 27, 2018
– for carbon monoxide 0.05901 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.809 from August 27, 2018
– for substances in the form of suspended solid particles non-differentiated by composition 0.00684 from August 27, 2018

No. 42 — Pipe (thermal machine UMP-350)

Table 35

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.03667 from August 27, 2018
– for carbon monoxide 0.165 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.01229 from August 27, 2018

No. 44 — Breathing nozzle

Table 36

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For kerosene, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 45 — Pipe (thermal machine UMP-350)

Table 37

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2		4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:

– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.0218 from August 27, 2018

– for carbon monoxide 0.0218 from August 27, 2018

– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.01035 from August 27, 2018

No. 47 — Breathing nozzle

Table 38

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For kerosene, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 48 — Breathing nozzle

Table 39

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 51 — Pipe (combustion engine, 2 pcs)

Table 40

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.003102 from August 27, 2018
– for carbon monoxide 0.116843 from August 27, 2018

No. 52 — Pipe (combustion engine, 2 pcs)

Table 41

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2		4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.003102 from August 27, 2018
– for carbon monoxide 0.116843 from August 27, 2018

No. 54 — Breathing nozzle

Table 42

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For gasoline (petroleum, low-sulphur, in terms of carbon), emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 57 — Breathing nozzle

Table 43

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For gasoline (petroleum, low-sulphur, in terms of carbon), emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 60 — Breathing nozzle

Table 44

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 63 — Breathing nozzle

Table 45

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For gasoline (petroleum, low-sulphur, in terms of carbon), emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 66 — Breathing nozzle

Table 46

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 69 — Breathing nozzle

Table 47

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, kerosene, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 72 — Breathing nozzle

Table 48

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2		4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 74 — Pipe (boiler unit UWM-1000, station No. 3, boiler unit Vitomax-200, station No. 2)

Table 49

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source: – for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.48892 from August 27, 2018 – for carbon monoxide 0.02705 from August 27, 2018			

No. 75 — Pipe (boiler unit Vitoplex-300, station No. 1)

Table 50

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.035 from August 27, 2018
– for carbon monoxide 0.0017 from August 27, 2018

No. 76 — Pipe (boiler unit Vitoplex-300, station No. 2)

Table 51

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.0325 from August 27, 2018
– for carbon monoxide 0.0017 from August 27, 2018

No. 77 — Pipe

Table 52

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For sodium hydroxide (lye, caustic soda), emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 78 — Pipe (accumulator charging station, 8 units)

Table 53

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2		4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for sulfuric acid (H2SO4) (sulphuric acid) 0.000261 from August 27, 2018

No. 79 — Pipe (welding station)

Table 54

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Vanadium and its compounds (in terms of vanadium pentoxide)	5 (total concentration for vanadium and its compounds in terms of vanadium pentoxide, chromium and its compounds in terms of chromium trioxide, mangan and its compounds in terms of mangan dioxide, highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor)	5 (total concentration for vanadium and its compounds in terms of vanadium pentoxide, chromium and its compounds in terms of chromium trioxide, mangan and its compounds in terms of mangan dioxide, highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor)	August 27, 2018
Chromium and its compounds (in terms of chromium trioxide)			
Mangan and its compounds (in terms of mangan dioxide)			
Highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor			

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:

– for iron and its compounds (in terms of iron) 0.0039 from August 27, 2018

– for fluor and its vaporous and gaseous compounds in terms of hydrogen fluoride 0.000499 from August 27, 2018

– for carbon monoxide 0.00355 from August 27, 2018

– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.009167 from August 27, 2018

No. 85 — Pipe

Table 55

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For sodium hydroxide (lye, caustic soda), emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 86 — Pipe

Table 56

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For sodium hydroxide (lye, caustic soda), emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 94 — Pipe

Table 57

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For kerosene, mineral petroleum oil (spindle, engine, cylindrical, etc.), emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 95 — Pipe (exhaust hood, 2 units)

Table 58

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for methanol 0.000917 from August 27, 2018
– for ethylene glycol ethyl ether 0.0019 from August 27, 2018

No. 97 — Pipe (accumulator charging station, 3 units)

Table 59

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for sulfuric acid (H2SO4) (sulphuric acid) 0.000188 from August 27, 2018

No. 101 — Pipe (diesel-generator unit 8041 Iveko)

Table 60

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	1	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.013684 from August 27, 2018
– for carbon monoxide 0.033396 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.000396 from August 27, 2018

No. 103 — Breathing nozzle

Table 61

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 104 — Pipe (diesel-generator unit Scania SC-4096)

Table 62

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.047724 from August 27, 2018
– for carbon monoxide 0.016072 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.00164 from August 27, 2018

No. 106 — Breathing nozzle

Table 63

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 107 — Pipe (diesel-generator unit DGA-24)

Table 64

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.00928 from August 27, 2018

– for carbon monoxide 01.0432 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.00164 from August 27, 2018

No. 109 — Breathing nozzle

Table 65

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 110 — Pipe (diesel-generator unit AD-10)

Table 66

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.00928 from August 27, 2018
– for carbon monoxide 0.10432 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.00164 from August 27, 2018

No. 111 — Pipe (diesel-generator unit ASDA-200 No. 1)

Table 67

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.018334 from August 27, 2018
– for carbon monoxide 0.020394 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.001133 from August 27, 2018

No. 112 — Pipe (diesel-generator unit ASDA-200 No. 1)

Table 68

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:

– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.022201 from August 27, 2018

– for carbon monoxide 0.027714 from August 27, 2018

– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.00149 from August 27, 2018

No. 113 — Pipe (diesel-generator unit ASDA-200 No. 2)

Table 69

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:

– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.023 852 from August 27, 2018

– for carbon monoxide 0.021172 from August 27, 2018

– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.001206 from August 27, 2018

No. 114 — Pipe (diesel-generator unit ASDA-200 No. 2)

Table 70

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:

– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.015478 from August 27, 2018

– for carbon monoxide 0.020928 from August 27, 2018

– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.000981 from August 27, 2018

No. 116 — Breathing nozzle

Table 71

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	2	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 117 — Pipe (diesel-generator unit DGA-24)

Table 72

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.008729 from August 27, 2018
– for carbon monoxide 0.047472 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.001032 from August 27, 2018

No. 119 — Breathing nozzle

Table 73

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 120 — Pipe (diesel-generator unit Perkins No. 1)

Table 74

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.022448 from August 27, 2018

– for carbon monoxide 0.058972 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.00092 from August 27, 2018

No. 121 — Pipe (diesel-generator unit Perkins No. 2)

Table 75

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.021344 from August 27, 2018
– for carbon monoxide 0.060168 from August 27, 2018 – for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.001012 from August 27, 2018

No. 123 — Breathing nozzle

Table 76

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 124 — Pipe (diesel-generator unit ASDA-200 No. 1)

Table 77

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.019886 from August 27, 2018
– for carbon monoxide 0.02806 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.001342 from August 27, 2018

No. 125 — Pipe (diesel-generator unit ASDA-200 No. 1)

Table 78

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.0217 from August 27, 2018
– for carbon monoxide 0.03136 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.00182 from August 27, 2018

No. 126 — Pipe (diesel-generator unit ASDA-200 No. 2)

Table 79

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.019176 from August 27, 2018
– for carbon monoxide 0.031416 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.001904 from August 27, 2018

No. 127 — Pipe (diesel-generator unit ASDA-200 No. 2)

Table 80

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.022922 from August 27, 2018
– for carbon monoxide 0.035332 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.00219 from August 27, 2018

No. 129 — Breathing nozzle

Table 81

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 130 — Pipe (diesel-generator unit Scania SC-4096)

Table 82

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.056265 from August 27, 2018
– for carbon monoxide 0.011385 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.001485 from August 27, 2018

No. 132 — Breathing nozzle

Table 83

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 133 — Pipe (diesel-generator unit DGA-24)

Table 84

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:

– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.012833 from August 27, 2018
– for carbon monoxide 0.099261 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.001271 from August 27, 2018

No. 135 — Breathing nozzle

Table 85

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 136 — Pipe (diesel-generator unit AD-200)

Table 86

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.014872 from August 27, 2018
– for carbon monoxide 0.190905 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.002431 from August 27, 2018

No. 137 — Pipe (diesel-generator unit AD-200)

Table 87

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.023562 from August 27, 2018
– for carbon monoxide 0.128673 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.001989 from August 27, 2018

No. 139 — Breathing nozzle

Table 88

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 140 — Pipe (diesel-generator unit 8041 Iveko)

Table 89

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:

– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.013635 from August 27, 2018

– for carbon monoxide 0.032805 from August 27, 2018

– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.00045 from August 27, 2018

No. 142 — Breathing nozzle

Table 90

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 143 — Pipe (diesel-generator unit 8041 Iveko)

Table 91

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:

– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.012056 from August 27, 2018

– for carbon monoxide 0.03146 from August 27, 2018

– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.000528 from August 27, 2018

No. 145 — Breathing nozzle

Table 92

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 146 — Pipe (diesel-generator unit DGA-24)

Table 93

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.0196 from August 27, 2018
– for carbon monoxide 0.06205 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.00075 from August 27, 2018

No. 147 — Pipe (diesel-generator unit AD-10)

Table 94

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.004658 from August 27, 2018
– for carbon monoxide 0.044744 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.000544 from August 27, 2018

No. 149 — Breathing nozzle

Table 95

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 150 — Pipe (diesel-generator unit ASDA-12 No. 1)

Table 96

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.003976 from August 27, 2018
– for carbon monoxide 0.032228 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.000616 from August 27, 2018

No. 151 — Pipe (diesel-generator unit ASDA-12 No. 1)

Table 97

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.004123 from August 27, 2018
– for carbon monoxide 0.038161 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.000558 from August 27, 2018

No. 152 — Pipe (diesel-generator unit ASDA-12 No. 1)

Table 98

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:

– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.00426 from August 27, 2018
– for carbon monoxide 0.03342 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.00039 from August 27, 2018

No. 153 — Pipe (diesel-generator unit ASDA-12 No. 2)

Table 99

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.004379 from August 27, 2018
– for carbon monoxide 0.027347 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.000406 from August 27, 2018

No. 154 — Pipe (diesel-generator unit P40P1)

Table 100

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.024804 from August 27, 2018
– for carbon monoxide 0.057798 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.000624 from August 27, 2018

No. 156 — Pipe (welding station)

Table 101

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Chromium and its compounds (in terms of chromium trioxide)	5 (total concentration for chromium and its compounds in terms of chromium trioxide, mangan and its compounds in terms of mangan dioxide, highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor)	5 (total concentration for chromium and its compounds in terms of chromium trioxide, mangan and its compounds in terms of mangan dioxide, highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor)	August 27, 2018
Mangan and its compounds (in terms of mangan dioxide)			
Highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor			

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for iron and its compounds (in terms of iron) 0.004 from August 27, 2018
– for fluor and its vaporous and gaseous compounds in terms of hydrogen fluoride 0.000336 from August 27, 2018
– for carbon monoxide 0.003547 from August 27, 2018
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.00072 from August 27, 2018

No. 157 — Pipe (combustion engine)

Table 102

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2		4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.0081 from August 27, 2018
– for carbon monoxide 0.0195 from August 27, 2018

No. 158 — Pipe (washing machine Kärcher)

Table 103

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4
Substances in the form of suspended solid particles non-differentiated by composition	150	150	August 27, 2018

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:

– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.004785 from August 27, 2018
– for carbon monoxide 0.003944 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.001508 from August 27, 2018

No. 159 — Pipe (boiler unit HWK 10000, station No. 1)

Table 104

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.35042 from August 27, 2018
– for carbon monoxide 0.03878 from August 27, 2018

No. 166 — Pipe (diesel-generator unit SDMO X2800)

Table 105

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 4.0125 from August 27, 2018
– for carbon monoxide 0.111458 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.044583 from August 27, 2018
– for substances in the form of suspended solid particles non-differentiated by composition 0.022292 from August 27, 2018

No. 167 — Pipe (diesel-generator unit SDMO X2800)

Table 106

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 4.0125 from August 27, 2018
– for carbon monoxide 0.111458 from August 27, 2018
– for sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide 0.044583 from August 27, 2018 – for substances in the form of suspended solid particles non-differentiated by composition 0.022292 from August 27, 2018

No. 168 — Breathing nozzle

Table 107

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 169 — Breathing nozzle

Table 108

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 174 — Pipe (welding station)

Table 109

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for iron and its compounds (in terms of iron) 0.00078 from August 27, 2018
– for mangan and its compounds (in terms of mangan dioxide) 0.000273 from August 27, 2018

No. 175 — Pipe

Table 110

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For potassium hydroxide, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 176 — Breathing nozzle

Table 111

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 178 — Breathing nozzle

Table 112

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For kerosene, C12-C19 saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 181 — Breathing nozzle

Table 113

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 183 — Breathing nozzle

Table 114

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For C_{12}–C_{19} saturated hydrocarbons (solvent RPK-26511 etc.) in terms of carbon, emissions of which are not regulated and monitored by the state, maximum permissible emissions are not established

No. 186 — Pipe (combustion engine, 3 pcs)

Table 115

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.0011 from August 27, 2018
– for carbon monoxide 0.030356 from August 27, 2018

No. 187 — Pipe (combustion engine, 3 pcs)

Table 116

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.001083 from August 27, 2018
– for carbon monoxide 0.029881 from August 27, 2018

No. 188 — Pipe (combustion engine, 3 pcs)

Table 117

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2	3	4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.001078 from August 27, 2018
– for carbon monoxide 0.029763 from August 27, 2018

No. 189 — Pipe (combustion engine, 1 pc)

Table 118

Pollutant name	Maximum permissible emission under the law, mg/m3	Approved maximum permissible emission, mg/m3	Term of reaching the approved value
1	2		4

For substances for which norm of maximum permissible emissions under the law have not been determined, the following values of mass flow rate (g/s) are established for each emission source:
– for nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide 0.00068 from August 27, 2018
– for carbon monoxide 0.03 from August 27, 2018

Norms of maximum permissible emissions are not established for fugitive emission sources No. 80 (metal welding; BPM, mechanical supervisor staff of the airport (MSSA), welding shop: welding station; mechanical metal-working; BPM, MSSA, welding shop; machine for cutting metal profiles); No. 96 (welding area; welding station; mechanical metal-working; aerodrome power, lighting, and technical services (APLTS), care and maintenance shop (CMS), welding area; angle grinder); No. 7 (mineral ore mining; RCS; warehouse for rubble, faction 5–20); No. 8 (mineral ore mining; RCS; warehouse for rubble, faction); No. 9 (mineral ore mining; RCS; warehouse for sand); No. 10 (mineral ore mining; RCS; warehouse for chippings); No. 43 (emergency vehicle service (EVS), stationary heating of emergency vehicles engines; filler of kerosene container); No. 46 (EVS, stationary heating of emergency vehicles engines; filler of kerosene container); No. 49 (heating, ventilation, conditioning (HVC)) No. 2; (filler of DO reservoir); No. 102 (APLTS, CMS, diesel-generator plant; container with DO); No. 105 (diesel-generator plant; container with DO); No. 108 (APLTS, CMS, diesel-generator plant; container with DO); No. 115 (diesel-generator plant; container with DO); No. 118 (APLTS, CMS, diesel-generator plant; container with DO); No. 122 (generator unit, container with DO); No. 128 (diesel-generator plant; container with DO); No. 131 (diesel-generator plant; container with DO); No. 134 (APLTS, CMS, diesel-generator plant; container with DO); No. 138 (APLTS, CMS, diesel-generator plant; container with DO); No. 141 (APLTS, CMS, diesel-generator plant; container with DO); No. 144 (APLTS, CMS, diesel-generator plant; container with DO); No. 148 (APLTS, CMS, diesel-generator plant); No. 170 (terminal D; filler of DO reservoir, container with DO); No. 53 (fuel-filling station (FFS) 1; filler of horizontal steel tank (HST) 25 No. 5); No. 55 (FFS-1; fuelling nozzle); No. 56 (FFS-1; filler of HST 25 No. 4); No. 58 (FFS-1; fuelling nozzle); No. 59 (FFS-1; filler of HST 25 No. 3); No. 61 (FFS-1; fuelling nozzle); No. 62 (FFS-1; filler of HST 25 No. 2); No. 64 (FFS-1; fuelling nozzle); No. 65 (FFS-1; filler of HST 25 No. 1); No. 67 (FFS-1; fuelling nozzle); No. 68 (FFS-2; filler of checkpoint No. 7); No. 70 (FFS-2; fuelling nozzle); No. 71 (FFS-2; filler of checkpoint No. 6); No. 73 (FFS-2) fuelling nozzle; No. 81 (BPM, MSSA, oxygen charging station (OCS) No. 1, acid accumulator unit; accumulator charging unit); No. 82 (BPM, MSSA, OCS No. 1, alkaline accumulator unit; accumulator charging station — 9 units); No. 83 (BPM, MSSA, OCS No. 2, acid accumulator unit; accumulator charging station); No. 84 (BPM, MSSA, OCS No. 2, acid accumulator unit, accumulator charging station — 26 units); No. 177 (FFS 2 (module FFS-30); filler of HST-20); No. 179 (FFS 2 (module FFS-30); filler of HST-10); No. 180 (FFS 2 (module FFS-30); fuelling nozzle (car tank)); No. 182 (FFS 3 (module FFS-30); filler HST-20); No. 184 (FFS 3 (module FFS-30); filler of HST-10); No. 185 (FFS 3 (module FFS-30); fuelling nozzle (car tank)). Regulation is carried out based on the requirements specified in section 2.

4. Measures for decreasing pollutant emissions

No measures are established

5. List of measures for monitoring of compliance with the established maximum permissible emissions of pollutants and conditions of permission for emissions

MEASURES
for monitoring of compliance with the approved
standards of maximum permissible emissions
of pollutants

Table 119

Number/numbers of emission sources	Pollutant name	Approved maximum permissible emission, mg/m3	Measurement time interval	Measurement method	Sampling site
1	2	3	4	5	6
1, 11, 16, 19, 22, 27, 30, 31, 34, 35	Substances in the form of suspended solid particles non-differentiated by composition	150	Once a year	MM No. 081/120161-05	After gas cleaning plant
12	Acetone Butyl acetate	150 (total concentration for acetone, butyl acetate)	Once a year	Metrologically certified measurement methods	Pipe
12	Ethylene glycol ethyl ether Toluene	100 (total concentration for toluene, ethylene glycol ethyl ether)	Once a year	Metrologically certified measurement methods	Pipe
20	Chromium and its compounds (in terms of chromium trioxide) Mangan and its compounds (in terms of mangan dioxide)	5 (total concentration of chromium and its compounds in terms of chromium trioxide)	Once a year	Metrologically certified measurement methods	Pipe
30	Acetone Butyl acetate Ethyl acetate	150 (total concentration for acetone, butyl acetate, ethyl acetate)	Once a year	Metrologically certified measurement methods	After gas cleaning plant
30	Ethylene glycol ethyl ether Xylene Toluenes	100 (total concentration for ethylene glycol ethyl ether, xylene, toluenes)	Once a year	Metrologically certified measurement methods	After gas cleaning plant

31	Acetone Butyl acetate Ethyl acetate	150 (total concentration for acetone, butyl acetate, ethyl acetate)	Once a year	Metrologically certified measurement methods	After gas cleaning plant
31	Ethylene glycol ethyl ether Xylene Toluenes	100 (total concentration for ethylene glycol ethyl ether, xylene, toluenes)	Once a year	Metrologically certified measurement methods	After gas cleaning plant
32, 33, 42, 45, 101, 104, 107, 110, 111, 112, 113, 114, 117, 120, 121, 124, 125, 126, 127, 130, 133, 136, 137, 140, 143, 146, 147, 150, 151, 152, 153, 154, 158	Substances in the form of suspended solid particles non-differentiated by composition	150	Once a year	MM No. 081/120161-05	Pipe
79	Vanadium and its compounds in terms of vanadium pentoxide, chromium and its compounds in terms of chromium trioxide, mangan and its compounds in terms of mangan dioxide, highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor	5 (total concentration for vanadium and its compounds in terms of vanadium pentoxide, chromium and its compounds in terms of chromium trioxide, mangan and its compounds in terms of mangan dioxide, highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor)	Once a year	Metrologically certified measurement methods	Pipe
156	Chromium and its compounds (in terms of chromium trioxide)	**5.** (total concentration for chromium and	Once a year	Metrologically certified measurement methods	Pipe

	Mangan and its compounds (in terms of mangan dioxide)	its compounds in terms of chromium trioxide, mangan and its compounds in terms of mangan dioxide, highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor			
	Highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor				

Department Head *<u>/signature/</u>* Yu. I. Magdenko
(signature)

AnnexNo. 11

APPROVED
Chief Engineer
of the State Enterprise "Boryspil International Airport"
/Signature/ **S. I. Leibuk**
May 15, 2018
/date/

Round Seal:
For documents
State Enterprise "Boryspil International Airport"
Identification code 20572039

REPORT
on pollutant waste inventory
at the State Enterprise "Boryspil International Airport"
(production site No. 1)
/company name/
(correction)

Position of an executive of the company that performed an inventory count:
Director of EKOTEKHSERVIS LLC _____ V. M. Hurak
/signature/

May 11, 2018
Round Seal:
EKOTEKHSERVIS
Limited Liability Company
Kyiv, Ukraine
Identification code 30300320

Kyiv – 2018

/Signature/
(illegible) */Signature/ (Khrulenko)*
May 11, 2018

List of pollutants emitted into the atmospheric air (exclusive of movable waste generators: waste generators No. 50, 155, 162 – 165, 171 – 173)

No	Name of the substance	Maximum allowable concentration, short-term exposure limit, safe reference levels of impact, mg/m^3	Hazard class	Emission rate of a pollutant, tons per year
1	Vanadium and its compounds expressed as vanadium pentoxide	0.02	1	0.000003
2	Iron and its compounds (expressed as iron)	0.4	3	0.058297
3	Manganese and its compounds expressed as manganese dioxide	0.01	2	0.0028233
4	Sodium hydroxide (sodium hydroxide, caustic soda)	0.01	-	0.010568
5	Mercury and its compounds expressed as mercury	0.003	1	0.000029
6	Lead and its compounds expressed as lead	0.001	1	0.0000008
7	Chromium and its compounds expressed as chromium trioxide	0.002	1	0.000029
8	Nitrogen oxides (nitrogen oxide and dioxide) expressed as nitrogen dioxide	0.2	3	7.3254377
9	Sulfuric acid (H2SO4) [sulfuric acid]	0.3	2	0.108974
10	Silicon dioxide	0.02	-	0.00108
11	Sulfur dioxide (dioxide and trioxide) expressed as sulfur dioxide	0.5	3	0.18614876
12	Carbon monoxide	5.0	4	1.0603269
13	Fluorine and its vaporous and gaseous compounds expressed as hydrogen fluoride	0.02	2	0.000225
14	Easily soluble fluorides (eg. NaF) and their compounds expressed as fluorine	0.03	2	0.0007689
15	Poorly soluble inorganic fluorides (aluminum and calcium fluoride)	0.2	2	0.00048
16	Methane	50.0	-	0.293606
17	2- ~ Methylpropene (isobutylene)	0.1	-	0.00001
18	Xylene	0.2	3	0.058344
19	Styrene	0.04	2	0.01125
20	Toluene	0.6	3	0.039041
21	Butyl alcohol	0.1	3	0.017084
22	Methyl alcohol	1.0	3	0.00143
23	Ethyl alcohol	5.0	4	0.006281
24	Butyl acetate	0.1	4	0.050784
25	Ethyl acetate	0.1	4	0.01359
26	Ethyl ether of ethylene glycol	0.7	-	0.010937
27	Dimethoxymethane (methylal, dimethylformal)	0.05	4	0.001376
28	Acetone	0.35	4	0.002092
29	Acrylonitrile	0.3	2	0.000003
30	Gasoline (petroleum-derived, low sulfur, expressed as carbon)	5.0	4	0.8952425
31	Kerosene	1.2	-	0.1253699372
32	Petroleum oil (spindle oil, engine oil, cylinder oil, etc.)	0.05	-	0.000394
33	Solvent naphtha	0.2	-	0.014156
34	White spirit	1.0	-	0.049834
35	Saturated hydrocarbons C12-C19 (solvent PPK-265 P and others)	1.0	4	0.0853036570161899
36	Substances in the form of suspended solids particles with undifferentiated composition	0.5	-	0.8431894
37	Titanium dioxide	0.5	-	0.000253
38	Asbestos (chrysotile, crocidolite, amosite, anthophyllite,	0.6	1	0.000022

	actinolite, tremolite) in the form of fine dust			
39	Aliphatic hydrocarbons	-	-	0.015657
40	Potassium hydroxide	-	-	0.000036
41	Carbon dioxide	-	-	15909.40073
42	Nitrogen (1) oxide (N2O)	-	-	0.031744
Total enterprise emissions (excluding movable waste generators Nos. 50, 155, 162 – 165, 171 – 173)				**15920.7229508542**
Total enterprise emissions (excluding movable waste generators Nos. 50, 155, 162 – 165, 171 – 173 and carbon dioxide)				**11.3222208542**

Annex 12

DOCUMENTS SUBSTANTIATING THE VOLUMES OF EMISSIONS TO OBTAIN A PERMISSION FOR EMISSION OF POLLUTANTS INTO THE ATMOSPHERE BY STATIONARY SOURCES FOR SE BORYSPIL INTERNATIONAL AIRPORT (Production site No. 1)

(project name)

Director of ECOTECHSERVICE LLC

(title of the organization or institution head — the document designer)

***July 27,* 2018** /signature/ **V. M. Hurak**

(date) (signature) (the person's surname, name and patronymic)

*/stamp: Ukraine * Limited Liability Company * Kyiv* ECOTECHSERVICE Identification code 30300320/*

Seal here

O. D. Malakhova

(full names of persons responsible for preparing the documents and drafters who completed training at extension courses of the Ministry of Environmental Protection and Natural Resources of Ukraine and have respective certificates)

Deputy Chief Director for Engineering and Technical Services and Personnel Development — Director of SE "International Airport Boryspil" Branch

(title of the business entity head)

_____ 2018 /signature/ **O. V. Struk**

(date) (signature) (the person's surname, name and patronymic)

/stamp: illegible/

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KYIV 2018

3.4 List and description of production sites, processes, and process equipment

Auxiliary production facilities for maintenance and repairs of aviation equipment and motor transport, and motor transport parking lots are located at production site No. 1 of SE “International Airport Boryspil”.

The auxiliary production facilities of the enterprise include:

- a repair and construction site (RCS)
- emergency vehicles service (EVS);
- fuel and oil material service (FOMS); FFS No. 1; FFS No. 2, FFS No. 3; laboratories No. 1, 2 of the central fuelling station (CFS);
- chief power engineer service (CPES): heating and production boiler house No. 1 (HPB No. 1); heating and production boiler house No. 2 (HPB No. 2); diesel-generator unit at Terminal D;
- mechanical supervisor staff of the airport (MSSA): ramp mechanization building — OCS No. 1, welding shop; at the cargo terminal — OCS No. 2;
- MAU PJSC (MAU-M-Boryspil): ramp mechanization building — alkaline accumulator units;
- Flight radio and lighting equipment service (FRLES): care and maintenance shops (CMS) — welding station, accumulator unit, diesel-generator units; information technology service — diesel-generator;
- airfield service — storage hangar;
- Terminal F — storm water drainage treatment facilities; temporary parking lots near Boryspil hotel, terminal B, terminal D, terminal F.

3.4.1 Repair and construction site (RCS)

The repair and construction site (RCS) provides ongoing repairs for upkeep of buildings, production facilities, offices.

Manufacturing divisions of RCS related to pollutant emissions to the atmosphere:

- ***carpentry shop*** (manufacturing of products and blanks from timber for the airport own needs) — pollutant emission sources are 6 wood-working machines (thickness planing machine SP6 2K; milling machine FSSH 1K; hybrid machine K40; crosscut saw TsME 3a; surfacing machine SF-4-1K;

band saw PP-Astra); substances in the form of suspended solid particles non-differentiated by composition enter the atmospheric air (**ES No. 1**);

- ***welding shop*** (manual arc welding and gas cutting) — the sources of pollutants formation are 3 welding stations and the site for gas cutting works; iron and its compounds (in terms of iron), mangan and its compounds (in terms of mangan dioxide), nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide, and carbon monoxide enter the atmospheric air **(ES No. 3, 4, 5);**
- ***inert materials storage warehouses:***
- *unsheltered warehouse for rubble with 5–20 fraction* — substances in the form of suspended solid particles non-differentiated by composition enter the atmospheric air (**ES No. 7**);
- *unsheltered warehouse for rubble with 20–40 fraction* — substances in the form of suspended solid particles non-differentiated by composition enter the atmospheric air (**ES No. 8)**;
- *unsheltered warehouse for ravine sand* — substances in the form of suspended solid particles non-differentiated by composition enter the atmospheric air (**ES No. 9**);
- *unsheltered warehouse for chippings* — substances in the form of suspended solid particles non-differentiated by composition enter the atmospheric air (**ES No. 10**);

3.4.2 Emergency vehicles service (EVS)

Emergency vehicles service (EVS) provides special machines and auxiliary mechanisms for the following processes: ground handling of aircrafts, transportation of aviation technical possessions, business cargo, carrying out other works according to the intended use of available special machines, elimination of consequences of emergencies.

Main functions of the EVS:

- planning scope of works and necessary labour and material and technical resources;

- organizing and carrying out correct use, storage and repairs of emergency vehicles and mechanisms in the EVS inventory;

- organizing and controlling safe operation of emergency vehicles and mechanisms, providing timely technical assistance to the maintenance personnel on the line.

Manufacturing divisions of EVS related to pollutant emissions to the atmosphere:

- ***plant shop*** (tool grinding; drilling and chamfering brake pads and clutch plates) — drilling and grinding machines are pollutant formation sources; substances in the form of suspended solid particles non-differentiated by composition and asbestos-containing dust enter the atmospheric air **(ES No. 11);**

- ***fuel shop*** (carburettor repairs and washing parts in kerosene and solvent) — the bath with kerosene and solvent is the pollutant formation source; the following substances enter the atmospheric air: kerosene; butanol; ethanol; butyl acetate; toluene; ethyl cellosolve; acetone **(ES No. 12);**

- ***repairs shop*** (maintenance and current repairs of motor transport) — combustion engines are pollutant formation sources; the following substances enter the atmosphere: carbon monoxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) **(ES No. 13, 14, 15, 186, 187, 188);**

- ***turning shop:***

- *tools grinding; drum boring* — the grinding machine and drum lathe are pollutant formation sources; substances in the form of suspended solid particles non-differentiated by composition enter the atmosphere **(ES No. 16);**

- *washing of engine parts in a kerosene bath* — the kerosene bath is a pollutant formation source; kerosene enters the atmosphere **(ES No. 17);**

- ***motor shop*** (degreasing parts, cold trial of engines) — the degreasing site and combustion engines are pollutant formation sources; the following substances enter the atmosphere: kerosene; mineral petroleum oil; ethanol; dimethoxymethane (methylal, dimethylformal) (ES No. 18);

- ***welding shop;***

- *tools and parts grinding station* — the grinding machine is the pollutant formation source; substances in the form of suspended solid particles non-differentiated by composition enter the atmosphere **(ES No. 19);**

- *manual arc welding* — 2 welding stations are the sources of pollutant formation; iron and its compounds (in terms of iron), mangan and its compounds (in terms of mangan dioxide), nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide, carbon monoxide, chromium and its compounds in terms of chromium trioxide, silicon dioxide, and titanium dioxide enter the atmospheric air **(ES No. 20);**

- *copper shop* (parts soldering) — the soldering station is a pollutant formation source; lead and its compounds in terms of lead enter the atmosphere **(ES No. 23 (V-6));**

- ***curing department:***

- *buffing motor transport rubber bags* — the grinding (buffing) machine is the pollutant formation source; substances in the form of suspended solid particles non-differentiated by composition enter the atmosphere **(ES No. 22);**

- *vulcanization of motor transport rubber bags* — the vulcanizer press is a pollutant formation source; the following substances enter the atmosphere: sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide; carbon monoxide; 2-methylpropene (isobutylene); acrylonitrile; C12–C19 saturated hydrocarbons; petroleum **(ES No. 23 (V-8));**

- ***accumulator unit*** (acid accumulators charging) — accumulator charging stations are pollutant formation sources; sulphuric acid (H2S04) (sulfuric acid) enters the atmosphere **(ES No. 24);**

- ***bus maintenance shop*** (maintenance and current repairs of buses) — combustion engines are pollutant formation sources; the following substances enter the atmosphere: carbon monoxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) **(ES No. 25);**

- ***diagnostics shop*** (combustion engines trials) — combustion engines are pollutant formation sources; the following substances enter the atmosphere: carbon monoxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) **(ES No. 26, 189);**

- ***carpentry shop*** (manufacturing of products and blanks from timber for own needs) — versatile wood-working machine US-2M is the pollutant formation source; substances in the form of suspended solid particles non-differentiated by composition enter the atmosphere **(ES No. 27);**

- ***washing and painting complex:***

- *washing station* (motor transport washing) — combustion engines are pollutant formation sources; the following substances enter the atmosphere: carbon monoxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; C_{12}–C_{19} saturated hydrocarbons **(ES No. 28, 29);**

- *painting station* (motor transport painting) — the spray booth is the pollutant formation source; the following substances enter the atmosphere: xylene; white spirit; butanol; ethanol; butyl acetate; toluene; ethyl cellosolve; acetone; ethyl acetate; solvent oil; aliphatic hydrocarbons; substances in the form of suspended solid particles non-differentiated by composition **(ES No. 30, 31);**

- *spraying station* (heat generators on diesel oil operate to provide for the drying chamber functioning) — 2 heat generators MKF 30/2 are pollutant formation sources; the following substances enter the atmosphere: carbon monoxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide; substances in the form of suspended solid particles non-differentiated by composition; methane; carbon dioxide; nitrogen (1) oxide (N_20) **(ES No. 32, 33);**

- *spray preparation station* (cleaning surfaces from rust and old paint layers; degreasing; surface filling) — the site of surface preparation for painting is the pollutant formation source; the following substances enter the atmosphere: styrene; substances in the form of suspended solid particles non-differentiated by composition **(ES No. 34, 35);**

- *express laboratory* (paints and solvents storage, paints quality control; paints dilution) — the following are pollutant formation sources:

- the cabinet for storing paints and solvents; the following substances enter the atmosphere: xylene; white spirit; butanol; ethanol; butyl acetate; toluene; ethyl cellosolve; acetone; ethyl acetate; solvent oil; aliphatic hydrocarbons **(ES No. 37);**

- machine for diluting paints; the following substances enter the atmosphere: xylene; white spirit; butanol; ethanol; butyl acetate; toluene; ethyl cellosolve; acetone; ethyl acetate; solvent oil; aliphatic hydrocarbons **(ES No. 36, 38);**

- ***stationary heating of emergency vehicles engines*** (heating of emergency vehicles engines on open-air parking lots at ambient temperature lower than 0 °C) — the following are the pollutant formation sources:

- *heat machines* UMP-350 — 2 units (fuel — kerosene); the following substances enter the atmosphere: carbon monoxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide; substances in the form of suspended solid particles non-differentiated by composition; methane; carbon dioxide; nitrogen (1) oxide (N_20) **(ES No. 42, 45);**

- *kerosene containers;* kerosene enters the atmosphere **(ES No. 43, 44, 46, 47);**

- ***car maintenance station (MS) at the ramp*** (current repairs of cars) — combustion engines are pollutant formation sources; the following substances enter the atmosphere: carbon monoxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) **(ES No. 51, 52);**

- ***repairs shop for airfield vehicles and special equipment (old name — airfield service, storage hangar)* —** when a motor vehicle arrives from a job, it is washed, after this the motor transport is sent to the storage site, or, if necessary, to maintenance and current repairs stations;

manufacturing divisions of the repairs shop for airfield vehicles and special equipment related to pollutant emissions to the atmosphere:

- ***mechanical station* —** the *welding station* is the pollutant formation source **(ES No. 156);** the following substances enter the atmosphere: iron and its compounds (in terms of iron); mangan and its compounds (in terms of mangan dioxide); nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; carbon monoxide; chromium and its compounds in terms of chromium trioxide; silicon dioxide; fluor and its vaporous and gaseous compounds in terms of hydrogen fluoride; highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor; slightly soluble inorganic fluorides (aluminium and calcium fluoride); titanium dioxide;

- ***maintenance station*** — two service pits — *exhaust pipe of combustion engine of Boschung Jet broom special machine* is the pollutant formation source **(ES No. 157)** (only one special machine is services at a time); the following substances enter the atmosphere: carbon monoxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon);

- ***washing station*** — Kärcher washing machine is the pollutant formation source; the following substances enter the atmosphere: carbon monoxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide; substances in the form of suspended solid particles non-differentiated by composition; methane; carbon dioxide; nitrogen (1) oxide (N_20) **(ES No. 158);**

3.4.3 Fuel and oil materials service (FOMS)

FFS-1, FFS-2, FFS-3 operate on the premises of SE “International Airport Boryspil” for timely fuelling of motor transport.

Motor transport is filled with petrol, diesel oil, and reactive engine fuel JET A1 (kerosene). The following are the pollutant formation sources:

- *at FFS-1 —– underground reservoirs (RGS-25) with petroleum and diesel oil; dispensing guns;* the following substances enter the atmosphere: petroleum **(ES No. 53–58; 62–64);** C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) **(ES No. 59–61; 65–67);**

- *at FFS-2 —– above-ground checkpoints (ABP-8) with diesel oil and kerosene; dispensing guns;* the following substances enter the atmosphere: C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) **(ES No. 68–73);** kerosene **(ES No. 68–70);** *above-ground modular FFS-30 with diesel oil and reactive engine fuel JET A1 (kerosene); dispensing guns;* the following substances enter the atmosphere: C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) **(ES No. 176, 177);** C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) and kerosene **(ES No. 178–180);**

- *at FFS-3 —– above-ground modular FFS-30 with diesel oil; dispensing guns;* the following substances enter the atmosphere: C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) **(ES No. 181–185);**

- *CFS — exhaust hoods of laboratories of fuel and oil materials No. 1 and of special fluid No. 2* — the following substances enter the atmosphere: kerosene; mineral petroleum oil **(ES No. 94);** ethyl cellosolve, methanol **(ES No. 95);**

- *CFS — general exhaust ventilation from the sites for conducting analysis at laboratories of fuel and oil materials No. 1 and of special fluid No. 2* — potassium hydroxide enters the atmosphere **(ES No. 175).**

3.4.4 Chief power engineer service

The CPES is responsible for heating and technical upkeep of airport facilities, water supply and water drainage, electrical engineering.

Heating and production boiler houses (HPB) No. 1 and 2 are located on the premises of the airport to provide all the airport buildings and facilities with heating and hot water.

The following are the pollutant formation sources at HPB No. 1:

- *boiler units Vitomax-200 and UWM-1000,* operating on natural gas **(ES No. 74);**
- *boiler unit Vitoplex-300 No. 1,* operating on natural gas **(ES No. 75);**
- *boiler unit Vitoplex-300 No. 2,* operating on natural gas **(ES No. 76);**
- *boiler unit HWK-10000,* operating on natural gas **(ES No. 159);**

The following substances enter the atmosphere: mercury and its compounds (in terms of mercury); carbon monoxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; methane; carbon dioxide; nitrogen (1) oxide (N_2O).

The following are the pollutant formation sources at HPB No. 2:

- *boiler units HWK—10000 No. 1, 2 and 3,* operating on natural gas **(ES No. 39, 40, 41)**; the following substances enter the atmosphere: mercury and its compounds (in terms of mercury); carbon monoxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; methane; carbon dioxide; nitrogen (10000) oxide (N_2O);
- *boiler unit HWK—10000 No. 3* can also operate on reserve diesel oil (DO) **(ES No. 41)** ; the following substances enter the atmosphere: carbon monoxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide; substances in the form of suspended solid particles non-differentiated by composition; methane; carbon dioxide; nitrogen (41) oxide (N_2O);
- *underground reservoir* for storage of diesel oil (DO) **(ES No. 48, 49),** C12-C19 saturated hydrocarbons enter the atmosphere.

2 diesel generators (one operating and one reserve) were installed in the premises of the generator unit to provide for uninterrupted power supply to terminal D.

The following are the pollutant formation sources at the generator unit:

- *diesel generators SDMO X2800 No. 1, 2* **(ES No. 166, 167)** ; the following substances enter the atmosphere: carbon monoxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide; substances in the form of suspended solid particles non-differentiated by composition; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon);

- *consumption tanks V = 0.99 ^{m3} – 4 units for diesel oil (DO)* **(ES No. 168)**, C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) enter the atmosphere.

- *underground reservoir for diesel oil (DO) storage* **(ES No. 169, 170)**, C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) enter the atmosphere.

3.4.5 Mechanical supervisor staff of the airport (MSSA)

The mechanical supervisor staff of the airport (MSSA) is responsible for operational upkeep and continuous operation of ramp mechanisation facilities, equipment for servicing passengers, luggage, cargo, hoisting, commercial and process, as well as domestic equipment, air ventilation and conditioning systems of airport facilities, process mechanisation and automation equipment.

Manufacturing divisions of MSSA related to pollutant emissions to the atmosphere:

- ***OCS No. 1*** *–— alkaline and acid accumulator units — and* ***OCS No. 2*** *— acid accumulator units* (current repairs and charging of accumulator batteries) — accumulator charging stations are pollutant formation sources; the following substances enter the atmosphere: sodium hydroxide **(ES No. 77, 82);** sulfuric acid (H2SO4) (sulphuric acid) **(ES No. 78, 81, 83, 84);**

- ***welding shop****–: welding stations and machine for cutting metal profiles* (manual arc welding and gas cutting; cutting metal profiles);

- the *welding station* is the pollutant formation source **(ES No. 79);** the following substances enter the atmosphere: vanadium and its compounds in terms of vanadium pentoxide; iron and its compounds (in terms of iron); mangan and its compounds (in terms of mangan dioxide); nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; carbon oxide; chromium and its compounds in terms of chromium trioxide; silicon dioxide; fluor and its vaporous and gaseous compounds in terms of hydrogen fluoride; highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor; slightly soluble inorganic fluorides (aluminium and calcium fluoride); titanium dioxide

- the *welding station and the machine for cutting metal profiles* are the pollutant formation sources **(ES No. 80);** the following substances enter the atmosphere: iron and its compounds (in terms of iron); mangan and its compounds (in terms of mangan dioxide); nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; carbon oxide; chromium and its compounds in terms of chromium trioxide; silicon dioxide; fluor and its vaporous and gaseous compounds in terms of hydrogen fluoride; highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor; slightly soluble inorganic fluorides (aluminium and calcium fluoride); titanium dioxide; substances in the form of suspended solid particles non-differentiated by composition.

3.4.6 MAU PJSC (MAU-M-Boryspil)

MAU PJSC (MAU-M-Boryspil) performs maintenance of aircrafts (AC) components.

Manufacturing divisions of MAU PJSC (MAU-M-Boryspil) related to pollutant emissions to the atmosphere:

- ***alkaline accumulator units*** (current repairs and charging of accumulator batteries) — accumulator charging stations are pollutant formation sources; the following substances enter the atmosphere: sodium hydroxide **(ES No. 85, 86).**

3.4.7 Flight radio and lighting equipment service (FRLES)

3.4.7.1 Care and maintenance shops (CMS) of FRLES

The flight radio and lighting equipment service (FRLES) is responsible for continuous operation of radio navigation equipment, landing systems and aircraft (AC) flight lighting facilities.

Manufacturing divisions of CMS related to pollutant emissions to the atmosphere:

- ***acid accumulator unit*** (accumulators charging) — *accumulator charging stations* are pollutant formation sources **(ES No. 97)**; sulphuric acid (H2S04) (sulfuric acid) enters the atmosphere;

- ***welding unit*** (welding and metal cutting with an angle grinder) — *the welding station and angle grinder for metal cutting* are pollution formation sources; the following substances enter the atmosphere: iron and its compounds (in terms of iron); mangan and its compounds (in terms of mangan dioxide); silicon dioxide; titanium dioxide; substances in the form of suspended solid particles non-differentiated by composition **(ES No. 96).**

3.4.7.2 FRLES CMS. Diesel generator units

For continuous operation of radio and lighting equipment necessary for aircraft landing, diesel generators are installed on the airport premises.

The following are the pollutant formation sources:

- *diesel generators* operating on diesel oil **(ES No. 101, 104, 107, 110–114, 117, 120, 121, 124–127, 130, 133, 136, 137, 140, 143, 146, 147, 150–153)**; the following substances enter the atmosphere: carbon monoxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide; substances in the form of suspended solid particles non-differentiated by composition; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon);

- *containers for diesel oil (DO) storage (breathing nozzles)* **(ES No. 103, 106, 109, 116, 119, 123, 129, 132, 135, 139, 142, 145, 149)**, C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) enter the atmosphere;

- *containers for DO storage (filler necks)* **(ES No. 102, 105, 108, 115, 118, 122, 128, 131, 134, 138, 141)**, C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) enter the atmosphere.

3.4.7.3 FRLES. Information technology service (ITS).

Diesel generator.

The Information technology service (ITS) is responsible for providing the airport’s activity with communication facilities and computer technology.

A diesel generator is installed for uninterrupted operation of ITS.

The following is the pollutant formation source:

- *diesel generator* operating *o*n diesel oil **(ES No. 154)**; the following substances enter the atmosphere: carbon oxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide; substances in the form of suspended solid particles non-differentiated by composition; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon).

3.4.7.4 TS-1023

- ***welding station*** (manual arc welding) — the following substances enter the atmosphere: iron and its compounds (in terms of iron); mangan and its compounds (in terms of mangan dioxide); silicon dioxide; titanium dioxide **(ES No. 174).**

3.4.8 Terminal F. Local storm water drainage treatment facilities

Treatment facilities with the capacity of 25 l/sec (European type installations OLV) are constructed as a rectangular metal chamber. The equipment is installed in a reinforced concrete chamber, located in the ground and put on a concrete foundation. All metal details of the installation are made of steel grade StZsp, GOST 380–88. The chamber (tank) is tested for air-tightness. The internal surface is moisture-resistant with two layers of cold enamel. The external surface is moisture-resistant and static-insulated with bitumen and polymer material Fibrebit.

Water supply for cleaning and the facilities operation is carried out by gravity-flowing method.

Gravity and sorption removal of contamination on the facilities.

The treatment facilities have three degrees of purification:

Degree 1 –— sand trap (water is cleaned from coarse fraction of suspended substances with hydraulic size 22.4 mm/s; drainage from the sand trap is delivered to the sediment chamber);

Degree 2 –— sediment chamber (sedimentation and surfacing of impurities with hydraulic size up to 0.2 mm/s inclusively, in the thin-layer sedimentation compartment; surfacing impurities are completely absorbed with swimming adhesive oil collectors (adhesive mat));

Degree 3 –— filtration compartment (equipped with a filter cassette filled with a modern sorbent manufactured domestically).

The treatment facilities are equipped with hydraulic seals at compartment connections.

Maintenance includes periodical observation of the filter cassette contamination. Standard filtration cycle of mats of 1 year is further defined in the process of operation for each object. Preventative cleaning of the chamber, thin-layer sedimentation block and filtering cassette is performed once a year.

The treatment facilities are equipped with two deflectors with diameter of 0.2 m **(ES No. 160, 161).**

According to direct instrumental measurements:

- volumetric flow-rate of dust-gas-air mixture of each source is 0.045 m^3/s (under normal conditions);
- pollutant concentrations: hydrocarbons (total); phenol and hydrogen sulphide — lower than LOQ.

Calculation methods for pollutant emissions for storm water drainage treatment facilities from motor transport guest parking are absent.

Taking into consideration the above information and sophistication of modern equipment (local storm water drainage treatment facilities) a conclusion can be made that pollutant emissions into the atmosphere at **ES No. 160, 161** are absent.

3.4.9 Temporary parking lots

3.4.9.1 Temporary parking lot No. 1 — landside area of terminal B

Temporary guest parking at the landside area of terminal B is designed for 490 parking slots for light motor vehicles (maximum parking load per day is 40 % (196 cars, including 80 % carburettor cars and 20 % diesel cars)) and 9 platforms for buses (maximum load – 7).

Motor transport combustion engines are pollutant formation sources **(ES No. 50)**; the following substances enter the atmosphere: carbon oxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon).

3.4.9.2 Car parking near Boryspil hotel

The temporary guest parking near Boryspil hotel is designed for 15 parking slots. The maximum parking load per day is 100 % (including 80 % carburettor cars and 20 % diesel cars).

Motor transport combustion engines are pollutant formation sources **(ES No. 155)**; the following substances enter the atmosphere: carbon oxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon).

3.4.9.3 Temporary guest parking at the landside area at terminal F

The temporary quest parking at the landside area at terminal F is designed for 371 parking slots. The maximum parking load per day is 40 % (148 cars, including 118 carburettor cars and 30 diesel cars).

Motor transport combustion engines are pollutant formation sources; the following substances enter the atmosphere: carbon oxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) **(ES No. 162)**.

3.4.9.4 Staff parking near the administrative building

The staff parking near the administrative building is designed for 500 parking slots. The maximum parking load per day is 40 % (200 cars, including 160 carburettor cars and 40 diesel cars).

Motor transport combustion engines are pollutant formation sources; the following substances enter the atmosphere: carbon oxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) **(ES No. 163)**.

3.4.9.5 Temporary parking No. 3

Temporary parking No. 3 is designed for 141 parking slots. The maximum parking load per day is 40 % (56 cars, including 45 carburettor cars and 11 diesel cars).

Motor transport combustion engines are pollutant formation sources; the following substances enter the atmosphere: carbon oxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) **(ES No. 164)**.

3.4.9.6 Temporary parking No. 2

Temporary parking No. 2 is designed for 200 parking slots for light vehicles and 4 slots for buses. The maximum parking lot load per day is– 40 % (80 cars, including 64 carburettor cars and 16 diesel cars; 2 buses).

Motor transport combustion engines are pollutant formation sources; the following substances enter the atmosphere: carbon oxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) **(ES No. 165)**.

3.4.9.7 D2 parking for staff motor transport near terminal D

D2 parking is designed for 184 parking slots for light motor vehicles. The maximum parking load per day is 100 % (80 % cars operating on petroleum, 10 % — on diesel oil, 10 % — on liquified gas).

Motor transport combustion engines are pollutant formation sources; the following substances enter the atmosphere: carbon oxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) **(ES No. 171)**.

3.4.9.8 D3 parking for cars on the premises of SE “International Airport Boryspil”

D3 parking is designed for 195 parking slots for light motor vehicles. The maximum parking load per day is 100 % (80 % cars operating on petroleum, 10 % — on diesel oil, 10 % — on liquified gas).

Motor transport combustion engines are pollutant formation sources; the following substances enter the atmosphere: carbon oxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) **(ES No. 172)**.

3.4.9.9 Parking lot D1 for short stays of vehicles

D1 parking is designed for 46 parking slots for light motor vehicles and buses.

Motor transport combustion engines are pollutant formation sources; the following substances enter the atmosphere: carbon oxide; nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide; C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon) **(ES No. 173)**.

3.5 Description and location of production and technical equipment where the best available technology and management methods are implemented

According to the annex to Instruction on general requirements for execution of documents substantiating emission volumes for obtaining a permission for pollutant emissions to the atmosphere from stationary sources for enterprises, institutions, organizations and citizens-entrepreneurs, the manufacturing processes (equipment) of SE “International Airport Boryspil” (manufacturing site No. 1) is absent from the list of production facilities and technical equipment subject to implementation of the best available technology and management methods.

8 Information on the atmospheric pollution

Background concentration of pollutants in the atmosphere in the territory influenced by the object; average annual pollutant concentrations for the last year; and maximum one-time pollutant concentration for the last year are given in **table 8.1 (5.3 per instruction).**

Information concerning average annual concentrations and maximum one-time concentration of pollutants for SE "International Airport Boryspil" is provided by the Department of Ecology and Natural Resources of Kyiv Regional State Administration.

Photocopies of the above documents with an official seal are given in Annex 2.

Data on the atmosphere pollution level

Table 8.1 (5.3 per instruction)

No.	Pollutant		Atmospheric air quality standards (mg/m3)	Hygienic norms		Background concentration (mg/m3)	Average annual concentration (mg/m3)	Maximum one-time concentrations (mg/m3)
	code	name		MPC, mg/m3	SRLI (mg/m3)			
1	2	3	4	5	6	7	8	9
1	01002110	Vanadium and its compounds (in terms of vanadium pentoxide)	–	0.002		–	–	–
2	01003123	Iron and its compounds (in terms of iron)	–	0.040	–	–	–	–
3	01104143	Mangan and its compounds (in terms of mangan dioxide)	–	0.010	–	0.004	–	–
4	150	Sodium hydroxide (lye, caustic soda)	–	–	0.01	0.004	–	–
5	01007183	Mercury and its compounds (in terms of mercury)	–	0.0003	–	–	–	–
6	01009184	Lead and its compounds (in terms of lead)	–	0.001	–	–	–	–
7	01010203	Chromium and its compounds (in terms of chromium trioxide)	–	0.002	–	0.0006	–	–
8	04001301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	–	0.2	–	0.008	–	–
9	05004322	Sulfuric acid (H2504) (sulphuric acid)	–	0.3	–	–		–

1	2	3	4	5	6	7	8	9
10	323	Silicon dioxide	–	–	0.02	0.008	–	–
11	05001330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	–	0.5	–	0.2	–	–
12	06000337	Carbon oxide	–	5.0	–	0.4	–	
13	16001342	Fluor and its vaporous and gaseous compounds in terms of hydrogen fluoride	–	0.02	–	–	–	–
14	16000343	Highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor	–	0.03	–	0.012	–	–
15	16000344	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	–	0.2	–	–	–	–
16	12000410	Methane	–	–	50	–	–	–
17	11000514	2-Methylpropene (isobutylene)	–	–	0.1	–	–	–
18	11030616	Xylene	–	0.2	–	0.08	–	–
19	11037620	Styrene	–	0.04	–	0.016	–	–
20	11041621	Toluenes	–	0.6	–	0.24	–	–
21	1100010 42	Butanol	–	0.1	–	0.04	–	–
22	1103610 52	Methanol	–	1.0	–	–	–	–
23	1100010 61	Ethanol	–	5.0	–	–	–	–
24	1100912 10	Butyl acetate	–	0.1	–	0.04	–	–
25	1102112 40	Ethyl acetate	–	0.1	–	0.04	–	–
26	1102012 46	Ethylene glycol ethyl ether	–	–	0.7	0.28	–	–
27	1100013 19	Dimethoxymethane (methylal, dimethylformal)	–	0.05	–	–	–	–
28	1100714 01	Acetone	–	0.35	–	0.14	–	–
29	1100120 01	Acrylonitrile	–	0.03	–	–	–	–
30	1100027 04	Gasoline (petroleum, low-sulphur, in terms of carbon)	–	5.0	–	–	–	–
31	1100027 32	Kerosene	–	–	1.2	0.48	–	–
32	1100027 35	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	–	–	0.05	–	–	–
33	1100027 50	Solvent oil	–	–	0.2	–	–	–

1	2	3	4	5	6	7	8	9
34	110002752	White spirit	–	–	1.0	0.4	–	–
35	110002754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	1.0	–	0.4	–	–
36	030002902	Substances in the form of suspended solid particles non-differentiated by composition	–	0.5	–	0.05	–	–
37	10226	Titanium dioxide	–	–	0.5	–	–	–
38	0300310368	Asbestos (chrysotile, crocidolite, amosite, anthophyllite, actinolite, tremolite) as fine dust	–	0.06	–	–	–	–
39	10442	Potassium hydroxide	–	–	–	–	–	–
40	1100010411	Aliphatic hydrocarbons	–	–	–	–	–	–
41	0700011812	Carbon dioxide	–	–	–	–	–	–
42	0400211815	Nitrogen (I) oxide (N_20)	–	–	–	–	–	–

9 Information on the type and volume of pollutants emission into the atmosphere from stationary sources

The information on the types and volumes of pollutant emissions to the atmosphere from stationary sources includes data prepared based on the report on inventory of pollutant emissions at (production site No. 1).

In the result of the works for adjustment of inventory of pollutant emissions to the atmosphere from stationary sources at production site No. 1 of SE “International Airport Boryspil” quantitative and qualitative composition of pollutant emissions to the atmosphere was determined, and it was also established that:

- **42** titles of pollutants emitted from organized and fugitive pollutant sources are emitted into the air;
- **176** pollutant emission sources to the atmosphere are present at the enterprise, 120 of which are organized, and 56 of which are fugitive (including 9 open-air parkings for mobile sources — ES No. 50, 155, 162–165, 171, 172, 173).

Total emission rate for the enterprise constitutes:

- 22.73701582 g/sec
- 15,931.4276589542 tons/year
- **15,920.7229508542** tons/year — without open-air parkings for mobile sources ES No. 50, 155, 162–165, 171, 172, 173;
- **11.3222208542** tons/year — without open-air parkings for mobile sources ES No. 50, 155, 162–165, 171, 172, 173 and carbon dioxide.

9.1 List of most common and hazardous pollutants subject to air emission regulations

In accordance with the List of the most common and hazardous pollutants, emissions of which into the air are subject to regulation, approved by the Resolution of the Cabinet of Ministers of Ukraine dated 29 November 2001 No. 1598, and the List of pollutants and threshold limit values of potential emissions, according to which state registration is carried out (on the procedure and criteria for state registration of facilities that have or may have a harmful effect on human health and the state of air, types and volumes of pollutants emitted into the air approved by order of the Ministry of Natural Resources of Ukraine dated 10 May 2002 No. 177 and registered with the Ministry of Justice of Ukraine on 22 May 2002 under No. 445/6733), the following is provided:

list of the most common pollutants, emissions of which are subject to regulation and which are accounted by the state, and volumes thereof;

list of hazardous pollutants, emissions of which are subject to regulation and which are accounted by the state, and volumes thereof;

list of other pollutants emitted into the air by stationary emission sources of the object, and volumes thereof;

list of pollutants for which no MPC (SRLI) in the atmosphere in populated areas is set, and volumes thereof.

The information is given in **table 9.1 (6.1 per instruction).**

List of types and volumes of pollutants emitted into the air by stationary emission sources

Table 9.1 (6.1 per instruction)

No.	Pollutant		Actual emissions (tons/year) for 2017	Potential emissions (tons/year)	Threshold values of potential emissions for state registration, (tons/year)
	code	name			
1	2		4	5	6
1	150	Sodium hydroxide (lye, caustic soda)	0.011	0.010568	–
2	323	Silicon dioxide	0.001	0.00108	–
3	10226	Titanium dioxide	0.000	0.000253	–
4	10442	Potassium hydroxide	–*	0.000036	–
5	06000337	Carbon oxide	1.098	1.0603269	1.500
6	0700011812	Carbon dioxide	1126.471	15,909.40073	500.000
7	12000410	Methane	0.022	0.293606	10.000
	01000	Metals and their compounds, including:	0.065	0.0611821	
8	01002110	Vanadium and its compounds (in terms of vanadium pentoxide)	0.000	0.000003	0.020
9	01003123	Iron and its compounds (in terms of iron)	0.062	0.058297	0.100
10	01007183	Mercury and its compounds (in terms of mercury)	0.000	0.000029	0.0003
11	01009184	Lead and its compounds (in terms of lead)	–*	0.0000008	0.003
12	01010203	Chromium and its compounds (in terms of chromium trioxide)	0.000	0.000029	0.020
13	01104143	Mangan and its compounds (in terms of mangan dioxide)	0.003	0.0028233	0.005
	03000	Substances in the form of suspended solid particles, including:	0.968	0.8432114	3.000
14	03000290 2	Substances in the form of suspended solid particles (microparticles, fibres)	0.968	0.8431894	3.000
15	0300310368	Asbestos	0.000	0.000022	0.001
	04000	Nitrogen compounds	1.615	7.3571817	
16	04001301	Nitrogen oxides (in terms of nitrogen dioxide (NO + NO_2))	1.609	7.3254377	1.000
17	0400211815	Nitrogen (I) oxide (N_20)	0.006	0.031744	0.100
	05000	Sulphur dioxide and other compounds, including:	0.295	0.29512276	2.000
18	05001330	Sulphur dioxide	0.186	0.18614876	1.500
19	05001322	Sulfuric acid (H2S04) (sulphuric acid)	0.109	0.108974	0.500
	11000	Non-methane volatile organic compounds, including:	1.719	1.39817909421619	1.500

No.	Pollutant		Actual emissions (tons/year) for 2017	Potential emissions (tons/year)	Threshold values of potential emissions for state registration, (tons/year)
	code	name			
1	2	3	4	5	6
20	11000514	2-Methylpropene (isobutylene)	0.000	0.00001	–
21	110001042	Butanol	0.112	0.017084	–
22	110001061	Ethanol	0.173	0.006281	–
23	110001319	Dimethoxymethane (methylal, dimethylformal)	0.001	0.001376	–
24	110002704	Gasoline (petroleum, low-sulphur, in terms of carbon)	0.223	0.8952425	–
25	110002732	Kerosene	0.021	0.1253699372	–
26	110002735	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	0.000	0.000394	–
27	110002750	Solvent oil	0.014	0.014156	–
28	110002752	White spirit	0.531	0.049834	–
29	110002754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	0.080	0.08530365701619	–
30	110001041 1	Aliphatic hydrocarbons	0.015	0.015657	–
31	110012001	Acrylonitrile	0.000	0.000003	0.003
32	110071401	Acetone	0.046	0.002092	0.500
33	110091210	Butyl acetate	0.086	0.050784	0.300
34	110201246	Ethyl cellosolve	0.086	0.010937	1.000
35	110211240	Ethyl acetate	0.062	0.01359	1.000
36	1103061 6	Xylene	0.153	0.058344	0.900
37	110361052	Methanol	0.002	0.00143	0.900
38	1103762 0	Styrene	0.038	0.01125	0.050
39	11041621	Toluene	0.076	0.039041	0.900
	16000	Fluor and its compounds (in terms of fluor), including:	0.001	0.0014739	0.050
40	1600034 3	Highly soluble inorganic fluorides (fluoride and sodium fluorosilicate)	0.001	0.0007689	0.050
41	1600034 4	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	0.000	0.00048	0.050
42	1600134 2	Fluorides, gaseous compounds (hydrogen fluoride, silicon tetrafluoride)	0.000	0.000225	0.050

No.	Pollutant		Actual emissions (tons/year) for 2017	Potential emissions (tons/year)	Threshold values of potential emissions for state registration, (tons/year)
	code	name			
1	2	3	4	5	6
Total for enterprise			1132.266	15,920.7229508542	
The most common pollutants					
1	2	3	4	5	6
1	06000337	Carbon oxide	1.098	1.0603269	1.500
	01000	Metals and their compounds, including:	0.000	0.0000008	
2	01009184	Lead and its compounds (in terms of lead)	**–***	0.0000008	0.003
	03000	Substances in the form of suspended solid particles, including:	0.968	0.8432114	3.000
3	03000292	Substances in the form of suspended solid particles (microparticles, fibres)	0.968	0.8431894	3.000
4	0300310368	Asbestos	0.000	0.000022	0.001
	04000	Nitrogen compounds	1.609	7.3254377	
5	04001301	Nitrogen oxides (in terms of nitrogen dioxide ($NO + NO_2$))	1.609	7.3254377	1.000
	05000	Sulphur dioxide and other compounds, including:	0.295	0.29512276	2.000
6	05001330	Sulphur dioxide	0.186	0.18614876	1.500
7	05004322	Sulfuric acid (H2504) (sulphuric acid)	0.109	0.108974	0.500
		Total	3.970	9.52409956	
Hazardous pollutants					
1	2	3	4	5	6
	01000	Metals and their compounds, including:	0.065	0.0611813	
1	01002110	Vanadium and its compounds (in terms of vanadium pentoxide)	0.000	0.000003	0.020
2	01003123	Iron and its compounds (in terms of iron)	0.062	0.058297	0.100
3	01007183	Mercury and its compounds (in terms of mercury)	0.000	0.000029	0.0003
4	01010203	Chromium and its compounds (in terms of chromium trioxide)	0.000	0.000029	0.020
5	01104143	Mangan and its compounds (in terms of mangan dioxide)	0.003	0.0028233	0.005
	11000	Non-methane volatile organic compounds, including:	0.549	0.187471	1.500
6	11001200 1	Acrylonitrile	0.000	0.000003	0.003
7	11007140 1	Acetone	0.046	0.002092	0.500
8	11009121 0	Butyl acetate	0.086	0.050784	0.300
9	11020124 6	Ethyl cellosolve	0.086	0.010937	1.000
10	11021124 0	Ethyl acetate	0.062	0.01359	1.000
11	11030616	Xylene	0.153	0.058344	0.900

No.	Pollutant		Actual emissions (tons/year) for 2017	Potential emissions (tons/year)	Threshold values of potential emissions for state registration, (tons/year)
	code	name			
1	2	3	4	5	6
12	1103610 52	Methanol	0.002	0.00143	0.900
13	1103762 0	Styrene	0.038	0.01125	0.050
14	1104162 1	Toluene	0.076	0.039041	0.900
	16000	Fluor and its compounds (in terms of fluor), including:	0.001	0.0014739	0.050
15	1600034 3	Highly soluble inorganic fluorides (fluoride and sodium fluorosilicate)	0.001	0.0007689	0.050
16	1600034 4	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	0.000	0.00048	0.050
17	1600134 2	Fluorides, gaseous compounds (hydrogen fluoride, silicon tetrafluoride)	0.000	0.000225	0.050
		Total	**0.615**	**0.2501262**	
Other pollutants present in facility emissions					
1	2	3	4	5	6
1	150	Sodium hydroxide (lye, caustic soda)	0.011	0.010568	–
2	323	Silicon dioxide	0.001	0.00108	–
3	10226	Titanium dioxide	0.000	0.000253	–
6	1200041 0	Methane	0.022	0.293606	10.000
	11000	Non-methane volatile organic compounds, including:	1.155	1.19505109421619	1.500
8	1100051 4	2-Methylpropene (isobutylene)	0.000	0.00001	–
9	11000 1042	Butanol	0.112	0.017084	–
10	1100010 61	Ethanol	0.173	0.006281	–
11	1100013 19	Dimethoxymethane (methylal, dimethylformal)	0.001	0.001376	–
12	1100027 04	Gasoline (petroleum, low-sulphur, in terms of carbon)	0.223	0.8952425	–
13	1100027 32	Kerosene	0.021	0.1253699372	–
14	1100027 35	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	0.000	0.000394	–
15	1100027 50	Solvent oil	0.014	0.014156	–
16	11000 2752	White spirit	0.531	0.049834	–
17	1100027 54	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	0.080	0.08530365701619	–

No.	Pollutant		Actual emissions (tons/year) for 2017	Potential emissions (tons/year)	Threshold values of potential emissions for state registration, (tons/year)
	code	name			
1	2	3	4	5	6
		Total	**1.189**	**1.50055809421619**	
Pollutants for which no MPC (SRLI) in the atmosphere in populated areas is set					
1	2	3	4	5	6
1	10442	Potassium hydroxide	**–***	0.000036	–
2	7000	Carbon dioxide	1126.471	15,909.40073	500.000
	04000	Nitrogen compounds	0.006	0.031744	
3	4002	Nitrogen (1) oxide (N_20)	0.006	0.031744	0.100
	11000	Non-methane volatile organic compounds, including:	0.015	0.015657	1.500
4	1100010411	Aliphatic hydrocarbons	0.015	0.015657	1.500
		Total	**1126.492**	**15909.448167**	

Note. * Information from statistical form 2-TP AIR is not provided in the report.

9.2 Characteristics of pollutant emission sources

Characteristics of the sources of pollutants emission to the atmosphere are given in **table 9.2 (6.2 per instruction)**; characteristics of emissions of pollutants to the atmosphere led away from certain equipment and facilities types and to the atmosphere at the emission source are given in **table 9.3 (6.3 per instruction).**

At the moment 12 dust-and-gas cleaning stations are operated at manufacturing site No. 1 of SE "International Airport Boryspil"

ES No. 1 — aspiration system from 6 wood-working machines of the wood-working shop of RBD for capturing substances in the form of suspended solid particles non-differentiated by composition — cyclone dust collector from Hiprodrevprom Ts-1050 (registration No. 51/1293 dated November 1, 2002);

ES No. 11 — aspiration system from drilling and grinding machines of the plant shop of EVS for capturing substances in the form of suspended solid particles non-differentiated by composition and asbestos (chrysotile, crocidolite, amosite, anthophyllite, actinolite, tremolite) as fine dust — dust collector IRP-1.0 (registration No. 49 dated December 1, 2010);

ES No. 16 — aspiration system from the grinding machine and drum lathe of the turning shop of the EVS for capturing substances in the form of suspended solid particles non-differentiated by composition — dust collector IRP-1.5 (registration No. 1577 dated January 30, 2004);

ES No. 19 — aspiration system from the grinding machine of the welding shop of the EVS for capturing substances in the form of suspended solid particles non-differentiated by composition — dust collector IRP-1.5 (registration No. 50 dated December 1, 2010);

ES No. 22 (V-5) — aspiration system from the grinding (buffing) machine of the curing department of the EVS for capturing substances in the form of suspended solid particles non-differentiated by composition —cyclone dust collector TsP-1000; unit efficiency = 82.89 % (based on direct measurements) (gas cleaning plant passport available);

ES No. 27 — aspiration system from the wood-working machine of the wood-working shop of EVS for capturing substances in the form of suspended solid particles non-differentiated by composition — cyclone dust collector RISI No. 5 (registration No. 1331 dated November 1, 2002);

ES No. 30 — aspiration system from the spray booth of the spraying station of the EVS for capturing substances in the form of suspended solid particles non-differentiated by composition and solvents — stage 1 — fibre filters (Italy); stage 2 — fibre filter + filters made of activated charcoal (registration number No. 1394/1 dated March 31, 2003);

ES No. 31 — aspiration system from the spray booth of the spraying station of the EVS for capturing substances in the form of suspended solid particles non-differentiated by composition and solvents — stage 1 — fibre filters (Italy); stage 2 — fibre filter + filters made of activated charcoal (registration number No. 1395/2 dated March 31, 2003);

ES No. 34 — aspiration system from the spray preparation station of the EVS for capturing substances in the form of suspended solid particles non-differentiated by composition and solvents — stage 1 — fibre filters (Italy); stage 2 — fibre filter + filters made of activated charcoal (registration number No. 1396/3 dated March 31, 2003);

ES No. 35 — aspiration system from the spray preparation station of the EVS for capturing substances in the form of suspended solid particles non-differentiated by composition and solvents — stage 1 — fibre filters (Italy); stage 2– — fibre filter + filters made of activated charcoal (registration number No. 1397/4 dated March 31, 2003).

Parameters of the sources equipped with dust-and-gas cleaning plants and other data about the gas cleaning stations are given in **table 9.4 (6.4 per instruction).**

Table 9.5 (6.5 per instruction) (characteristics of bulk emission sources) was not completed due to absence of bulk emissions).

Characteristics of fugitive emissions are given in **table 9.6 (6.6 per instruction).**

Characteristics of emission parameters is given per year under real operation conditions at the enterprise.

Characteristics of the sources of pollutant emissions into the atmosphere and their parameters

Table 9.2 (6.2 per instruction)

Manufacturing, process, installation, equipment	Emission source number	Emission source name	Emission source parameters		Source coordinates at the index map				Sampling site	Gas-and-dust flow parameters at the measuring point			Pollutant code	Pollutant name	Maximum mass concentration of the pollutant, mg/m^3	Emission rate		
					Point or start of a line source; centre of symmetry of a planar source		Other end of a line source; width and length of a planar source			consumption, m^3/s	rate, m/s	temperature, °C				g/sec	kg/h	t/year
			height, m	exhaust outlet diameter, m	X_1, m	Y_1, m	X_2, m	Y_2, m										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
210617. Other (including manufacture of fibrous asbestos); RCS, carpentry shop, wood-working machines — 6 units	1	pipe	10	0.63	1669	7423	–	–	After gas cleaning plant	1.9	6, 10	15	030002902	Substances in the form of suspended solid particles non-differentiated by composition	21.3	0.040	0.144	0.02073
RCS, power-saw bench	2	Suspended																
130326. Metal welding; RCS, welding shop, welding station	3	pipe	8	0.25	1696	7395	–	–	in the pipe	0.557	11.35	17	06000337	Carbon oxide	Lower than LOQ	0.000666	0.0023976	0.00012
													01003123	Iron and its compounds (in terms of iron)	3.6	0.00201	0,007236	0.000607
													01104143	Mangan and its compounds (in terms of mangan dioxide)	0.265	0.000148	0.0005328	0.000053
													04001301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	Lower than LOQ	0.007334	0.0264024	0.001523

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
130326. Metal welding; RCS, welding shop, welding station — 2 units	4	pipe	7.3	0.25	1704	7392	–		in the pipe	0.671	13.67	17	01003123	Iron and its compounds (in terms of iron)	2.05	0.00138	0.004968	0.000433
													01104143	Mangan and its compounds (in terms of mangan dioxide)	0.200	0.000134	0.0004824	0.000047
130326. Metal welding; RCS, welding shop, welding station — 3 units	5	pipe	7.4	0.2	1704	7389	–	–	in the pipe	0.218	6.94	17	06000337	Carbon oxide	Lower than LOQ	0.000167	0.0006012	0.00003
													01003123	Iron and its compounds (in terms of iron)	1.850	0.0004	0.00144	0.00026
													01104143	Mangan and its compounds (in terms of mangan dioxide)	0.170	0.000037	0.0001332	0.000026
													04001301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	Lower than LOQ	0.001833	0.0065988	0.000381
RCS, cement mixture room	6	Suspended																
210616. Mineral ore mining; RCS; warehouse of rubble with 5–20 fraction	7	fugitive	2	0.5	1726	7455	–	–	–	0.294	1.5	27.8	03000290 2	Substances in the form of suspended solid particles non-differentiated by composition	–	0.03798	0.136728	0.12649
210616. Mineral ore mining; RCS; warehouse of rubble with 20–40 fraction	8	fugitive	2	0.5	1726	7442	–	–	–	0.294	1.5	27.8	03000290 2	Substances in the form of suspended solid particles non-differentiated by composition	–	0.03165	0.11394	0.10521
210616. Mineral ore mining; RCS; warehouse of sand	9	fugitive	2	0.5	1708	7448	–	–	–	0.294	1.5	27.8	03000290 2	Substances in the form of suspended solid particles non-differentiated by composition	–	0.09207	0.331452	0.22639
20616. Mineral ore mining; RCS; warehouse of chippings	10	fugitive	2	0.5	1725	7434	–	–	–	0.294	1.5	27.8	03000290 2	Substances in the form of suspended solid particles non-differentiated by composition	–	0.04199	0.151164	0.07367

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
210620. Mechanical engineering (mechanical metal-working); EVS, plant shop; grinding machine, drilling machine	11	pipe	8	0.11 × 0.14	1595	7445	–	–	After gas cleaning plant	0.159	10.32	17	030002 902	Substances in the form of suspended solid particles non-differentiated by composition	13.9	0.00221	0.007956	0.000034
													030001 0368	Asbestos (chrysotile, crocidolite, amosite, anthophyllite, actinolite, tremolite) as fine dust	0.84	0.000134	0.0004824	0.000022
410201. Metal degreasing; EVS, fuel shop; bath — 2 units	12	pipe	10	0.15	1581	7420	–	–	in the pipe	0.552	31.24	20	110001 042	Butanol	22.3	0.0123	0.04428	0.001305
													11000 1061	Ethanol	14.6	0.0081	0.02916	0.001958
													110002 732	Kerosene	63.0	0.0348	0.12528	0.020256
													110071 401	Acetone	6.54	0.00361	0.012996	0.000914
													110091 210	Butyl acetate	15.1	0.0083	0.02988	0.001305
													110201 246	Ethylene glycol ethyl ether	9.4	0.0052	0.01872	0.001044
													110416 21	Toluene	34.1	0.0188	0.06768	0.006525
310503. Service stations (including car fuelling); EVS, repairs shop; combustion engine — 1 unit	13	pipe	8	0.2	1580	7430	–	–	in the pipe	0.103	3.58	18	060003 37	Carbon oxide	630	0.065	0.234	0.000237
													040013 01	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	41.5	0.00427	0.015372	0.000002
													110002 754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.00034	0.001224	0.0000004

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310503. Service stations (including car fuelling); EVS, repairs shop; combustion engine — 1 unit	14	pipe	8	0.2	1580	7436	–	–	in the pipe	0.101	3.49	18	0600003 37	Carbon oxide	630	0.064	0.2304	0.000237
													0400131 01	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	43.5	0.00439	0.015804	0.000002
													1100027 54	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.00034	0.001224	0.0000004
310503. Service stations (including car fuelling); EVS, repairs shop; combustion engine — 4 units	15	pipe	8	0.35	1558	7438	–	–	in the pipe	0.427	3.72	18	0600003 37	Carbon oxide	440	0.188	0.6768	0.001123
													0400131 01	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	43.1	0.0184	0.06624	0.000029
													1100027 54	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000544	0.0019584	0.0000042
210620. Mechanical engineering (mechanical metal-working); EVS, turning shop; grinding machine, drum lathe	16	pipe	9	0.31	1575	7447	–	–	After gas cleaning plant	0.201	2.66	19	0300029 02	Substances in the form of suspended solid particles non-differentiated by composition	16.5	0.00332	0.011952	0.00082
430201. Metal degreasing; EVS, turning shop; bath	17	pipe	8	0.15	1581	7456	–	–	in the pipe	0.568	32.14	19	1100027 32	Kerosene	230	0.131	0.4716	0.00844

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
410102. Car repairs (new activity definition); EVS, motor shop; combustion engine, parts degreasing site	18	pipe	10	0.5	1568	7439	–	–	in the pipe	0.877	4.88	18	11000 2735	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	0.342	0.0003	0.00108	0.000011
													110001 061	Ethanol	Lower than LOQ	0.000956	0.0034416	0.001376
													110001 319	Dimethoxymethane (methylal, dimethylformal)	–	0.000956	0.0034416	0.001376
													110002 732	Kerosene	Lower than LOQ	0.00446	0.016056	0.006423
210620. Mechanical engineering (mechanical metal-working); EVS, welding shop; grinding machine	19	pipe	9.5	0.1	1569	7451	–	–	After gas cleaning plant	0.186	23.68	17	030002 902	Substances in the form of suspended solid particles non-differentiated by composition	14.5	0.0027	0.00972	0.000513
130326. Metal welding; EVS, welding shop, welding station — 2 units	20	pipe	9.2	0.4	1534	7443	–	–	in the pipe	0.779	7	18	– 323	Silicon dioxide	–	0.000472	0.0016992	0.000053
													– 10226	Titanium dioxide	–	0.000131	0.0004716	0.000015
													060003 37	Carbon oxide	Lower than LOQ	0.000411	0.0014796	0.000293
													010031 23	Iron and its compounds (in terms of iron)	1.96	0.00153	0.005508	0.000937
													010102 03	Chromium and its compounds (in terms of chromium trioxide)	Lower than LOQ	0.000003	0.0000108	0.000002
													011041 43	Mangan and its compounds (in terms of mangan dioxide)	0.64	0.0005	0.0018	0.0000993
													040013 01	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	Lower than LOQ	0.009167	0.0330012	0.0001614

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
130326. Metal welding; EVS, copper shop; soldering station	21	After the reconstruction ventilation system V-6 at ES No. 21, soldering station, was joined with ventilation system V-8 (the ES new number is 23)																
410305. Raw rubber processing; EVS, curing department; grinding machine	22	pipe	10	0.315	1561	7442	–	–	in the pipe	0.217	3.09	18	030002 902	Substances in the form of suspended solid particles non-differentiated by composition	41	0.0089	0.03204	0.00320
130326. Metal welding; EVS, copper shop; soldering station	23	pipe	10	0.5	1558	7442	–	–	in the pipe	0.794	4.41	18	010091 84	Lead and its compounds (in terms of lead)	Lower than LOQ	0.000006	0.0000216	0.0000008
410305. Raw rubber processing; EVS, curing department; electric vulcanizer													060003 37	Carbon oxide	Lower than LOQ	0.0000003	0.00000108	0.0000004
													050013 30	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	Lower than LOQ	0.0000002	0.00000072	0.0000003
													110005 14	2-Methylpropene (isobutylene)	–	0.000007	0.0000252	0.00001
													110002 704	Gasoline (petroleum, low-sulphur, in terms of carbon)	49.2	0.0214	0.07704	0.03075
													110002 754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000016	0.0000576	0.000023
													110012 001	Acrylonitrile	Lower than LOQ	0.000002	0.0000072	0.000003
310503. Service stations (including car refuelling); EVS, accumulator shop; accumulator charging station — 8 units	24	pipe	10	0.315	1550	7437	–	–	in the pipe	0.211	2.94	18	050043 22	Sulfuric acid (H2S04) (sulphuric acid)	Lower than LOQ	0.000378	0.0013608	0.000843

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310503. Service stations (including car fuelling); EVS, bus maintenance shop; combustion engine — 2 units	25	pipe	10	0.32	1548	7438	–	–	in the pipe	0.346	4.30	21	06000 337	Carbon oxide	12.5	0.00433	0.015588	0.001032
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	9.6	0.00332	0.011952	0.000737
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000478	0.0017208	0.000103
310503. Service stations (including car fuelling); EVS, diagnostics shop; combustion engine	26	pipe	1.5	0.14	1535	7451	–	–	in the pipe	0.101	7.24	20	06000 337	Carbon oxide	630	0.064	0.2304	0.002089
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	42.4	0.00428	0.015408	0.000013
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.00034	0.001224	0.0000018
210617. Other (including manufacture of fibrous asbestos); EVS, carpentry shop, wood-working machine US-2M	27	pipe	6.3	0.19	1535	7433	–	–	After gas cleaning plant	0.526	18.55	17	03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	20.2	0.0106	0.03816	0.00336
310503. Service stations (including car fuelling); EVS, CW and P, wash station; combustion engine — 2 units	28	pipe	8.7	1.2	1517	7425	–	–	in the pipe	4.92	4.35	19	06000 337	Carbon oxide	Lower than LOQ	0.037684	0.1356624	0.018454
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	Lower than LOQ	0.001256	0.0045216	0.004124
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000176	0.0006336	0.000577

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310503. Service stations (including car fuelling); EVS, CW and P, wash station; combustion engine — 2 units	29	pipe	7.5	0.82	1519	7434	–	–	in the pipe	0.433	0.82	19	06000 337	Carbon oxide	Lower than LOQ	0.003316	0.0119376	0.001624
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	Lower than LOQ	0.00011	0.000396	0.000336
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000015	0.000054	0.000051
410102. Car repairs (new activity definition); EVS, CW and P, painting station; spray booth	30	pipe	9.1	0.7 × 1.49	1503	7424	–	–	After gas cleaning plant	6.25	5.99	21	03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	3.76	0.0235	0.0846	0.000458
													11000 1042	Butanol	6.9	0.043	0.1548	0.007407
													11000 1061	Ethanol	10.6	0.066	0.2376	0.001384
													11000 2750	Solvent oil	–	0.005171	0.0186156	0.006645
													11000 2752	White spirit	32.7	0.204	0.7344	0.023394
													11000 10411	Aliphatic hydrocarbons	–	0.005719	0.0205884	0.00735
													11007 1401	Acetone	3.54	0.0221	0.07956	0.000553
													11009 1210	Butyl acetate	6.5	0.041	0.1476	0.023228
													11020 1246	Ethylene glycol ethyl ether	6.1	0.0381	0.13716	0.003255
													11021 1240	Ethyl acetate	5.4	0.0338	0.12168	0.00638
													11030 616	Xylene	10.6	0.066	0.2376	0.027389
													11041 621	Toluenes	5.2	0.0325	0.117	0.015264

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
410102. Car repairs (new activity definition); EVS, CW and P, painting station; spray booth	31	pipe	9.1	0.7 × 1.49	1503	7433		–	After gas cleaning plant	6.63	6.36	21	03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	3.74	0.0248	0.08928	0.000485
													11000 1042	Butanol	6.8	0.045	0.162	0.007858
													11000 1061	Ethanol	10.4	0.069	0.2484	0.001467
													11000 2750	Solvent oil	–	0.005485	0.019746	0.00705
													11000 2752	White spirit	32.7	0.217	0.7812	0.024816
													11000 10411	Aliphatic hydrocarbons	–	0.006067	0.0218412	0.007797
													11007 1401	Acetone	3.43	0.0227	0.08172	0.000587
													11009 1210	Butyl acetate	6.3	0.042	0.1512	0.02464
													11020 1246	Ethylene glycol butyl ether	6.0	0.040	0.144	0.003453
													11021 1240	Ethyl acetate	5.3	0.0351	0.12636	0.006767
													11030 616	Xylene	10.5	0.070	0.252	0.029054
													11041 621	Toluenes	5.2	0.0345	0.1242	0.016193
120106. Other stationary equipment; EVS, CW and P, painting station; heat generator Blowterm MKFL	32	pipe	9.9	0.24	1503	7429	–	–	in the pipe	0.097	2.14	118	06000 337	Carbon oxide	1658	0.10185	0.36666	0.126294
													07000 11812	Carbon dioxide	–	–	–	20.507
													12000 410	Methane	–	–	–	0.000832
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	58.9	0.00362	0.013032	0.000651
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	207	0.01271	0.045756	0.015358
													04002 11815	Nitrogen (I) oxide (N_20)	–	–	–	0.000277
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	62	0.00378	0.013608	0.02604

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120106. Other stationary equipment; EVS, CW and P, painting station; heat generator Blowterm MKFL	33	pipe	9.9	0.24	1503	7431	–	–	in the pipe	0.097	2.14	131	06000 337	Carbon oxide	1528	0.09719	0.349884	0.116627
													07000 11812	Carbon dioxide	–	–	–	20.507
													12000 410	Methane	–	–	–	0.000832
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	53.4	0.0034	0.01224	0.000651
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	224	0.01426	0.051336	0.016683
													04002 11815	Nitrogen (I) oxide (N_20)	–	–	–	0.000277
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	67	0.00427	0.015372	0.02604
410102. Car repairs (new activity definition); EVS, CW and P, spray preparation site; spray preparation station	34	pipe	9.1	0.7 × 1.49	1503	7440	–	–	in the pipe	6.75	6.47	19	03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	4.3	0.029	0.1044	0.000168
													11037 620	Styrene	1.42	0.0096	0.03456	0.005588
410102. Car repairs (new activity definition); EVS, CW and P, spray preparation site; spray preparation station	35	pipe	9.1	0.7 × 1.49	1503	7446	–	–	in the pipe	6.84	6.56	19	03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	4.5	0.0308	0.11088	0.00017
													11037 620	Styrene	1.42	0.0097	0.03492	0.005662

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
410102. Car repairs (new activity definition); EVS, CW and P, express laboratory, paint preparation machine	36	pipe	9.1	0.18	1503	7451	–	–	in the pipe	0.243	9.55	19	110001042	Butanol	Lower than LOQ	0.000303	0.0010908	0.000218
													110001061	Ethanol	Lower than LOQ	0.000057	0.0002052	0.000041
													110002750	Solvent oil	–	0.000272	0.0009792	0.000196
													110002752	White spirit	Lower than LOQ	0.000957	0.0034452	0.000689
													1100010411	Aliphatic hydrocarbons	.	0.0003	0.00108	0.000216
													110071401	Acetone	Lower than LOQ	0.000022	0.0000792	0.000016
													110091210	Butyl acetate	Lower than LOQ	0.00095	0.00342	0.000684
													110201246	Ethylene glycol ethyl ether	Lower than LOQ	0.000133	0.0004788	0.000096
													110211240	Ethyl acetate	Lower than LOQ	0.000261	0.0009396	0.000188
													11030616	Xylene	Lower than LOQ	0.001121	0.0040356	0.000807
													11041621	Toluenes	Lower than LOQ	0.000624	0.0022464	0.000449
410102. Car repairs (new activity definition); EVS, CW and P, express laboratory, paint storage cabinet	37	pipe	9.1	0.11	1502	7453	–	–	in the pipe	0.215	22.62	19	110001042	Butanol	Lower than LOQ	0.00083	0.002988	0.000193
													110001061	Ethanol	Lower than LOQ	0.0014	0.00504	0.000036
													110002750	Solvent oil	–	0.0014	0.00504	0.000173
													110002752	White spirit	Lower than LOQ	0.0014	0.00504	0.00061
													1100010411	Aliphatic hydrocarbons	–	0.00083	0.002988	0.000192

													110071401	Acetone	Lower than LOQ	0.0027	0.00972	0.000014
													110091210	Butyl acetate	Lower than LOQ	0.00055	0.00198	0.000605
													110201246	Ethylene glycol ethyl ether	Lower than LOQ	0.00055	0.00198	0.000084
													110211240	Ethyl acetate	Lower than LOQ	0.00083	0.002988	0.000166
													11030616	Xylene	Lower than LOQ	0.00083	0.002988	0.000714
													11041621	Toluenes	Lower than LOQ	0.0014	0.00504	0.000398

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
410102. Car repairs (new activity definition); EVS, CW and P, express laboratory, paint preparation machine	38	pipe	8.3	0.25	1503	7452	–	–	in the pipe	0.543	11.06	19	11000 1042	Butanol	Lower than LOQ	0.000143	0.0005148	0.000103
													11000 1061	Ethanol	Lower than LOQ	0.000023	0.0000828	0.000019
													11000 2750	Solvent oil	–	0.000128	0.0004608	0.000092
													11000 2752	White spirit	Lower than LOQ	0.000451	0.0016236	0.000325
													11000 10411	Aliphatic hydrocarbons	–	0.000142	0.0005112	0.000102
													11007 1401	Acetone	Lower than LOQ	0.000011	0.0000396	0.000008
													11009 1210	Butyl acetate	Lower than LOQ	0.000447	0.0016092	0.000322
													11020 1246	Ethylene glycol ethyl ether	Lower than LOQ	0.000063	0.0002268	0.000045
													11021 1240	Ethyl acetate	Lower than LOQ	0.000124	0.0004464	0.000089
													11030 616	Xylene	Lower than LOQ	0.000528	0.0019008	0.00038
													11041 621	Toluenes	Lower than LOQ	0.000294	0.0010584	0.000212
120103. Incineration units for < 50 MW (boiler units); HPB No. 2; boiler unit HWK 10000 No. 1	39	pipe	25	0.92	1690	7640	–	–	in the pipe	5.59	8.41	119.5	06000 337	Carbon oxide	2.6	0.0041	0.01476	0.023956
													07000 11812	Carbon dioxide	–	–	–	3009.287
													12000 410	Methane	–	–	–	0.054446
													01007 183	Mercury and its compounds (in terms of mercury)	–	–	–	0.000005
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms	103.7	0.2153	0.77508	1.234292

														of nitrogen dioxide				
													04002 11815	Nitrogen (I) oxide (N_20)	–	–	–	0.005445

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120103. Incineration units for < 50 MW (boiler units); HPB No. 2; boiler unit HWK 10000 No. 2	40	pipe	25	0.92	1690	7646	–	–	in the pipe	5.53	8.32	121.4	06000 337	Carbon oxide	2.6	0.004	0.0144	0.0027
													07000 11812	Carbon dioxide	–	–	–	298.505
													12000 410	Methane	–	–	–	0.005401
													01007 183	Mercury and its compounds (in terms of mercury)	–	–	–	0.000001
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	86.7	0.2108	0.75888	0.110445
													04002 11815	Nitrogen (I) oxide (N_20)	–	–	–	0.00054
120103. Incineration units for < 50 MW (boiler units); HPB No. 2; boiler unit HWK 10000 No. 3 (when using natural gas)	41	pipe	25	0.92	1690	7652	–	–	in the pipe	5.59	8.41	115.3	06000 337	Carbon oxide	2.5	0.0041	0.01476	0.037157
													07000 11812	Carbon dioxide	–	–	–	5009.004
													12000 410	Methane	–	–	–	0.090626
													01007 183	Mercury and its compounds (in terms of mercury)	–	–	–	0.000009
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	103.7	0.2014	0.072504	1.993778
													04002 11815	Nitrogen (I) oxide (N_20)	–	–	–	0.009063
120103. Incineration units for < 50 MW (boiler units); HPB No. 2; boiler unit HWK 10000 No. (when using diesel oil (DO))	41	pipe	25	0.92	1690	7652	–	–	in the pipe	4.1	6.17	126.1	06000 337	Carbon oxide	19.7	0.05901	0.212436	0.011971
													07000 11812	Carbon dioxide	–	–	–	186.150
													12000 410	Methane	–	–	–	0.007641
													03000 2902	Substances *in* the form of suspended solid particles non-differentiated by composition	–	0.00684	0.024624	0.001773

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	200.9	0.6018	2.16648	0.136518
													04002 11815	Nitrogen (I) oxide (N_20)	–	–	–	0.002547
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	268.3	0.809	2.9124	0.117415
120106. Other stationary equipment; EVS, stationary heating of special motor transport engines; thermal machine UMP-350	42	pipe	1.5	0.15	2196	5555	–	–	in the pipe	0.189	10.70	345	06000 337	Carbon oxide	1620	0.165	0.594	0.020289
													07000 11812	Carbon dioxide	–	–	–	3.345
													12000 410	Methane	–	–	–	0.000137
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	73.5	0.0075	0.027	0.000032
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	360	0.03667	0.132012	0.004321
													04002 11815	Nitrogen (I) oxide (N_20)	–	–	–	0.000046
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	121	0.01229	0.044244	0.002124
310402. Other types of transportation and storage (including pipelines); EVS, stationary heating of special motor transport engines; kerosene container filler neck	43	fugitive	–	–	2224	5554	–	–	–	–	–	27.8	11000 2732	Kerosene	–	0.000001	0.0000036	0.0000000002

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310402. Other types of transportation and storage (including pipelines); EVS, stationary heating of special motor transport engines; kerosene container filler neck	44	Breathing nozzle	–	–	2233	5554	–	–	–	–	–	27.8	11000 2732	Kerosene	–	0.0000005	0.0000018	0.000007
120106. Other stationary equipment; EVS, stationary heating of special motor transport engines; thermal machine UMP-350	45	pipe	1.5	0.15	1603	5085	–	–	in the pipe	0.138	7.81	278	06000 337	Carbon oxide	2463	0.1718	0.61848	0.162544
													07000 11812	Carbon dioxide	–	–	–	18.018
													12000 410	Methane	–	–	–	0.00074
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	69	0.0048	0.01728	0.000172
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	313	0.0218	0.07848	0.020198
													04002 11815	Nitrogen (I) oxide (N_20)	–	–	–	0.000247
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	148	0.01035	0.03726	0.011439
310402. Other types of transportation and storage (including pipelines); EVS, stationary heating of special motor transport engines; kerosene container filler neck	46	fugitive	–	–	1600	5068	–	–	–	–	–	27.8	11000 2732	Kerosene	–	0.000005	0.000018	0.000000007

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310402. Other types of transportation and storage (including pipelines); EVS, stationary heating of special motor transport engines; kerosene container	47	Breathing nozzle	–	–	1608	5068	–	–	–	–	–	27.8	11000 2732	Kerosene	–	0.000003	0.0000108	0.000043
310402. Other types of transportation and storage (including pipelines); HPB No. 2; DO reservoir	48	Breathing nozzle	–	–	1735	7679	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0000006	0.00600216	0.000018
310402. Other types of transportation and storage (including pipelines); HPB No. 2; (DO reservoir filler neck)	49	fugitive	–	–	1734	7679	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0000006	0.00000216	0.000000006
Terminal B, parking	50	Open air parking for mobile sources																
310503. Service stations (including car fuelling); EVS, scheduled maintenance on the ramp; combustion engine — 2 unit	51	pipe	5	0.3	1684	5452	–	–	in the pipe	0.065	0.92	18	06000 337	Carbon oxide	Lower than LOQ	0.116843	0.4206348	0.105159
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	Lower than LOQ	0.003102	0.011672	0.002792
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000435	0.001566	0.000391

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310503. Service stations (including car fuelling); EVS, scheduled maintenance on the ramp; combustion engine — 2 unit	52	pipe	5	0.3	1684	5442	–	–	in the pipe	0.065	0.92	18	06000337	Carbon oxide	Lower than LOQ	0.116843	0.4206348	0.105159
													04001301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	Lower than LOQ	0.003102	0.0111672	0.002792
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000435	0.001566	0.000391
310503. Service stations (including car refuelling); FFS-1; filler neck of HST 25 No. 5	53	fugitive	–	–	1514	7305	–	–	–		–	27.8	11000 2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	–	0.006773	0.0243828	0.000203
310503. Service stations (including car refuelling); FFS-1; reservoir of HST 25 No. 5	54	Breathing nozzle	–	–	1516	7298	–	–	–	–	–	27.8	11000 2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	–	0.013163	0.0473868	0.41511
310503. Service stations (including car refuelling); FFS-3; dispensing gun	55	fugitive	–	–	1507	7306	–	–	–	–	–	27.8	11000 2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	–	0.003483	0.0125388	0.000834
310503. Service stations (including car refuelling); FFS-1; filler neck of HST 25 No. 4	56	fugitive	–	–	1519	7305	–	–	–	–	–	27.8	11000 2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	–	0.001391	0.0050076	0.0000085
310503. Service stations (including car refuelling); FFS-1; reservoir of HST 25 No. 4	57	Breathing nozzle	–	–	1518	7298	–	–	–	–	–	27.8	11000 2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	–	0.002703	0.0097308	0.085226

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310503. Service stations (including car refuelling); FFS-1; dispensing gun	58	fugitive	–	–	1525	7306	–	–	–	–	–	27.8	11000 2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	–	0.000709	0.0025524	0.000035
310503. Service stations (including car refuelling); FFS-1; filler neck of HST 25 No. 3	59	fugitive	–	–	1520	7322	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000005	0.000018	0.0000004
310503. Service stations (including car refuelling); FFS-1; reservoir of HST 25 No. 3	60	Breathing nozzle	–	–	1502	7326	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000003	0.0000108	0.000096
310503. Service stations (including car refuelling); FFS-1; dispensing gun	61	fugitive	–	–	1525	7319	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0000025	0.000009	0.0000016
310503. Service stations (including car refuelling); FFS-1; filler neck of HST 25 No. 2	62	fugitive	–	–	1514	7322	–	–	–	–	–	27.8	11000 2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	–	0.005911	0.0212796	0.000154
310503. Service stations (including car refuelling); FFS-1; reservoir of HST 25 No. 2	63	Breathing nozzle	–	–	1500	7325	–	–	–	–	–	27.8	11000 2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	–	0.011488	0.0413568	0.362287
310503. Service stations (including car refuelling); FFS-1; dispensing gun	64	fugitive	–	–	1508	7319	–	–	–	–	–	27.8	11000 2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	–	0.00304	0.010944	0.000635

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310503. Service stations (including car refuelling); FFS-1; filler neck of HST 25 No. 1	65	fugitive	–	–	1495	7321	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000003	0.0000108	0.00000016
310503. Service stations (including car refuelling); FFS-1; reservoir of HST 25 No. 1	66	Breathing nozzle	–	–	1498	7325	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0000021	0.00000756	0.000066
310503. Service stations (including car refuelling); FFS-1; dispensing gun	67	fugitive	–	–	1491	7318	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000002	0.0000072	0.0000017
310503. Service stations (including car refuelling); FFS-2; filler neck of checkpoint No. 7	68	fugitive	–	–	1619	5579	–	–	–	–	–	27.8	11000 2732	Kerosene	–	0.000063	0.0002268	0.00000076
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000001	0.0000036	0.00000002
310503. Service stations (including car refuelling); FFS-2; checkpoint No. 7	69	Breathing nozzle	–	–	1612	5579	–	–	–	–	–	27.8	11000 2732	Kerosene		0.000043	0.0001548	0.000675
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.00000094	0.00000338	0.000015
310503. Service stations (including car refuelling); FFS-2; dispensing gun	70	fugitive	–	–	1626	5579	–	–	–	–	–	27.8	11000 2732	Kerosene	–	0.000032	0.0001152	0.000003
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0000008	0.00000288	0.0000001

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310503. Service stations (including car refuelling); FFS-2; filler neck of checkpoint No. 6	71	fugitive	–	–	1619	5571	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000006	0.0000216	0.0000004
310503. Service stations (including car refuelling); FFS-2; checkpoint No. 6	72	Breathing nozzle	–	–	1612	5571	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000004	0.0000144	0.000123
310503. Service stations (including car refuelling); FFS-2; dispensing gun	73	fugitive	–	–	1626	5571	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000003	0.0000108	0.000002
120103. Incineration units for < 50 MW (boiler units); HPB No. 1; boiler unit UWM-1000, station No. 3, boiler unit Vitomax-200, station No. 2	74	pipe	30	1	1560	6384	–	–	–	4.52	5.76	134	06000 337	Carbon oxide	10	0.02705	0.09738	0.071406
													07000 11812	Carbon dioxide	–	–	–	3104.505
													12000 410	Methane	–	–	–	0.056194
													01007 183	Mercury and its compounds (in terms of mercury)	–	–	–	0.000006
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	199	0.48892	1.760112	1.484105
													04002 11815	Nitrogen (I) oxide (N_20)	–	–	–	0.005619

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120103. Incineration units for < 50 MW (boiler units); HPB No. 1; boiler unit Vitoplex-300, station No. 1	75	pipe	12	0.45	1568	6380	–	–	in the pipe	0.643	4.04	136	06000 337	Carbon oxide	9.69	0.0017	0.00612	0.018927
													07000 11812	Carbon dioxide	–	–	–	523.050
													12000 410	Methane	–	–	–	0.009463
													01007 183	Mercury and its compounds (in terms of mercury)	–	–	–	0.000001
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	116	0.035	0.126	0.283522
													04002 11815	Nitrogen (I) oxide (N_20)	–	–	–	0.000946
120103. Incineration units for < 50 MW (boiler units); HPB No. 1; boiler unit Vitoplex-300, station No. 2	76	pipe	12	0.45	1576	6379	–	–	in the pipe	0.644	4.05	138	06000 337	Carbon oxide	10.940	0.0017	0.00612	0.020315
													07000 11812	Carbon dioxide	–	–	–	522.008
													12000 410	Methane	–	–	–	0.009449
													01007 183	Mercury and its compounds (in terms of mercury)	–	–	–	0.000001
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	123.320	0.0325	0.117	0.290267
													04002 11815	Nitrogen (I) oxide (N_20)	–	–	–	0.000945
310503. Service stations (including car refuelling); BPM, MSSA, OCS No. 1 alkaline accumulator unit; accumulator charging station — 6 units	77	pipe	7.5	0.21 × 0.41	2135	5586	–	–	–	1.59	19.98	16	150	Sodium hydroxide (lye, caustic soda)	Lower than LOQ	0.000333	0.0011988	0.000346
310503. Service stations (including car refuelling); BPM, MSSA, OCS No. 1, acid accumulator unit; accumulator charging station — 8 units	78	pipe	7.5	0.29	2141	5580	–	–	–	0.596	9.02	19	05004 322	Sulfuric acid (H2S04) (sulphuric acid)	Lower than LOQ	0.000261	0.0009396	0.001019

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
130326. Metal welding; BPM, MSSA, welding shop, welding station	79	pipe	7.5	0.34 × 0.65	2139	5544	–	–	in the pipe	0.989	4.84	16	– 323	Silicon dioxide	–	0.000472	0.0016992	0.000451
													– 10226	Titanium dioxide	–	0.000131	0.0004716	0.000123
													06000 337	Carbon oxide	Lower than LOQ	0.00355	0.01278	0.000615
													01002 110	Vanadium and its compounds (in terms of vanadium pentoxide)	Lower than LOQ	0.000144	0.0005184	0.000003
													01003 123	Iron and its compounds (in terms of iron)	3.93	0.0039	0.01404	0.004435
													01010 203	Chromium and its compounds (in terms of chromium trioxide)	Lower than LOQ	0.000307	0.0011052	0.000012
													01104 143	Mangan and its compounds (in terms of mangan dioxide)	0.54	0.00053	0.001908	0.000511
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	Lower than LOQ	0.009167	0.0330012	0.001312
													16000 343	Highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor	Lower than LOQ	0.00128	0.004608	0.0000244
													16000 344	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	Lower than LOQ	0.00072	0.002592	0.000035
													16001 342	Fluor and its vaporous and gaseous compounds in terms of hydrogen fluoride	Lower than LOQ	0.000499	0.0017964	0.000022
130326. Metal welding; BPM, MSSA, welding shop, welding station	80	fugitive	2	0.5	2143	5540	–	–	–	0.294	1.50	27.8	–323	Silicon dioxide	–	0.000472	0.0016992	0.000311
													– 10226	Titanium dioxide	–	0.000131	0.0004716	0.000083
													06000 337	Carbon oxide	–	0.00355	0.01278	0.009922
													01003 123	Iron and its compounds (in terms of iron)	–	0.003973	0.0143028	0.048626

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
													01010 203	Chromium and its compounds (in terms of chromium trioxide)	–	0.000307	0.0011052	0.000014
													01104 143	Mangan and its compounds (in terms of mangan dioxide)	–	0.00052	0.001872	0.001792
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	–	0.009167	0.0330012	0.00909
													16000 343	Highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor	–	0.00128	0.004608	0.0000245
													16000 344	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	–	0.00072	0.002592	0.00004
													16001 342	Fluor and its vaporous and gaseous compounds in terms of hydrogen fluoride	–	0.000336	0.0012096	0.000014
210620. Mechanical engineering (mechanical metal-working); BPM, MSSA, welding shop; machine for cutting metal profiles	80	fugitive	2	0.5	2143	5540	–	–	–	0.294	1.50	27.8	03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	–	0.190	0.684	0.2736
310503. Service stations (including car refuelling); BPM, MSSA, OCS No. 1, acid accumulator unit; accumulator charging station — 28 units	81	fugitive	2	0.5	2144	5565	–	–	–	0.294	1.50	27.8	05004 322	Sulfuric acid (H2S04) (sulphuric acid)	–	0.002739	0.0098604	0.021913
310503. Service stations (including car refuelling); BPM, MSSA, OCS No. 1, alkaline accumulator unit; accumulator charging station — 9 units	82	fugitive	2	0.5	2119	5590	–	–	–	0.294	1.50	27.8	150	Sodium hydroxide (lye, caustic soda)	–	0.0005	0.0018	0.00131

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310503. Service stations (including car refuelling); BPM, MSSA, OCS No. 2, acid accumulator unit; accumulator charging station — 19 units	83	fugitive	2	0.5	1538	6204	–	–	–	0.294	1.50	27.8	05004322	Sulfuric acid (H2S04) (sulphuric acid)	–	0.002331	0.0083916	0.01867
310503. Service stations (including car refuelling); BPM, MSSA, OCS No. 2, acid accumulator unit; accumulator charging station — 26 units	84	fugitive	2	0.5	1524	6178	–	–	–	0.294	1.50	27.8	05004322	Sulfuric acid (H2S04) (sulphuric acid)	–	0.004014	0.0144504	0.066263
310503. Service stations (including car refuelling); BPM, MAU PJSC — M — Boryspil, alkaline accumulator unit; accumulator charging station — 2 units	85	pipe	7.5	0.36 × 0.36	2139	5555	–	–	–	0.371	2.86	19	150	Sodium hydroxide (lye, caustic soda)	Lower than LOQ	0.000018	0.0000648	0.005776
310503. Service stations (including car refuelling); BPM, MAU PJSC — M — Boryspil, alkaline accumulator unit; accumulator charging station — 6 units	86	pipe	7.5	0.36 × 0.36	2138	5560	–	–	–	0.508	3.92	19	150	Sodium hydroxide (lye, caustic soda)	Lower than LOQ	0.000033	0.0001188	0.003136
BPM, MAU PJSC — M — Boryspil, alkaline accumulator unit	87	Liquidated																
BPM, MAU PJSC — M — Boryspil, brush rubbing station	88	Liquidated																
CFS of fuel and oil material procurement service	89–93	Suspended																

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
210522. Storage of organic chemicals; CFS of FOMS, FOM laboratory No. 1; exhaust hood — 4 units	94	pipe	5.5	0.185 × 0.185	1689	5013	–	–	in the pipe	0.308	9.76	19	11000 2732	Kerosene	31.25	0.0096	0.03456	0.0894
													11000 2735	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	0.72	0.000222	0.0007992	0.000383
210522. Storage of organic chemicals; CFS of FOMS, special fluid laboratory No. 2; exhaust hood — 2 units	95	pipe	5.5	0.13 × 0.135	1695	5004	–	–	in the pipe	0.221	13.68	19	11020 1246	Ethylene glycol ethyl ether	8.6	0.0019	0.00684	0.00296
													11036 1052	Methanol	4.15	0.000917	0.0033012	0.00143
130326. Metal welding; FRLES, CMS, welding area; welding station	96	fugitive	2	0.5	1729	7085	–	–	–	0.294	1.50	27.8	–323	Silicon dioxide	–	0.000472	0.0016992	0.000035
													– 10226	Titanium dioxide	–	0.000131	0.0004716	0.00001
													01003 123	Iron and its compounds (in terms of iron)	–	0.0016	0.00576	0.00012
													01104 143	Mangan and its compounds (in terms of mangan dioxide)	–	0.000435	0.001566	0.000033
210620. Mechanical engineering (mechanical metal-working); FRLES, CMS, welding area; angle grinder	96	fugitive	2	0.5	1729	7085	–	–	–	0.294	1.50	27.8	03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	–	0.041	0.1476	0.002952
310503. Service stations (including car refuelling); FRLES, CMS, acid accumulator unit; accumulator charging station — 3 units	97	pipe	11	0.21 × 0.21	1702	7078	–	–	–	0.906	20.54	19	05004 322	Sulfuric acid (H2S04) (sulphuric acid)	Lower than LOQ	0.000188	0.0006768	0.000266

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
FRLES, CMS, acid accumulator unit, electrolyte room	98	Suspended																
FRLES, CMS, object TP-1023, grinding machine	99	Suspended																
FRLES, CMS, object TP-1023, welding station	100	Liquidated																
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator 8041 Iveko	101	pipe	2.3	0.055	2385	9190	–	–	in the pipe	0.044	18.52	120	06000337	Carbon oxide	1571.13	0.033396	0.1202256	0.0009
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	30.39	0.000646	0.0023256	0.00002
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	643.77	0.0492624	0.0492624	0.0004
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	18.63	0.000396	0.0014256	0.00001
													11000 2754	Saturated hydrocarbons C_{12}–C_{19} (RPK-265 P solvent, etc.)	–	0.0333	0.11988	0.001
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir filler neck	102	fugitive	–	–	2399	9199	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	2.3E-10	8.28E-10	4.2E-13
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir	103	Breathing nozzle	–	–	2390	9200	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000000002	0.0000000072	0.00000006

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator Scania SC-4096	104	pipe	2.3	0.16	2309	8222	–	–	in the pipe	0.164	8.16	133	06000337	Carbon oxide	172.48	0.016072	0.0578592	0.0004
													03000290 2	Substances in the form of suspended solid particles non-differentiated by composition	25.24	0.002352	0.0084672	0.00006
													04001301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	512.16	0.047724	0.1718064	0.0013
													05001330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	17.60	0.00164	0.005904	0.00004
													11000275 4	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.240	0.864	0.0069
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir filler neck	105	fugitive	2	0.051	2293	8205	–	–	–	0.006667	3.26	27.8	11000275 4	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000000002	0.0000000072	3E-12
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir	106	Breathing nozzle	–	–	2303	8206	–	–	–	–	–	27.8	11000275 4	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.00000001	0.000000036	0.00000004

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator DGA-24	107	pipe	3	0.06	900	8357	–	–	in the pipe	0.04	14.15	129	06000337	Carbon oxide	1841.25	0.10432	0.375552	0.0028
													03000290 2	Substances in the form of suspended solid particles non-differentiated by composition	28.59	0.00162	0.305832	0.0000424
													04001301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	163.79	0.00928	0.033408	0.0003
													05001330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	28.95	0.00164	0.005904	0.0000424
													11000275 4	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0267	0.09612	0.0008
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir filler neck	108	fugitive	–	–	901	8324	–	–	–	–	–	27.8	11000275 4	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	1.9E-10	6.34E-10	3.3E-13
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir	109	Breathing nozzle	–	–	900	8313	–	–	–	–	–	27.8	11000275 4	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000000001	0.0000000036	0.00000004

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator AD-10	110	pipe	2.5	0.05	887	8357	–	–	in the pipe	0.033	16.81	72	06000 337	Carbon oxide	2128.26	0.044451	0.1600236	0.0011
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	36.02	0.000752	0.0027072	0.0000202
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	248.06	0.005181	0.0186516	0.0001
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	41.08	0.000858	0.0030888	0.0000215
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.016	0.0576	0.0005
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator ASDA-200 No. 1	111	pipe	5.5	0.095	1284	7293	–	–	in the pipe	0.103	14.53	119	06000 337	Carbon oxide	566.28	0.020394	0.0734184	0.0006
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	30.29	0.001091	0.0039276	0.0000273
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	509.08	0.018334	0.0660024	0.0005
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	31.46	0.001133	0.0040788	0.0000285
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.180	0.648	0.0052

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator ASDA-200 No. 1	112	pipe	5.5	0.095	1284	7287	–	–	in the pipe	0.149	21.02	122	06000 337	Carbon oxide	531.78	0.027714	0.0997704	0.0008
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	29.14	0.001518	0.0054648	0.0000391
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	426.14	0.022201	0.0799236	0.0006
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	28.60	0.00149	0.005364	0.0000378
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.180	0.648	0.0052
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator ASDA-200 No. 2	113	pipe	5.5	0.095	1283	7281	–	–	in the pipe	0.134	18.91	97	06000 337	Carbon oxide	451.88	0.021172	0.0762192	0.0006
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	28.97	0.001357	0.0048852	0.0000356
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	509.08	0.023852	0.0858672	0.0007
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	25.74	0.001206	0.0043416	0.0000309
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.180	0.648	0.0052

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator ASDA-200 No. 2	114	pipe	5.5	0.095	1283	7276	–	–	in the pipe	0.109	15.38	74	06000 337	Carbon oxide	576.00	0.020928	0.0753408	0.0006
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	29.73	0.00108	0.003888	0.0000286
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	426.00	0.015478	0.0557208	0.0004
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	27.00	0.000981	0.0035316	0.0000264
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.180	0.648	0.0052
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir filler neck	115	fugitive	–	–	1288	7301	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000000001	0.0000000036	2.3E-12
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir	116	Breathing nozzle	–	–	1295	7301	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.00000001	0.000000036	0.0000003
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator DGA-24	117	pipe	4	0.09	743	6942	–	–	in the pipe	0.043	6.76	128	06000 337	Carbon oxide	1943.04	0.047472	0.1708992	0.0013
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	42.33	0.001034	0.0037224	0.0000275

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
													04001301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	357.28	0.008729	0.0314244	0.0002
													05001330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	42.24	0.001032	0.0037152	0.000025
													11000754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0267	0.09612	0.0008
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir filler neck	118	fugitive	–	–	745	6926	–	–	–	–	–	27.8	11000754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	1.9E-10	6.84E-10	3.3E-13
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir	119	Breathing nozzle	–	–	746	6918	–	–	–	–	–	27.8	11000754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000000001	0.0000000036	0.00000004
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator Perkins No. 1	120	pipe	4.5	0.07	2190	5852	–	–	in the pipe	0.092	23.91	165	06000337	Carbon oxide	987.14	0.058972	0.2122992	0.0016
													03000290 2	Substances in the form of suspended solid particles non-differentiated by composition	18.80	0.001123	0.0040428	0.00003
													04001301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	375.76	0.022448	0.0808128	0.0006

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	15.40	0.00092	0.003312	0.00002
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0567	0.20412	0.0016
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator Perkins No. 2	121	pipe	4.5	0.07	2193	5846	–	–	in the pipe	0.092	23.91	162	06000 337	Carbon oxide	1059.48	0.060168	0.2166048	0.0017
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	22.31	0.001267	0.0045612	0.00002
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	375.84	0.021344	0.0768384	0.0006
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	17.82	0.001012	0.0036432	0.00003
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0567	0.20412	0.0016
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir filler neck	122	fugitive	–	–	2201	5846	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	3.9E-10	1.4E-9	7.1E-13
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir	123	Breathing nozzle	–	–	2209	5846	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000000003	0.0000000108	0.00000009

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator ASDA-200 No. 1	124	pipe	4.0	0.095	2193	5825	–	–	in the pipe	0.122	17.21	88.0	06000 337	Carbon oxide	492.20	0.02806	0.101016	0.0008
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	36.51	0.002081	0.0074916	0.0000566
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	348.82	0.019886	0.0715896	0.0005
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	23.54	0.001342	0.0048312	0.0000344
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.180	0.648	0.0052
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator ASDA-200 No. 1	125	pipe	4	0.095	2193	5819	–	–	in the pipe	0.14	19.75	91	06000 337	Carbon oxide	517.44	0.03136	0.112896	0.0009
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	38.18	0.002314	0.0083304	0.0000602
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	358.05	0.0217	0.07812	0.0006
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	30.03	0.00182	0.006552	0.0000476
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.180	0.648	0.0052

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator ASDA-200 No. 2	126	pipe	4	0.095	2193	5813	–	–	in the pipe	0.136	19.19	89	06000 337	Carbon oxide	494.34	0.031416	0.1130976	0.0009
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	35.37	0.002248	0.0080928	0.0000597
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	301.74	0.019176	0.0690336	0.0005
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	29.96	0.001904	0.0068544	0.0000486
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.180	0.648	0.0052
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator ASDA-200 No. 2	127	pipe	4	0.095	2193	5807	–	–	in the pipe	0.146	20.60	87	06000 337	Carbon oxide	605.00	0.035332	0.1271952	0.003
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	41.98	0.002451	0.0088236	0.0000657
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	392.50	0.022922	0.0825192	0.0006
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	37.50	0.00219	0.007884	0.0000547
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.180	0.648	0.0052
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir filler neck	128	fugitive	–	–	2203	5819	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000000001	0.0000000036	2.3E-12

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir	129	Breathing nozzle	–	–	2205	5825	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.00000001	0.000000036	0.0000003
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator Scania SC-4096	130	pipe	2.3	0.16	2364	3939	–	–	in the pipe	0.165	8.21	139	06000 337	Carbon oxide	129.72	0.011385	0.040986	0.0003
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	27.77	0.002437	0.0087732	0.00006
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	641.08	0.056265	0.202554	0.0061
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	16.92	0.001485	0.005346	0.00004
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.240	0.864	0.0069
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir filler neck	131	fugitive	–	–	2351	3925	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)		0.000000002	0.0000000072	3E-12
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir	132	Breathing nozzle	–	–	2359	3925	–	–		–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.00000001	0.000000036	0.0000004

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator DGA-24	133	pipe	4	0.06	702	3844	–	–	in the pipe	0.041	14.50	99	06000 337	Carbon oxide	3825.18	0.099261	0.3573396	0.0027
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	44.03	0.001143	0.0041148	0.0000289
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	494.54	0.012833	0.0461988	0.0003
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	48.98	0.001271	0.0045756	0.0000338
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0267	0.09612	0.0008
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir filler neck	134	fugitive	–	–	698	3863	–	–	–	–		27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	1.9E-10	6.84E-10	-3.3E-13
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir	135	Breathing nozzle	–	–	699	3872	–	–	–	–		27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000000001	0.0000000036	0.00000004

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator ASDA-200	136	pipe	5.5	0.095	1294	3283	–	–	in the pipe	0.143	20.17	79	06000 337	Carbon oxide	4445.55	0.190905	0.687258	0.0052
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	66.67	0.002863	0.0103068	0.0000781
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	346.32	0.014872	0.0535392	0.0004
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	56.61	0.002431	0.0087516	0.0000618
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.180	0.648	0.0052
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator ASDA-200	137	pipe	5.5	0.095	1286	3283	–	–	in the pipe	0.153	21.59	91	06000 337	Carbon oxide	2657.56	0.128673	0.4632228	0.0036
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	60.48	0.002928	0.0105408	0.0000777
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	486.64	0.023562	0.0848232	0.0006
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	41.08	0.001989	0.0071604	0.0000511
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.180	0.648	0.0052

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir filler neck	138	fugitive	–	–	1321	3283	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000000001	0.0000000036	2.3E-12
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir	139	Breathing nozzle	–	–	1310	3283	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.00000001	0.000000036	0.0000003
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator 8041 Iveko	140	pipe	2.3	0.055	2564	2914	–	–	in the pipe	0.045	18.94	122	06000 337	Carbon oxide	1618.38	0.032805	0.118098	0.0009
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	34.74	0.000704	0.0025344	0.00002
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	672.66	0.013635	0.049086	0.0004
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	22.20	0.00045	0.00162	0.00001
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0333	0.11988	0.001
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir filler neck	141	fugitive	–	–	2574	2925	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	2.3E-10	8.28E-10	4.2E-13

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir	142	Breathing nozzle	–	–	2583	2925	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000000002	0.0000000072	0.00000006
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator 8041 Iveko	143	pipe	2.3	0.055	2541	2339	–	–	in the pipe	0.044	18.52	119	06000 337	Carbon oxide	1530.10	0.03146	0.113256	0.0009
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	37.26	0.000766	0.0027576	0.00002
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	586.36	0.012056	0.0434016	0.0003
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	25.68	0.000528	0.0019008	0.00001
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0333	0.11988	0.001
310402. Other types of transportation and storage (including pipelines); (DO container filler neck)	144	fugitive	–	–	2561	2348	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	2.3E-10	8.28E-10	4.2E-13
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir	145	Breathing nozzle	–	–	2552	2348	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000000002	0.0000000072	0.00000006

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator DGA-24	146	pipe	4	0.075	917	2446	–	–	in the pipe	0.05	11.32	93	06000 337	Carbon oxide	2184.16	0.06205	0.22338	0.0018
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	36.40	0.00075	0.0027	0.0000194
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	689.92	0.0196	0.07056	0.0005
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	26.40	0.00075	0.0027	0.0000187
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0267	0.09612	0.0008
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator AD-10	147	pipe	4.4	0.055	931	2446	–	–	in the pipe	0.034	14.31	60	06000 337	Carbon oxide	2197.72	0.044744	0.1610784	0.0012
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	24.83	0.000506	0.0018216	0.0000135
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	228.79	0.004658	0.0167688	0.000123
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	26.72	0.000544	0.0019584	0.0000131
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.016	0.0576	0.0005

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir filler neck	148	fugitive	–	–	904	2472	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	1.9E-10	6.84E-10	3.3E-13
310402. Other types of transportation and storage (including pipelines); FRLES, CMS, diesel-generator unit; DO reservoir	149	Breathing nozzle	–	–	904	2481	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000000001	0.0000000036	0.00000004
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator ASDA-12 No. 1	150	pipe	3.5	0.055	949	1988	–	–	in the pipe	0.028	11.79	77	06000 337	Carbon oxide	1772.54	0.032228	0.1160208	0.0009
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	27.95	0.000508	0.0018288	0.0000136
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	218.68	0.003976	0.0143136	0.0001
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	33.88	0.000616	0.0022176	0.0000161
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.016	0.0576	0.0005

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator ASDA-12 No. 2	151	pipe	3.5	0.055	948	1997	–	–	in the pipe	0.031	13.05	65	06000 337	Carbon oxide	2055.77	0.038161	0.1373796	0.001
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	30.29	0.000562	0.0020232	0.000015
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	222.11	0.004123	0.0148428	0.0001
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	30.06	0.000558	0.0020088	0.0000137
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.016	0.0576	0.0005
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator ASDA-12 No. 1	152	pipe	4	0.055	2825	11215	–	–	in the pipe	0.03	12.63	68	06000 337	Carbon oxide	1593.02	0.03342	0.120312	0.0009
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	22.04	0.000462	0.0016632	0.0000119
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	203.06	0.00426	0.015336	0.0001
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	18.59	0.00039	0.001404	0.0000095
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.016	0.0576	0.0005

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120105, stationary engines; FRLES, CMS, diesel-generator unit; diesel-generator ASDA-12 No. 2	153	pipe	4	0.055	2825	11214	–	–	in the pipe	0.029	12.21	69	0600003 37	Carbon oxide	1225.90	0.027347	0.0984492	0.0008
													0300029 02	Substances in the form of suspended solid particles non-differentiated by composition	21.26	0.000474	0.0017064	0.0000124
													0400130 1	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	196.30	0.004379	0.0157644	0.0001
													0500133 0	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	18.20	0.000406	0.0014616	0.00000986
													1100027 54	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.016	0.0576	0.0005
120105. Stationary engines; FRLES, ITS, diesel-generator P40P1	154	pipe	1.5	0.065	1721	7.015	–	–	in the pipe	0.078	23.51	173	0600003 37	Carbon oxide	1037.40	0.057798	02080728	0.0024
													0300029 02	Substances in the form of suspended solid particles non-differentiated by composition	13.93	0.000776	0.0027936	0.00003
													0400130 1	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	445.20	0.024804	0.0892944	0.001
													0500133 0	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	11.20	0.000624	0.022464	0.00002
													1100027 54	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0293	0.10548	0.0013
Boryspil hotel, car parking	155	Open air parking for mobile sources																

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
130326. Metal welding; storage hangar, mechanical area; welding station	156	pipe	10	0.15	1398	7273	–	–	in the pipe	0.559	31.63	20	323	Silicon dioxide	–	0.000472	0.0016992	0.000203
													10226	Titanium dioxide	–	0.000131	0.0004716	0.000015
													06000 337	Carbon oxide	Lower than LOQ	0.003547	0.0127692	0.00214
													01003 123	Iron and its compounds (in terms of iron)	7.10	0.004	0.0144	0.002789
													01010 203	Chromium and its compounds (in terms of chromium trioxide)	Lower than LOQ	0.000003	0.0000108	0.000001
													01104 143	Mangan and its compounds (in terms of mangan dioxide)	1.10	0.00061	0.002196	0.000238
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	Lower than LOQ	0.00072	0.002592	0.00044
													16000 343	Highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor	Lower than LOQ	0.00128	0.004608	0.00072
													16000 344	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	Lower than LOQ	0.00072	0.002592	0.000405
													16001 342	Fluor and its vaporous and gaseous compounds in terms of hydrogen fluoride	Lower than LOQ	0.000336	0.0012096	0.000189
310503. Service stations (including car fuelling); storage hangar, maintenance area; combustion engine	157	pipe	8	0.12	1386	7248	–	–	in the pipe	0.089	7.87	22	06000 337	Carbon oxide	219	0.0195	0.0702	0.006856
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	91	0.0081	0.02916	0.004897
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000522	0.0018792	0.000685

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
120106. Other stationary equipment; storage hangar, washing station; washing machine Kärcher	158	pipe	3.5	0.12	1388	7227	–	–	in the pipe	0.029	2.56	158	06000 337	Carbon oxide	201	0.003944	0.0141984	0.000541
													07000 11812	Carbon dioxide	–	–	–	0.78673
													12000 410	Methane	–	–	–	0.000036
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	44	0.00086	0.003096	0.000025
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	243	0.004785	0.017226	0.000679
													04002 11815	Nitrogen (I) oxide (N_20)	–	–	–	0.000011
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	77	0.001508	0.0054288	0.000999
120103. Incineration units for < 50 MW (boiler units); HPB No. 1; boiler unit HWK 10000 st. No. 1	159	pipe	30	1	1560	6393	–	–	in the pipe	4.521	5.76	128	06000 337	Carbon oxide	13.7	0.03878	0.139608	0.150304
													07000 11812	Carbon dioxide	–	–	–	3193.728
													12000 410	Methane	–	–	–	0.057809
													01007 183	Mercury and its compounds (in terms of mercury)	–	–	–	0.000006
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	120.0	0.35042	1.261512	1.677046
													04002 11815	Nitrogen (I) oxide (N_20)	–	–	–	0.005781
511002. Return water treatment in the residential and commercial sectors; Terminal F; storm water drainage treatment facilities	160	pipe	1.7	0.2	1598	5897	–	–	in the pipe	0.045	1.43	12	05002 333	Hydrogen sulphide	No emissions			
													11000 10447	Oil hydrocarbons	No emissions			
													11048 1071	Phenol	No emissions			

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
511002. Return water treatment in the residential and commercial sectors; Terminal F; storm water drainage treatment facilities	161	pipe	1.7	0.2	1607	5894	–	–	in the pipe	0.045	1.43	12	05002 333	Hydrogen sulphide	No emissions			
													11000 10447	Oil hydrocarbons	No emissions			
													11048 1071	Phenol	No emissions			
162–165	Open air parking for mobile sources																	
120105, stationary engines; terminal D; diesel-generator unit; diesel-generator SDMC X2800 No. 1	166	pipe	15.4	3.5	2212	6945	–	–	–	6.8	34.65	500	06000 337	Carbon oxide	–	0.111458	0.4012488	0.001606
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	–	0.022292	0.0802512	0.000321
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	–	4.0125	14.445	0.005783
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	–	0.044583	0.1604988	0.000643
													31000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0535	0.1926	0.000771
120105, stationary engines; terminal D; diesel-generator unit; diesel-generator SDMO X2800 No. 2	167	pipe	15.4	0.5	2212	6958	–	–	–	6.8	34.65	500	06000 337	Carbon oxide	–	0.111458	0.4012488	0.001606
													03000 2902	Substances in the form of suspended solid particles non-differentiated by composition	–	0.022292	0.0802512	0.000321
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	–	4.0125	14.445	0.005783
													05001 330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	–	0.044583	0.1604988	0.000643
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0535	0.1926	0.000771

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310402. Other types of transportation and storage (including pipelines); Terminal D, diesel-generator unit; consumption tank — 4 units	168	Breathing nozzle	–	–	2224	6952	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.00000026	0.000000936	0.0000082
310402. Other types of transportation and storage (including pipelines); Terminal D; DO reservoir	169	Breathing nozzle	–	–	2200	6877	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.00000015	0.00000054	0.0000048
310402. Other types of transportation and storage (including pipelines); Terminal D; DO reservoir filler neck	170	fugitive	–	–	2200	6888	–	–	–	–	–	27.8	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0000002	0.00000072	0.000000001
Terminal D, motor transport parking lot D2; D3; D1	171, 172; 173	Open air parking for mobile sources																
130326; metal welding; FRLES, TP-1023; welding station	174	pipe	2.7	0.1	1234	7300	–	–	in the pipe	0.077	10.55	16	323	Silicon dioxide	–	0.000472	0.0016992	0.000027
													10226	Titanium dioxide	–	0.000131	0.0004716	0.000007
													01003 123	Iron and its compounds (in terms of iron)	10.1	0.00078	0.002808	0.00009
													01104 143	Mangan and its compounds (in terms of mangan dioxide)	3.54	0.000273	0.0009828	0.000024
210415; storage of inorganic chemical products; FOMS, fuel and oil materials procurement and SR, CFS, laboratories of fuel and oil materials No. 1 and of special fluid No. 2; analysis sites — 4 units	175	pipe	5.5	0.13 × 0.135	1696	5008	–	–	in the pipe	0.242	14.99	19	10442	Potassium hydroxide	Lower than LOQ	0.00001	0.000036	0.000036

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310503. Service stations (including car refuelling); FFS-2 (modular FFS-30), HST-20	176	Breathing nozzle	–	–	1623	5606	–	–	–	–	–	27.4	1100027 54	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000017	0.0000612	0.00055
310503. Service stations (including car refuelling); FFS-2 (modular FFS-30); filler neck of HST-20	177	fugitive	–	–	1623	5607	–	–	–	–	–	27.4	1100027 54	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000026	0.0000936	0.000001
310503. Service stations (including car refuelling); FFS-2 (modular FFS-30), HST-10	178	Breathing nozzle	–	–	1627	5606	–	–	–	–	–	27.4	1100027 32	Kerosene	–	0.000008	0.0000288	0.000122
													1100027 54	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000005	0.000018	0.000088
310503. Service stations (including car refuelling); FFS-2 (modular FFS-30); filler neck of HST-10	179	fugitive	–	–	1627	5607	–	–	–	–	–	27.4	1100027 32	Kerosene	–	0.000011	0.0000396	0.00000008
													1100027 54	Saturated hydrocarbons C_{12}–C_{19} (RPK-265 P solvent, etc.)	–	0.000008	0.0000288	0.0000001
310503. Service stations (including car refuelling); FFS-2; (modular FFS-30); dispensing gun; (car tank)	180	fugitive	–	–	1630	5607	–	–	–	–	–	27.4	1100027 32	Kerosene	–	0.000006	0.0000216	0.00000009
													1100027 54	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000013	0.0000468	0.0000011
310503. Service stations (including car refuelling); FFS-3 (modular FFS-30), HST-20	181	Breathing nozzle	–	–	2213	7650	–	–	–	–	–	27.4	1100027 54	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.00001	0.000036	0.000552

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
310503. Service stations (including car refuelling); FFS-3 (modular FFS-30); filler neck of HST-20	182	fugitive	–	–	2213	7651	–	–	–	–	–	27.4	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000015	0.000054	0.0000005
310503. Service stations (including car refuelling); FFS-3 (modular FFS-30), HST-10	183	Breathing nozzle	–	–	2217	7650	–	–	–	–	–	27.4	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000015	0.000054	0.000489
310503. Service stations (including car refuelling); FFS-3 (modular FFS-30); filler neck of HST-10	184	fugitive	–	–	2217	7651	–	–	–	–	–	27.4	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000023	0.0000828	0.000001
310503. Service stations (including car refuelling); FFS-3 (modular FFS-30); dispensing gun; (car tank)	185	fugitive	–	–	2220	7651	–	–	–	–	–	27.4	11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.0000006	0.00000216	0.0000016
310503. Service stations (including car fuelling); EVS, repairs shop; combustion engine — 3 units	186	pipe	9.2	0.63	1596	7430	–	–	in the pipe	2.56	8.97	18	06000 337	Carbon oxide	Lower than LOQ	0.030356	0.1092816	0.000057
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	Lower than LOQ	0.0011	0.00396	0.00000135
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000283	0.0010188	0.0000034

1	2	3	4	5	6	7	8	9	10	11	12	13	34	15	16	17	18	19
310503. Service stations (including car fuelling); EVS, repairs shop; combustion engine — 3 units	187	pipe	9.2	0.63	1537	7435	–	–	in the pipe	2.52	8.83	18	06000 337	Carbon oxide	Lower than LOQ	0.029881	0.1075716	0.000057
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	Lower than LOQ	0.001083	0.0038988	0.00000133
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000279	0.0010044	0.0000033
310503. Service stations (including car fuelling); EVS, repairs shop; combustion engine — 3 units	188	pipe	9.2	0.63	1534	7445	–	–	in the pipe	2.51	8.84	18	06000 337	Carbon oxide	Lower than LOQ	0.029763	0.1071468	0.000056
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	Lower than LOQ	0.001078	0.0038808	0.00000132
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000278	0.0010008	0.0000033
310503. Service stations (including car fuelling); EVS, diagnostics shop; combustion engine — 1 UNIT	189	pipe	9.2	0.4	1534	7446	–	–	in the pipe	0.696	6.05	18	06000 337	Carbon oxide	Lower than LOQ	0.030	0.108	0.0002235
													04001 301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	Lower than LOQ	0.00068	0.002448	0.0000013
													11000 2754	C_{12}–C_{19} saturated hydrocarbons (RPK-26511 solvent, etc.) (in terms of total organic carbon)	–	0.000175	0.00063	0.0000004

10 Assessment of the impact of pollutant emissions on the state of air pollution

Assessment of the impact of pollutant emissions on the state of air pollution is performed based on the data of calculation of pollutants dispersal in the atmospheric air.

All the permanent and simultaneously operating emission sources were taken for calculation of pollutants dispersal. Before calculating pollution dispersal the coefficient of practicality of calculations for all pollutants was determined under OND-86.

It is practical to calculate pollutant dispersal if

$$(M/MPC) > F;$$

$$F = 0.01\ H, \text{ if } H > 10 \text{ m};$$

$$F = 0.1, \text{ if } H < 10 \text{ m},$$

where: M is the total value of emissions from all emission sources of the enterprise (g/sec);

MPC — maximum permissible concentration of the substance (mg/m^3);

H –is the average weighted height.

Determination of the dispersal calculation practicality is given in the table:

No.	Substance code	Substance name	Average weighted height	Enterprise emission		MPC	M/MPC/H, where H > 10	Practicality of dispersal calculation (yes or no) M/MPC > F
			m	g/sec	tons/year	mg/m^3	M/MPC for H < 10	
1	2	3	4	5	6	7	8	9
1	110	Vanadium and its compounds (in terms of vanadium pentoxide)	5.0	0.00014400	0.000003	0.02	0.0072	No
2	123	Iron and its compounds (in terms of iron)	5.0	0.01957300	0.058297	0.4	0.049	No
3	143	Mangan and its compounds (in terms of mangan dioxide)	5.0	0.00318700	0.0028233	0.01	0.32	Yes
4	150	Sodium hydroxide (lye, caustic soda)	5.0	0.00088400	0.010568	0.01	0.088	No
5	183	Mercury and its compounds (in terms of mercury)	–	–	0.000029	0.01	–	No

1	2	3	4	5	6	7	8	9
6	184	Lead and its compounds (in terms of lead)	5.0	0.00000600	0.0000008	0.001	0.006	No
7	203	Chromium and its compounds (in terms of chromium trioxide)	5.0	0.00062000	0.000029	0.002	0.31	Yes
8	301	Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide	16.0906	10.66399900	7.4334107	0.2	3.3137	Yes
9	322	Sulfuric acid (H2S04) (sulphuric acid)	5.1897	0.00991100	0.108974	0.3	0.0064	No
10	323	Silicon dioxide	5.0	0.00283200	0.00108	0.02	0.14	Yes
11	330	Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide	22.7466	0.96197020	0.8614876	0.5	0.085	Yes
12	337	Carbon oxide	5.871	5.65079430	10.3176189	5.0	0.19	Yes
13	342	Fluor and its vaporous and gaseous compounds in terms of hydrogen fluoride	5.0	0.00117100	0.000225	0.02	0.059	No
14	343	Highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor	5.0	0.00384000	0.0007689	0.03	0.13	Yes
15	344	Slightly soluble inorganic fluorides (aluminium and calcium fluoride)	5.0	0.00216000	0.00048	0.2	0.011	No
16	410	Methane	–	–	0.293606	0.2	–	No
17	514	2-Methylpropene (isobutylene)	5.0	0.00000700	0.00001	0.1	0.00007	No
18	616	Xylene	5.0	0.13847900	0.058344	0.2	0.69	Yes
19	620	Styrene	5.0	0.01930000	0.01125	0.04	0.48	Yes
20	621	Toluene	5.0	0.08811800	0.039041	0.6	0.15	Yes
21	1042	Butanol	5.0	0.10157600	0.017084	0.1	1.0158	Yes
22	1052	Methanol	5.0	0.00091700	0.00143	1.0	0.00092	No
23	1061	Ethanol	5.0	0.14553600	0.006281	5.0	0.029	No
24	1210	Butyl acetate	5.0	0.09324700	0.050784	0.1	0.93	Yes
25	1240	Ethyl acetate	5.0	0.07011500	0.01359	0.1	0.7	Yes
26	1246	Ethylene glycol ethyl ether	5.0	0.08594600	0.010937	0.7	0.12	Yes
27	1319	Dimethoxymethane (methylal, dimethylformal)	5.0	0.00095600	0.001376	0.05	0.019	No
28	1401	Acetone	5.0	0.05114300	0.002092	0.35	0.15	Yes
29	2001	Acrylonitrile	5.0	0.00000200	0.000003	0.3	0.0000067	No
30	2704	Gasoline (petroleum, low-sulphur, in terms of carbon)	5.0	0.07006100	0.8952425	5.0	0.014	No
31	2732	Kerosene	5.0	0.18003250	0.12536994	1.2	0.15	Yes
32	2735	Mineral petroleum oil (spindle, engine, cylindrical, etc.)	5.0	0.00052200	0.000394	0.05	0.01	No
33	2750	Solvent oil	5.0	0.01245600	0.014156	0.2	0.062	No
34	2752	White spirit	5.0	0.42380800	0.049834	1.0	0.42	Yes
35	2754	Saturated hydrocarbons C_{12}–C_{19} (RPK-265 P solvent, etc.)	5.3344	3.19977782	1.42474676	1.0	0.6	Yes
36	2902	Substances in the form of suspended solid particles non-differentiated by composition	5.8093	0.71993700	0.8431894	0.5	0.25	Yes
37	10226	Titanium dioxide	5.0	0.00078600	0.000253	0.5	0.0016	No

1	2	3	4	5	6	7	8	9
38	10368	Asbestos (chrysotile, crocidolite, amosite, anthophyllite, actinolite, tremolite) as fine dust	5.0	0.00013400	0.000022	0.6	0.00022	No
39	10411	Aliphatic hydrocarbons	5.0	0.01305800	0.015657		–	No
40	10442	Potassium hydroxide	5.0	0.00001000	0.000036	–	–	No
41	11812	Carbon dioxide	–	–	15,909.40073	–	–	No
42	11815	Nitrogen (I) oxide (N_20)	–	–	0.031744	–		No

Calculation of pollutant dispersal was performed using EOL-Plus programming complex, version 5.23.

Based on the calculation data ground-level concentration of the pollutants, for which dispersal calculation is practical, at the border of the sanitary protection area (not counting the background concentrations) do not exceed the permissible levels and constitute:

- nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide — 0.66 MPC;
- for other substances — less than 0.1 MPC.

Calculation of dispersal taking into account background concentrations provided by the Department of Ecology and Natural Resources of Kyiv Regional State Administration given below was also performed.

- Mangan and its compounds (in terms of mangan dioxide) — 0.004 mg/m3 (0.4 MPC);
- Chromium and its compounds (in terms of chromium trioxide) –— 0.0006 mg/m3 (0.3 MPC);
- Nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide –— 0.008 mg/m3 (0.04 MPC);
- Silicon dioxide –— 0.008 mg/m3 (0.4 MPC);
- Sulphur dioxide (dioxide and trioxide) in terms of sulphur dioxide –— 0.2 mg/m3 (0.4 MPC);
- Highly soluble fluorides (for instance, NaF) and their compounds in terms of fluor –— 0.012 mg/m3 (0.4 MPC);
- Xylene –— 0.08 mg/m3 (0.4 MPC);
- Styrene –— 0.016 mg/m3 (0.4 MPC);
- Toluene –— 0.24 mg/m3 (0.4 MPC);
- Butanol –—0.04 mg/m3 (0.4 MPC);

- Butyl acetate 0.04 mg/m3 (0.4 MPC);
- Ethyl acetate — 0.04 mg/m3 (0.4 MPC);
- Ethylene glycol ethyl ether — 0.28 mg/m3 (0.4 MPC);
- Acetone — 0.14 mg/m3 (0.4 MPC);
- Kerosene — 0.48 mg/m3 (0.4 MPC);
- White spirit — 0.4 mg/m3 (0.4 MPC);
- C_{12}–C_{19} saturated hydrocarbons (RPK-265 solvent, etc.) (in terms of total organic carbon) — 0.4 mg/m3 (0.4 MPC);
- Substances in the form of suspended solid particles non-differentiated by composition — 0.05 mg/m3 (0.1 MPC).

Ground level concentrations of pollutants at the border of the sanitary protection area (taking into account background concentrations) do not exceed permissible levels and constitute:

- nitrogen oxides (oxide and nitrogen dioxide) in terms of nitrogen dioxide — 0.67 MPC;
- C_{12}–C_{19} saturated hydrocarbons (RPK-265 solvent, etc.) (in terms of total organic carbon) — 0.11 MPC;
- for other substances — less than 0.1 MPC.

Isoline maps of calculated ingredient concentrations given in Annex 3 clearly demonstrate the distribution of concentrations in the determined calculation rectangle and at the border of sanitary protection area.

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[State Medal]

The State Emergency Service of Ukraine
CENTRAL GEOPHYSICAL OBSERVATORY named after Borys Sreznevsky
(CGO named after Borys Sreznevsky)
39 Nauky Ave., Building 2, 03028 Kyiv
Tel./Fax: +38 (044) 525 94 58, 525 69 69
http://www.cgo-sreznevskyi.kiev.ua
E-mail: aupcgo@meteo.gov.ua
EDRPOU (Unified Public Register of Enterprises and Organizations of Ukraine) Code 22864480

20 August 2020 No. 02-14.1/1768/06-327 To Ref._____ as of _____

Attn. of Director of ECO GLOBAL NEST LLC
Ms. Iryna KORNIYENKO

Regarding the meteorological geographical features

Subject to your request hereby we provide the following climatic indicators (meteorological geographical features) as per Boryspil weather station data that have been averaged in the CGO named after Borys Sreznevsky over a 30-year period of aerography for Martusivka village of Boryspil district of Kyiv region.

1. The average maximum air temperature in the hottest month (July) is 24.8° C.
2. The average air temperature in the coldest month (January) is minus 6.2° C.
3. The wind speed with 5% excess repetition is 9 m/s.
4. The average annual wind speed is 3.4 m/s.
5. The average annual wind frequency of wind directions:

Wind direction, (%)							
North	*North east*	*East*	*South east*	*South*	*South west*	*West*	*North west*
13.0	9.9	9.8	11.8	13.9	13.4	15.4	12.8

The coefficient that includes the impact of the terrain relief on dispersal of pollutants shall be determined individually in each particular case. If within a radius of 50 heights of the highest enterprise pipe the terrain point difference is less than 50 m per 1 km, the terrain relief coefficient shall be taken as **1** (one). Otherwise, the relief correction shall be determined based on cartographical material that shows terrain relief within a radius of 50 pipe heights from the pollution source according to the OND-86 (All-Union Regulatory Document) Goskomgidromet (the USSR State Committee for Hydrometeorology and Environmental Surveillance), "Methodology for calculating the concentration in the atmospheric air of harmful substances discharged by the enterprise."

The atmospheric stratification coefficient for pollution sources with the height less than 200 m located in Ukraine in the area from 50° N. latitude to 52° N. latitude is 180, and the one located more to the south of 50° N. latitude is 200.

This information is provided to draw up the Environmental impact analysis report regarding the planned reconstruction activity in maneuvering area No.2 of Boryspil International Airport State Enterprise.

Director [*Signature affixed*] Oleksandr KOSOVETS

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[State Medal]

The State Emergency Service of Ukraine
CENTRAL GEOPHYSICAL OBSERVATORY named after Borys Sreznevsky
(CGO named after Borys Sreznevsky)
39 Nauky Ave., Building 2, 03028 Kyiv
Tel./Fax: +38 (044) 525 94 58, 525 69 69
http://www.cgo-sreznevskyi.kiev.ua
E-mail: aupcgo@meteo.gov.ua
EDRPOU (Unified Public Register of Enterprises and Organizations of Ukraine) Code 22864480

20 August 2020 No. 02-14.1/1768/06-327 To Ref._____ as of_____

Attn. of Director of ECO GLOBAL NEST LLC
Ms. Iryna KORNIYENKO

Regarding the meteorological geographical features

Subject to your request hereby we provide the following climatic indicators (meteorological geographical features) as per Boryspil weather station data that have been averaged in the CGO named after Borys Sreznevsky over a 30-year period of aerography for Hora village of Boryspil district of Kyiv region.

1. The average maximum air temperature in the hottest month (July) is 24.8° C.
2. The average air temperature in the coldest month (January) is minus 6.2° C.
3. The wind speed with 5% excess repetition is 9 m/s.
4. The average annual wind speed is 3.4 m/s.
5. The average annual wind frequency of wind directions:

Wind direction, (%)							
North	*North east*	*East*	*South east*	*South*	*South west*	*West*	*Nort-west*
13.0	9.9	9.8	11.8	13.9	13.4	15.4	12.8

The coefficient that includes the impact of the terrain relief on dispersal of pollutants shall be determined individually in each particular case. If within a radius of 50 heights of the highest enterprise pipe the terrain point difference is less than 50 m per 1 km, the terrain relief coefficient shall be taken as **1** (one). Otherwise, the relief correction shall be determined based on cartographical material that shows terrain relief within a radius of 50 pipe heights from the pollution source according to the OND-86 (All-Union Regulatory Document) Goskomgidromet (the USSR State Committee for Hydrometeorology and Environmental Surveillance), "Methodology for calculating the concentration in the atmospheric air of harmful substances discharged by the enterprise."

The atmospheric stratification coefficient for pollution sources with the height less than 200 m located in Ukraine in the area from 50° N. latitude to 52° N. latitude is 180, and the one located more to the south of 50° N. latitude is 200.

This information is provided to draw up the Environmental impact analysis report regarding the planned reconstruction activity in maneuvering area No.2 of Boryspil International Airport State Enterprise.

Director [*Signature affixed*] Oleksandr KOSOVETS

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CENTRAL GEOPHYSICAL OBSERVATORY named after Borys Sreznevsky
(CGO named after Borys Sreznevsky)
39 Nauky Ave., Building 2, 03028 Kyiv
Tel./Fax: +38 (044) 525 94 58, 525 69 69
http://www.cgo-sreznevskyi.kiev.ua
E-mail: aupcgo@meteo.gov.ua
EDRPOU (Unified Public Register of Enterprises and Organizations of Ukraine) Code 22864480

20 August 2020 No. 02-14.1/1768/06-327 To Ref._____ as of _____

Attn. of Director of ECO GLOBAL NEST LLC
Ms. Iryna KORNIYENKO

Regarding the meteorological geographical features

Subject to your request hereby we provide the following climatic indicators (meteorological geographical features) as per Boryspil weather station data that have been averaged in the CGO named after Borys Sreznevsky over a 30-year period of aerography for Zatyshne village of Boryspil district of Kyiv region.

1. The average maximum air temperature in the hottest month (July) is 24.8° C.
2. The average air temperature in the coldest month (January) is minus 6.2° C.
3. The wind speed with 5% excess repetition is 9 m/s.
4. The average annual wind speed is 3.4 m/s.
5. The average annual wind frequency of wind directions:

Wind direction, (%)							
North	*North east*	*East*	*South east*	*South*	*South west*	*West*	*North west*
13.0	9.9	9.8	11.8	13.9	13.4	15.4	12.8

The coefficient that includes the impact of the terrain relief on dispersal of pollutants shall be determined individually in each particular case. If within a radius of 50 heights of the highest enterprise pipe the terrain point difference is less than 50 m per 1 km, the terrain relief coefficient shall be taken as **1** (one). Otherwise, the relief correction shall be determined based on cartographical material that shows terrain relief within a radius of 50 pipe heights from the pollution source according to the OND-86 (All-Union Regulatory Document) Goskomgidromet (the USSR State Committee for Hydrometeorology and Environmental Surveillance), "Methodology for calculating the concentration in the atmospheric air of harmful substances discharged by the enterprise."

The atmospheric stratification coefficient for pollution sources with the height less than 200 m located in Ukraine in the area from 50° N. latitude to 52° N. latitude is 180, and the one located more to the south of 50° N. latitude is 200.

This information is provided to draw up the Environmental impact analysis report regarding the planned reconstruction activity in maneuvering area No.2 of Boryspil International Airport State Enterprise, located at the address: **82 Pryvokzalna Str., Boryspil, Kyiv region.**

Director [*Signature affixed*] Oleksandr KOSOVETS
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Annex 6
to Clause 5.6. of the Method of
Determining the Indexes of Background
Contaminants Concentrations in the air

Indexes presentation

INDEXES OF BACKGROUND CONTAMINANTS CONCENTRATIONS
(determined by calculation)

Department of Ecology and Natural Resources
of Kyiv Regional State Administration
(Name of organization issuing the background concentration indexes)

City (village) village of Hora, village of Martusivka, village of Zatyshne
Boryspil District
(name)
Region Kyiv
(name)

The organization requesting the background concentration indexes
ECO GLOBAL NEST LLC
(Name)

The company for which the background concentration indexes are determined
Reconstruction of Maneuvering area No. 2 of Boryspil International Airport State Enterprise
(Indicate name: operating, under reconstruction, new construction)

The list of contaminants for which the background concentration indexes are determined and substances with harmful effect accumulation
mangan and its compounds (recalculated as per manganese dioxide)
sodium hydroxide (sodium hydroxide, caustic soda), chrome and its compounds (recalculated as per chromium trioxide), nitrogen oxides (nitrogen oxide and dioxide) recalculated as per nitrogen dioxide, amorphous silicon dioxide (aerosil-175), sulphur dioxide, carbon oxide, highly soluble inorganic fluorides (sodium fluoride, sodium hexafluosilicate)/recalculated as per fluorine/ xylene, styrene, toluene, butyl alcohol, butyl acetate, ethyl acetate, 2-ethoxyethanol (ethylcellosolve, ethylene glycol ethyl oxide), acetone, gas, mineral spirit, saturated hydrocarbons C12-C19 (solvent РПК-26511, etc.) recalculated as per total organic carbon, contaminants in the form of suspended solids with undifferentiated composition

The background concentration indexes are determined taking into account the contribution of enterprise for which they are requested
the background concentrations indexes are determined generally throughout the settlement
(yes, no)

Based on the calculations the following indexes of
background contaminants concentrations
were determined :

Provisional coordinates of the pre-calculated rectangle	Name of Contaminant	Concentration, mg/cub.m.							
		Wind directions							
		N	NE	E	SE	S	SW	W	NW
0; 0	Mangan and its compounds (recalculated as per manganese dioxide)	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
	Sodium hydroxide (sodium hydroxide, caustic soda)	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
	Chrome and its compounds (recalculated as per chromium trioxide)	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006
	Nitrogen oxides (nitrogen oxide and dioxide) recalculated as per nitrogen dioxide	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
	Amorphous silicon dioxide (aerosil-175),	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008
	Sulphur dioxide	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	Carbon oxide	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	Highly soluble inorganic fluorides (sodium fluoride, sodium hexa fluosilicate)/recalculated as per fluorine/	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012
	Xylene	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
	Styrene	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
	Toluene	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
	Butyl alcohol	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	Butyl acetate	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	Ethyl acetate	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
	2-Ethoxyethanol (ethyl cellosolve, ethylene glycol ethyl oxide)	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
	Acetone	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
	Gas	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
	Mineral spirit	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	Saturated hydrocarbons C12-C19 (solvent RPK-26511, etc.) recalculated as per total organic carbon	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	Contaminants in the form of suspended solids with undifferentiated composition	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05

Authorized representative
of the body issuing the background concentration indexes

Acting Head of the Department

	[Signature affixed]	**Hanna TKALICH**
(Title)	(Signature)	(Surname, initials)

*[Official Seal: Ukraine*Kyiv Regional State Administration* Department of Ecology and Natural Resources*Identification number (illegible)*Trident – National Emblem of Ukraine]*

Kolesnikova, Tel.: 279 01 58

Annex No. 5

Description and parameters of the newly-created and reconstructed sources of pollutant emissions to the atmospheric air

Emission source number	Emission source title	Emission source height, in m	Emission source diameter, in m	Source coordinates: A point source or start of a line source; centre of symmetry of a plane source X1	Y1	A second end of a line source; width and length of a plane source X2	Y2	Angle of length of a plane source relative to OX axis of the factory system Degree	Parameters of a gas-and-dust flow in a measurement site: Flowrate, cub. nm per sec.	Speed, m per sec	Temperature, °C	Substance code according to 2-TP (2-TID) Air	Inventory code	Title of a pollutant	Output data to determine the amount of emission: Design Maximum weight concentration of a pollutant, in mg per cub. nm	Manufacturer-based Maximum weight concentration of a pollutant, * in mg per cub. nm	Design: g per sec	Design: tons per year	Manufacturer-based: g per sec	Manufacturer-based: tons per year	Determination of emission intensity: g per sec	Determination of emission intensity: tons per year
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
190	RW-1 inorganic movable sources aircraft	2		2679	6061	600	4000				27.4	4001	301	Nitrogen dioxide			0.018903	35.6482			0.018903	35.6482
												6000	337	Carbon oxide			0.116708	50.9382			0.116708	50.9382
												11000	2754	Carbohydrate threshold C12-C19			0.013191	5.8705			0.013191	5.8705
												3000	2902	suspended particles, non-differentiated by composition			0.000125	0.09676			0.000125	0.09676
												3004	328	soot								
191	Terminal D ramp inorganic movable motor transport	2		2281	7166	200	800	-3			27.4	4001	301	Nitrogen dioxide			0.03961	0.04970			0.03961	0.04970
												4003	303	Ammonia			0.0000001	0.000002			0.0000001	0.000002
												4002	304	Nitrogen oxide			0.00017	0.00021			0.00017	0.00021
												5001	330	Sulphurous anhydride			0.00569	0.00622			0.00569	0.00622
												6000	337	Carbon oxide			0.08156	0.24437			0.08156	0.24437
												12000	410	Methane			0.00045	0.00108			0.00045	0.00108
												13101	703	Benzo[a]pyrene			0.00004	0.00000			0.00004	0.00000
												11000	2754	Non-methane volatile organic compounds			0.01150	0.03683			0.01150	0.03683
												3000	2902	suspended particles, non-differentiated by composition			0.00912	0.00912			0.00912	0.00912
												3004	328	soot								
														Carbon dioxide			4.22375	5.90782			4.22375	5.90782
192	Terminal B ramp inorganic movable motor transport	2		1912	5506	225	620	-3			27.4	4001	301	Nitrogen dioxide			0.017131	0.013500			0.017131	0.013500
												4003	303	Ammonia			0.00000008	0.000001			0.00000008	0.000001
												4002	304	Nitrogen oxide			0.000075	0.000056			0.000075	0.000056
												5001	330	Sulphurous anhydride			0.017131	0.001699			0.017131	0.001699
												6000	337	Carbon oxide			0.037018	0.064487			0.037018	0.064487
												12000	410	Methane			0.000196	0.000287			0.000196	0.000287
												13101	703	Benzo[a]pyrene			0.000003	0.000001			0.000003	0.000001
												11000	2754	Non-methane volatile organic compounds			0.0052193	0.00973			0.0052193	0.00973
												3000	2902	suspended particles, non-differentiated by composition			0.003909	0.002501			0.003909	0.002501
												3004	328	soot								
														Carbon dioxide			1.83259	1.59523			1.83259	1.59523
193	Terminal F ramp inorganic movable motor transport	2		1307	6276	225	2000	3			27.4	4001	301	Nitrogen dioxide			0.03108	0.03754			0.03108	0.03754
												4003	303	Ammonia			0.0000001	0.000001			0.0000001	0.000001
												4002	304	Nitrogen oxide			0.00014	0.00015			0.00014	0.00015
												5001	330	Sulphurous anhydride			0.00447	0.00490			0.00447	0.00490
												6000	337	Carbon oxide			0.06288	0.15303			0.06288	0.15303
												12000	410	Methane			0.00031	0.00071			0.00031	0.00071

												13101	703	Benzo[a]pyrene			0.00003	0.000003			0.00003	0.000003
												11000	2754	Non-methane volatile organic compounds			0.00839	0.02305			0.00839	0.02305
												3000	2902	suspended particles, non-differentiated by composition			0.00717	0.00739			0.00717	0.00739
												3004	328	soot								
														Carbon dioxide			3.30745	4.32412			3.30745	4.32412
200	RW-2 inorganic movable sources aircraft	2		1094	5302	600	3800				27.4	4001	301	Nitrogen dioxide			0.04333	35.64816			0.04333	35.64816
												6000	337	Carbon oxide			0.21772	50.93818			0.21772	50.93818
												11000	2754	Carbohydrate threshold C12-C19			0.01877	5.87049			0.01877	5.87049
												3000	2902	suspended particles, non-differentiated by composition								
												3004	328	soot			0.00047	0.09676			0.00047	0.09676
201	pressure vent valve of a service station (including motor vehicle filling); filling station – storage of diesel fuel oil	5	0.05	1621	5584						27.4	5002	333	Hydrogen sulphide			2.0E-09	6.4E-08			2.0E-09	6.4E-08
												11000	2754	Non-methane volatile organic compounds			7.2E-07	2.3E-05			7.2E-07	2.3E-05
												11000	10312	Carbohydrate aromatic			1.1E-09	3.4E-08			1.1E-09	3.4E-08
202	pressure vent valve of a service station (including motor vehicle filling); filling station – storage of jet fuel (kerosene)	5	0.05	1621	5576						27.4	5002	333	Hydrogen sulphide			2.9E-10	9.3E-09			2.9E-10	9.3E-09
												11000	2754	Non-methane volatile organic compounds			4.9E-07	1.5E-05			4.9E-07	1.5E-05
												11000	10312	Carbohydrate aromatic			4.9E-10	1.5E-08			4.9E-10	1.5E-08
203	pressure vent valve of a service station (including motor vehicle filling); filling station – storage of diesel fuel oil	5	0.05	1621	5566						27.4	5002	333	Hydrogen sulphide			2.2E-09	6.9E-08			2.2E-09	6.9E-08
												11000	2754	Non-methane volatile organic compounds			7.7E-07	2.4E-05			7.7E-07	2.4E-05
												11000	10312	Carbohydrate aromatic			1.2E-09	3.7E-08			1.2E-09	3.7E-08
204	pressure vent valve of a service station (including motor vehicle filling); filling station – storage of diesel fuel oil	5	0.05	1621	5560						27.4	5002	333	Hydrogen sulphide			3.9E-07	1.3E-08			3.9E-07	1.3E-08
												11000	2754	Non-methane volatile organic compounds			1.4E-04	4.5E-06			1.4E-04	4.5E-06
												11000	10312	Carbohydrate aromatic			2.1E-07	6.8E-09			2.1E-07	6.8E-09
205	filler port inorganic service stations (including motor vehicle filling); filling station, diesel fuel oil	4	0.5	1621	5582						27.4	5002	333	Hydrogen sulphide			3.9E-07	1.3E-08			3.9E-07	1.3E-08
												11000	2754	Non-methane volatile organic compounds			1.4E-04	4.5E-06			1.4E-04	4.5E-06
												11000	10312	Carbohydrate aromatic			2.1E-07	6.8E-09			2.1E-07	6.8E-09
206	filler port inorganic service stations (including motor vehicle filling); filling station, jet fuel (kerosene)	4	0.5	1621	5578						27.4	5002	333	Hydrogen sulphide			4.4E-06	4.7E-08			4.4E-06	4.7E-08
												11000	2754	Non-methane volatile organic compounds			7.3E-03	7.9E-05			7.3E-03	7.9E-05
												11000	10312	Carbohydrate aromatic			7.3E-06	7.9E-08			7.3E-06	7.9E-08
207	filler port inorganic service stations (including motor vehicle filling); filling station, diesel fuel oil	4	0.5	1621	5562						27.4	5002	333	Hydrogen sulphide			3.9E-07	1.6E-08			3.9E-07	1.6E-08
												11000	2754	Non-methane volatile organic compounds			1.4E-04	5.5E-06			1.4E-04	5.5E-06
												11000	10312	Carbohydrate aromatic			2.1E-07	8.3E-09			2.1E-07	8.3E-09
208	filler port inorganic service stations (including	4	0.5	1621	5564						27.4	5002	333	Hydrogen sulphide			3.9E-07	1.3E-08			3.9E-07	1.3E-08
												11000	2754	Non-methane volatile organic compounds			1.4E-04	4.5E-06			1.4E-04	4.5E-06
												11000	10312	Carbohydrate aromatic			2.1E-07	6.8E-09			2.1E-07	6.8E-09

	motor vehicle filling); filling station, diesel fuel oil																						
209	fuel nozzle inorganic service stations (including motor vehicle filling); filling station, diesel fuel oil	1.5	0.1	1620	5584						27.4	5002	333	Hydrogen sulphide			1.4E-04	2.7E-05			1.4E-04	2.7E-05
												11000	2754	Non-methane volatile organic compounds			5.0E-02	9.6E-03			5.0E-02	9.6E-03
												11000	10312	Carbohydrate aromatic			7.5E-05	1.4E-05			7.5E-05	1.4E-05
210	fuel nozzle inorganic service stations (including motor vehicle filling); filling station, jet fuel (kerosene)	1.5	0.1	1622	5584						27.4	5002	333	Hydrogen sulphide			1.2E-10	1.0E-11			1.2E-10	1.0E-11
												11000	2754	Non-methane volatile organic compounds			1.9E-07	1.7E-08			1.9E-07	1.7E-08
												11000	10312	Carbohydrate aromatic			1.9E-10	1.7E-11			1.9E-10	1.7E-11
211	fuel nozzle inorganic service stations (including motor vehicle filling); filling station, diesel fuel oil	1.5	0.1	1620	5559						27.4	5002	333	Hydrogen sulphide			7.8E-05	2.9E-05			7.8E-05	2.9E-05
												11000	2754	Non-methane volatile organic compounds			2.8E-02	1.0E-02			2.8E-02	1.0E-02
												11000	10312	Carbohydrate aromatic			4.2E-05	1.6E-05			4.2E-05	1.6E-05
212	fuel nozzle inorganic service stations (including motor vehicle filling); filling station, diesel fuel oil	1.5	0.1	1622	5559						27.4	5002	333	Hydrogen sulphide			7.8E-05	1.3E-05			7.8E-05	1.3E-05
												11000	2754	Non-methane volatile organic compounds			2.8E-02	4.5E-03			2.8E-02	4.5E-03
												11000	10312	Carbohydrate aromatic			4.2E-05	6.8E-06			4.2E-05	6.8E-06
213	Chimney stationary engines; СРСТЗП, PEM, diesel-generator plant; diesel generator	7	0.15	636	3832				1.08	61.12	630	4001	301	Nitrogen dioxide	185.185		0.200000	0.05454			0.200000	0.05454
												5001	330	Sulphurous anhydride	57.870		0.062500	0.01704			0.062500	0.01704
												6000	337	Carbon oxide	149.498		0.161458	0.04431			0.161458	0.04431
												13101	703	Benzo[a]pyrene	0.000		0.0000002	0.0000001			0.0000002	0.0000001
												11049	1325	Formaldehyde	1.653		0.001786	0.00049			0.001786	0.00049
												11000	2754	Non-methane volatile organic compounds	39.958		0.043155	0.01169			0.043155	0.01169
												11000	2902	suspended particles, non-differentiated by composition	6.889		0.007440	0.00195			0.007440	0.00195
												3004	328	soot								
214	pressure vent valve other types of transportation and storage (including pipelines); СРСТЗП, PEM, diesel-generator plant; reservoir with diesel fuel oil	7	0.05	636	3828						27.4	5002	333	Hydrogen sulphide			2.8E-11	8.9E-10			2.8E-11	8.9E-10
												11000	2754	Non-methane volatile organic compounds			1.0E-08	3.2E-07			1.0E-08	3.2E-07
												11000	10312	Carbohydrate aromatic			1.5E-11	4.8E-10			1.5E-11	4.8E-10
215	filler port inorganic other types of transportation and storage (including pipelines); СРСТЗП, PEM, diesel-generator plant; reservoirs with diesel fuel oil	4	0.5	636	3823						27.4	5002	333	Hydrogen sulphide			3.9E-07	7.6E-10			3.9E-07	7.6E-10
												11000	2754	Non-methane volatile organic compounds			1.4E-04	5.0E-07			1.4E-04	5.0E-07
												11000	10312	Carbohydrate aromatic			2.1E-07	1.4E-09			2.1E-07	1.4E-09
216	Chimney stationary engines; СРСТЗП,	7	0.15	630	6969				1.08	61.12	630	4001	301	Nitrogen dioxide	185.185		0.200000	0.05454			0.200000	0.05454
												5001	330	Sulphurous anhydride	57.87		0.062500	0.01704			0.062500	0.01704

	PEM diesel-generator plant; diesel generator											6000	337	Carbon oxide	0 149.498		0.161458	0.04431			0.161458	0.04431
												13101	703	Benzo[a]pyrene	0.000		0.0000002	0.0000001			0.0000002	0.0000001
												11049	1325	Formaldehyde	1.653		0.001786	0.00049			0.001786	0.00049
												11000	2754	Non-methane volatile organic compounds	39.958		0.043155	0.01169			0.043155	0.01169
												11000	2902	suspended particles, non-differentiated by composition	6.889		0.007440	0.00195			0.007440	0.00195
												3004	328	soot								
217	pressure vent valve other types of transportation and storage (including pipelines); CPCT3FL PEM diesel-generator plant; reservoir with diesel fuel oil	7	0.05	630	6969						27.4	5002	333	Hydrogen sulphide			2.8E-11	8.9E-10			2.8E-11	8.9E-10
												11000	2754	Non-methane volatile organic compounds			1.0E-08	3.2E-07			1.0E-08	3.2E-07
												11000	10312	Carbohydrate aromatic			1.5E-11	4.8E-10			1.5E-11	4.8E-10
218	filler port inorganic other types of transportation and storage (including pipelines); CPCT3FL PEM diesel-generator plant; reservoirs with diesel fuel oil	4	0.5	630	6960						27.4	5002	333	Hydrogen sulphide			3.9E-07	7.6E-10			3.9E-07	7.6E-10
												11000	2754	Non-methane volatile organic compounds			1.4E-04	5.0E-07			1.4E-04	5.0E-07
												11000	10312	Carbohydrate aromatic			2.1E-07	1.4E-09			2.1E-07	1.4E-09
219	inorganic site for testing aircraft engines	2		1267	4096	170	100	-3			27.4	4001	301	Nitrogen dioxide			0.01890	562.2009			0.01890	562.2009
												6000	337	Carbon oxide			0.11671	391.7258			0.11671	391.7258
												11000	2754	Carbohydrate threshold C12-C19			0.01319	44.5543			0.01319	44.5543
												3000	2902	suspended particles, non-differentiated by composition								
												3004	328	soot			0.00012	0.55186			0.00012	0.55186
220	Baffle storage shed for ERS motor vehicles	8	0.5	1318	6500				0.295	1.5	27.4	4001	301	Nitrogen dioxide	47.603		0.01402	0.00019			0.01402	0.00019
												4002	304	Nitrogen oxide	0.191		0.00006	0.000001			0.00006	0.000001
												5001	330	Sulphurous anhydride	6.862		0.00202	0.00003			0.00202	0.00003
												6000	337	Carbon oxide	86.652		0.02552	0.00034			0.02552	0.00034
												12000	410	Methane	0.559		0.00016	0.000002			0.00016	0.000002
												13101	703	Benzo[a]pyrene	0.048		0.00001	0.0000002			0.00001	0.0000002
												11000	2754	Non-methane volatile organic compounds	13.022		0.00384	0.00005			0.00384	0.00005
												3000	2902	suspended particles, non-differentiated by composition	11.059		0.00326	0.00004			0.00326	0.00004
												3004	328	soot								
														Carbon dioxide	5007.6		1.47486	0.01947			1.47486	0.01947
221	ramp S inorganic movable motor vehicles	2	1327	6389	400	360	-3				27.4	4001	301	Nitrogen dioxide			0.02535	0.00676			0.02535	0.00676
												4003	303	Ammonia			0.00000004	0.0000002			0.00000004	0.0000002
												4002	304	Nitrogen oxide			0.00011	0.00003			0.00011	0.00003
												5001	330	Sulphurous anhydride			0.00365	0.00091			0.00365	0.00091
												6000	337	Carbon oxide			0.04930	0.02262			0.04930	0.02262
												12000	410	Methane			0.00028	0.00011			0.00028	0.00011
												13101	703	Benzo[a]pyrene			0.00003	0.000001			0.00003	0.000001
												11000	2754	Non-methane volatile organic compounds			0.00705	0.00340			0.00705	0.00340
												3000	2902	suspended particles, non-differentiated by composition			0.00586	0.00141			0.00586	0.00141
												3004	328	soot								
														Carbon dioxide			2.68613	0.75732			2.68613	0.75732

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ORNITHOLOGICAL AND ENVIRONMENTAL EXPERT APPRAISAL

Conducted by ornithologist Aleksandr Petrovich Shkrabaliuk over the period from 1 October to 31 December 2019 in line with a work order from Boryspil International Airport and contract agreement no. 14.5.38.19.12

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2. METHODOLOGY

Information was gathered using visual and acoustic methods:
1. the method of point counting of birds during daylight hours, during which all bird movements were registered with the aid of optical equipment from viewpoints of runways 36R18L and 36L18R.
2. the method of en route bird counting in the vicinity of the villages of Hora, Martusivka, Petrivske, Shchastlyve and Hlyboke, and also along the sludge beds of the Bortnychy aeration station, during which the bird species that made use of these territories in numbers to support their vital needs were recorded.
3. the method of counting natural vocalisation for migrating species at night time.

3. METEOROLOGICAL CONDITIONS AND WEATHER FEATURES

The ornithological studies were conducted over the period from 1 October to 31 December 2019.
The meteorological conditions were not typical for this time of year.
There was only a small amount of precipitation and average monthly temperatures were 2-4 degrees higher than normal.
Precipitation in the form of snow fell only in December, creating snow cover of 6 mm which persisted for only 7 days.
Major water bodies and the River Dnepr were not ice-bound, and minor water bodies were only ice-bound occasionally.

4. BIRD SPECIES RECORDED DURING THE STUDY PERIOD

Over the entire territory monitoring period, 69 bird species were recorded, 29 of which were migratory and 40 were sedentary, making wandering journeys but one way or another remaining present on the territory of the airport and its vicinity:

-common heron
-great white heron
-greylag goose
-white-fronted goose
-bean goose
-mute swan
-garganey
-northern shoveler
-European wigeon
-mallard
-rock dove
-stock dove
-wood pigeon
-collared dove
-moorhen
-coot
-common crane
-quail
-grey partridge
-common lapwing
-woodcock
-redshank
-black-headed gull
-common gull
-yellow-legged gull
-little owl
-long-eared owl
-short-eared owl
-hen harrier
-goshawk
-sparrow hawk
-white-tailed eagle
-rough-legged buzzard
-common buzzard
-kestrel
-kingfisher
-grey-headed woodpecker
-Syrian woodpecker
-greater spotted woodpecker

-middle spotted woodpecker
-lesser spotted woodpecker
-black woodpecker
-northern shrike
-common jay
-jackdaw
-rook
-raven
-hooded crow
-blue tit
-great tit
-long-tailed tit
-skylark
-crested lark
-swallow
-treecreeper
-nuthatch
-common starling
-mistle thrush
-blackbird
-fieldfare
-tree sparrow
-house sparrow
-pied wagtail
-hawfinch
-bullfinch
-greenfinch
-linnet
-goldfinch
-siskin

5. DESCRIPTION OF NATURE, TIMES AND DAILY FEATURES OF BIRD MOVEMENTS AND MIGRATIONS

Of the 29 species of migratory birds, 6 fly over the airport in transit without making any stops en route to rest or feed.

5.1 Nocturnal migrants

Waterside species: the greylag goose, the white-fronted goose, the bean goose, the northern shoveler, the wigeon and the common crane.
These species typically migrate along the Dnepr in the Dnepr migration corridor. The birds fly during the hours of darkness and in the early morning hours. The flying peak time band is from 22:00 hours to 2:00 hours. The greatest concentration of migrating flocks is seen in the Dnepr corridor close to the river, which is around 15 km wide. Migration takes place when there is a northerly or north-easterly tail wind – this is a mandatory condition for migration.

Above the territory of Boryspil airport, flocks of migratory geese and ducks were recorded, mainly at night time, but with some morning instances up to 10:00 hours. The flocks flew at a height of 300-400 m with a northerly wind, must commonly when it was cloudy.

The most intensive flying was recorded in the middle third of October. The flying birds could be heard all night long, and from dawn to 9:00 hours up to 19 flying flocks were recorded in the area of Boryspil airport. The fly-past of geese and ducks ended by 28 October. Rare flocks continued to be recorded during the first days of November. Common cranes were registered as flying above the airport during daytime on 4 occasions, with clear skies and a north-easterly tail wind. The cranes were flying at a height of 250-400 m.

The remaining 23 species of migrant birds make a stop in the territory of the airport or near to it.

Three species of nocturnal migrants: the common kingfisher, the redshank and the moorhen were recorded in small numbers on the ponds of the Boryspil water purification plants. Also observed on these ponds on more than one occasion were flocks of garganeys numbering up to 35 individuals, in mid-October and up to the beginning of November. In October individual grey herons and snowy egrets were also recorded on these ponds.

In October, short-eared and long-eared owls and woodcock were seen in the vicinity of the airport – these are nocturnal migrants which fly at a height of 3-5 m above the ground and make stops for rests. They fly alone in calm weather with no precipitation.

At the beginning of October, swallows cease to fly past; these fly at night for considerable distances, and feed in daytime, including above the runways. Their greatest activity is on calm days between 11:00 and 16:00 hours. The last day on which swallows were recorded as flying in this area in 2019 was 18 October.

Also in October there was migration of the common starling, which also flies at night. We shall dwell further on this below when describing the species which constitute a hazard for aircraft.

5.2 Diurnal migrants

Of the birds that migrate by day there are two species of brambling that appear in the airport area between 10-31 October – the siskin and the bullfinch. These are woodland species which keep together in dense flocks and avoid crossing large open areas, although they are regularly recorded crossing the runways in transit, flying at a height of 10-15 m above the ground. Two species of pigeon – the stock dove and the wood pigeon – complete their migration at the end of October. The stock dove was recorded three times in small flocks; it feeds at the sides of roads and on field margins next to trees. Passing flocks of wood pigeons comprised on average 20-40 birds, which regularly fed on the margins of fields where sunflowers and maize were grown, or on the sides of roads. Their travel height is 10-25 m. They were recorded more than once flying over runways.

Birds of prey migrate on a broad front in a south-westerly direction. They fly in sunny weather, with a north-easterly tail wind a compulsory condition. The main migrants among diurnal birds of prey in October were the common buzzard, the rough-legged buzzard, the kestrel and the hen harrier.

The hen harrier flies alone at a height of up to 50 m. Their numbers are small: 7 birds were recorded in the runway area, with 4 of them seen on one day.

The kestrel flies alone at a height of up to 40 m. During migration kestrels may group together at feeding biotopes: unploughed fields on which cereal crops or sunflowers were growing. During daylight between 10-20 October there were 43 recordings of flying or feeding kestrels in the area of runway 36R18L.

For the common buzzard and the rough-legged buzzard, the most intensive flying was seen between 10-20 October. The birds fly alone, in a gliding flight. The height is 300-400 m. Flying lasts from 11:00 to 15:00 hours. They often make use of powerful updraughts originating from the heated runways and the aerodrome territory to gain height, and 150-300 birds group together in one place and, circling in a small area, rise to 600-700 m and then continue their migration. Such gatherings are very hazardous for aircraft.

The rook carries out its migration between 1-10 November. The first overflying flocks of rooks in the airport area were seen in October. They fly during the day, between 10:00 and 16:00 hours. In sunny weather, they fly in a south-westerly direction. Flock numbers vary between 20 and 300 or more individuals. Like the buzzards, they make use of updraughts to gain height. In favourable weather conditions, rook flying may be large-scale within a single day, at thousands of birds per day.

5.3 Sedentary species

On the investigated territory, 12 species of sedentary birds were recorded:
-Woodpeckers 5 species (greater spotted, Syrian, grey-headed, middle spotted and lesser spotted),
-Tits 3 species (great, long-tailed and blue),
-Little owl,
-Nuthatch,
-Treecreeper,
-Mistle thrush.

These present no hazard for aircraft since they are representatives of woodland species or species which do not form large flocks, do not use runway areas to obtain food and have never been recorded above runways.

5.4 Isolated encounters

Four bird species were recorded once only in and around the airport territory: the white-tailed eagle, the mute swan, the northern shrike and the black woodpecker.

Two white-tailed eagles were seen on updraughts above the village of Hora at a height of around 700 m.
A group of mute swans comprising 5 birds was recorded near the village of Petrivske.
The birds were flying in a westerly direction at a height of 150 metres.
The black woodpecker was seen on the southern edge of Hora village (4 km from the runways).
The northern shrike was seen in the vicinity of Petrivske village.

5.5 Sedentary birds with small populations

A further 6 sedentary species with small populations live on the airport territory: the magpie (up to 15 individuals), which fly over the runways in groups of 2-3 birds in the direction of the town of Boryspil and back.

The jay. Transit flights of up to 5 birds in a flock or single birds in search of food have been recorded between terminals A and B.
The collared dove. Up to 5 birds, used to fly regularly from the town of Boryspil during the observation period.

The crested lark, up to 20 birds, often appear on and above the runways, as this is a natural habitat for this species.

The goshawk, of which 4 birds were counted, which regularly appear on the airport territory to hunt pigeons and jackdaws, and often fly over the runways at heights of up to 50 metres.
The sparrow-hawk is a regular inhabitant of the airport territory (2-3 birds), and while hunting it is also seen above the runways. Flying height 10-30 metres.

Brambling species: goldfinch, linnet, hawfinch, greenfinch (weight per bird 20-40 g) form flocks of between 20 and 80 individuals, rarely more, in the autumn-winter period. They feed on open areas: fields, lawns, along roads. Their feed range covers seeds of weeds, cereal crops and sunflowers. They can make substantial flights to find food in the morning and evening hours at heights of up to 25 metres.

5.6 Lack of snow cover – reason for changes to behaviour

Because of the snow-free November and December, brambling flocks constantly fed on fields where sunflowers are grown in season, and more than once crossed the runways.

Because of the lack of snow cover, the fieldfare, which, when there is snow, forms large gatherings of up to 100 birds or more around food sources, during the observation period was seen in small groups of around 10 individuals.

The lack of snow in the winter of 2019-2020 constituted a factor which impacted on the behaviour of common and rough-legged buzzards. Instead of their usual feeding habitats – ploughed maize and sunflower fields – the birds began using all types of agrocenoses for hunting, distributing themselves evenly over them. On the 10 km route from Hora to Martusivka to Hlyboke, 11 common buzzards and 3 rough-legged buzzards were recorded along the fields.

In observations from the runway 36R18L viewpoint, buzzards were almost always recorded, 1-2 birds, which hunted or rested on the ground or elevations at a distance of 50-100 metres from the runway (averaged value).

Sparrows typically congregate in large flocks when there is snow cover, at places where food is available. Since snow was absent for virtually the entire observation period, only small flocks of tree sparrows (20-35 individuals) were recorded, which crossed the runways in transit.

Since Boryspil airport is almost completely surrounded by agrocenoses, on which the main crops that are grown are cereals and sunflowers, and the actual fenced territory of the airport is an excellent refuge for the grey partridge, numbers of this species on the area in question are an order of magnitude bigger (evaluation performed visually) than on other similar biotopes.

In November 88 birds were recorded on a 10 km route during a circuit on foot through the fields along the western line of airport fencing. In December around 150 birds were recorded on the same route. Partridges were easily discovered in similar habitats: field margins overgrown with weeds or covered

with small and sparse shrubbery. These birds are regularly encountered in the vicinity of the village of Martusivka, the suburbs of Boryspil and near the solid waste disposal site at Hlyboke. The lack of snow cover and frozen ground enabled flocks of grey partridges to take fuller advantage of the food base and thus not to gather at places where food was available: along roads and margins of fields sown with winter crops. The peak feeding activity was seen in the morning hours from dawn up to 11:00 hours. And also movements from 14:00 hours until darkness (during the period of short daylight hours). Partridges move in short bursts of running, and if they are startled they take off.

More than once flocks of grey partridges were observed that were in the immediate vicinity of runways and wandering about on runways. An airborne flock of partridges flies at heights in the 3-10 metre range.

6. SYNANTHROPIC BIRD SPECIES AND REASONS FOR THEIR GATHERING

85-90% of the birds observed in the runways area are synanthropic species whose numbers depend entirely on man's vital activities. This includes sparrows (tree and house), and to some extent starlings, rock doves, crows (rooks, hooded crows, jackdaws and ravens) and gulls (laughing, common and black-headed). All these species are hazardous for aeroplanes, as they fly in tight flocks, passing over runways in transit and using the airport territory to rest and feed.

Of the synanthropic species, the common starling is a migrant and disappears completely from the territory under study towards the end of October. Pre-migration flocks of this species may consist of thousands of birds, and normally a flock comprises 500-1500 individuals. Starlings feed in river floodplains and on fields, and constantly follow tractors which are ploughing up land, and they fly at heights of 50-150 metres. Such flocks were constantly observed in the first two-thirds of October, and they were constantly moving from field to field. The most numerous encounters were between the town of Boryspil and the village of Martusivka. When there were no agricultural machines in motion, the starlings would settle around solid waste disposal sites or directly on the sites.

During the first two-thirds of October, large flocks of starlings would accumulate for regular overnighting in reed beds on the ponds of the Boryspil purification plants. Large flocks appear in the period before sunset (at roughly 17:30 hours for October), and they circle above the reeds in a 1 km radius, gradually curtailing this radius and then suddenly settling down in the reeds. Up to 4 flocks were recorded, with a total number of birds of 4,000 to 6,000. They fly at a height of 100-300 metres. Flocks crossed the airspace of the southern runway area many times. It has been stated above that sparrows typically concentrate in large flocks when there is snow cover at places with available food. The autumn and winter of 2019 was an exception, since there was practically no snow, and only small flocks of tree sparrows were recorded (20-35 individuals), which flew over the runways in transit. The main places where they concentrated were field margins and the vicinity of villages. Sparrow numbers in the airport territory were 150-200 individuals, which kept together in flocks. Feeding flights for a flock rarely exceed 300-400 m in length when there is an abundance of food. There were only isolated instances of sparrows crossing the runways. Flights were at a height of 10-20 metres.

The rock dove is an entirely sedentary species, and lives in flocks. Each flock has its own place to rest and nest. On the territory of Boryspil airport there was a total of 110-150 individuals of the rock dove (while the observations were under way), and the flock settles on the roof of Terminal B and uses the territory around the airport as a feeding location. Feeding takes place in the morning (from dawn until 10 a.m.) and in the evening (roughly from 14:00 to 17:00 hours during the short daylight period).

On days with a light wind, some of the flock make a feeding flight to arable fields located to the west of the airport territory, and also to grass-covered areas that are adjacent to runway 36R18L.

In windy weather the birds leave the airport territory in a loose flock. Flying height 10-50 metres.

While the observations were being made, there were several instances when, following a goshawk attack, the birds, in strong wind, were directly above the runway and could not return to their resting place (the terminal roof) for some time, constituting a major threat to aircraft taking off.

More than once over the entire observation period there were records of another flock of doves which had flown from the town of Boryspil to feed in the area of the solid waste disposal site and on arable land between Boryspil and the village of Martusivka. The flocks numbered 350-500 individuals. A flock would fly in early in the morning, constantly flying across the southern end of the runways at a height of 70-200 metres, and sometimes it would land on the mown grass in the central part of runway 36R18L. This was not recorded on days of strong wind or on rainy days.

Flocks of corvids (comprising 80% rooks, 12% jackdaws and 8% hooded crows, on average) are permanent inhabitants of the airport. Numbers vary from 180 to 600 individuals depending on weather conditions. The airport territory is used as a place to rest and partially as a feeding biotope. The main mass of the flock feeds on the solid waste disposal site and on adjacent arable fields. The birds are constantly moving above the runway; some are flying off to feed, while others are returning to the airport territory to rest. Two peaks in flying activity are seen: the first from dawn up to 10 or 11 a.m. and the second from 14:00 to 16:30-17:00 hours (during the short daylight hours period). The flying is at a height of 20-70 metres. There is active bird movement in the direction of the solid waste disposal site and back. This activity drops away towards 11 a.m. and some of the birds rest, concentrating along the runways or on the arable fields. Flight activity resumes from 14:00 hours, and after 16:00 hours some of the birds begin to fly off southwards towards Martusivka to spend the night, while some of them move towards the town of Boryspil.

In sunny weather with light winds, after 12:00 hours some of the birds (rooks) get airborne on strong updraughts which form above the airport territory, and begin to gain height by smoothly circling in a dense flock (up to 300 individuals), rising to a significant height – sometimes the birds cannot be seen, even with optical equipment. A flock may hang in the air for an hour or more, shifting significantly sidewards. This phenomenon is very hazardous for aircraft that are gaining height. We had to observe on occasions how an aircraft would fly very close by a circling flock of this type. Sometimes a small number of yellow-legged gulls would join the circling rooks and jackdaws, using the same ascending currents. Gull flocks are mainly made up of yellow-legged gulls (there is a small % of common and black-headed gulls in gull groups).

The yellow-legged gull is a bird that is known throughout the world as a bird of dumps. Over the last 100 years it has significantly enlarged its areal and increased in number, and its main feeding biotopes are dumps or just food waste in open rubbish containers. During daylight the yellow-legged gull can fly up to 45 km in search of rubbish dumps. Even long-since abandoned and no longer used dumps attract the gulls and they check them out. We had to observe on occasions flocks of gulls sitting on a dump covered over with earth which had not been receiving rubbish for seven years.

In recording bird overflights of the runways from a viewpoint, gulls were recorded every day, and they were observed throughout the hours of daylight, flying over the southern part of the runways in various directions. With strong gusts of wind, flocks of gulls numbering 10-20 individuals also appeared above the airport territory at a height of 20-50 metres (in the area of terminals B and F). In windless weather, up to 110 yellow-legged gulls were logged in a 4-hour observation period. When the birds were counted in the area of the solid waste disposal site, between 100 and 200 yellow-legged gulls were registered on different days. Most often they were either flying around or settled on adjacent territories, or feeding on the dump. Very often the gulls were following a tractor that was ploughing the land. Sometimes up to 40 gulls were concentrated in mixed flocks with rooks and starlings. In the evening gulls, from about 16:00 hours on (roughly an hour and a half before the sun set) would begin to move westwards. They would fly at a height of 70-150 m, which differed little with different weather conditions. Only when there were gusts of strong wind would the gulls fly at heights of 50-70 m. In the morning we would observe the flight back from the direction of the R. Dnepr in an eastward direction. At one viewpoint (the southern edge of the village of Hora), a total of 126 individual gulls was logged in 40 minutes.

Scaring the gulls off the disposal site means that they have to wait for a convenient moment to feed: the gulls either settle in the fields around the site or fly alongside, crossing the aircraft take-off path.

7.RECOMMENDATIONS

Recommendations for monitoring and curtailing bird numbers, which will in turn lower the risk of collision with aircraft.

1 Avoidance of large-scale concentrations of synanthropic birds is possible by depriving them of access to waste which is a source of food. Such access to food waste is increasing the numbers of gulls, corvids, rock doves and sparrows. Dumps and open waste containers enable these birds to survive cold winters and even rear offspring. Such dumps and open waste containers are not admissible within a 15-kilometre zone around the airport.

2. Arable land is the second most important feeding biotope for many species, and large numbers of birds accumulate on it, so

-The make-up of agrocenoses needs to be altered. The sowing of maize, sunflowers and cereal crops should be completely ruled out.

-Following harvesting, 3-7% of lost grain remains on fields, so it is necessary to re-plough the land immediately after the harvest is gathered, and at night. This will enable concentrations of many bird species that are hazardous to aircraft to be avoided.

-On arable land around airports the ideal is to develop crop growing under glass – greenhouse farming.

3. Trapping should be carried out to keep down the numbers of sedentary birds that constitute a hazard for aircraft (grey partridges, rock doves). This will reduce the bird concentration and lower the risk of collisions. Captured grey partridges may be released on different land, and the doves should be captured for sanitary reasons. Observations indicate that some of the doves in the airport zone are infected with avian pox.

4. The reed fields at the water purification plants in Boryspil should be completely done away with, as they attract flocks of thousands of starlings and swallows.

5. To change the places where rooks spend the night in the village of Martusivka, the tops of all the tall trees where rooks roost overnight should be trimmed.

6. To reduce rodent numbers (field mice) in the airport protection zone, I recommend capturing the rodents using capture ditches equipped with water traps at the ends. A reduction in rodent numbers will in turn lower the numbers of myophage birds on the territory.

8. ANNEXES

Map chart 1. Feeding migrations of the yellow-legged gull.



Flying height 70-150 m

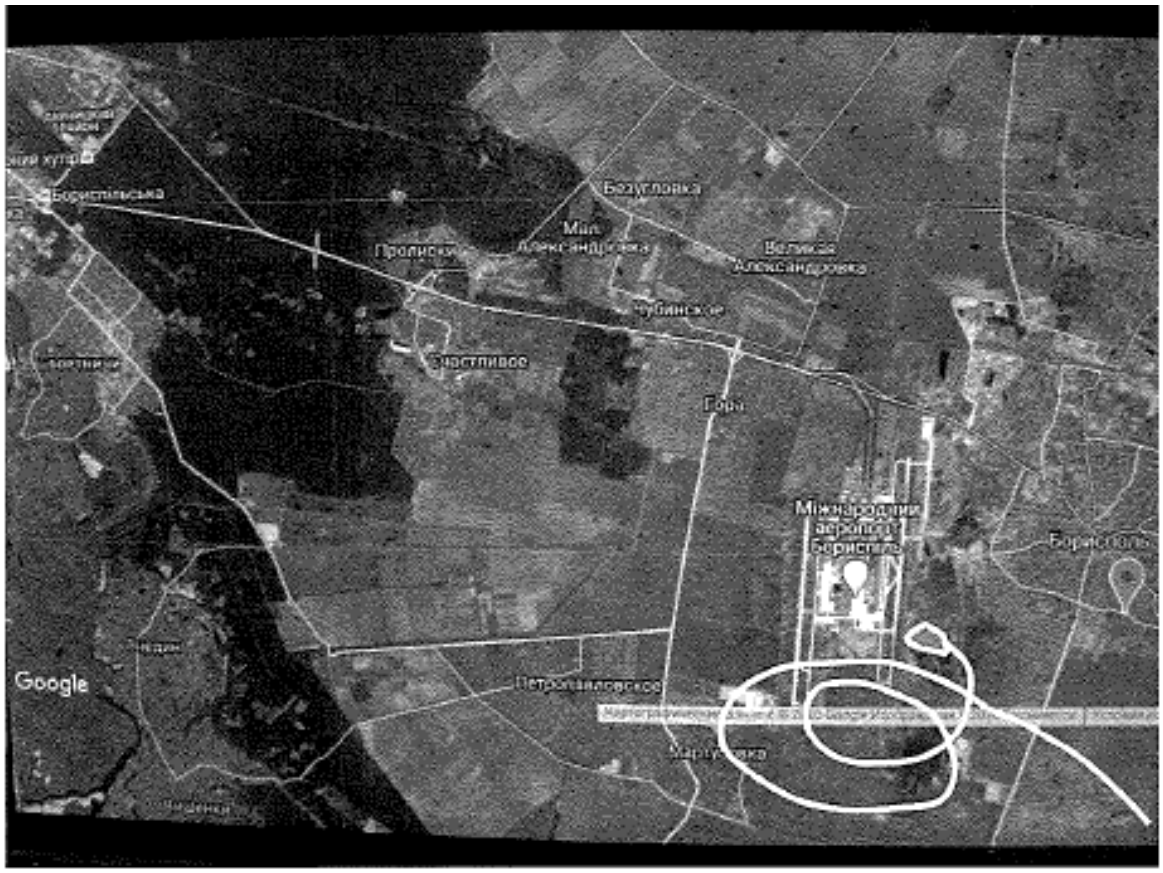
<u>Key to map charts:</u>
Міжнародний аеропорт Бориспіль – Boryspil International Airport
Бориспільська - Boryspilska
Бортничи - Bortnychy
Пролиски - Prolysky
Безугловка - Bezuhlovka
Мал. Александровка – Mal. Oleksandrivka
Велика Александровка – Velyka Oleksandrivka
Борисполь - Boryspil
Петропавловское - Petropavlivske
Мартусовка - Martusivka
Гора - Hora
Счастливое - Shchaslyve
Чубинское - Chubynske
Гнедин - Hnidyn

Map chart 2. Daily feeding movements of corvids and places where they rest by day



Flying height 70-200 m

Map chart 3. Pre-migration accumulations of the common starling at overnight locations



Flying height 50-150 m

Map chart 4. Concentration of flocks of grey partridge autumn-winter 2019



Map chart 5. Daily feeding movements of the rock dove (flock 1)



Flying height 10-50 m

Map chart 6. Daily feeding movements of the rock dove (flock 2)



Flying height 70-200 m

MINISTRY OF INFRASTRUCTURE OF UKRAINE
BORYSPIL INTERNATIONAL AIRPORT
STATE ENTERPRISE

REPORT
May 28, 2020 No.79-30-6
Inspection of airfield environs

Grounds: Requirements of the Plan for Management of Wildlife Hazards in the area of Kyiv/Boryspil Airport

Composition of the commission:

Chairman of the commission:
Head of the Service for Flight Safety Control and Air Navigation Support — V. Cheburenko

Members of the commission:
Head of the airfield service — E. Nuraddinov
Senior engineer
(head of the group on ornithological flight support) — O. Shkuleta

On May 27, 2020, an inspection was carried out to identify the fact of gathering of birds at the following sites, namely:
- Waste landfill operated by Eko-Servis LLC, located at a distance of about 2 km from the airport runway 36R/18L;
- Boryspil sewage treatment plants located at a distance of 700 m from the airport runway 36R/18L;
- Agricultural lands around the abovementioned sites.

Facts identified in the course of inspection:

1. Flights and flocks of birds at the waste landfill operated by Eko-Servis LLC, namely:
- black-headed gull in the amount of about 400-500 individuals;
- white stork in the amount of about 20-30 individuals.

Conclusion: the Commission considers that the waste landfill continues to pose a potential threat to the flight safety in the territory Kyiv/Boryspil airfield, since birds that gather at the landfill cross the aerodrome area and have a permanent forage base there.

Photos in the amount of 5 pcs. are attached.

Chairman of the commission	*/Signature/*	V. Cheburenko
Members of the commission	*/Signature/*	E. Nuraddinov
	/Signature/	O. Shkuleta

MINISTRY OF INFRASTRUCTURE OF UKRAINE
BORYSPIL INTERNATIONAL AIRPORT
STATE ENTERPRISE

REPORT
July 17, 2020 No.79-26/2-16
Inspection of airfield environs

Grounds: Requirements of the Plan for Management of Wildlife Hazards in the area of Kyiv/Boryspil airfield

Composition of the commission:

Head of the airfield service — E. Nuraddinov
Senior engineer
(head of the group on ornithological flight support) — O. Shkuleta

On July 16, 2020, an inspection was carried out to identify the fact of gathering of birds at the following sites, namely:
- Waste landfill operated by Eko-Servis LLC, located at a distance of about 2 km from the airport runway 36R/18L;
- Boryspil sewage treatment plants located at a distance of 700 m from the airport runway 36R/18L;
- Agricultural lands around the abovementioned sites.

Facts identified in the course of inspection:

1. Flights and flocks of birds at the waste landfill operated by Eko-Servis LLC, namely:
- starling in the amount of about 40-60 individuals;
- white stork in the amount of about 100-120 individuals.

Conclusion: the Commission considers that the waste landfill continues to pose a potential threat to the flight safety in the territory Kyiv/Boryspil airfield, since birds that gather at the landfill cross the aerodrome area and have a permanent forage base there.

Photos in the amount of 4 pcs. are attached.

Members of the commission — */Signature/* E. Nuraddinov
/Signature/ O. Shkuleta

MINISTRY OF INFRASTRUCTURE OF UKRAINE
BORYSPIL INTERNATIONAL AIRPORT
STATE ENTERPRISE

REPORT
July 17, 2020 No.20-26-14
Inspection of the waste landfill
operated by Eko-Servis LLC

Grounds: Requirements of the *Plan for Management of Wildlife Hazards in the area of Kyiv/Boryspil airfield*

Composition of the commission:

Chairman of the commission:
- Head of the Service for Flight Safety Control and Air Navigation Support V. Cheburenko

Members of the commission:
- Senior engineer
(head of the group) O. Shkuleta
- Inspection engineer of the Service for
Flight Safety Control and Air Navigation Support V. V. Voitovych
- State Inspector for Aviation Safety Supervision
of the Department of Environmental Safety in
Civil Aviation of the Department of Strategic Development
of the State Aviation Service of Ukraine I. V. Yatsenko
- Deputy Head of the Main Department
of Housing and Communal Services
of the Executive Committee of Boryspil City Council N. O. Kolidenkova
- Director of Municipal Enterprise
"Production Directorate of Public Utilities" V. A. Naichuk

On July 16, 2019, we carried out an inspection of the waste landfill operated by Eko-Servis LLC, located at a distance of about 2 km from the airport runway 18L/36R, to identify the presence of birds or wild animals.

Facts identified and recorded in the course of the inspection:
1. Concentration of birds (gulls) in the amount of up to 120 individuals.
2. Concentration of storks in the amount of up to 20 individuals.
3. Presence of stray dogs.
4. Conditions that attract and contribute to gathering of birds.

These wildlife species are attracted to the waste landfill in the search for food.

Conclusion:
1. The waste landfill creates and supports conditions for attraction and gathering of birds in contradiction with the regulatory requirements of the Air Code of Ukraine.
2. The waste landfill poses a potential threat to the flight safety in the territory of Kyiv/Boryspil airfield due to attracting and gathering of birds.
3. Accumulation and long-term storage of different types of waste (food, household waste) in this area has a negative impact on the environment of Boryspil district.

Recommendations

1. Boryspil City Council should address to the top executives of Eko-Servis LLC a **request** to take effective measures to prevent attraction and gathering of birds at the landfill.
2. Boryspil City Council should speed up the process of consideration of the urgent issue of construction of a waste processing plant.

Chairman of the commission	*/Signature/*	V.V. Cheburenko
Members of the commission	*/Signature/*	O.S. Shkuleta
	/Signature/	V. V. Voitovych
	/Signature/	I. V. Yatsenko
	/Signature/	N. O. Kolidenkova
	/Signature/	V. A. Naichuk

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Feasibility Study (Adjusted)

Reconstruction of Manoeuvring Area No.2 of Boryspil International Airport State-Owned Enterprise

Volume 2

UA-KBP-02-TEO-АПР-2
UA-KBP-02-TEO-ВД-2

Aerodrome Planning Works
Drainage

Contract No.37-14.3/5-30
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Volume 2

Feasibility Study (Adjusted)

Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE

UA-KBP-02-TEO-АПР-2
UA-KBP-02-TEO-ВД-2

Aerodrome Planning Works
Drainage

Customer		BORYSPIL INTERNATIONAL AIRPORT STATE-OWNED ENTERPRISE
Designer	[Round seal:] INSTITUTE UKRDORPROEKT Identification code: 37355642 Kyiv*Ukraine*Limited Liability Company	INSTITUTE UKRDORPROEKT LIMITED LIABILITY COMPANY
Director	[Signature]	Koretsky S.S.
Head of the Department for the Design of Aerodrome Complexes	[Signature]	Belov M.I.
Chief Project Engineer	[Signature]	Pelikhov G.I.

Contract No.37-14.3/5-30

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1. General Data

Adjustment of the previously developed Feasibility Study "Reconstruction of Manoeuvring Area No.2 of Boryspil International Airport State-Owned Enterprise", completed by Ukraeroproekt in 2010, was carried out in accordance with the Design Assignment No. 58-25/1-2, approved by the General Director of Boryspil International Airport State-Owned Enterprise (hereinafter referred to as THE BIA SOE) on the 7th February 2019, as amended and restated, in accordance with the requirements of the current regulatory documents of Ukraine and the standards and recommended practices of ICAO in the design and operation of Aerodromes:

- SNIP 2.05.08-85 Aerodromes.
- Annex 10 to the Convention on International Civil Aviation. Volume I. Radio Navigation Aids. Sixth Edition, July 2006.
- Annex 14 to the Convention on International Civil Aviation. Volume I. Aerodromes. Design and Operations. Eighth Edition, July 2018.
- Annex 16 to the Convention on International Civil Aviation. Environmental Protection, Volume I. Aircraft Noise. Seventh Edition, July 2014.
- Annex 16 to the Convention on International Civil Aviation. Environmental Protection, Volume II. Aircraft Engine Emissions. Third Edition, July 2008.
- Aerodrome Design Manual. Part I. Runways. Third Edition, 2006.
- Aerodrome Design Manual. Part II. Taxiways, Aprons and Holding Bays. Fourth Edition, 2005.
- Aerodrome Design Manual. Part III. Pavements. Second Edition, 1983.
- Aerodrome Design Manual. Part IV. Visual Aids. Fourth Edition, 2004.
- Aerodrome Design Manual. Part V. Electrical Systems. Second Edition, 2017.
- Aerodrome Design Manual. Part VI. Frangibility. First Edition, 2006

- Airport Design Manual. Part 1. Master Planning. Second Edition, 1987.
- Airport Design Manual. Part 2. Land Use and Environmental Protection. Third Edition, 2002.
- Airport Services Manual. Part 6. Control of Obstacles. Second Edition, 1983.
- Airport Services Manual. Part 8. Airport Operational Services. First Edition, 1983.
- Airport Services Manual. Part 9. Airport Maintenance Practices. First Edition, 1984.
- Security Manual for Safeguarding Civil Aviation against Acts of Unlawful Interference. Volume III. Airport Security. Organization, Programme, and Design Requirements. Seventh Edition, 2009.
- IATA Airport Development Reference Guide.

Materials from Engineering Surveys performed by S.A.LANA Private Enterprise [PE] in 2019 were used to adjust the Feasibility Study:

- UA-KBP-02/C-1-1 – Engineering and Geodetic Surveys.
- UA-KBP-02/C-1-2 – Engineering and Geodetic Surveys.

The Drawings of this Section of the Project have been made, based on Topographic and Geodetic Surveying and a Digital Terrain Model made by S.A.LANA PE.

When adjusting the Feasibility Study, the materials of Boryspil Airport Master Plan prepared by Airport Consulting Vienna in 2017, were used as a reference in SWOT-Analysis, Air Traffic Analysis, Passenger Traffic Calculation, Air Traffic Forecast and the General Development Concept of the BIA SOE for the period up to 2045. Also, Proposals and Schematic Drawings for the Modernization and Reconstruction of Manoeuvring Area No.2, made by China Communications Construction/China Road and Bridge Corporation in 2018, were considered.

This Section of the FS covers:

- Completing a package of Preparatory Works.
- Vertical Levelling of Manoeuvring Area No.2, Critical and Sensory Areas of Localisers and Glide-Path Beacons (through to the Patrol Road).

- Construction of New Aerodrome Pavements for AR-2 [Artificial Runway-2], MT-2 [Main Taxiway-2], Connective Taxiways, High-Speed Exit Taxiways.
- Reconstruction of Apron S (between Taxiway-9 and Taxiway-19).
- Construction of an Aircraft Engine Test Site (Racing).
- Construction of an Isolated Parking Area.
- Construction of a Cargo Terminal Parking Area (in accordance with the Airport Development Concept 2045).

In the previous FS, the Aerodrome Planning Works section was presented only as an Explanatory Note. Therefore, in this FS, it has been totally re-written.

For the Aerodrome, the main differences from the 2010 Project are as follows:

- Planning Solutions - Schematic Drawings of Designed Aerodrome Pavements and placement of Radio Navigational and Landing Aids, taking into account their Critical and Sensory Areas.
- Vertical Levelling - Schematic Drawings for the Grading of Manoeuvring Area No.2 in conjunction with the existing Aerodrome Pavements of Apron M, Taxiway-10, Aprons C, S and G (since it was not covered in the previous FS).
- Aerodrome Pavement Structures.

2. Preparatory Works.

The package of Preparatory Works includes: Dismantling of the Existing Aerodrome Pavements of Runway-2, Taxiways, Aprons S and G, Patrol Road Pavements, Driveways and Sites, Existing Engineering Networks, Drainage System Elements; and Dismantling of the Existing Structures, Lighting and Radio Equipment, Lighting Masts and Fencing of Manoeuvring Area No.2.

The Existing Aerodrome Pavements should be dismantled, taking into account:

- Their unsatisfactory condition.
- Operation over a period of more than 40 years, which significantly exceeds the time between their major overhauls.
- Condition of Drainage Elements along Existing Pavements.
- The Design Load significantly exceeds the existing one (the existing PCN is 39, after reconstruction it should exceed 100).

After dismantling, some of the materials will be removed as Construction Waste to a Landfill Site, but some can be used (as agreed with the Customer) for the Foundations of a New Patrol Road and the Arrangement of Auxiliary Driveways, Sites, etc.

The Existing Engineering Networks of the Airport, falling within the Planning Area of Manoeuvring Area No.2, should be moved away in accordance with the Technical Specifications provided by the Customer.

Engineering Networks that belong to third-party users and pass through Manoeuvring Area No.2 in transit, are subject to protection.

The composition and scope of Preparatory Works are shown in Drawing АПР-01.

3. Planning Concepts.

When adjusting the FS, Two Options for the Placement of the New Runway were considered and compared. Option 1 – Offset of the Axis of the New Runway. Option 2 - the Axis of the New Runway coincides with the Axis of the Old Runway.

Schematic Drawings for these Options are shown in Drawings АПР-2 and АПР-3.

The main criterion for choosing an Option for the Reconstruction of Manoeuvring Area No.2 is an Additional Land Allocation - the conveyance of plots around the airport, which have long been privately owned or owned by rural communities.

Another, no less important criterion is the Reconstruction of the existing Apron S with the provision, in the first and subsequent stages of construction, of the Aircraft Parking Area, which would allow for manoeuvring an aircraft simply by the thrust of its own engines.

The Main Indicators for the Options for placing New AR-2

Item No.	Item	Unit of measure	Quantity	
			Option 1	Option 2
			Axis Offset	No Axis Offset
1	Aerodrome Pavement Area, Total	m^2	1,064,105	1,040,060
2	Length of a New Additional Fence and Patrol Road	running meter	1,400	3,100
3	Additional Land Allocation Area	hectare	≈42	≈51

Upon comparison of both Options, the advantage (in view of the main indicators) should be given to Option 1, which envisages the Offset of the Axis of the New Runway.

The Planned Position of the New Runway with Artificial Turf (AR-2) is determined based on the provision of Regulatory Distances between the Aerodrome Elements; the Aerodrome Elements and Stationary and Moving Objects; placement of Lighting and Radio Equipment, taking into account their Critical and Sensory Areas; and Aviation Security Requirements for the Aerodrome Area.

The Axis of new AR-2 is offset parallel to the Axis of the Old Runway-2 by 80 meters to the west, which accommodates the Runway Strip and the Radio-Navigational/Landing Facilities within the Existing Airport Grounds.

The Northern End of the New AR-2 (18R) has been altered to take into account the Height of the Existing Fence, which should not be an obstacle for Aircraft carrying out Take-Off and Landing Operations.

The Geometrical Dimensions of the Elements of Manoeuvring Area No.2 have been adopted in accordance with the Standards and Recommended Practices of ICAO for Aerodromes with a Reference Code of 4F.

The Length of New AR-2, in accordance with the Design Assignment, is 3,800 meters. The AR Width is assumed to be 45 meters in accordance with the requirements of paragraph 3.1.10 of Annex 14.

In accordance with the recommendations of paragraph 3.2.2 of Annex 14, the Reinforced Shoulders have been adopted at 15m each and placed on both sides of New AR-2. Therefore, the Total Width of the Runway and its Shoulders is 75m. In the previous FS, the Total Width of the Runway and its Shoulders was 63m.

The Width of the Aerodrome Runway Strip, including the Runway equipped for a precision approach, is 280 meters in accordance with paragraph 3.4.3 of Annex 14 and is located symmetrically on both sides of the centre line of AR-2 and its extension for 140 meters. In the previous FS, the Runway Strip width was 300m (150m on both sides).

The length of the Runway Strip is 4,100m and includes sections of 150m beyond both Ends of AR-2.

Instrument Landing Systems [ILS] for radio navigation and landing are placed taking into account the regulatory requirements for their Critical And Sensory Areas, set forth to protect the structure of the radio signal from the curvature of the Earth's Surface, Moving and Stationary So-Called ‘Radio Opaque’ Objects - Technical Buildings and Structures, Vehicles on the Patrol Road, Fences, Aircraft on Taxiways and Aprons, etc. (even objects located outside the airport can affect the operation of the ILS). The Project provides for an Additional Land Allocation to accommodate Localisers, Glide-Path Beacons and Lighting Facilities, which protects their Critical and Sensory Areas.

The Width of the Taxiways was adopted in accordance with the recommendations of paragraphs 3.9.4 and 3.10.1 of Annex 14 - 23 meters with two Reinforced Shoulders 10.5m wide on both sides (for taxiing a Code F Aircraft) and 7.5m wide (for taxiing a Code E Aircraft). In the previous Feasibility Study, the Width of the Main Taxiway was 25m, and the Width of the High-Speed Exit Taxiways and Connective Taxiways was 23m.

The Separation Distances between the Axes of Parallel Taxiways, between the Axes of Taxiways and Facilities, between the Axes of Aircraft Lead-In Lines to the Parking Area have been adopted in accordance with Table 3-1 of Annex 14 and take into account the location of Facilities, Buildings And Structures of the Existing Airport Infrastructure.

On Apron S, reconstruction is envisaged, which ensures manoeuvring and parking of Codes C, D, E and F Aircraft. The Lead-In and Lead-Out of an aircraft is carried out from the thrust of its own engines.

The size of an Aircraft Parking Area for each code has been adopted in accordance with the recommendations of the IATA Airport Development Reference Guide.

The width of Two-Way Service Roads has been assumed to be 8m, of One-Way Roads - 4m.

Two Stands will be set up on the Apron for the treatment of Code F Aircraft with an Anti-Icing Liquid.

In accordance with the requirements of the Design Assignment, an Aircraft Engine Test Site will be set up behind the Cargo Sector Parking Area. A Shield will be set up around the Aviation Equipment Protection Site, Support Equipment, People and Structures, to absorb and deflect the Exhaust Blast of Aircraft Engines for Code F Aircraft.

The Isolated Parking Area will be located at a distance of 100m from the existing fencing and the designed objects of Manoeuvring Area No.2.

The Plan to arrange aircraft on the Apron, Parking Areas, Aircraft Engine Test Site and Isolated Parking Area is shown in Drawing АПР-04.

4. Grading Plan.

According to the materials of the Engineering and Geological Surveys, the natural basis of Aerodrome Pavements is solid, silty, and loess sandy loam of Type I Subsidence. No groundwater has been found when exploring ground 10 meters deep.

The project envisages the Grading of Manoeuvring Area No.2 so that Surface Runoff is collected and diverted beyond the Aerodrome Pavements, Runway Strip, Taxiway Shoulders, Critical and Sensory Areas of the ILS in a lower planning point.

The Longitudinal Profile (Drawing АПР-05) Along the Axis of new AR-2 and its extension provides direct visibility in front of the antennas of the Localisers in both directions.

Longitudinal slopes of artificial pavements have been accepted within the regulatory limits; transverse - min 0.005 on Taxiways, min 0.003 on Apron, and min 0.015 on AR.

Longitudinal Slopes of Unpaved Aerodrome Sections have been accepted from the minimum possible 0.002 when installing an Open Drainage System (Fortified Shallow Ditches outside the Runway Strip and Taxiway Shoulders) to the maximum possible 0.025. The arrangement of Shallow Open Fortified Ditches accelerates the process of Evaporation of Effluents and reduces their Infiltration into the Soil in comparison with the System of Soil Gutters.

The Design Surfaces for the planning of Aerodrome Pavements, Unpaved Sections of Manoeuvring Area and of Slopes to the Existing Relief have been made in the form of a Digital Model using the AutoCAD® Civil 3D® 2014 software product.

The Grading Plan is shown in Drawing АПР-06.

5. Earthworks.

The Earthworks Project envisages the following in Manoeuvring Area No.2:

- In the 'Trough' of new Aerodrome Pavements, removal of Vegetative Soil in full.
- On the Unpaved Sections of the Runway Strip and Taxiway Shoulders, removal of a Vegetation Soil Layer in full, followed by Restoration of a 20cm-thick layer to form a Sod Cover.
- On the Unpaved Sections outside the Runway Strip and on Design Slopes, removal of the top 20cm-thick layer of vegetation soil, followed by its Restoration to form a Sod Cover.

The Total Volume of Earthworks to form an Embankment (in the compacted state) makes 3,805,061m^3, including:

- In the 'Trough' of the Aerodrome Pavements 1,106,522m^3.
- On the Unpaved Sections of the Runway Strip 2,357,737m^3.
- On the Unpaved Sections outside the Runway Strip 340,802m^3.

The lack of Mineral Soil in the amount of 3,640,567m^3 for filling the Embankment will be imported from the Quarry.

The Earthworks Cartograms are shown in Drawings АПР-07, АПР-08, and АПР-09.

After the completion of all types of Earthworks and Grading and Levelling Works, Agrotechnical Works will be carried out in an Optimal Agronomic Season, on the Unpaved Sections of the Runway Strip and outside it, consisting of Pre-Sowing Treatment, Mineral Fertilization, and Sowing Mixed Grass Seeds.

The total area to cover is 261.32ha, including within the Runway Strip – 180.03ha, outside the Runway Strip – 81.29ha.

6. Artificial Aerodrome Pavements.

The new Aerodrome Pavements for the operation at the Design Load (at a standard load of 900 kN on the aircraft conditional gear and the tire pressure of 1.5 MPa) will be of a multi-layer rigid type, consisting of:

- Soil Foundation with K-factor K_s=40MH/m^3.
- Artificial Base – Sand Cement from Ready-Mix M 75, 30cm thick.
- Bottom Layer of the Pavements – 'Lean' Concrete B 10/150, 30cm thick.
- Top Layer of the Pavements – Monolithic Cement Concrete B_{tb} 4.4/55 B45, 45cm thick.

The Aerodrome Pavements that had been adopted in the previous FS, consisted of the following layers:

- Sand Cement M40, 15cm thick.
- 'Lean' Concrete, 30cm thick.
- Cement Concrete B_{tb} 4.0/55, 45cm thick.

In the Upper Layer of the Pavements, it is planned to form Transverse Seams with Pin Connections. In the Longitudinal Seams that divide the 8m-wide Plates into two 4m-wide Plates, Seams with Pin Connections will also be formed. A Tongue-and-Groove Connection will be used in the Longitudinal Through Seams.

In the Lower Layer of the Pavements from 'Lean' Concrete, it is planned to cut Transverse and Longitudinal Seams aligned with the Seams of the Upper Layer.

Reinforced Shoulders will be made of 30cm-thick Cement Concrete based on 15cm-thick Ready-Mixed Sand Cement.

The Dimensions of the Plates of the Load-Bearing Cement-Concrete Pavements have been taken as 7.5m×7.5m; 4m×7.5m; Plates of the 'Lean' Concrete Pavements 7.5m×15m; 8m× 15m. The Dimensions of the Plates of the Cement-Concrete Pavements of the Reinforced Shoulders have been taken as 7.5m×7.5m.

The total area of Aerodrome Pavements will be 1,064,105m^2, including:

- AR-2 – 171,000m^2, Shoulders and Ends 100,195m^2.
- Main Taxiway-2 – 87,400m^2, Shoulders 50,360m^2.
- Main Taxiway as a Connective Taxiway – 87,400m^2, Shoulders 49,590m^2.

- High-Speed Exit Taxiways – 105,600m^2, Shoulders 49,265m^2.
- Connective Taxiway – 41,900m^2, Shoulders 21,870m^2.
- Taxiway-9 – 17,540m^2, Shoulders 10,980m^2.
- Taxiway-10 and Apron G – 11,160m^2, Shoulders 1,900m^2.
- Taxiway-16 – 2,830m^2, Shoulders 1,935m^2.
- Taxiway-17 – 2,730m^2, Shoulders 1,895m^2.
- Taxiway-18 – 2,285m^2, Shoulders 1,090m^2.
- Aircraft Engine Test Site – 19,620m^2, Shoulders 330m^2.
- Isolated Parking Area – 13,070m^2, Shoulders 3,060m^2.
- Apron S – 121,430m^2, Shoulders 3,890m^2.
- Parking Area – 83,300m^2, Shoulders 480m^2.

Elements of the Aerodrome Pavements and their sections are shown in Drawing АПР-10.

7. Commissioning Stages and Start-Ups.

At the Customer's request, the construction of Manoeuvring Area No.2 will be split into Commissioning Stages and Start-Ups.

According to the distribution given on Master Layout Sheet UA-КВР-02-ТЕО-ГП-1-02, the Artificial Aerodrome Pavements will follow these Commissioning Stages.

First Commissioning Stage, First Start-Up:

- Taxiway-9 – 17,540m^2, Shoulders 10,980m^2.
- Taxiway-18 – 2,285m^2, Shoulders 1,090m^2.
- Apron S – 121,430m^2, Shoulders 3,890m^2.

First Commissioning Stage, Second Start-Up:

- AR-2 – 171,000m^2, Shoulders and Ends 100,195m^2.
- Main Taxiway-2 – 87,400m^2, Shoulders 50,360m^2.
- Main Taxiway as a Connective Taxiway – 87,400m^2, Shoulders 49,590m^2.
- High-Speed Exit Taxiways – 105,600m^2, Shoulders 49,265m^2

- Connective Taxiway – 41,900m^2, Shoulders 21,870m^2.
- Taxiway-10 and Apron G – 11,160m^2, Shoulders 1,900m^2.
- Taxiway-16 – 2,830m^2, Shoulders 1,935m^2.
- Taxiway-17 – 2,730m^2, Shoulders 1,895m^2.

Second Commissioning Stage, First Start-Up:

- Parking Area – 83,300m^2, Shoulders 480m^2.

Second Commissioning Stage, Second Start-Up:

- Aircraft Engine Test Site – 19,620m^2, Shoulders 330m^2.

Second Commissioning Stage, Third Start-Up:

- Isolated Parking Area – 13,070m^2, Shoulders 3,060m^2.

Aerodrome Planning Works:

First Commissioning Stage, First Start-Up:

- Earthworks in the 'Trough' 163,482m^3.
- Earthworks on the Unpaved Sections of the Runway Strip 348,341m^3.
- Agrotechnical Works 26.60ha.

First Commissioning Stage, Second Start-Up:

- Aerodrome Land Allocation 22.6800ha + 27.5200ha (Reserve Lands).
- Earthworks in the 'Trough' 818,402m^3.
- Earthworks on the Unpaved Sections of the Runway Strip 1,743,822m^3.
- Earthworks on the Unpaved Sections Outside of the Runway Strip 340,802m^3.
- Agrotechnical Works 214.44ha.

Second Commissioning Stage, First Start-Up:

- Earthworks in the 'Trough' 87,120m^3.
- Earthworks on the Unpaved Sections of the Runway Strip 185,631m^3.
- Agrotechnical Works 14.17ha.

Second Commissioning Stage, Second Start-Up:

- Earthworks in the 'Trough' 20,745m^3.
- Earthworks on the Unpaved Sections of the Runway Strip 44,203m^3.
- Agrotechnical Works 3.38ha.

Second Commissioning Stage, Third Start-Up:

- Earthworks in the 'Trough' 16,773m^3.
- Earthworks on the Unpaved Sections of the Runway Strip 35,739m^3.
- Agrotechnical Works 2.73ha.

The scope of Works, split into Commissioning Stages and Start-Ups, is shown in Drawing АПР-1 and АПР-12.

8. Drainage

This Drainage section envisages:

- Dismantling of some elements of the existing Drainage Network.
- Setting up a Drainage Network.
- Installation of a system for automatic collection of spent Anti-Icing Liquid at the Aircraft Anti-Icing Treatment Site.

8.1. Drainage Network of Manoeuvring Area No.2

The choice of the Drainage System Layout was made in accordance with the requirements of SNiP 2.05.08-85 Aerodromes and DBN [Ukraine's National Building Code] V.2.5-75: 2013 Sewerage. Outdoor Networks and Facilities. Basic Design Provisions, taking into account the Road and Climatic Zone, the type of Hydrogeological Conditions, the nature of Surface Runoff, Soil Moisture Degree and Soil Type, the Topographic Conditions of the existing Manoeuvring Area No.2.

The Drainage System will be arranged as a Closed Gravity Drainage Network, which includes a Linear System of Rain-Receiving Polymer Concrete Elements, Drains, Thalweg Wells, Inspection Wells, and Drainage Ditches.

From Artificial Pavements, Rainwater enters the Linear System of Polymer Concrete Elements. It will be installed at the AR Pavement Edge, on Apron S, in the Parking Area, in the Aircraft Isolated Parking Area, and on the Aircraft Engine Test Site. The System includes Drainage Channels, Access Units and Sand Traps with Waste Collection Baskets. Through the Sand Traps, the water flows through the Bypass into the Inspection Well, and from there it will be channelled through the System to the Sewage Pumping Station for Rainwater.

[Figure]

Figure 8.1.1 Polymer Concrete Drainage Channels

Concrete Drainage Ditches (1m wide, 50cm deep, with 1: 1.5 slopes) with Culvert Inlets will be sited in the Lower Ground Part outside the Runway Strip, and thanks to gravity, the Rainwater will enter the Drain also through the Bypass and will be transported to the Sewage Pumping Station. Where a Drainage Ditch cannot be sited, Reinforced Concrete Thalweg Wells of Strengthened Type with three Grids will be installed.

To arrange Drains, the Polyethylene Pipes with Ring Stiffness not lower than SN8 and Diameters as per Design Calculations will be used. The Drainage Plan is shown in Drawing ВД-01.

[Figure]

Figure 8.1.2. Polyethylene Pipes

[Figure]

Figure 8.1.3. Inspection Well

The Pipes will be laid on a Compacted Soil Base and a 15cm thick Sand Bed.

Inspection Wells - Reinforced Polyethylene with Ring Stiffness not lower than SN8.

The Total Estimated Rainwater Flow Rate will be about 3,100 l/s.

The Diameter of the Pipeline supplying Wastewater to the Sewage Pumping Station, according to the Design Calculations, will be 1500mm.

The Depth of the Interceptor at the Sewage Pumping Station is approximately 8 meters. Such a Depth does not allow performing Wastewater Treatment in a Gravity Mode. Therefore, a Pumping Station will be designed to ensure a Full Rainwater Flow Rate.

The Pumping Station has been designed in a round shape with a Diameter of 12.0m. In the Underground Part, it is planned to install two groups of Submersible Pumps (including Standby Pumps), designed for Maximum-Average and Average-Minimum Estimated Flow Rates. Both groups of Pumps will be installed at the bottom of the Pumping Station and will be separated from each other by a Partition with Water Passage Windows.

Each group of Pumps will be equipped with Pressure Pipelines (1 Working, 1 Standby), which will transport Contaminated Rainwater to Treatment Facilities. The Contaminated Rainwater Pressure Pipeline has been taken as 2Ø630 mm. Conditionally Clean Rainwater will be transported to a Storage Tank. The Conditionally Clean Rainwater Pressure Pipeline has been taken as 2Ø1200mm.

Above the Station, a Ground Pavilion will be built. It will be equipped with Ventilation, Heating and Power Supply Systems. It will house a Control Panel, Lifting and Transport Equipment for Equipment Maintenance and Repair, Automatic Load Transfer Panel, etc.

The Rainwater Treatment Facilities are being designed under a separate project.

8.2. System for Collection of Spent Anti-Icing Liquid at the Aircraft Anti-Icing Treatment Site

In order to ensure a Safe Take Off during a Low Temperature Period, it will be necessary to remove the Snow and Ice Deposits from the Aircraft Critical Surfaces, and to prevent their reoccurrence before Take-off.

To do this, the Aircraft will be treated with a Mono Propylene Glycol-Based Liquid using Specialized Machines.

[Figure]

Figure 8.2.1. Aircraft Anti-Icing Treatment

The use of Mono Propylene Glycol is based on its ability to reduce the freezing point of aqueous solutions. To protect the environment, it will be necessary to ensure reliable collection and disposal of any waste solution.

The Aircraft Anti-Icing Treatment Site will be located on Apron S in a way that allows the aircraft to reach AR-2 as quickly as possible after treatment and is designed for the simultaneous treatment of two aircraft.

After an hourly cycle of aircraft treatment, the liquid will be collected from the Site Surface using a Vacuum Unit. Any remaining liquid will be hosed down by water.

Separate Sewage System will include two Rainwater Wells located directly at the Parking Area in a way that avoids them being run over by the Aircraft Landing Gear. The Rainwater Wells will be connected through Bypasses to a Drain, which transports the Liquid Residues to two Underground Steel Tanks with a Capacity of 75m^3 each. They are located outside the Apron, in the 'Green Zone', with access for vehicles that empty them. The Tanks are equipped with Automatic Valves in order to exclude the Rainwater Ingress into the Tanks after Aircraft Treatment and Hosing down the Liquid Residues from the Pavement Surfaces.

In the warm season, Rainwater flows directly into the Storm Sewage System.

8.3. Sequence of Construction

According to the distribution given on the Master Layout Sheet UA-KBP-02-TEO-ГП-1-02, the construction of the Aerodrome Drainage System will consist of the following stages:

First Commissioning Stage, First Start-Up:

- Drain D. Total Length – 294m.
- Two Temporary Drain Sections with connection to the Existing Drainage Network. Total Length – 318m.
- Drain L. Total Length – 219m.

The Total Length of Bypasses from Storm Water Inlets will be an additional 120m.

First Commissioning Stage, Second Start-Up:

- Drain A. Total Length – 4,157m.
- Drain B. Total Length – 3,878m
- Drain C. Total Length – 4,220m.
- Drain E. Total Length – 269m.
- Drain H. Total Length – 827m.
- Drain J. Total Length – 1,139m.
- Drain M. Total Length – 387m.
- Drain N. Total Length – 386m.
- Drain P. Total Length – 283m.
- Drainage Ditches. Total Length 1,584m.

- Construction of a Sewage Pumping Station for Wastewater.

The Total Length of Bypasses from Storm Water Inlets will be an additional 2,642m.

Second Commissioning Stage, First Start-Up:

- Drain F. Total Length – 656m.

The Total Length of Bypasses from Storm Water Inlets will be an additional 90m.

Second Commissioning Stage, Second Start-Up:

- Drain G. Total Length – 230m.

The Total Length of Bypasses from Storm Water Inlets will be an additional 11m.

Second Commissioning Stage, Third Start-Up:

- Drain K. Total Length – 240m.

The Total Length of bypasses from storm water inlets will be an additional 9m.

9. Environmental Protection.

In terms of environmental protection, this section of the FS provides:

- Drainage of Wastewater from new and existing Aerodrome Pavements of Manoeuvring Area No.2 into the designed Drainage System and transportation to Treatment Facilities.
- Protection of Natural Resources on the Occupied and Allocated Lands:

- Removal and restoration of Vegetative Soil on the Unpaved Sections of the Runway Strip and beyond.
- Removal of Vegetative Soil in the 'Trough' of Artificial Pavements and its transfer to improve the Airport Territory.
- Creating a Sod Cover that will prevent Soil Erosion.

Taxiway-9	Designed aerodrome pavements of manoeuvring area No.2
Apron S	Existing aerodrome pavements of manoeuvring area No.2 to be dismantled
	Aerodrome additional land allocation border
	Protective cases for existing cables
	Disassembly and dismantling of existing structures and networks

LIST OF TREES, THE FELLING OF WHICH IS PROVIDED FOR BY THE FEASIBILITY STUDY (ACCORDING TO THE SURVEY)

Reference	Description	Quantity
Pine	pine trees 5m high, trunk diameter 15 cm, distance between trees 3m	73
Pine	pine trees 7-10m high, trunk diameter 20 cm, distance between trees 3m	12
Poplars	poplar trees 7m high, trunk diameter 20 cm, distance between trees 3m	38
Birch tree	poplar trees 7m high, trunk diameter 20 cm, distance between trees 3m	30
Wood	foliage trees 8-9m high, trunk diameter 10 cm, distance between trees 2m	14

LIST OF DRAWINGS OF АПР SET

Sheet	Item	Note
01	Preparatory Work Plan. Scale 1:5000	
02	Reconstruction Schematic Drawing, Option 1. Scale 1:5000	
03	Reconstruction Schematic Drawing, Option 2. Scale 1:5000	
04	Aircraft Arrangement Plan. Scale 1:2000	
05	Longitudinal Profile for the Artificial Runway and the Runway Strip	
06	Grading Plan. Scale 1:5000	
07	Diagram of Earthworks in the 'Trough' of Airfield Pavements. Scale 1:2000	
08	Diagram of Earthworks on Soil Sections of the Runway Strip. Scale 1:2000	
09	Diagram of Earthworks on Soil Sections Outside the Runway Strip. Scale 1:2000	
10	Airfield Pavement Structures	
11	Land Allocation Plan. Scale 1:5000	
12	Bill of Quantities	

Item No.	Item	Unit	Quantity	Note
	Dismantling of equipment 1 stage 1 start-up			
	Taxiway lights system			
1	Taxiway sidelights	pcs	96	
2	Aerodrome signs	pcs	9	
3	Isolation transformer 45 W	pcs	96	
4	Stand for installing elevated-type lights	pcs	105	
5	Basis for installing elevated-type lights	pcs	105	
6	Rubber-insulated cable with a cross section of 2x2.5mm^2	m	945	
7	Special aviation cable with a cross-section of 1x6mm^2 and voltage 5/10 kV	m	2775	
8	Excavation of mineral soil of II gr for dismantling of existing cable lines of the Lighting Equipment with an excavator in trenches with slopes into a disposal area up to 1 m deep	m^3	500	
	Dismantling of existing cable lines			
1	Armoured aluminium cable 3-core 10 kV	m	4470	
2	Armoured cable 5-core 0.4 kV	m	4260	
3	Excavation of mineral soil of II gr for dismantling of existing cable lines with an excavator in trenches with slopes into a disposal area up to 1 m deep	m^3	3200	
	Apron			
1	Lighting masts	pcs	8	
2	Lighting control cabinets	sets	8	

Item No.	Item	Unit	Quantity	Note
	Dismantling of equipment 1 stage 2 start-up			
	Approach lights subsystem			
1	Approach lights and horizon bar lights	pcs	328	
2	Side row approach lights	pcs	54	
3	Isolation transformer 150 W	pcs	328	
4	Isolation transformer 100 W	pcs	54	
5	Stand for installing elevated-type lights	pcs	382	
6	Basis for installing elevated-type lights	pcs	382	
7	Rubber-insulated cable with a cross section of 2x4mm^2	m	1800	
8	Special aviation cable with a cross-section of 1x6mm^2 and voltage 5/10 kV	m	13660	
9	Brightness control 15 kVA	pcs	4	
10	Brightness control 10 kVA	pcs	2	
	AR lighting system			
11	Entry floodlights	pcs	46	
12	Restriction floodlights	pcs	24	
13	Side universal lens lights of Runway	pcs	130	
14	Isolation transformer 150 W	pcs	176	
15	Isolation transformer 65 W	pcs	24	
16	Stand for installing elevated-type lights	pcs	300	
17	Basis for installing elevated-type lights	pcs	300	
18	Rubber-insulated cable with a cross section of 2x2.5mm^2	m	1000	
19	Special aviation cable with a cross-section of 1x6mm^2 and voltage 5/10 kV	m	19510	
20	Brightness control 3 kVA	pcs	4	
21	Brightness control 10 kVA	pcs	2	
22	Landing area lights	pcs	180	
23	Isolation transformer 48 W	pcs	180	
24	Basis for installation of deepened lights	pcs	180	
25	Rubber-insulated cable with a cross section of 2x4mm^2	m	12960	
26	Special aviation cable with a cross-section of 1x6mm^2 and voltage 5/10 kV	m	6310	
27	Brightness control 5 kVA	pcs	2	
28	AR centreline lights	pcs	276	
29	Isolation transformer 100 W	pcs	276	
30	Basis for installation of deepened lights	pcs	276	
31	Rubber-insulated cable with a cross section of 2x4mm^2	m	11040	
32	Special aviation cable with a cross-section of 1x6mm^2 and voltage 5/10 kV	m	16700	
33	Brightness control 17.5 kVA	pcs	2	
34	Angle-of-approach lights (PAPI)	pcs	46	
35	Isolation transformer 200 W	pcs	16	
36	Stand for installing elevated-type lights	pcs	4	
37	Basis for installing elevated-type lights	pcs	4	
38	Rubber-insulated cable with a cross section of 2x2.5mm^2	m	48	
39	Special aviation cable with a cross-section of 1x6mm^2 and voltage 5/10 kV	m	7920	
40	Brightness control 5 kVA	pcs	4	
41	Wing bar lights	pcs	20	
42	Isolation transformer 48 W	pcs	20	

43	Stand for installing elevated-type lights	pcs	20	
44	Basis for installing elevated-type lights	pcs	20	
45	Rubber-insulated cable with a cross section of 2x4mm^2	m	45	
46	Special aviation cable with a cross-section of 1x6mm^2 and voltage 5/10 kV	m	4010	
47	Brightness control 5 kVA	pcs	4	
	Taxiway lighting system			
48	Taxiway edge lights	pcs	227	
49	AR protection lights	pcs	10	
50	Aerodrome signs	pcs	30	
51	Isolation transformer 45 W	pcs	227	
52	Stand for installing elevated-type lights	pcs	227	
53	Basis for installing elevated-type lights	pcs	227	
54	Rubber-insulated cable with a cross section of 2x2.5mm^2	m	1345	
55	Special aviation cable with a cross-section of 1x6mm^2 and voltage 5/10 kV	m	14735	
56	Brightness control 12.5 kVA	pcs	2	
57	Excavation of mineral soil of II gr for dismantling of existing cable lines of the Lighting Equipment with an excavator in trenches with slopes into a disposal area up to 1 m deep	m^3	12150	

Item No.	Item	Unit	Quantity	Note
	Equipment of Lights Transforming Substations			
1	Dismantling of switchboards RU-0.4 kV	sets	2	
2	Dismantling of High-Voltage Contactor Cabinets HVCC	sets	2	
3	Condenser units	sets	2	
4	Remote control equipment, Horizon	sets	2	
5	Diesel generator ASDA-200	pcs	2	
6	Oil transformers TM-250 kVA	pcs	4	
	Dismantling of existing cable lines			
1	Armoured aluminium cable 3-core 10 kV	m	11175	
2	Armoured cable 5-core 0.4 kV	m	3110	
3	Excavation of mineral soil of II gr for dismantling of existing cable lines with an excavator in trenches with slopes into a disposal area up to 1 m deep	m^3	2500	
	Dismantling of building structures of Transforming Substation-24			
1	Foundations	m^3	47	
2	Concrete floor	m^3	9	
3	Channels and pits	m^3	45	
4	Brick walls	m^3	173	
5	Floor slabs	m^3	61	
6	Perimeter pavement	m^3	9	

Item No.	Item	Unit	Quantity	Note
	1 stage 2 start-up			
1	Dismantling of existing pavements of driveways to isolated sections of the manoeuvring area No. 2 and the patrol road - crushed stone treated with bitumen, 15cm thick Loading into dump trucks, removal for reuse at a distance of 30 km	m^2 m^2 t	5610 29300 2378	γ =1.6 t/m^2
2	Felling of softwood trees 10m high, with a diameter of up to 20cm with removal for processing at a distance of 30km	pcs	167	
3	Dismantling of existing metal shelters with loading into a trailer and transportation up to 30 km (use on site)	pcs t	4 12.8	
4	Destruction of existing non-residential buildings with loading of construction debris into dump trucks and transportation up to 30km	pcs	5	
5	Dismantling of the existing wooden fence along the wooden poles with loading of construction debris into dump trucks and transportation up to 30km	r. m m^3 t	601 38.41 32.70	Д1Б(Д) type γ =0,85 t/m^3
6	Dismantling of the existing concrete fence with loading of construction debris into dump trucks and transportation up to 30km	r. m m^3 t	495 91.58 201.47	Б5в-1 type γ =2.2 t/m^3
7	Dismantling of existing aerodrome fencing made of 3m long mesh panels along the posts with loading into dump trucks and transportation up to 30 km	r. m pcs t	10470 3490 91.58	51.1 kg П 15 kg С
8	Dismantling of existing concrete foundations with loading debris into dump trucks and transportation up to 30km Backfilling of the pits with soil from the excavation with layer-by-layer compaction up to 50 cm (take into account the movement of the bulldozer up to 20 m)	m^3 t m^3	975 2145 1073	γ =2.2 t/m^3 soil of II gr
9	Arrangement of protective cases for existing cables - excavation of soil in trenches with vertical walls up to 1m deep and wide by hand (Soil of 2 gr) - cutting steel pipes L= 4m and welding metal strips - metal strip 100x100x10 - bolts and nuts M12 - double anti-corrosion waterproofing - steel pipes with a diameter of Ø102x4.5mm - backfilling of trenches with soil manually with layer-by-layer compaction	r. m m^3 pcs kg kg m^2 r. m m^3	2655 1328 1328 4168.35 323.91 1701.86 2655 1328	

Construction waste for disposal at a landfill

Item No.	Item	Unit	Quantity	Note
1	from dismantling of artificial pavements 1 stage 2 start-up	m^3	47242	1 stage 1 start-up
	from dismantling of elements of the drainage system	m^3	151	
	from dismantling of elements of electrical equipment	m^3	11.03	
2	from dismantling of artificial pavements	m^3	54058	1 stage 1 start-up
	from dismantling of elements of the drainage system	m^3	2480	
	from dismantling of elements of electrical equipment	m^3	445.95	
	from dismantling of elements of buildings and structures	m^3	3222	

Item No.	Item	Unit	Quantity	Note
	1 stage 1 start-up			
1	Excavation of mineral soil of 2 gr for dismantling of existing drainage system with an excavator in trenches with slopes into a disposal area up to 3 m deep	m^3	6744	
2	Excavation of mineral soil of 2 gr for dismantling of existing drainage system with an excavator in trenches with slopes into a disposal area up to 7.5 m deep	m^3	7170	
3	Dismantling of existing collectors made of asbestos-cement and reinforced concrete pipes with loading by excavator into dump trucks and removal up to 30km diameter 150mm 200mm 300mm 500mm 800mm	t r. m.	141.73 170 207 416 142 145	
4	Dismantling of existing reinforced concrete inspection wells with loading into dump trucks and removal up to 30km	pcs t m^3	21 125 50	
6	Dismantling of existing reinforced concrete thalweg wells with loading into dump trucks and removal up to 30km	pcs t/m^3	10 72/30	
7	Backfilling of trenches with soil of the 2nd group from the excavation with a bulldozer with removal up to 10m with compaction by air rammers and watering	m^3	15597	Compaction ratio $k_{ущ}$ = 1.1
	1 stage 2 start-up			
1	Excavation of mineral soil of 2 gr for dismantling of existing drainage system with an excavator in trenches with slopes into a disposal area up to 3 m deep	m^3	40624	
2	Excavation of mineral soil of 2 gr for dismantling of existing drainage system with an excavator in trenches with slopes into a disposal area up to 7.5 m deep	m^3	401618	
3	Dismantling of existing collectors made of asbestos-cement and reinforced concrete pipes with loading by excavator into dump trucks and removal up to 30km diameter 150mm 200mm 220mm 250mm 279mm 300mm 350mm 500mm 800mm 1000mm	t r. m 	3415.43 593 337 314 339 129 333 3355 178 406 3765	
4	Dismantling of existing reinforced concrete inspection wells with loading into dump trucks and removal up to 30km	pcs t m^3	118 1516 634	
5	Dismantling of existing reinforced concrete rainwater wells with loading into dump trucks and removal up to 30km	pcs t m^3	63 296 123	
6	Dismantling of existing reinforced concrete thalweg wells with loading into dump trucks and removal up to 30km	pcs t/m^3	5 35/15	

7	Backfilling of trenches with soil of the 2nd group from the excavation with a bulldozer with removal up to 10m with compaction by air rammers and watering	m^3	491685	Compaction ratio $k_{ущ.} = 1.1$

Arrangement of protective cases for existing engineering networks

Steel pipe Ø102x4.5mm

M12 bolt connection

New orig. inv. no											
Signature and date							UA-КВР-02-ТЕО-АПР-2-01-Р5				
							Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE				
		Rev.	Quantity	Sheet	Doc No.	Signature	Date				
Orig. inv. no		Head of Dept		Belov		[Signature]	02.20	Aerodrome Planning Works	Phase	Sheet	Sheets
		CPE		Pelikhov		[Signature]	02.20		FS	01	12
		Chief Specialist		Cherevko		[Signature]	02.20				
		Drawn by:		Kozlov		[Signature]	02.20	Preparatory Works Plans Scale 1:5000	INSTITUTE UKRDORPROEKT LLC		
		Drawn by:		Serova		[Signature]	02.20				
		Drawn by:		Cherevko		[Signature]	02.20				

Item No.	Item	Unit	Quantity																Note
			AR-2	Main taxiway-2	Taxiway-9	Taxiway-10	Taxiway-11	Taxiway-12	Taxiway-13	Taxiway-14	Taxiway-15	Taxiway-16	Taxiway-17	Taxiway-18	Taxiway-19	Taxiway *UTR*	Apron S	Aerodrome	
			1 stage	1 stage	1 stage	1 stage	1 stage	1 stage	1 stage	1 stage	1 stage	1 stage	1 stage	1 stage	1 stage	1 stage	1 stage	1 stage	
			2 start-up	2 start-up	1 start-up	2 start-up	2 start-up	2 start-up	2 start-up	2 start-up	2 start-up	2 start-up	2 start-up	2 start-up	2 start-up	1 start-up	1 start-up	2 start-up	
1	Dismantling of existing aerodrome pavements of manoeuvring area No.2	m²	---	---	15925	---	---	---	---	---	7015	---	---	---	---	---	---	---	y=2.0 t/m³
	- asphalt concrete 6 cm thick	m²	219445	74035	15925	---	7660	8840	5860	6260	7015	965	---	---	---	3045	---	---	
	- reinforced concrete 26 cm thick	m²	77590	16675	---	7965	9205	6185	6615	7295	1020	---	---	---	3235	---	---		
	- soil bitumen 13cm thick	r.m.	223010	25200	5415	---	2605	3005	1995	2130	2385	330	---	---	---	1035	---	---	y=2.5 t/m³
	Cutting seams in reinforced concrete (slabs 3.5mx4m)	t	756000	46395	9977	---	4790	5530	3679	3932	4387	606	---	---	---	1915	---	---	y=1.8 t/m³
	Loading into dump trucks and removal for reuse at a distance of 30 km	t	136213	19884	6187	---	2053	2370	1577	1685	2722	260	---	---	---	821	---	---	
	Loading into dump trucks and removal of construction waste to a landfill at a distance of 30 km		58377																
2	Dismantling of existing aerodrome pavements of manoeuvring area No.2	m²	---	---	---	---	---	---	---	---	---	---	---	---	---	---	211 15	---	y=2.2 t/m³
	- asphalt concrete 45 cm thick	m²	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
	- sand cement 15cm thick	m²	---	---	---	---	---	---	---	---	---	---	---	---	---	---	214 45	---	
	- cement concrete 38cm thick	m²	---	---	---	---	---	---	---	---	---	---	---	1280	---	---		---	y=1.8 t/m³
	- sand cement 20cm thick	t	---	---	---	---	---	---	---	---	---	---	---	1345	---	---	---	---	
	Loading into dump trucks and removal of construction waste to a landfill at a distance of 30 km		---	---	---	---	---	---	---	---	---	---	---	1554	--	--	---	---	
																	266 94		
3	Dismantling of existing aerodrome pavements of manoeuvring area No.2	m²	---	---	---	6300	---	---	---	---	---	---	2235	---	6360	---	188 85	---	y=2.2 t/m³
	- cement concrete 45см thick	m²	---	---	---	6615	---	---	---	---	---	---	2375	---	6675	---		---	
	- lean concrete 20 cm thick	m²	---	---	---	6615	---	---	---	---	---	---	2375	---	6675	---	191 75	---	y=2.2 t/m
	- sand cement 15 cm thick	t	---	---	---	10934	---	---	---	---	---	---	3899	---	11036	---	191 75	---	
	Loading into dump trucks and removal of construction waste to a landfill at a distance of 30 km																323 10		y=1.8 t/m³
4	Dismantling of existing aerodrome pavements of manoeuvring area No.2	m²	---	---	---	---	---	---	---	---	---	---	---	---	---	---	237 95	---	y=2,2 t/m³
	- cement concrete	t	---	---	---	---	---	---	---	---	---	---	---	---	---	---		---	

	30 cm thick Loading into dump trucks and removal of construction waste to a landfill at a distance of 30 km - crushed stone 20 cm thick - sand 20cm thick Loading into dump trucks and removal for the needs of the airport at a distance of 10 km	m² m² t	--- --- ---	--- --- ---	--- --- ---	--- --- ---	--- --- ---	--- --- ---	--- --- ---	--- --- ---	--- --- ---	--- --- ---	--- --- ---	--- --- ---	--- --- ---	--- --- ---	15705 24190 24190 15482	--- --- ---	y=1,6 t/m³ y=1,6 t/m³
5	Dismantling of removable reinforced concrete slabs over existing fuel lines (*PZhK*37.5x37.5x28) Loading into dump trucks and removal for reuse at a distance of 30 km Dismantling of existing sandy bases under 32cm thick plates Loading into dump trucks and removal for the needs of the airport at a distance of 10 km	pcs t m² t	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	--- --- --- ---	182 1792 2560 1311	--- --- --- ---	y=2,5 t/m³ y=1,6 t/m³
6	Dismantling of existing shoulders of aerodrome pavements of manoeuvring area No.2 and aerodrome driveways - asphalt concrete 3cm thick - crushed stone 12cm thick Loading into dump trucks and removal for the needs of the airport at a distance of 10 km	m² m² t	12430 19250 4442	29110 32680 8021	8290 9260 2275	--- --- ---	2850 3175 781	1880 2470 587	3735 4205 1031	3820 4425 1079	2700 3125 762	--- --- ---	--- --- ---	465 555 134	--- --- ---	685 855 205	255 330 79	21570 29250 6910	y=2,0 t/m³ y=1,6 t/m³
7	Dismantling of existing shoulders of aerodrome pavements of manoeuvring area No.2 and aerodrome driveways - cement concrete 24cm thick - sand cement 21cm thick - cement concrete 15 thick - sand cement 12cm thick Loading into dump trucks and removal of construction waste to a landfill at a distance of 30 km	m² m² m² m² t	--- --- --- --- ---	--- --- 23690 26360 13511	--- --- --- --- ---	565 665 --- --- 550	--- --- --- --- ---	--- --- --- --- ---	--- --- --- --- ---	--- --- --- --- ---	--- --- --- --- ---	--- --- --- --- ---	805 955 --- --- 786	--- --- --- --- ---	480 565 --- --- 467	3435 3740 --- --- 3227	2770 3340 --- --- 2725	1615 2235 --- --- 1698	y=2,2 t/m³ y=1,8 t/m³

Taxiway-9 Designed aerodrome pavements of manoeuvring area No.2

Existing pavements of manoeuvring area No.2

Aerodrome additional land allocation border

Main technical and economic indicators

Item no.	Item	Unit	Quantity
1	Area of aerodrome pavements, total Including - load-bearing pavements - reinforced shoulders	m² m² m²	1064105 767265 296840
2	Length of additional fence and patrol road	r.m.	1400
3	Additional land allocation area	ha	19.1

1. The Axis of new AR-2 is offset by 80 meters to the west from the Axis of the existing one.
2. Reconstruction of Apron S under this option provides an area of new pavements sufficient for manoeuvring aircraft from the thrust of their own engines.

New orig. inv. no										
Signature and date										
							UA-КВР-02-ТЕО-АПР-2-02-Р2			
							Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE			
		Rev.	Quantity	Sheet	Doc No.	Signature	Date			
Orig. inv. no								Aerodrome Planning Works	Phase	Sheet	Sheets
									FS	02	
		Head of Dept		Belov		[Signature]	03.19				
		CPE		Pelikhov		[Signature]	03.19	Reconstruction Schematic Drawing, Option 1. Scale 1:5000	INSTITUTE UKRDORPROEKT LLC		
		Chief Specialist		Cherevko		[Signature]	03.19				
		Drawn by:		Cherevko		[Signature]	03.19				

Taxiway-9 Designed aerodrome pavements of manoeuvring area No.2

Existing pavements of manoeuvring area No.2

Aerodrome additional land allocation border

Main technical and economic indicators

Item no.	Item	Unit	Quantity
1	Area of aerodrome pavements, total Including - load-bearing pavements - reinforced shoulders	m² m² m²	1040060 742500 297560
2	Length of additional fence and patrol road	r.m.	3100
3	Additional land allocation area	ha	27.4
4	Area of additional aerodrome pavements, total (for the transfer of existing Parking Area S39-S45 and 104)	m²	39030

1. The axis of new AR-2 is aligned with the axis of the existing one.

2. Reconstruction of Apron S under this option provides an area of new pavements sufficient for manoeuvring aircraft:

- Western (first from MT-2) row (thrust of own engines).

- Eastern (second from MT-2) row (taxiing out from parking area by a tow tractor).

New orig. inv. no											
Signature and date											
							UA-КВР-02-ТЕО-АПР-03-01-Р1				
							Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE				
		Rev.	Quantity	Sheet	Doc No.	Signature	Date				
Orig. inv. no								Aerodrome Planning Works		Phase	Sheet	Sheets
		Head of Dept		Belov		[Signature]	04.19			FS	03	
		CPE		Pelikhov		[Signature]	04.19					
		Chief Specialist		Cherevko		[Signature]	04.19	Reconstruction Schematic Drawing, Option 2. Scale 1:5000		INSTITUTE UKRDORPROEKT LLC		
		Checked by		Cherevko		[Signature]	04.19					
		Drawn by		Koryak		[Signature]	04.19					

Aircraft Engine Test Site

Isolated Parking Area

Special Purpose Vehicle Parking Area

Aircraft Anti-Icing Treatment Site

Designed aerodrome pavements of manoeuvring area No.2

Existing artificial pavements of manoeuvring area No.2

Fencing of manoeuvring area No.2 of Boryspil IA SOE

Perspective view

New orig. inv. no										
Signature and date							UA-КВР-02-ТЕО-АПР-2-04-Р1			
							Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE			
		Rev.	Quantity	Sheet	Doc No.	Signature	Date			
Orig. inv. no								Aerodrome Planning Works	Phase	Sheet	Sheets
		Head of Dept		Belov		[Signature]	03.19		FS	04	
		CPE		Pelikhov		[Signature]	03.19				
		Chief Specialist		Cherevko		[Signature]	03.19	Aircraft Arrangement Plan. Scale 1:2000	INSTITUTE UKRDORPROEKT LLC		
		Checked by		Cherevko		[Signature]	03.19				
		Drawn by		Koryak		[Signature]	03.19				

Lithological description of soils

EGE (layer) No.	Brief description of soils
1	humus sandy loam with plant roots, firm consistency, dark brown
1a	bulk soil - hard sandy loam, from dark gray to brown in color with interlayers of sand, in some places with an admixture of rubble and construction waste
1б	plastic sandy loam, silty, slightly peaty and with an admixture of organic substances, dark gray
2	hard sandy loam, silty, loess, subsiding, from yellow-brown to yellow-gray, in places with interlayers and lenses of fine and dusty sand
2a	plastic sandy loam, silty, loess, subsiding, from yellow-brown to yellow-gray color, in places with interlayers and lenses of fine and dusty sand
3	fine sand, yellow-gray, in places with lenses and interlayers of sandy loam and dusty sand
4	plastic sandy loam, sometimes hard, silty, from greenish-brown to yellow-gray color, in places with interlayers and lenses of sand
5	fine, gray sand, sometimes with interlayers of silty sand

26/1 - disturbed soil sample

33/1 - undisturbed soil sample

TC3-23 - static probing point

Designation of the consistency and degree of soil moisture

Sandy	Loamy
low degree of water saturation	Hard
_____	Semi-hard
_____	Plastic

New orig. inv. no										
Signature and date								UA-KBP-02-TEO-АПР-5-Р1		
								Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE		
		Rev.	Quantity	Sheet	Doc No.	Signature	Date			
Orig. inv. no								Aerodrome Planning Works	Phase	Sheet	Sheets
		Head of Dept		Belov		[Signature]	04.19		FS	5	
		CPE		Pelikhov		[Signature]	04.19				
		Chief Specialist		Cherevko		[Signature]	04.19	Longitudinal Profile Along the Axis of the Artificial Runway and the Runway Strip	INSTITUTE UKRDORPROEKT LLC		
		Checked by		Cherevko		[Signature]	04.19				
		Drawn by		Koryak		[Signature]	04.19				

Existing fencing of manoeuvring area No.2

Design contour line and height in meters (Baltic Elevation System)

Designed aerodrome pavements of manoeuvring area No.2

Planned unpaved sections of manoeuvring area No.2

Zero fill line

Aerodrome additional land allocation border

1. The grading plan is based on topographic and geodetic surveying, engineering and geodetic surveys, and a digital terrain model made by SALANA LLC in 2019.

2. Coordinate system – local, elevation system – Baltic Elevation System.

The design surfaces for the planning of aerodrome pavements, unpaved sections of manoeuvring area and of slopes to the existing relief have been made in the form of a digital model using the AutoCAD® Civil 3D® 2014 software product.

4. The grading plan is made in horizontals with crossings in 0.5m and 1m.

5. Design slopes for connecting the design surface of manoeuvring zone No. 2 planning with the existing relief are taken as 1:40 (slope 0.025).

6. The area of the temporary land allocation for the construction of the design slopes will be specified at the subsequent design stages when performing additional survey of the territory adjacent to the aerodrome. In this project, it is determined and is approximately 4.45 ha.

New orig. inv. no										
Signature and date							UA-KBP-02-TEO-AПP-2-06-P1			
							Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE			
		Rev.	Quantity	Sheet	Doc No.	Signature	Date			
Orig. inv. no								Aerodrome Planning Works	Phase	Sheet	Sheets
									FS	06	
		Head of Dept		Belov		[Signature]	03.19				
		CPE		Pelikhov		[Signature]	03.19	Grading Plan. Scale 1:5000	INSTITUTE UKRDORPROEKT LLC		
		Chief Specialist		Cherevko		[Signature]	03.19				
		Drawn by		Cherevko		[Signature]	03.19				

excavation volume m^3
fill volume m^3

bottom contour of the 'trough' of aerodrome pavements

zero fill line

1. The cartogram has been calculated using the Cartogramma Utility for AutoCAD ® Civil 3D ® 2014.
2. The method of triangulation on a 30x30 meters square grid has been selected for the calculation.
3. The initial data for calculating the cartogram are the design surfaces of levelling off the bottom of the trough of the aerodrome pavements and the levelling off the bottom of the pit for the aerodrome pavements (the existing relief after removing the layer of vegetation soil and dismantling of the existing pavements).
4. Volumes of earthworks are given in cubic meters.

New orig. inv. no										
Signature and date										
							UA-КВР-02-ТЕО-АПР-2-07-Р1			
							Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE			
		Rev.	Quantity	Sheet	Doc No.	Signature	Date			
Orig. inv. no								Aerodrome Planning Works	Phase	Sheet	Sheets
									FS	07	
		Head of Dept		Belov		[Signature]	03.19				
		CPE		Pelikhov		[Signature]	03.19	Cartogram of Earthworks in the 'Trough' of Aerodrome Pavements. Scale 1:5000	INSTITUTE UKRDORPROEKT LLC		
		Chief Specialist		Cherevko		[Signature]	03.19				
		Drawn by		Cherevko		[Signature]	03.19				

fill volume m^3

zero fill line

contour of aerodrome pavements

excavation volume m^3

1. The cartogram has been calculated using the Cartogramma Utility for AutoCAD ® Civil 3D ® 2014.
2. The method of triangulation on a 30x30 meters square grid has been selected for the calculation.
3. The initial data for calculating the cartogram are the design surfaces of levelling off soil sections of the runway strip for vegetation soil and the levelling off the bottom of the excavation for the runway strip (the existing relief after removing the layer of vegetation soil and dismantling of the existing coatings).
4. Volumes of earthworks are given in cubic meters.

New orig. inv. no										
Signature and date										
							UA-КВР-02-ТЕО-АПР-2-08-Р1			
							Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE			
	Rev.	Quantity	Sheet	Doc No.	Signature	Date				
Orig. inv. no							Aerodrome Planning Works	Phase	Sheet	Sheets
								FS	08	
	Head of Dept		Belov		[Signature]	03.19				
	CPE		Pelikhov		[Signature]	03.19	Cartogram of Earthworks on Soil Sections of the Runway Strip. Scale 1:5000	INSTITUTE UKRDORPROEKT LLC		
	Chief Specialist		Cherevko		[Signature]	03.19				
	Drawn by		Cherevko		[Signature]	03.19				

fill on design slopes
zero fill line

fill volume m^3
border between contours of the same name
excavation volume m^3
excavation on design slopes

1. The cartogram has been calculated using the Cartogramma Utility for AutoCAD ® Civil 3D ® 2014.
2. The method of triangulation on a 30x30 meters square grid has been selected for the calculation.
3. The initial data for calculating the cartogram are the design surfaces of levelling off soil sections outside the runway strip and slopes and the surfaces of the existing relief.
4. Volumes of earthworks are given in cubic meters.

New orig. inv. no										
Signature and date							UA-KBP-02-TEO-AПP-2-09-P1			
							Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE			
		Rev.	Quantity	Sheet	Doc No.	Signature	Date			
Orig. inv. no								Aerodrome Planning Works	Phase	Sheet	Sheets
									FS	09	
		Head of Dept		Belov		[Signature]	03.19				
		CPE		Pelikhov		[Signature]	03.19	Cartogram of Earthworks on Soil Sections Outside the Runway Strip. Scale 1:5000	INSTITUTE UKRDORPROEKT LLC		
		Chief Specialist		Cherevko		[Signature]	03.19				
		Drawn by		Cherevko		[Signature]	03.19				

A FRAGMENT OF THE LAYOUT OF SLABS ON CEMENT CONCRETE PAVEMENTS TRANSVERSE COMPRESSION JOINT AND LONGITUDINAL JOINT WHICH IS CUT LONGITUDINAL TONGUE-AND-GROOVE JOINT UNIT A UNIT A joint filler ДСТУ Б.В.2.7-116-2002 [Ukraine's National Standard] joint sealant of 1.5a diameter	A FRAGMENT OF ARRANGING JOINTS IN SLABS OF CEMENT-CONCRETE PAVEMENTS Transverse compression joint Longitudinal joint which is cut Transverse compression joint Longitudinal tongue-and-groove joint Longitudinal joint which is cut	cement concrete ДСТУ Б.В.2.7-43-96 Btb4.4/55 B45 45cm thick separating layer lean concrete ДСТУ Б.В.2.7-43-96 B10/150 30cm thick sand cement ДСТУ Б.В.2.7-207:2009 M75 30cm thick bottom of the trough - compacted natural soil base or fill cement concrete ДСТУ Б.В.2.7-43-96 Btb4.0/50 B40 30cm thick separating layer sand cement ДСТУ Б.В.2.7-207:2009 M75 15cm thick filling the trough sinuses with ready-made sand cement mixture M75 bottom of the trough - compacted natural soil base or fill CROSS SECTION OF MAIN TAXIWAY

New orig. inv. no										
Signature and date							UA-КВР-02-ТЕО-АПР-2-10-РЗ			
							Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE			
		Rev.	Quantity	Sheet	Doc No.	Signature	Date			
Orig. inv. no								Aerodrome Planning Works	Phase	Sheet	Sheets
									FS	10	
		Head of Dept		Belov		[Signature]	02.20				
		CPE		Pelikhov		[Signature]	02.20	Aerodrome Pavement Structures	INSTITUTE UKRDORPROEKT LLC		
		Chief Specialist		Cherevko		[Signature]	02.20				
		Drawn by:		Cherevko		[Signature]	02.20				

EXPLICATION OF LAND WITHIN THE ADDITIONAL LAND ALLOCATION (start)

Land plot No.	Cadastral number	Name/Surname of land owner or land user	Plot area, ha total	Plot area, ha alienated
168	3220885000:02:006:0018	Karpenko	0.6132	0.2049
169	3220885000:02:006:0017	Sakhno	0.6133	0.6133
170	3220885000:02:006:0016	Babich	0.6133	0.6133
171	3220885000:02:006:0015	Shum	0.6132	0.6132
172	3220885000:02:006:0014	Voshkulat	0.6133	0.6133
173	3220885000:02:006:0013	Voloshina	0.6132	0.6132
174	3220885000:02:006:0001	Babich	0.6133	0.5092
175	3220885000:02:006:0002	Morgushko	0.6132	0.5872
176	3220885000:02:006:0003	Kryvolapchuk	0.6133	0.4728
177	3220885000:02:006:0004	Maistrenko	0.6133	0.3875
178	3220885000:02:006:0005	Shvets	0.6133	0.3472
		Village Council		0.5164
Total				6.0915

EXPLICATION OF LAND WITHIN THE ADDITIONAL LAND ALLOCATION (continued)

Land plot No.	Cadastral number	Name/Surname of land owner or land user	Plot area, ha total	Plot area, ha alienated
237	3220883200:02:003:0113	Selentii	0.9559	0.9311
239	3220883200:02:003:0105	Uzvarik	0.9354	0.2823
240	3220883200:02:003:0105	Grebenko	0.9354	0.9354
241	plot is not formed	Didok	0.9354	0.9354
242	3220883200:02:003:0205	Stutz	0.9355	0.9355
244	3220883200:02:003:0103	Zavitailo	0.9354	0.9354
246	3220883200:02:003:0091	Kurochkin	0.5105	0.1451
247	3220883200:02:003:0202	Andriiako	0.5126	0.2465
248	3220883200:02:003:0096	Levash	0.5401	0.4702
251	3220883200:02:003:0087	Zhurbas	0.5108	0.2101
259	3220883200:02:003:1106	Levkivsky	0.9276	0.7953
260	3220883200:02:003:0204	Voloshchu	0.5332	0.0406
261	3220883200:02:003:0203	Kompaniiets	0.5104	0.1980
262	3220883200:02:003:0203	Levkivsky	0.5106	0.2222
		Village Council		5.6833
Total				12.9664
GRAND TOTAL				19.0579

Designed aerodrome pavements of Manoeuvring Area No.2
Plots of required additional land allocation
Plots, the land user of which is Boryspil IA SOE
Plots, the boundaries of which are digitized from a public cadastral map
Plots, the boundary coordinates of which are derived from files in4 of State Land Cadastre
Land plot No

EXPLICATION OF LAND WITHIN THE ADDITIONAL LAND ALLOCATION (end)

Land plot No.	Cadastral number	Name/Surname of land owner or land user	Plot area, ha total	Plot area, ha alienated
Reserve land for airport development				
124	3220885000:04:002:0038	Mishchanska	3.2500	1.6750
135	3220885000:04:002:0034	Shum	3.2500	0.0707
140	3220885000:04:002:0050	Sereda	3.2500	2.6117
141	plot is not formed	Priadko	3.2458	3.2458
142	3220885000:04:002:0041	Balykina	3.2501	3.2501
143	3220885000:04:002:0032	Dziuba	3.2500	3.2500
144	220885000:04:002:0044	Liashchenko	3.4001	3.4001
145	plot is not formed	Turlo	2.0700	2.0700
146	3220885000:04:002:0036	Levun, Berehova, Levun	4.0000	0.8388
156	3220885000:04:002:0053	Turlo	1.4300	0.7467
		Village Council		2.0911
GRAND TOTAL				23.2500

1. Information on land plots is indicated in accordance with the "Register of land plots of adjacent land users" provided by the Customer.
2. The area of the additional land allocation is calculated to the border of the plots, the land user of which is Boryspil IA SOE.

New orig. inv. no											
Signature and date											
							UA-КВР-02-ТЕО-АПР-2-11-Р2				
							Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE				
	Rev.	Quantity	Sheet	Doc No.	Signature	Date					
Orig. inv. no							Aerodrome Planning Works		Phase	Sheet	Sheets
									FS	11	
	Head of Dept		Belov		[Signature]	09.19					
	CPE		Pelikhov		[Signature]	09.19	Land Allocation Plan. Scale 1:5000		INSTITUTE UKRDORPROEKT LLC		
	Chief Specialist		Cherevko		[Signature]	09.19					
	Drawn by		Cherevko		[Signature]	09.19					

Item No.	Item	Unit	Quantity						Note
			Total	1 stage 1 start-up	1 stage 2 start-up	2 stage 1 start-up	2 stage 2 start-up	2 stage 3 start-up	
Works that are valued as per similar projects (approved project)									
1	Earthworks in the trough of aerodrome pavements 2-1-1 local cost estimate indicator - fill volume in the trough	m^3 m^3	1106522 191143	163482	818402	87120	20745	16773	
	Earthworks on the unpaved part of the runway strip (RS) 2-1-6 local cost estimate indicator (Volume 10.2 Book 1.1) – fill volume on the runway strip	m^3 m^3	2357737 510000	352352	1739812	185631	44203	35739	
3	Earthworks on the unpaved part outside the RS 2-1-7 local cost estimate indicator (Volume 10.2 Book 1.1) – fill volume outside the runway strip	m^3 m^3	340802 49670	---	340802	---	---	---	
4	Agrotechnical works 2-1-16 local cost estimate indicator (Volume 10.2 Book 1.1) – work area on the runway strip	ha ha	180.03 94.5	26.60	133.15	14.17	3.38	2.73	
5	Agrotechnical works 2-1-17 local cost estimate indicator (Volume 10.2 Book 1.1) – work area outside the runway strip	ha ha	81.29 25.7	---	81.29	---	---	---	
6	Aerodrome pavement marking AR-2 Main Taxiway-2 Main Taxiway as a connective Taxiway High-Speed Exit Taxiways Connective Taxiways TAXIWAY-9 TAXIWAY-16 TAXIWAY-17 TAXIWAY-18 TAXIWAY-10 + Apron G Racing site Isolated Parking Area Apron S Parking area	m^2 m^2 m^2 m^2 m^2 m^2 m^2 m^2 m^2 m^2 m^2 m^2 m^2 m^2 m^2 m^2	171000 87400 87400 105600 41900 17540 2830 2730 2285 11160 19620 13070 121430 83300 168705	--- --- --- --- --- 17540 --- --- 2285 --- --- --- 121430 ---	171000 87400 87400 105600 41900 --- 2830 2730 --- 11160 --- --- --- ---	--- --- --- --- --- --- --- --- --- --- --- --- --- 83300	--- --- --- --- --- --- --- --- --- --- 19620 --- --- ---	--- --- --- --- --- --- --- --- --- --- --- 13070 ---	

	2-2-29 local cost estimate indicator Volume 10.2 Book 1.1 Part 2								
Costs valued based on initial data of KBP									
7	Additional land allocation total share plots with code 2.01 share plots with code 1.03 share plots with code 1.01 plots under the roads of Martusivska village council plots under the roads of Hirska village council code 1.01 share plots have not been formed plots of village councils have not been formed	ha ha ha ha ha ha ha	19.0579 1.2056 4.3695 5.3302 0.5164 0.5164 5.1810	--- --- --- --- --- --- ---	19.0579 1.2056 4.3695 5.3302 0.5164 1.9529 5.1810	--- --- --- --- --- --- ---	--- --- --- --- --- --- ---	--- --- --- --- --- --- ---	
8	Code 1.01 - 1.03 reserve lands for aerodrome development	ha	23.2500	---	23.2500	---	---	---	

Item No.	Item	Unit	1 stage 2 start-up	Note
BILLS OF QUANTITIES FOR ARTIFICIAL PAVEMENTS OF AR-2				
Bottom of the trough				
1	Bottom of the trough	m^2	314950	
2	Leveling the bottom of the trough by means of small-scale mechanization	m^2	31495	10% p.1
3	Trough bottom sealing with pneumatic rammers to a depth of 20cm	m^2	31495	10% p.1
Load-bearing artificial pavements				
4	Sand-cement base M75 (with M400 cement consumption of 16% of the sand mass) 30cm thick	m^2	190250	
5	Maintenance of sand-cement base with sand and water	m^2	190250	
6	Bottom layer of pavements from lean concrete B 10/150 30cm thick	m^2	182545	
7	Maintenance of lean cement pavements with film-forming agents	m^2	182545	
8	Seams in lean concrete with filling with joint sealant Ø12mm and mastic with a flow rate of 0.000104m^3 / r.m			γ=1.2t/m^3

	cutting to a depth of 10 cm and jointing to a depth of 3 cm of transverse seams cutting to a depth of 10 cm and jointing to a depth of 3 cm of longitudinal seams	r.m. r.m.	24378 26615	
9	Separating layer with fastening	m^2	171000	
10	Pavement top layer of cement concrete Btb4,4/55 B45 45 cm thick with a high-performance set with an additional formwork	m^2	169650	
11	Same, Btb4,4/55 B45 45cm thick, by means of small-scale mechanization	m^2	1350	
12	Maintenance of the cement concrete pavements with film-forming agents	m^2	171000	
13	Surface treatment of a cement-concrete pavement with CC100 mortar at a rate of 400 g/m^2, followed by cleaning the pavement with hanging brushes	m^2	171000	
14	Seams in hardened cement concrete 14.1 and jointing to a depth of 4cm of longitudinal through seams (tongue and groove) - sealing cord Ø18mm - mastic with consumption 0.000204m^3/r.m. γ=1.2t/m^3 14.2. cutting to a depth of 11cm and jointing to a depth of 3cm of longitudinal false seams (pins) - sealing cord Ø12mm - mastic with consumption 0.000104m^3/r.m. γ=1.2t/m^3 - dowel pins from fittings A240 Ø22mm, length 60cm 14.3. cutting to a depth of 11cm and jointing to a depth of 3cm of transverse false seams (pins) - sealing cord Ø12mm - mastic with consumption 0.000104m^3/r.m. γ=1.2t/m^3 - dowel pins from fittings A240 Ø22mm length 60cm	r.m. r.m. pcs r.m. pcs	11400 15200 46614 22770 106260	 23pcs/7.5m 35pcs/7.5m
15	Reinforced A400C Ø16mm frames for slabs 7.5x7.5x0.45m with consumption 1335.748kg per slab	m^2	1350	23.747kg/m^2
16	Seams with a board around the PZhK plates - board 20mm 0.009m^3/r.m. - sealing cord Ø37.5mm - three twisted Ø12mm - mastic with consumption 0.00075m^3/r.m. γ=1.2t/m^3	r.m.	360	
Artificial turf for reinforced shoulders				
17	Bottom of the trough	m^2	107220	
18	Filling of sinuses of a trough with M75 sand cement (with M400 cement consumption of 16% of the sand mass) with layer-by-layer compaction	m^3m^2	83632 214440	
19	Sand-cement base M75 (with M400 cement consumption of 16% of the sand mass) 15cm thick	m^2	107220	
20	Maintenance of sand-cement base with sand and water	m^2	107220	
21	Separating layer between the base and the pavements	m^2	100195	
22	Layer of pavements from Btb4.0/50 B35 cement concrete, 30 cm thick, mechanically	m^2	100195	
23	Maintenance of the cement concrete pavements with film-forming agents	m^2	100195	
24	Seams in cement concrete 24.1 jointing to a depth of 3cm of longitudinal though seams - sealing cord Ø12mm - mastic with consumption 0.000104м^3/r.m. γ=1.2t/m^3	r.m.	7575	

	24.2. cutting to a depth of 10 cm and jointing to a depth of 3 cm of longitudinal false seams - sealing cord Ø12mm - mastic with consumption 0.000104m³/r.m. γ=1.2t/m³ 24.3. cutting to a depth of 10 cm and jointing to a depth of 3 cm of transverse false seams - sealing cord Ø12mm - mastic with consumption 0.000104m³/r.m. γ=1.2t/m³	r.m. r.m.	13395 26345	
Cable transitions (quantity is taken similar as for Runway-1)				
25	Development of mineral soil of IIgr. by excavator in trenches up to 1 m deep, loading into dump trucks and removal for 10km γ=1.65t/m³	m³	2053	
26	Manual cleaning of the bottom and walls of trenches	m³	228	
27	Loosening of the bottom of trenches to a depth of 20cm, followed by compaction with pneumatic rammers	m²	2074	
28	Cable transitions from pipes Ø110mm with ring stiffness not lower than SN12 (pipes with broach) - from 4 pipes in one thread - from 6 pipes in one thread - from 8 pipes in two threads - from 10 pipes in two threads - from 12 pipes in three threads	 r.m. r.m. r.m. r.m. r.m.	 316 79 158 553 79	
29	Sealing of pipe ends with plugs Ø110mm	pcs	240	
30	Manual backfilling of trenches with M75 sand cement (with M400 cement consumption of 16% of the sand mass) with layer-by-layer compaction	m³	1617	
31	Mechanical backfilling of trenches with M75 sand cement (with M400 cement consumption of 16% of the sand mass) with layer-by-layer compaction	m³	1348	
32	Reinforcement of the lower zone of the upper layer of the pavement with reinforcement mesh A400C Ø16mm which is laid on concrete 10cmx10cmx3cm substrates	r.m. kg m³	675 20743.20 0.90	
Grooves in lean concrete (quantity is taken similar as for Runway-1)				
33	Cutting grooves in a layer of lean concrete with dimensions 25cmx21cm with loading construction waste into dump trucks and removal for 10km γ = 2.40t/m³	r.m. m³	13797 724	
34	Manual cleaning of grooves	r.m.	13797	
35	Laying pipes with ring stiffness not less than SN12 Ø110mm Ø200mm	 r.m. r.m.	 13629 168	
36	Fastening pipes in grooves with clamps made of steel plates 10cm wide up to 50cm long 5mm thick (with a step of 1m)	r.m. kg	13140 51574.50	
37	Plugging the grooves and sinuses of pipes with M200 concrete with careful compaction by hand	m³	593	
38	Cage of M200concrete around the pipes outside service areas in soil to wells of the Sanitary Cleaning Scheme	r.m. m³	445 74	

1. According to the local cost estimate for pavements of AR-2 (which includes p.1- p.38 of volumes for pavements)

to determine the cost of 1m² - the figure for the estimate, the area of Runway-2 171000m².

2. Using the integrated cost of 1m², to draw up local cost estimates for the aerodrome pavements of other elements of the aerodrome, the areas of which by stages are as follows:

Aerodrome element	Quantity				
	1 stage 1 start-up	1 stage 2 start-up	2 stage 1 start-up	2 stage 2 start-up	2 stage 3 start-up
Main Taxiway-2	---	87400	---	---	---
Main Taxiway as Connective	---	87400	---	---	---
Taxiway	---	105600	---	---	---
High-Speed Exit	---	41900	---	---	---
Taxiways Connective	---	2830	---	---	---
Taxiways	---	2730	---	---	---
Taxiway-16	---	11160	---	---	---
Taxiway-17	17540	---	---	---	---
Taxiway-10 + Apron G	2285	---	---	---	---
Taxiway-9	121430	---	---	---	---
Taxiway-18	---	---	83300	---	---
Apron S	---	---	---	19620	---
Parking Area	---	---	---	---	13070
Racing Site					
Isolated Parking Area					

3. Mastic for filling expansion joints of aerodrome pavements is used with the preliminary heating.

New orig. inv. no											
Signature and date								UA-КВР-02-ТЕО-АПР-2-12-Р5			
								Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE			
		Rev.	Quantity	Sheet	Doc No.	Signature	Date				
Orig. inv. no								Aerodrome Planning Works	Phase	Sheet	Sheets
									FS	12	
		Head of Dept		Belov		[Signature]	02.20				
		CPE		Pelikhov		[Signature]	02.20	Bill of Quantities	INSTITUTE UKRDORPROEKT LLC		
		Chief Specialist		Cherevko		[Signature]	02.20				
		Drawn by:		Cherevko		[Signature]	02.20				

EXPLICATIONS OF PAVEMENTS

Item No.	Item	Note
I	Artificial Turf Runway	I stage III start-up
I I	Main Taxiway for Code F Aircraft	I stage III start-up
I I I	Connective Taxiway	I stage III start-up
IV	Connective High-Speed Exit Taxiways	I stage III start-up
V	Connective Taxiways	I stage III start-up
VI	Connective Taxiway-9	I stage I start-up
VII	Connective Taxiway-16	I stage III start-up
VIII	Connective Taxiway-17	I stage III start-up
IX	Connective Taxiway-18	I stage I start-up
X	Passenger Apron S	Reconstruction I stage I start-up
XI	Isolation Parking Area	II stage III start-up
XII	Aircraft Engine Test Site	II stage II start-up
XIII	Aircraft Anti-Icing Treatment Site	I stage I start-up
XIV	Aircraft Parking Area	I I stage I start-up
XV	Apron G and Taxiway-10	I stage III start-up

Construction of a drainage system of the first start-up of I stage of construction

Drain D. Total length – 294m (Ø300mm...450mm).
Two temporary sites with connection to the existing drainage network.
Total length – 376m (Ø250mm....Ø600mm).

Drain L. Total length – 229m (Ø250mm)

Construction of a drainage system of the third start-up of I stage of construction

Drain A. Total length - 4 157m (Ø350mm...1500mm)
Drain B. Total length - 3 878m (Ø200mm...800mm)
Drain C. Total length - 4 220m (Ø200mm...1250mm)
Drain E. Total length – 269m (Ø250mm...300mm)
Drain H. Total length – 827m (Ø250mm...350mm)
Drain J Total length - 1 139m (Ø350mm...400mm)
Drain M. Total length – 387m (Ø300mm...Ø350mm)
Drain N. Total length – 386m (Ø500mm)
Drain P. Total length – 283m (Ø250mm)

Construction of a drainage system of the first start-up of II stage of construction

Drain F. Total length – 656m (Ø300mm...600mm)

Construction of a drainage system of the second start-up of II stage of construction

Drain G. Total length – 241m (Ø300mm...400mm)

Construction of a drainage system of the third start-up of II stage of construction

Drain K. Total length – 249m (Ø250mm...300mm)

Total length and diameter of bypasses are not taken into account.

- artificial aerodrome pavements of the first start-up of I stage of construction
- artificial aerodrome pavements of the third start-up of I stage of construction
- artificial aerodrome pavements of the first start-up of II stage of construction
- artificial aerodrome pavements of the second start-up of II stage of construction
- artificial aerodrome pavements of the third start-up of II stage of construction
- buildings and structures of the second start-up of I stage of construction
- *design contour line*

Drawings were prepared on the basis of aerodrome vertical levelling drawings and master plan.

New orig. inv. no										
Signature and date							UA-KBP-02-TEO-ВД-2-01			
							Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE			
		Rev.	Quantity	Sheet	Doc No.	Signature	Date			
Orig. inv. no								Drainage	Phase	Sheet	Sheets
		Head of Dept		Belov		[Signature]	06.19		FS	01	
		CPE		Pelikhov		[Signature]	06.19				
		Chief Specialist		Cherevko		[Signature]	06.19	Drainage Plan. Scale 1:5000	INSTITUTE UKRDORPROEKT LLC		
		Drawn by		Serova		[Signature]	06.19				

1. The Schematic Drawing was developed based on the materials of the topographic and geodetic survey of the KBP provided by the Customer.

2. The Schematic Drawing takes into account the relative position of the objects of reconstruction of Manoeuvring Area No.2, Aprons S, C, M and the new terminal, which is plotted on a provisional basis, using the PDF images of the KBP MPL 2017 Concept.

New orig. inv. no											
Signature and date											
								Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE			
		Rev.	Quantity	Sheet	Doc No.	Signature	Date				
Orig. inv. no								Aerodrome Planning Works	Phase	Sheet	Sheets
									FS		
		Head of Dept		Belov		[Signature]	06.19				
		CPE		Pelikhov		[Signature]	06.19	The Arrangement of the Aircraft on Aprons S, C, M, the New Terminal and Manoeuvring Area No.2	INSTITUTE UKRDORPROEKT LLC		
		Chief Specialist		Cherevko		[Signature]	06.19				
		Drawn by		Cherevko		[Signature]	06.19				

[Stamp]:
SE IA Boryspil
Reference copy

BORYSPIL
International Airport

MINISTRY OF INFRASTRUCTURE OF UKRAINE
STATE ENTERPRISE
BORYSPIL INTERNATIONAL
AIRPORT

APPROVED BY
P.B. Riabkin, CEO

[Signature affixed]

PLAN
31 May 2019 No. *47-04/2-4*
for the Mitigation of Environmental Impact
caused by the activity of
Boryspil International Airport State Enterprise
for the period by 2020 (inclusive)

Edition 02

Ref. No.	Measures	Implementation period	Persons responsible for implementation	Persons responsible for control
1	**Implementation of measures on protection of atmospheric air**			
1.1.	Compliance with the requirements of permits for emissions of pollutants into the atmosphere by stationary sources:			
1.1.1.	Control of the content of pollutants in the exhaust gases of mobile sources	On a quarterly basis, 2017-2020	Head of EVS, head of the Service for Emergency and Fire-Protection Support of Flights, Chief Mechanic of the Airport	Head of EVS
1.1.2.	Exploitation and control over the technical condition of gas purification plants in compliance with the "Maintenance of Gas Purification Plants"	On a regular basis, 2017-2020	Head of EVS, Head of RCS, Chief Mechanic of the Airport	Head of GEPM

Ref. No.	Measures	Implementation period	Persons responsible for implementation	Persons responsible for

				control
1.1.3	Checking operational efficiency of gas purification plants	Annually, 2017-2020	Head of GEPM	Responsible for NEP at the Enterprise
1.1.4	Control over compliance with the established maximum allowable emissions of pollutants at the stationary sources	Annually, 2017-2020	Head of GEPM	Responsible for NEP at the Enterprise
1.1.5	Reporting according to the statistical data form No. 2-tp (air) - annual	Annually, 2017-2020	Head of GEPM	Responsible for NEP at the Enterprise
1.1.6.	Boiler units operation according to Parameter Tables	On a regular basis, 2017-2020	Head of CPSS boiler houses group	Chief Power Supervisor
1.2.	Materials plan for emissions inventory at the stationary sources of Boryspil International Airport State Enterprise	Upon necessity, 2017-2020	Head of GEPM	Responsible for NEP at the Enterprise
1.3	Spatial zonation of aerodrome environs of the airport with respect to aircraft noise	2019-2020 (after coming into effect of the Aviation Rules of Ukraine “Demands to the Aerodrome Operator concerning the Spatial Zonation of the Territory	Head of GEPM, Head of RLSFO	Responsible for NEP at the Enterprise

Ref. No.	Measures	Implementation period	Persons responsible for implementation	Persons responsible for control
		Airfront with respect to Aircraft Noise")		
2	**Implementation of measures in the field of healthcare and water resources management**			
2.1	Compliance with the requirements of permit for the special water use:			
2.1.1	Control for compliance with the limits for water withdrawal and water use from the underground sources	During the validity period of Permit for the special water use (by 6 March 2020)	Heads of the Structural Subdivisions	Chief Electrician
2.1.2	Control for compliance with the limits for the pollutants discharge with waste water into the natural water bodies outlets No. 1, 2, 3	On a quarterly basis, 2017-2020	Head of GEPM	Responsible for NEP at the Enterprise
2.1.3	Control for the quality of waste water discharged into the natural water bodies	On a quarterly basis, 2017-2020	Head of GEPM	Responsible for NEP at the Enterprise
2.1.4	Reporting according to statistical data forms: No. 2-TP Water Management (Annual), No. 7 – gr	Annually, 2017-2020	Chief Power Supervisor, Head of GEPM	Responsible for NEP at the Enterprise
2.2.	Measures towards the reduction of waste water pollution:			

Ref. No.	Measures	Implementation period	Persons responsible for implementation	Persons responsible for control
2.2.1	Exploitation and maintenance of the operating local waste treatment plants (LWTP) for the purification of the surface flow waste water; LWTP of the terminal "F" storm waters; LWTP of Filling Station-1storm waters "Solap-6" (car park D3); oil catcher NPP-8 (car park D1); "Rainpark BMO-200" (car park D1); "ASO Oleopator-KNS 20" (4 units, domestic flights sector of terminal "D"), "SOR.II-JKS-ZP" (4 units, following the car park commissioning)	On a regular basis, 2017-2020	Head of MES, head of AS, Head of CLS	Responsible for NEP at the Enterprise, Head of GEPM
2.2.2	Control and performance of the repair works, purification of storm water sewer system wells	2017-2020 (upon production necessity)	Director for CC Head of AS	Head of AS
2.2.3	Construction of the local treatment plants within the construction of pumping and purification plant of the centralized refueling system	2019-2020	Director for CC	Deputy CEO for CA and BS, Head of CLS
2.2.4	Construction of the surface water treatment plants at the Boryspil International Airport State Enterprise	2017-2020 (implementation period shall be adjusted according to the decisions on the reconstruction of maneuvering area No.2)	Director for CC	Responsible for NEP at the Enterprise

Ref. No.	Measures	Implementation period	Persons responsible for implementation	Persons responsible for control
2.3	Compliance with the requirements of the special permit for the subsoil use:			
2.3.1	Implementation of the "Geological Survey Programs including pilot commercial development of potable ground waters within the subsoil area of the water abstraction intake of Boryspil International Airport State Enterprise: wells No. 2190 (1a), No. 7 (3000), No. 9 (3001), No. 1577 "P" (4), No. 5 "P", No. 2190 (6), No. 950 (7), No. 2205 (8), No. 2204 (9) and No. 2202 (10)" in order to receive the permit for the subsoil (ground waters) use for the period of 20 years	On a stage-by-stage basis, 2017-2020	Chief Power Supervisor	Responsible for NEP at the Enterprise
3	**Implementation of land conservation measures**			
3.1.	Execution of works with regard to oil products extraction from the ground waters at the fuel and lubricant depot of the Centralized Refueling System territory	2017-2020	Head of CLS	Responsible for NEP at the Enterprise
3.2.	Reconstruction of the storage facilities of the Centralized Refueling System (installation of the monitoring system to prevent the leakage/dripping of the oil product from storage facilities) (Phase 2)	2017-2020	Director for CC	Deputy CEO for CA and BS, Head of CLS

Ref. No.	Measures	Implementation period	Persons responsible for implementation	Persons responsible for control
3.3.	Reconstruction of the purification plant for the oil products discharge (inv. No. 47707) at the fuel and lubricant depot	2017-2020	Director for CC	Deputy CEO for CA and BS, Head of CLS
4	**Implementation of measures in the field of waste management**			
4.1.	Primary accounting of waste generated, transferred for storage, treatment, recycling, neutralization and discharge	On a regular basis, 2017-2020	Persons responsible for waste management within the structural subdivisions	Head of GEPM
4.2.	Reporting according to the statistical data forms on the condition of business activity in the field of waste oil (lubricants) management; No. 1 – waste (annual)	On a quarterly basis; Annually, 2017-2020	Head of CLS, Head of GEPM	Responsible for NEP at the Enterprise
4.3	Making arrangements concerning the realization or transfer of waste to the other enterprises, institutions and organizations, dealing with the collection, treatment and recycling of waste	2017-2020	Head of MES, Head of DS and SF Head of CLS Head of GEPM	Responsible for NEP at the Enterprise
4.4.	Timely receipt of permit for the execution of operations in the field of waste management	2017-2020 (following the implementation of the regulation for obtaining of permit by the Ministry of Ecology and Natural Resources of Ukraine)	Head of GEPM	Responsible for NEP at the Enterprise

Ref. No.	Measures	Implementation period	Persons responsible for implementation	Persons responsible for control
5	**Implementation of energy saving measures**			
5.1	Implementation of the "Program of Energy Saving Measures at the Boryspil International Airport State Enterprise for 2019-2020": - Organizational measures for constant monitoring and control of energy resources management; - technical and technological measures towards energy-saving and increase of energy efficiency during exploitation of buildings, electrical, heating and water supply networks, sewage system	On a stage-by-stage basis, 2019-2020	Heads of the structural subdivisions, Chief Power Supervisor	Responsible for NEP at the Enterprise
6	**Staff training, ensuring participation in the international environmental organizations**			
6.1	Qualification upgrade and experience exchange of the environmental agencies' workers	2017-2020	Head of GEPM	Head of MES
6.2.	Implementation of Operational Directive No. ЕД-11-17 "compliance with the flights safety and environmental protection requirements"	On a stage-by-stage basis 2017-2020	Workgroup, appointed by Order No. 01-07/1-215 as of 4 May 2017	Responsible for NEP at the Enterprise

Ref. No.	Measures	Implementation period	Persons responsible for implementation	Persons responsible for control
	and environmental management			
7	**Environment Impact Assessment**			
7.1.	Organization of environment impact assessment of the planned activity of the enterprise (if necessary)	2019-2020 (according to the investment plan for the construction of the Enterprise infrastructure facilities)	Director for CC	Responsible for NEP at the Enterprise

Notes: abbreviations of positions and structural subdivisions of Boryspil International Airport State Enterprise:

Responsible for NEP at the Enterprise	–	Responsible for the natural environment protection at the Enterprise
Deputy CEO for CA and BS	–	Deputy CEO for the Commercial Activity and Business Strategy
GEPM	–	Group on environmental protection measures
EVS	–	Emergency vehicle service
AS	–	Airfield Service
RCS	–	Repair and Construction Site
CPSS	–	Chief Power Supervision Service
MES	–	Maintenance and Exploitation Service
CLS	–	Combustibles and Lubricants Service
Director for CC	–	Director for Capital Construction
DS and SF	–	Department of Supply and Storage Facilities

MSDS	–	Management and Staff Development Service
RLSFO	–	Radio and Lighting Service for Flight Operations
CRS	–	Centralized Refueling System

Chief Technologist – Head of the Service *[Signature affixed]* O.V. Fedyna

O.Yu. Drach, 281-71-70

Annex No. 1

Annex 2
to the Summary of Information on the Procedure of transferring the Documents to Provide the Opinion on the Environmental Impact Assessment and funding of the Environmental Impact Assessment

(Date of official publication in the Unified Register of the Environmental Impact Assessment)

Registration number of the case on the Planned Activity Environmental Impact Assessment

NOTIFICATION
of planned activity subject to the environmental impact assessment of
BORYSPIL INTERNATIONAL AIRPORT STATE ENTERPRISE

(Full name of the legal entity, EDRPOU code)

herewith notifies of its intention to conduct the planned activity and its environmental impact assessment.

1. **Details of the business entity:**

Boryspil-7 str., Hora Village, Boryspil District, Kyiv Region, 08300

(Location of the legal entity or place of the individual entrepreneur's activity)

(044) 281-78-54, Fax: (044) 281-71-22, (044) 281-74-62

(Contact telephone number)

2. **Planned activity, its characteristics, technical alternatives.**

Planned activity, characteristics.

"Reconstruction of the maneuvering area No. 2 of Boryspil International Airport State Enterprise (hereinafter Boryspil IA SE).

Reconstruction workpackage of maneuvering area No. 2 of Boryspil IA SE includes:

Preparatory workpackage:

- Demolition of the existing airfield pavement of maneuvering area No.2: runway, taxiway (TW), roadsides of the airfield pavements and existing airfield laneways;
- Dismantling the utility networks within the reconstruction area (fuel supply line, water supply, water discharge, communication cables, airfield lighting system, etc.)
- Removal of trees and shrubbery vegetation
- Stripping excavation.

Planned construction of the following new buildings and facilities:

- Artificial runway (ARW-2), rapid taxiway, connecting taxiways and speed turnoff ways;
- Isolated aircraft parking aprons (AC), parking aprons for the aircraft engine testing; parking aprons for the cargo aircrafts
- Radio-navigation and lighting facilities
- Emergency rescue stations (ERS)
- Waste water collecting and discharge from the airport apron and sewage systems
- Transformer substations
- Filling stations (FS)
- Patrolling road, access roads and aprons
- Airport fencing with guard lights and video-surveillance
- Deicing operational base (preparation of deicing fluid) and car parking
- Civil protection fire-fighting equipment and warding depot.

Planned reconstruction of the existing buildings and facilities:

- Transformer substations;
- Auel pipeline networks;
- Platform "S" equipped for conducting aircrafts' deicing.

Construction works shall be performed while airport is operating, with the cessation of exploitation of maneuvering area No.2.

Technical alternatives.

The following two alternatives of maneuvering area No.2 reconstruction were considered:

Technical alternative 1. Arrangement of the new runway with the displacement (maximum possible) westwards. Main indexes according to the selection criteria

of Alternative 1: airfield pavements area, sq.m. – 1, 064,105; length of the new additional fencing, rm. – 1,400; area of the additional land allotment, ha – 19.1.

Technical alternative 2. Arrangement of a new runway in the place of the old one. Main indexes according to the selection criteria of Alternative 2: airfield pavements area, sq.m. – 1, 040,060; length of the new additional enclosure, rm. – 3,100; area of the additional land allotment, ha – 27.4.

With the help of the comparative analysis of the design solution selection, technical alternative No. 1 was determined as the most economically and technically reasonable, as recorded in the Minutes of the Meeting of the Council for Construction and Development of Boryspil International Airport State Enterprise as of 21 December 2018 No. 01-27/5-13.

3. Place of the planned activity, territorial alternatives.

Boryspil International Airport State Enterprise is located in the south west from the city of Boryspil, Kyiv Region, the airport territory has been in operation since 1959.

Territorial alternative 1.

Maneuvering area No.2 under reconstruction, is located on the territory of the operating Boryspil IA SE.

Territorial alternative 2.

Territorial alternatives are not being considered. Planned activity is being conducted on the territory of operating airport complex under the Law of Ukraine "On the Master Plan of the Territory of Ukraine".

4. Social and economic impact of the planned activity.

Continuation of Boryspil International Airport reconstruction and expansion works and efficient exploitation of the country's transit potential along with the integration of its transport sector within the European and world transportation and communication system, will facilitate the development of Ukraine's engineering and transport infrastructure, development of the territories adjacent to the transportation corridors of the country in general.

5. General specifications, including the parameters of the planned activity (capacity, length, area, production scope, etc.).

The complex of buildings and facilities of maneuvering area No.2:

Artificial airfield pavements (ARW-2, rapid taxiway, connecting taxiways and speed turnoff ways). Construction of the new airfield pavements is composed of the following: soil base; artificial base i.e. sand-and-cement mixture M75, 30cm thick; lower runway layer is composed of the "arid" concrete B 10/150, 30cm thick; upper runway layer is composed of the monolithic concrete Btb 4.4/55, 45cm thick. Total area of the airfield pavement comprises 1,062,905 sq.m..

Platform "S" with the arranged area for the aircrafts deicing *(to prevent the icing of the aircraft surface, the planes are treated with the de-icing liquid composed of the propylene-glycol, the treatment is conducted only during the cold seasons)* ***and Centralized Aircrafts Refueling System*** *(oil product: aviation fuel type JET A-1, fueling rate: 280 cu.m./h).*

Engine testing area. The area is equipped with the sound insulated shields with the area of 19,950 sq.m. on three sides.

Isolated aircraft parking aprons. The area per one aircraft is 16,130 sq.m..

Parking aprons for the cargo aircrafts The area per 7 aircrafts is 83,780 sq.m..

Construction of the new filling station provides for the installation of the following: horizontal double-walled underground steel tanks with the capacity of 60 cu.m. – 6 pcs.; horizontal double-walled underground steel tanks with the capacity of 14 cu.m. – 2 pcs. Refueling of cars with 4 types of fuel is provided.

Lighting system. Nominal capacity of lighting system comprises 337 kW. Annual electric energy consumption – 1,516.5 ths. kWh.

Radio-navigation of maneuvering facilities. The installation of equipment analogical to the one installed on the artificial runway No.1 (ARW-1) is provided in two maneuvering directions composed of the following facilities:

- Localizer transmitter (LOC) – installed on the airfield. Main characteristics: working frequency range: 108-112 MHz; range of LOC operation is not less than 46 km in the sector ±10° towards the course line (artificial runway-2 axle).
- Glideslope transmitter(GS) – installed on the airfield. Main characteristics of GS: working frequency range: 329-335 MHz; range of GS operation is not less than 18 km; range of GS operation ± 8° in the vertical plane.
- DME transmitter, main characteristics: working frequency range: 960 -0215 MHz; number of frequency channels - 252; channel frequency grid: 1 MHz; transmitter power - 100W.

Meteorological Supply for the air traffic control within the airport area of responsibility. This includes installation of meteorological indexes measurer (weather station), system of early glaze frost identification.

Flight emergency-rescue support. Construction of the emergency rescue station (ERS) fitted for five boxes. ERS location provides for the widest field of view of ARW-2 and free passage of the fire fighting vehicles to the ARW-2. Location of the ERS facility does not interfere with the airfield radio-facilities.

Maneuvering area No.2 utility facilities.

Water supply to the reconstructed objects and the new construction is provided from the existing centralized water supply systems.

Waste water discharge will be ensured through the sewage system of Boryspil IA SE with the initial purification at the treatment facilities (rainwater and snowmelt collected from the surface of maneuvering area No.2 considering the existing and newly-formed artificial solid pavements) and local treatment facilities (LTF) from separate technological processes.

Object power supply. Supply voltage: 10kW; 0.4kW. Power supply category: II, I, special group of category I. After the project implementation the capacity increased up to 1,119.65kW. Annual electricity consumption comprises 4,945 ths. kWh.

Substations of Boryspil IA SE serve as the source of the designed facilities electricity supply. Existing transformer substations (TS) are reconstructed, additional 2 TS are being installed.

The installation of the diesel-generator units is provided as the alternative source (to ensure uninterrupted operation of the lighting system).

All designed TS provide for technical active and reactive energy metering system.

New transformer substations are equipped with the air conditioning systems and autonomous heating system necessary for technological equipment operation without the help of maintenance personnel, security and fire alarm systems, and automatic fire-extinguishing system in the diesel-generator units.

High-tech perimeter security and video-surveillance system. To provide for the aviation security, prevention of unauthorized penetration into the terminal control area of third persons, wild and domestic animals, for the perimeter guard, the project provides for the arrangement of fencing of the perimeter guard system of maneuvering area No.2.

Roads and areas. Transportation communications between the separate buildings of maneuvering area No.2 and airport technical facilities include construction of the service road with asphalt pavement. Total area of the pavement is 61,508 sq.m.

General improvement and landscaping. Sowing of grass and lawns on the undeveloped territory is provided. Landscaping area comprises 209.69 ha considering the agrotechnical works on maneuvering area No.2.

6. Environmental and other restrictions of the planned activity based on alternative type:

- **with regard to technical alternative 1.** Enterprise is one of the objects which are subject to the environmental, sanitary and epidemiological, fire-fighting and other restrictions that are determined in the current state environmental regulatory documents, construction, sanitary and fire regulations in compliance with the conditions of the Air Code of Ukraine.
- **with regard to technical alternative 2.** Technical alternative is not considered.
- **with regard to technical alternative 1.** Planned activity is conducted on the territory of the existing airport complex with determined territorial restrictions.
- **with regard to technical alternative 2.** Not considered.

7. **Necessary environmental and site preparation and territory protection based on alternative type:**

- **with regard to technical alternative 1.**

Preparatory workpackage includes terrain arrangement of maneuvering area No. 2

- Groundwork: stripping excavation shall be complete on the sections of the new airfield pavements; stripping excavation shall be complete on the unpaved sections of the maneuvering area and taxiway safety zones. Mineral soil is used to arrange the earthfill.

Construction waste generated in the course of dismantling the existing buildings shall not be stored at the construction sites. Organized waste removal is provided.

- **with regard to technical alternative 2**. Technical alternative is not considered.
- **with regard to territorial alternative 1.** The workpackage is conducted within the operating airport. It includes fencing of the production facility and temporary buildings.
- **with regard to territorial alternative 2.** Is not considered.

8. **Sphere, sources and types of the potential environmental impact:**

- **with regard to technical alternative 1.**

Air environment: Planned activity presupposes the emissions into the atmosphere from the stationary and mobile sources.

Physical impact factors: Acoustic impact of the planned activity on the following settlements:

71 ≤LAmax≤75 dBA partially: Trebukhiv, Dudarkiv, Velyka Oleksandrivka – northward from the airport; residential areas of multi-story buildings and Boryspil outskirts – eastward; most of Voronkiva, Martusivka, separate buildings of Zatyshne – southward; Hora – westward.

76 ≤LAmax≤80 dBA partially: Dudarkiv (separate buildings), Velyka Oleksandrivka – northward from the airport; residential areas of multi-story buildings and Boryspil outskirts - eastward; Zatyshne, Martusivka, Voronkiva – southward; Hora – westward.

LAmax>80 dBA partially: northward from the airport: Velyka Oleksandrivka, southward – separate residential blocks in Boryspil; northward – Zatyshne, Martusivka partially; westward: Hora separate blocks.

Electromagnetic radiation propagation during operation of the radio-navigation equipment.

Geological environment: No impact.

Soils, land resources: Conducting planned activity provides for the additional lands allocation on a permanent basis. It includes stripping excavation.

Flora and fauna: Flora and fauna of the territory where the construction is planned has already been impacted by the business activity. Removal of the trees and shrubbery vegetation is provided. There is no national ~~terirory~~territory near the area.

Social environment: Continuation of reconstruction and extension works of Boryspil International Airport will facilitate the development of the engineering and transport infrastructure as well as the territories adjacent to the airport.

Waste management: generation of the construction waste in the course of dismantling the existing buildings and facilities.

During the business activity the increase of the generated and generating of the new hazardous waste is not provided.

- **with regard to technical alternative 2.** Not considered
- **with regard to territorial alternative 1.** Impact is analogical to the impacts of technical alternative 1.
- **with regard to territorial alternative 2.** Not considered

9. Belonging of the planned activity to the first and second category of the activities and objects which may have substantial environmental impact and are subject to the environmental impact assessment (mark applicable paragraph and part of article 3 of the Law of Ukraine "On the Environmental Impact Assessment").

Belongs to the first category of the planned activities and objects which may have substantial environmental impact according to clause 7 p. 2 art. 3 of the Law of Ukraine "On the Environmental Impact Assessment".

10. The availability of the grounds for conducting of trans-border environmental impact assessment (including presence of substantial trans-border environmental impact and list of the states whose environment may suffer from the substantial negative trans-border impact (affected states).

No grounds. Boryspil IA SE fully supports the policy and practice of the International Civil Aviation Organization (ICAO) in the field of environmental protection. Complies with the standards, recommended practices (SARPS) and policy for the International Civil Aviation.

11. Planned scope of researches and level of the detailing of information subject to the inclusion into the Report on the Environmental Impact Assessment.

The planned scope of researches and the level of the detailing of information which is subject to the inclusion into the report on the Environmental Impact Assessment according to art. 6 of the Law of Ukraine "On the Environmental Impact Assessment".

12. Procedure of environmental impact assessment and possibility of public involvement.

The activity planned by the business entity may have substantial environmental impact and is subject to the Environmental Impact Assessment, according to the Law of Ukraine "On the Environmental Impact Assessment". Environmental Impact Assessment is a procedure which provides for the following:

- Preparation of the Report on the Environmental Impact Assessment by the business entity
- Conducting public debate with regard to the planned activity
- Analysing by the authorized body of the Report on the Environmental Impact Assessment, any additional information provided by the business entity as well as the information received from the public during the public debate, during the trans-border impact assessment, and other information
- Provision by the authorized body of the motivated Opinion on the Environmental Impact Assessment considering the results of analysis provided for by paragraph five of this clause
- Taking into account the Opinion on the Environmental Impact Assessment in the Decision on the planned activity as stated in clause 14 of this Notification.

The Opinion on the Environmental Impact Assessment the authorized body, on the basis of the Environmental Impact Assessment of the planned activity, shall determine the permissibility or substantiate the non-permissibility of the planned activity and define the ecological conditions of such activity.

The planned activity cannot be started without the Environmental Impact Assessment and receipt of the Decision on the pursuit of the planned activity.

The Environmental Impact Assessment procedure provides for the right and possibility of the public to participate in such procedure, in particular, at the stage of discussion of the scope of researches and level of the detailing of information subject to the inclusion into the Report on the Environmental Impact Assessment and at the stage of consideration by the authorized body of the Report on the Environmental Impact Assessment submitted by the business entity.

At the stage of public debate of the Report on the Environmental Impact Assessment during the period of at least 25 working days the public is given the possibility to provide any remarks and suggestions to the Report on the Environmental Impact Assessment and planned activity and to participate in the public hearings. More information on the public debate procedure concerning the Environmental Impact Assessment will be provided in the Notification on the beginning of the public debate.

13. The public debate concerning the planned scope of researches and level of the detailing of information subject to the inclusion into the Report on the Environmental Impact Assessment.

Within 20 working days from the day of publication of this notification on the official website of the authorized body, the public shall have the right to submit any remarks and suggestions with regard to the planned activity, scope of researches and level of the detailing of information subject to the inclusion into the Report on the Environmental Impact Assessment to the authorized body specified in clause 15 of this Notification. While submitting such remarks and suggestions, please indicate the registration number of the case on the planned activity Environmental Impact Assessment in the Unified Register of the Environmental Impact Assessment (see the first page of this Notification). This will make the process of registration of your remarks and suggestions much simpler. If such remarks and suggestions from the public are received, they will be recorded in the Unified Register of the Environmental Impact Assessment and transferred to the business entity (within three working days from the day of their receipt). The persons who provided the remarks and suggestions shall sign the consent for their personal data processing. In the course of preparation of the Report on the Environmental Impact Assessment, the business entity shall consider in full, consider partially or substantiate its rejection of the public remarks and suggestions, provided in the process of the public debate concerning 5 researches and level of the detailing of information subject to the inclusion into the Report on the Environmental Impact Assessment. Detailed information on this shall be included into the Environmental Impact Assessment.

14. Decision on conducting the planned activity.

According to the law, the decision on conducting the planned activity will be as follows:

Opinion on the Environmental Impact Assessment determining the permissibility of conducting such planned activity (p.3 art. 11 of the Law of Ukraine "On the Environmental Impact Assessment").

(Type of the decision according to part one article 11 of the Law of Ukraine "On the Environmental Impact Assessment")

issued by

the Ministry of Ecology and Natural Resources of Ukraine.

(Authorized body making such Decision)

15. All public remarks and suggestions concerning the planned activity, scope of the researches and level of the detailing of information subject to the inclusion into the Report on the Environmental Impact Assessment shall be sent to:

The Ministry of Ecology and Natural Resources of Ukraine
Mail address: 35 Mytropolyta Vasylia Lypkivskoho str., Kyiv, 03035.
E-mail for sending remarks and suggestions, for the EIA procedures exercised by the Ministry of Ecology and Natural Resources of Ukraine: eia@menr.gov.ua
Public reception office: Fax (044) 206-33-02, (044) 206-31-39.
Department of Environmental Impact Assessment: m.shimkus@menr.gov.ua, tel.: (044) 206-20-89
Contact person: Maryna Oleksandrivna Shymkus, Head of the
Department of Environmental Impact Assessment.

[Logo: BORYSPIL International Airport]

To Chairman of Boryspil District Council
V.M. Baichas

17.09.2019 No. 09-22-102

Regarding the environmental impact assessment

Dear Mr. Chairman,

We hereby would like to take this opportunity to express to you our highest consideration and address to you with the following.
In order to solve the problem of underdevelopment of the Boryspil Airport infrastructure, its non-conformity with the current demands and expected increase in traffic volumes, the Cabinet of Ministers of Ukraine has approved the Concept for the Development of Boryspil International Airport till 2045 with the purpose of fulfilling the Decree of the National Security and Defense Council of Ukraine dated 20 July 2015 “On Measures to Protect National Interests of Ukraine in Aviation Industry”.
Implementation of the Concept will allow creating conditions for Boryspil Airport to become the leading international airline hub in the Eastern Europe, satisfy the needs of the Ukrainian population in air conveyances, ensure appropriate level of flight and aviation security, and increase competitiveness of the company on the global aviation market.
As part of the Concept, Boryspil IA SE is performing design and survey works under the Feasibility Study Stage for the construction project “Reconstruction of Flight Zone No. 2 of Boryspil International Airport State Enterprise” (Institute Ukrdorproekt LLC as a general designer).
Flight Zone No. 2 was put into operation in 1960s and 1970s.
Current airfield pavement of Runway No. 2, primary and bleed off taxiways, some old ramps are to be reconstructed due to their poor condition, their time in commission exceeding by far the overhaul intervals, and their strength issues (current PCN is 39, after reconstruction it should be 120).
Current radio, lighting, and meteorological equipment is outdated and requires updating.
Reconstruction of the Flight Zone No.2 elements will allow its rated operation till next repair for over 25 years.
The reconstruction package includes : construction of a novel runway, novel taxiways, expansion of current ramps, installation of high technology engineering and maintenance equipment (lighting, radio-navigation, weather station, emergency rescue station, etc.), and other elements of infrastructure that are required for safe operation and technical maintenance of the airport.

The Ministry of Infrastructure of Ukraine | Boryspil International Airport State Enterprise | Boryspil-7 Str., Hora village, Boryspil district, Kyiv region, Ukraine, 08300
tel: +38 044 281 78 54 | fax: +38 044 281 71 22 | info@kbp.aero | AFTN: UKBBYDYD

Reconstruction of Flight Zone No. 2 is aimed to ensure that the Kyiv/Boryspil airfield complies with the international standards and ICAO's recommended practices for civil aerodromes to meet safe operation requirements for F aircraft (Airbus-380, Boeing-7 (800)).
In particular, the novel runway will be extended in length with artificial pavement up to 3,800 m (current length is 3,600 m) and equipped with lighting system of III-B ICAO's category.
The planned location of the novel runway has been determined based on the standard distances that are to be ensured between the airfield elements, airfield elements and fixed and movable objects, location of the lighting and radio equipment including extreme and sensitive areas therein, aviation safety requirements regarding airfield territory and minimal adjacent land areas.
The axis of the novel ARW-2 is shifted parallel to that of the old one 80 m westwards which allows for location of the runway and taxiway system within the current land allocation of the airport.
In view of the above and in accordance with the Law of Ukraine "On Environmental Impact Assessment", we hereby request to publish *Notification about Scheduled Activities Subject to Environmental Impact Assessment*, registration number 20199134502/15506 of the construction site *"Reconstruction of Flight Zone No. 2 of Boryspil IA SE"* at the official web-site of Boryspil District Council and bulletin boards of village councils of Boryspil district.
Contact person responsible for the implementation of the procedure for the environmental impact assessment: Marianna Zheliezko, Head of Boryspil IA SE Design Work Department, Tel. +38 044 281 73 95, +38 063 980 65 01, e-mail: m.zheliezko@kbp.aero.

Attachment: Notification about Scheduled Activities Subject to Environmental Impact Assessment, registration number 20199134502/15506 in 6 pages in 1 copy.

Sincerely yours,
[signed] A. Petrychenko

Temporary acting Director of Capital Construction and Operation

Executed by M. Zheliezko 281 73 95

Annex No. 2

[A heading in VISTI Newspaper, No. 33 (993) of 13 September 2019: FIRE NEAR THE AIRPORT. WHO CAPITALISES ON THE DESTRUCTION AND WILL THOSE GUILTY EVER BE PUNISHED?]

NOTIFICATION
about Scheduled Activities Subject to Environmental Impact Assessment
BORYSPIL INTERNATIONAL AIRPORT STATE ENTERPRISE
is hereby notifying about its intention to perform scheduled activities and assess the environmental impact thereof.

1. Information about business entity:
Boryspil-7 Street, Hora village, Boryspil district, Kyiv region, 08300, Ukraine
Tel. +38 (044) 281 78 54, Fax +38 (044) 281 71 22, (044) 281 74 62

2. Scheduled activities: description and technical alternatives.

Scheduled activities: description.
"Reconstruction of Flight Zone No. 2 of Boryspil International Airport State Enterprise" (hereinafter, Boryspil IA SE).
Work package on reconstruction activities in Flight Zone No. 2 of Boryspil IA SE includes the following:
Preliminary work package:
– dismantling current airfield pavements in Flight Zone No. 2: the runway, taxiways (TWs), airfield pavement waysides, and existing passages in the airfield,
– disassembling pipelines and networks within the reconstruction area (networks of fuel pipelines, water supply, water drainage, communication cables, lighting systems, etc.),
– grubbing of trees and shrubberies, and
– topsoil stripping.
We ensure the construction of the following novel buildings and facilities:
– artificial runway (RW-2), primary taxiway, bleed off taxiways, and rapid exit taxiways,
– quarantine aircraft (AC) stand, aircraft stand for testing aircraft engines, and freight aircraft stands,
– radio navigation and lighting system,
– emergency rescue station (ERS),
– airfield rainwater harvesting systems and sewage disposal plants,
– transformer substations,
– filling station,
– patrolling highway, driveway, and sites,
– airport fence equipped with an intrusion alarm system and video surveillance,
– operation station for de-icing (preparation of defroster fluid) and parking lots, and
– civil protection storehouse for the fire-fighting equipment and duty guard.
We ensure the reconstruction of the following current buildings and facilities:
– transformer substations,
– fuel pipeline networks, and
– ramp S with a site for aircraft treatment with defroster fluid.
Construction works will be performed under conditions of the running airport operations with terminated operation of Flight Zone No. 2.

Technical alternatives.
We have reviewed two alternative options for reconstruction of Flight Zone No. 2:

Technical alternative 1. Location of the novel runway axis will be shifted as much westwards as possible. Main indicators by choice criterion for Alternative 1: airfield pavement area, in sq.m: 1,064,105; novel additional fence length, in run.m: 1,400; additional land allocation, in ha: 19.1.
Technical alternative 2. The novel runway will be located at the place of the old one. Main indicators by choice criterion for Alternative 2: airfield pavement area, in sq.m: 1040060; novel additional fence length, in run.m: 3,100; additional land allocation, in ha: 27.4.
On the basis of comparative analysis of project solution options we have determined Technical Alternative 1 to be the most efficient in economic and technical terms as decreed in Minutes No. 01- 27/5-13 of 21.12.2018 of the Meeting of the Council for Construction and Development of Boryspil IA SE.

3. Place for running scheduled activities, territorial alternatives.
Boryspil International Airport State Enterprise is located south-west of Boryspil town, Kyiv region, Ukraine. The airport territory has been in operation since 1959.
Territorial alternative 1.
Flight Zone No. 2 under reconstruction is located on the territory of the current airport of Boryspil IA SE.
Territorial alternative 2.
Territorial alternatives are out of scope. The scheduled activities are to be conducted on the current airport territory according to the Law of Ukraine "About the General Planning Scheme of the Territory of Ukraine".

4. Social and economic impact of the scheduled activities.
Extension of works in reconstruction and expansion of Boryspil State International Airport and effective use of the country's transit potential with integration of its transport infrastructure to the European and world transportation and communication systems will promote development of the engineering and transportation infrastructure of Ukraine, development of the areas adjacent to the country's transport corridors in whole.

5. General technical features including scheduled activities performance (capacity, length, area, production output, etc.).
Flight Zone No. 2 buildings and facilities:
Artificial airfield pavement (ARW-2, primary taxiway, bleed off taxiways, and rapid exit taxiways). The structure of novel airfield pavements consists of: soil base, artificial base: sand-and-cement premix M75 of 30 cm thick, lower pavement layer: 'lean' concrete B 10/150 of 30 cm thick; upper pavement layer: cast-in-situ cement concrete Btb 4.4/55 of 45 cm thick. Total area of the airfield pavement is 1,062 905 sq.m.
Ramp S with a site for aircraft treatment with defroster fluid (in order to protect aircraft surfaces from glaze ice, aircraft are treated with propylene glycol-based defroster fluid; treatment in cold seasons only) **and centralized aircraft fueling** (oil products: jet fuel type JET A-1, aircraft fuelling rate: 280 cub.m per hour).
The site for testing aircraft engines. The site will be equipped with soundproof shields on three sides of 19,950 sq.m area.
The quarantine aircraft stand. For one aircraft, area of 16,130 sq.m.
Freight aircraft stands. For 7 aircraft, area of 83,780 sq.m.
Construction of a new filling station includes installation of: underground horizontal double-walled steel tanks: 6 pcs with a capacity of 60 cub.m, and 2 pcs with a capacity of 14 cub.m. Motor vehicles will be filled with fuel of 4 types.
Lighting equipment (LE). Rated capacity of the LE is 337 kW. Annual electricity consumption is 1,516.5 thous kW per hour.
Radio-navigation landing system. The equipment similar to that of artificial runway No.1 (ARW-1) will be installed in two landing directions to include the following:

– on-course beacon (OCB) to be installed on the airfield. Key features: working frequency band: 108–112 MHz, OCB range: at least 46 km in the sector of ±10 degrees relative the course line (ARW-2 axis).
– glide-path localizer (GPL) to be installed on the airfield. Key features of the GPL: working frequency band: 329–335 MHz, GPL range: at least 18 km; GPL zone: ±8 degrees in vertical plane.
– navigation and landing distance measuring radio beacon DME, key features: working frequency band: 960–0215 MHz; number of frequency channels: 252; channel frequency spectrum: 1 MHz; transmitter power: 100 W.
Weather support of air traffic control in the airport's area of responsibility. Meteorological meters (a weather station) and a glaze ice early-detection system will be installed.
Emergency and rescue flight support.
Construction of an emergency rescue station (ERS) for five boxes. Location of an ERS will allow for the widest view of ARW-2 and unimpeded passage for fire-engines to ARW-2. Location of the ERS building will pose no obstacles to operation of the airfield radio equipment.
Engineering networks of Flight Zone No. 2.
Water supply of the facilities under reconstruction and the newly constructed ones will be provided through the current centralized water supply system.
Rainwater drainage will be provided through the drainage system of Boryspil IA SE with preliminary treatment at the sewage disposal plants (rain and melt waters collected from the surface of Flight Zone No. 2 including current and newly built artificial rigid pavements) and local sewage disposal plants (LSDP) from particular engineering operations.
Power supply for the object. Supply voltage: 10 kV, 0.4 kV. Power supply category II, I, and special group category I. Upon implementation of the project the power will increase up to 1,119.65 kW. Annual electricity consumption is 4,945 thous kW per hour.
Substations of Boryspil IA SE will be the source for power supply to the project facilities. Current transformer substations (TS) will be reconstructed and another two TSs mounted.
Diesel-generators (for uninterrupted operation of lighting systems) will be used as an alternative source of power.
All project TSs will be subject to technical record-keeping of active and reactive energy.
New transformer substations are equipped with the air conditioning system and indirect heating system for installation of unattended engineering equipment, intrusion and fire alarm system, and automatic fire-extinguishing system in the diesel-generator room.
Fence Intrusion Detection and CCTV System. To meet the aviation security requirements, prevent entry into the control airport area by unauthorized persons, wild and domestic animals, protect the airport perimeter, the project provides for installation of Fence Intrusion Detection System in Flight Zone No. 2.
Roads and sites. For transport communication between the buildings in Flight Zone No. 2 and engineering facilities of the airport we provide for construction of an engineering asphaltic concrete road. Total area of the road surface will be 61,508 sq.m.
Land improvement and landscaping. The territory beyond construction will be developed using grass and lawns. Landscape area is 209.69 ha including land treatment works in Flight Zone No. 2.

6. Environmental and other restrictions imposed on the scheduled activities in terms of alternatives:
– Technical alternative 1. The enterprise is classified as an object for which environmental, sanitary and epidemiological, fire prevention and other restrictions are listed in current state environmental regulations, construction, sanitary and fire prevention standards taking account of the Air Code of Ukraine.
– **Technical alternative 2.** The technical alternative is out of scope.
– **Technical alternative 1.** The scheduled activities are to be conducted in the territory of the current airport where the territorial restriction areas have already been determined.

– **Technical alternative 2.** Out of scope.

7. Required environmental and engineering measures and protection of territories in terms of the alternatives:

– Technical alternative 1.

The preliminary work package includes landscape design in Flight Zone. 2, the excavation works being as follows: full topsoil stripping at the sites of novel airfield pavements; full topsoil stripping at the ground sites of the flight zone and taxiway safe margins. Inorganic soil will be used for bank arrangement.

Construction waste generated under dismantling of current buildings will not be stored at the construction sites. We will arrange for regular waste disposal.

– Technical alternative 2. The technical alternative is out of scope

– **Territorial alternative 1.** The whole work package will be performed within the current airport territory. We will arrange guarding of the production facilities and temporary structures.

– **Territorial alternative 2.** Out of scope.

8. Scope, sources, and types of the environmental impact:

– **Technical alternative 1.**

Air: Scheduled activities presuppose pollutant emission into atmosphere by the stationary and movable pollutant emitting sources.

Physical factors of the impact: Impact of scheduled activities on noise background in the following communities:

71 ≤LAmax≤75dBA partially: Trebukhiv, Dudarkiv, Velyka Oleksandrivka: to the north of the airport; high-rise residential communities and suburbs of Boryspil: in the east; major part of Voronkiv, Martusivka, separate buildings in Zatushne: in the south; Hora: in the west.

71 ≤LAmax≤80dBA partially: Dudarkiv (separate buildings) Velyka Oleksandrivka: to the north of the airport; high-rise residential communities and suburbs of Boryspil: in the east; Zatushne, Martusivka, Voronkiv: in the south; Hora: in the west.

LAmax> 80 dBA partially: to the north of the airport: Velyka Oleksandrivka, in the east: some residential communities of Boryspil; in the south: Zatushne partially, Martusivka; in the west: some residential communities of Hora.

Electromagnetic radiation propagation under operation of the radio navigation equipment.

Geological environment: No impact.

Soils, land resources: Implementation of the scheduled activities includes additional land allocation for permanent use. The topsoil will be stripped.

Flora and fauna: The flora and fauna of the area where construction works will be performed have already been influenced by economic activities. We will arrange for grubbing of trees and shrubberies. There are no reserve objects near the implementation area.

Social environment: Extension of works in reconstruction and expansion of Boryspil State International Airport will promote development of the engineering and transportation infrastructure of the areas adjacent to the airport.

Waste management: generation of construction waste from dismantling of the current buildings and facilities.

No increase in the generated or generation of hazardous waste of new types will occur under the economic activities.

– **Technical alternative 2.** Out of scope.

– **Territorial alternative 1.** The impact is similar to that of Technical alternative 1

– **Technical alternative 2.** Out of scope.

9. Classification of the scheduled activities with regard to category 1 or 2 of the activities types and objects that may have significant impact on the environment and are to be subject

to the environmental impact assessment (corresponding paragraph and part of Article 3 of the Law of Ukraine "About Environmental Impact Assessment" to be specified).
The scheduled activities are classified as category 1 of activity types and objects that may have significant impact on the environment according to paragraph 7, Part 2, Article 3 of the Law of Ukraine "About Environmental Impact Assessment".

10. Available grounds for assessment of cross-border impact on the environment (including available significant negative cross-border impact on the environment and a list of the countries where environment may be exposed to significant negative cross-border impact (affected countries).
No grounds available. Boryspil IA SE are stating their full support of ICAO's (International Civil Aviation Organization) environmental policies and practices. We conform to the Standards and Recommended Practices (SARPs), and political measures for international civil aviation.

11. The scheduled scope of research and level of information specification to be included into the Environmental impact assessment report.
The scheduled scope of research and level of information specification to be included into the Environmental Impact Assessment report conform to Article 6 of the Law of Ukraine "About Environmental Impact Assessment".

12. Procedure for environmental impact assessment and possibilities for public involvement.
The scheduled activities of the business entity may have significant impact on the environment and are to be subject to the environmental impact assessment according to the Law of Ukraine "About Environmental Impact Assessment". Environmental impact assessment constitutes a procedure that includes the following stages:
– drawing up by the business entity of the environmental impact assessment report,
– public hearing of the scheduled activity,
– review by a competent authority of the environmental impact assessment report, any additional information provided by the business entity and received in the course of public discussions and under procedure of cross-border impact assessment, as well as other data,
– publication by a competent authority of valid conclusion on the environmental impact assessment including review of the findings in accordance with the fifth sub-paragraph of this paragraph,
– analysis of the conclusion on the environmental impact assessment in the resolution on execution of scheduled activities as specified in paragraph 14 of this Notification.
In the conclusion on the environmental impact assessment, the competent authority shall, based on the assessment of the environmental impact produced by the scheduled activities, determine if the scheduled activities are permissible, or explain why given activities are not permissible, and specify the environmental terms and conditions for the performance of works.
The scheduled activities should not be launched unless the environmental impact assessment and resolution on their performance are issued.
The procedure for assessment of the environmental impact includes the rights and possibilities for public involvement, in particular at the hearing stage, with regard to the scope and level of information to be included into the Environmental impact assessment report, and at the stage of review by the competent authority of the Environmental impact assessment report as submitted by the business entity.
At the stage of public hearing of the Environmental impact assessment report, the public is allowed to voice objections and proposals related to the Environmental impact assessment report and the scheduled activities during at least 25 working days, and take part in the public hearing. More details on the public hearing procedure for the environmental impact assessment report and on the initiation of public hearing will be further given in a publication.

13. Public hearing of the scope of research and level of information specification that are to be included into the Environmental impact assessment report.

Within 20 working days after publication of this notification at the official web-site of the competent authority, the public is entitled to submit to the competent authority specified in paragraph 15 hereof any objections and proposals related to the scheduled activities, scope of research and level of information specification that are to be included into the report. When submitting your objections and proposals please indicate the relevant file registration number in the Unified Register for Environmental Impact Assessment (given on the first page of this notification). This will make registration and review of your objections and proposals easier. In case such public objections and proposals are submitted, these will be published in the Unified Register for Environmental Impact Assessment and made known to the business entity (within three working days upon receipt). Persons submitting objections and proposals shall confirm their consent to processing their personal data with their signature. The business entity shall draw up the environmental impact assessment report taking into account public objections and proposals, whether in whole or in part, or reasonably rejecting objections and proposals provided under public hearing of the scope of 5 researches and level of information specification that are to be included into the Environmental impact assessment report. Detailed information thereon shall be included into the Environmental impact assessment report.

14. Decision on execution of scheduled activities.

According to law, decision on execution of these scheduled activities will be issued in the form of a conclusion on the environmental impact assessment with resolution regarding the permissibility of executing these scheduled activities (Part 3, Article 11 of the Law of Ukraine "About environmental impact assessment") to be issued by the Ministry of Ecology and Natural Resources of Ukraine.

15. All public objections and proposals regarding the scheduled activities, scope of research and level of information specification that are to be included in the Environmental impact assessment report must be sent to:

The Ministry of Ecology and Natural resources of Ukraine

Postal address: 35 Mytropolita Vasylia Lypkivskogo Str., 03035 Kyiv.

E-mail address for objections and proposals, procedures of the Ministry of Ecology and Natural resources of Ukraine as to environmental impact assessment: eia@menr.gov.ua

Public reception office: Fax +38 044 206 33 02, 044 206 31 39.

Department of environmental impact assessment: m.shimkus@menr.gov.ua, Tel.: +38 044 206 20 89

Contact person: Head of the Department of environmental impact assessment Maryna Shymkus.

[A heading in Trudova Slava Newspaper, No. 36 (13822) of 13 September, 2019: Since the previous week, fire hazard in most regions of Ukraine is still extremely high, the State Emergency Service of Ukraine is warning. A LANDFILL NEAR BORYSPIL IS ON FIRE: FIRE REACHED SEWAGE DISPOSAL PLANTS.]

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(date of official publication in the Unified Register for Environmental Impact Assessment)

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registration number of a file on assessment of scheduled activities' environmental impact

NOTIFICATION
ABOUT SCHEDULED ACTIVITIES SUBJECT TO ENVIRONMENTAL IMPACT ASSESSMENT BY BORYSPIL INTERNATIONAL AIRPORT STATE ENTERPRISE

(detailed title of a business entity, EDRPOU Code)

is hereby notifying about its intention to perform scheduled activities and assess the environmental impact thereof.

1. **Information about the business entity:**

Boryspil-7 Street, Hora village, Boryspil district, Kyiv region, 08300, Ukraine (location address of a business entity or place of business activities of a self-employed person)
Tel. +38 (044) 281 78 54, Fax +38 (044) 281 71 22, (044) 281 74 62
(contact telephone numbers)

2. **Scheduled activities: description and technical alternatives.**

Scheduled activities: description.

"Reconstruction of Flight Zone No. 2 of Boryspil International Airport State Enterprise" (hereinafter, Boryspil IA SE).

Work package on reconstruction activities in Flight Zone No. 2 of Boryspil IA SE includes the following: **Preliminary work package:**

– dismantling of current airfield pavements in Flight Zone No. 2: the runway, taxiways (TWs), airfield pavement waysides, and existing passages in the airfield,
– disassembling of pipelines and networks within the reconstruction area (networks of fuel pipelines, water supply, water drainage, communication cables, lighting systems, etc.),
– grubbing of trees and shrubberies, and
– topsoil stripping.

We provide for construction of the following novel buildings and facilities:

– artificial runway (RW-2), primary taxiway, bleed off taxiways, and rapid exit taxiways,
– quarantine aircraft (AC) stand, aircraft stand for testing aircraft engines, and freight aircraft stands,
– radio navigation and lighting system,
– emergency rescue station (ERS),
– airfield rainwater drainage systems and sewage disposal plants,
– transformer substations,
– filling station,
– patrolling highway, driveway, and sites,
– airport fence equipped with an intrusion alarm system and video surveillance,
– operation station for de-icing (preparation of defroster fluid) and parking lots, and
– civil protection storehouse for the fire-fighting equipment and duty guard.

We provide for reconstruction of the following current buildings and facilities:

– transformer substations,
– fuel pipeline networks, and
– ramp S with a site for aircraft treatment with defroster fluid.

Construction works will be performed under conditions of the running airport operations with terminated operation of Flight Zone No. 2.
Technical alternatives.
We have reviewed two alternative options for reconstruction of Flight Zone No. 2:
Technical alternative 1. Location of the novel runway axis will be shifted as much westwards as possible. Main indicators by choice criterion for Alternative 1: airfield pavement area, in sq.m: 1,064,105; novel additional fence length, in run.m: 1,400; additional land allocation, in ha: 19.1.
Technical alternative 2. The novel runway will be located at the place of the old one. Main indicators by choice criterion for Alternative 2: airfield pavement area, in sq.m: 1040060; novel additional fence length, in run. m: 3,100; additional land allocation, in ha: 27.4.
With comparative analysis of project solution options we have determined Technical Alternative 1 to be the most efficient in economic and technical terms as decreed in Minutes No. 01- 27/5-13 of 21.12.2018 of the Meeting of the Council for Construction and Development of Boryspil IA SE. № 01- 27/5-13.

3. Place for running scheduled activities, territorial alternatives.
Boryspil International Airport State Enterprise is located south-west of Boryspil town, Kyiv region, Ukraine. The airport territory has been in operation since 1959.
Territorial alternative 1.
Flight Zone No. 2 under reconstruction is located on the territory of the current airport of Boryspil IA SE.
Territorial alternative 2.
Territorial alternatives are out of scope. The scheduled activities are to be conducted in the territory of the current airport according to the Law of Ukraine "About the General scheme of planning of the territory of Ukraine".

4. Social and economic impact of the scheduled activities.
Scope of works in reconstruction and expansion of Boryspil State International Airport and effective use of the country's transit potential with integration of its transport infrastructure to the European and world transportation and communication systems will promote development of the engineering and transportation infrastructure of Ukraine, development of the areas adjacent to the country's transport corridors in whole.

5. General technical features including scheduled activities performance (capacity, length, area, production output, etc.).
Flight Zone No. 2 buildings and facilities:
Artificial airfield pavement (ARW-2, primary taxiway, bleed off taxiways, and rapid exit taxiways). The structure of novel airfield pavements consists of: soil base, artificial base: sand-and-cement premix M75 of 30 cm thick, lower pavement layer: 'lean' concrete B 10/150 of 30 cm thick; upper pavement layer: cast-in-situ cement concrete Btb 4.4/55 of 45 cm thick. Total area of the airfield pavement is 1,062 905 sq.m.
Ramp S with a site for aircraft treatment with defroster fluid (in order to prevent aircraft surface from formation of glaze ice, aircraft are treated with propylene glycol-based defroster fluid; treatment in cold seasons only) **and centralized aircraft fueling** (oil products: jet fuel type JET A-1, aircraft fueling rate: 280 cub.m per hour).
The site for testing aircraft engines. The site will be equipped with soundproof shields on three sides of 19,950 sq.m area.
The quarantine aircraft stand. For one aircraft, area of 16,130 sq.m.
Freight aircraft stands. For 7 aircraft, area of 83,780 sq.m.
Construction of a new filling station includes installation of: underground horizontal double-walled steel tanks: 6 pcs with a capacity of 60 cub.m, and 2 pcs with a capacity of 14 cub.m. Motor vehicles will be filled with fuel of 4 types.

Lighting equipment (LE). Rated capacity of the LE is 337 kW. Annual electricity consumption is 1,516.5 thous kW per hour.

Radio-navigation landing system. The equipment similar to that of artificial runway No. 1 (ARW-1) will be installed in two landing directions to include the following:

– on-course beacon (OCB) to be installed on the airfield. Key features: working frequency band: 108–112 MHz, OCB range: at least 46 km in the sector of ±10 degrees relative to the course line (ARW-2 axis).

– glide-path localizer (GPL) to be installed on the airfield. Key features of the GPL: working frequency band: 329–335 MHz, GPL range: at least 18 km; GPL zone: ±8 degrees in vertical plane.

– navigation and landing distance measuring radio beacon DME, key features: working frequency band: 960–0215 Mhz; number of frequency channels: 252; channel frequency spectrum: 1 Mhz; transmitter power: 100 W.

Weather support of air traffic control in the airport's area of responsibility. Meteorological meters (a weather station) and a glaze ice early-detection system will be installed.

Emergency and rescue flight support.

Construction of an emergency rescue station (ERS) for five boxes. Location of an ERS will allow for the widest view of ARW-2 and unimpeded passage for fire-engines to ARW-2. Location of the ERS building will pose no obstacles to operation of the airfield radio equipment.

Engineering networks of Flight Zone No. 2.

Water supply of the facilities under reconstruction and the newly constructed ones will be provided through the current centralized water supply system.

Rainwater drainage will be provided through the drainage system of Boryspil IA SE with preliminary treatment at the sewage disposal plants (rain and melt waters harvested from the surface of Flight Zone No. 2 including current and newly built artificial rigid pavements) and local sewage disposal plants (LSDP) from particular engineering operations.

Power supply for the object. Supply voltage: 10 kV, 0.4 kV. Power supply category II, I, and special group category I. Upon implementation of the project the power will increase up to 1,119.65 kW. Annual electricity consumption is 4,945 thousand kW*hour.

Substations of Boryspil IA SE will be the source for power supply to the project facilities. Current transformer substations (TS) will be reconstructed and another two TSs mounted.

Diesel-generators (for uninterrupted operation of lighting systems) will serve as an alternative source of power.

All project TSs will be subject to technical record-keeping of active and reactive energy.

New transformer substations are equipped with the air conditioning system and indirect heating system for installation of the unattended engineering equipment, intrusion and fire alarm system, and automatic fire-extinguishing system in the diesel-generator room.

Fence Intrusion Detection and CCTV System. To meet the aviation security requirements, prevent entry into the control airport area by unauthorized persons, wild and domestic animals, protect the airport perimeter, the project provides for installation of Fence Intrusion Detection System in Flight Zone No. 2.

Roads and sites. For transport communication between the buildings in Flight Zone No. 2 and engineering facilities of the airport we provide for construction of an engineering asphaltic concrete road. Total area of the road surface will be 61,508 sq.m.

Land improvement and landscaping. The territory beyond construction site will be developed using grass and lawns. Landscape area is 209.69 ha including land treatment works in Flight Zone No. 2.

6. Environmental and other restrictions imposed on the scheduled activities in terms of alternatives:

– Technical alternative 1. The enterprise is classified as an object for which environmental, sanitary and epidemiological, fire prevention and other restrictions are listed in current state

environmental regulations, construction, sanitary and fire prevention standards taking account of the Air Code of Ukraine.
– **Technical alternative 2.** The technical alternative is out of scope.
– **Technical alternative 1.** The scheduled activities are to be conducted in the territory of the current airport where the territorial restriction areas have been already determined.
– **Technical alternative 2.** Out of scope.

7. Required environmental and engineering measures and protection of territories in terms of the alternatives:
– Technical alternative 1.
The preliminary work package includes landscape design in Flight Zone. 2, excavation works being as follows: full topsoil stripping at the sites of novel airfield pavements; full topsoil stripping at the ground sites of the flight zone and taxiway safe margins. Inorganic soil will be used for bank arrangement.
Construction waste generated under dismantling of current buildings will not be stored at the construction sites. We will arrange for regular waste disposal.
– Technical alternative 2. The technical alternative is out of scope
– **Territorial alternative 1.** The whole work package will be performed within the current airport. We will arrange guarding of the production facilities and temporary structures.
– **Territorial alternative 2.** Out of scope.

8. Scope, sources, and types of the environmental impact:
– **Technical alternative 1.**
Air: The scheduled activity presuppose pollutant emission into atmosphere by the stationary and movable pollutant emitting sources.
Physical factors of the impact: Impact of the scheduled activities on noise background in the following communities:
71 ≤LAmax≤75dBA partially: Trebukhiv, Dudarkiv, Velyka Oleksandrivka: to the north of the airport; high-rise residential communities and suburbs of Boryspil: in the east; major part of Voronkiv, Martusivka, separate buildings in Zatushne: in the south; Hora: in the west.
71 ≤LAmax≤80dBA partially: Dudarkiv (separate buildings) Velyka Oleksandrivka: in the north of the airport; high-rise residential communities and suburbs of Boryspil: in the east; Zatushne, Martusivka, Voronkiv: in the south; Hora: in the west.
LAmax> 80 dBA partially: to the north of the airport: Velyka Oleksandrivka, in the east: some residential communities of Boryspil; in the south: Zatushne partially, Martusivka; in the west: some residential communities of Hora.
Electromagnetic radiation propagation under operation of the radio navigation equipment.
Geological environment: No impact.
Soils, land resources: Performance of scheduled activities includes additional land allocation for permanent use. The topsoil will be stripped.
Flora and fauna: The flora and fauna at the area under construction have had impact of the economic activities. We will arrange for grubbing of trees and shrubberies. There are no reserve objects near the implementation area.
Social environment: Scope of works in reconstruction and expansion of Boryspil State International Airport will promote development of the engineering and transportation infrastructure of the areas adjacent to the airport.
Waste management: generation of construction waste from dismantling of the current buildings and facilities.
No increase in the generated or generation of hazardous waste of new types will occur under the economic activities.
– **Technical alternative 2.** Out of scope.
– **Territorial alternative 1.** The impact is similar to that of Technical alternative 1

– **Technical alternative 2.** Out of scope.

9. Classification of the scheduled activities with regard to category 1 or 2 of the activity types and objects that may have significant impact on the environment and are to be subject to the environmental impact assessment (corresponding paragraph and part of Article 3 of the Law of Ukraine "About Environmental Impact Assessment" to be specified).

The scheduled activities are classified as category 1 of the activity types and objects that may have significant impact on the environment according to paragraph 7, Part 2, Article 3 of the Law of Ukraine "About Environmental Impact Assessment".

10. Available grounds for assessment of cross-border impact on the environment (including available significant negative cross-border impact on the environment and a list of the countries where environment may be exposed to significant negative cross-border impact (affected countries).

No grounds available. Boryspil IA SE are stating their full support of ICAO's (International Civil Aviation Organization) environmental policies and practices. We conform to the Standards and Recommended Practices (SARPs), and political measures for the international civil aviation.

11. The scheduled scope of research and level of information specification to be included into the Environmental impact assessment report.

The scheduled scope of research and level of information specification to be included into the Environmental impact assessment report conform to Article 6 of the Law of Ukraine "About Environmental Impact Assessment".

12. Procedure for environmental impact assessment and possibilities for public involvement.

The scheduled activities of the business entity may have significant impact on the environment and are to be subject to the environmental impact assessment according to the Law of Ukraine "About Environmental Impact Assessment". Environmental impact assessment constitutes a procedure that includes the following stages:

– drawing up by the business entity of the environmental impact assessment report,

– public hearing of the scheduled activity,

– review by a competent authority of the environmental impact assessment report, any additional information provided by the business entity and received in the course of public discussions and under procedure of cross-border impact assessment, as well as other data,

– publication by a competent authority of valid conclusion on the environmental impact assessment including review of the findings in accordance with the fifth sub-paragraph of this paragraph,

– consideration of the conclusion on the environmental impact assessment in the resolution on implementation of the scheduled activities as specified in paragraph 14 of this Notification.

In the conclusion on the environmental impact assessment, the competent authority shall, based on the assessment of the environmental impact produced by the scheduled activities, determine if the scheduled activities are permissible or explain why they are not permissible, and specify the environmental terms and conditions for their performance.

The scheduled activities should not be launched unless the environmental impact assessment and resolution on execution of such activities are issued.

The procedure for assessment of the environmental impact includes the rights and possibilities for public involvement, in particular at the hearing stage, with regard to the scope and level of information to be included into the Environmental impact assessment report, and at the stage of review by the competent authority of the Environmental impact assessment report as submitted by the business entity.

At the stage of public hearing of the Environmental impact assessment report, the public is allowed to voice objections and proposals related to the Environmental impact assessment report and the scheduled activities during at least 25 working days, and take part in the public hearing. More details on the public hearing procedure for the environmental impact assessment report and on the initiation of public hearing will be further given in a publication.

13. Public hearing of the scope of research and level of information specification that are to be included into the Environmental impact assessment report.

Within 20 working days after publication of this notification at the official web-site of the competent authority, the public is entitled to submit to the competent authority specified in paragraph 15 hereof any objections and proposals related to the scheduled activities, scope of research and level of information specification that are to be included into the report. When submitting your objections and proposals please indicate the relevant file registration number in the Unified Register for Environmental Impact Assessment (given on the first page of this notification). This will make registration and review of your objections and proposals easier. In case such public objections and proposals are submitted, these will be published in the Unified Register for Environmental Impact Assessment and made known to the business entity (within three working days upon receipt). Persons submitting objections and proposals shall confirm their consent to processing their personal data with their signature. The business entity shall draw up the environmental impact assessment report taking into account public objections and proposals, whether in whole or in part, or reasonably rejecting objections and proposals provided under public hearing of the scope of 5 researches and level of information specification that are to be included into the Environmental impact assessment report. Detailed information thereon shall be included into the Environmental impact assessment report.

14. Decision on execution of scheduled activities.

According to law, decision on execution of these scheduled activities will be issued in the form of a conclusion on the environmental impact assessment with resolution as to admissibility of implementation of these scheduled activities (Part 3, Article 11 of the Law of Ukraine "About environmental impact assessment")

(type of resolution according to the first part of Article 11 of the Law of Ukraine "About environmental impact assessment")

to be issued by the Ministry of Ecology and Natural resources of Ukraine.

(an authority with powers and competence to issue such a resolution)

15. All public objections and proposals related to the scheduled activities, scope of research and level of information specification are to be included in the Environmental impact assessment report that must be sent to:

The Ministry of Ecology and Natural resources of Ukraine

Postal address: 35 Mytropolita Vasylia Lypkivskogo Str., 03035 Kyiv.

E-mail address for objections and proposals, procedures of the Ministry of Ecology and Natural resources of Ukraine as to environmental impact assessment: eia@menr.gov.ua

Public reception office: Fax +38 044 206 33 02, 044 206 31 39.

Department of environmental impact assessment: m.shimkus@menr.gov.ua, Tel.:+38 044 206 20 89

Contact person: Head of the Department of environmental impact assessment Maryna Shymkus.

Annex No.3

MINISTRY OF ENERGY AND ENVIRONMENT PROTECTION OF UKRAINE

Department of ecological safety and license operations
35 Mytropolyta Vasylia Lypkivsky Str., Kyiv, 03035, Tel.: +38 044 206 31 00, 044 206 31 64
Fax +38 044 206 31 07, E-mail: bryl@menr.gov.ua, Code EDRPOU 3755299

21.10.2019

BORYSPIL INTERNATIONAL AIRPORT STATE ENTERPRISE
08300, Kyiv Region, Boryspil District, Hora village, Boryspil-7 Street

Department of ecological safety and license operations of the Ministry of Energy and Environment Protection of Ukraine hereby informs that:
- according to Notification on the planned activities of Boryspil International Airport State Enterprise providing assessment of environmental impact (file registration number 20199134502 in the Unified Register of Environmental Impact Assessments) with regard to reconstruction of the maneuvering area no.2 of Boryspil International Airport State Enterprise, the procedure of environmental impact assessment has been launched under applicable legislation; and
- from the date of official publication of the above Notification on the planned activities, the Ministry of Energy and Environment Protection of Ukraine has received from the public objections and proposals attached hereto.

Attachment: above stated on __ pages in 1 copy.

[signed] O.S. Semenets
Deputy Director of Department
Chief of Bureau

Executed by: I. P. Telychko +38 044 206 31 40 (07/3)

Maryna Oleksandrivna Shymkus

From: Aleksandr Fitzev <aleks.fitzev@gmail.com>
Sent on 16 October, 2019 23:48
To: Maryna Oleksandrivna Shymkus; Public reception office
Subject Petition with regard to reconstruction of Boryspil Airport

To:
Minister of Ecology and Environment Protection of Ukraine
O.A.Orzhel
03035 Kyiv
35 Metropolitan Vasyliy Lypkivskiy Str., Kyiv, 03035,
m.shimkus@menr.gov.ua
gr_priem@menr.gov.ua
16 October, 2019

From:
Igor Mykolaiovych Fitsev
Yulia Oleksandrivna Fitseva
32 Volodymyr Maiakovskiy Ave., ap. 266, Kyiv
+38 050 398 94 46

PETITION

In connection with Notification No. 20199134502 in the National Register of the Environmental Impact Assessments on “Reconstruction of maneuvering area no.2 of Boryspil International Airport State Enterprise”, please, be informed that:

With regard to paragraph 8 of this Notification as to the types of possible environmental impact concerning, in particular, Martusivka village, where I live:
1. No assessment of acoustic impact is confirmed. And namely, there is no confirmation that acoustic impact on adjacent human settlements will remain within limits under applicable regulations. Obscure wording like "LAmax>80 dBA partially: [...] to the south-partially Zatyshne, Martusivka; to the west: some blocks of Gora”, does not provide clear idea on:
a) applicable rates of acoustic impact
b) current rates of such impact
c) authority the expert examination was performed by and its conclusions,
which makes impossible the acoustic impact assessment.

2. It contains no information on electromagnetic emission, and namely, on propagation of electromagnetic emission during operation of radio-navigational equipment. No assessment was provided. At the same time, under paragraph 5 concerning the General Technical Specifications, two radio beacons - localizer and glideslope transmitter – with operation range of 46 km and 18 km, respectively, as well as distance-measuring beacon will be installed. Accordingly, the following was not specified at all:
a) applicable rates of electromagnetic emission including for airports
b) current rates of emission for adjacent human settlements

c) authority the expert and scientific examination was performed by and its conclusions,
which makes impossible the electromagnetic impact assessment.

3. It does not provide any information on emissions to air. It is obvious that construction of the additional runway can result in at least 2-time increase of hazardous fuel-generated emissions. However, the general wording like "activities provide for pollutant emissions to the air by the stationary and mobile pollutant emission sources" does not state in any way the following:
a) applicable rates of hazardous emissions including for airports,
b) current rates of emission for adjacent human settlements,
c) expected emissions and authority the expert examination of impact was performed by,
which makes impossible the hazardous emission assessment.

In view of the above stated, I require the following:
1. To prohibit construction of the artificial runway and performance of other related works specified in Notification No. 20199134502 until an independent and qualified examination of environmental impact.
2. To perform qualified examination of the environmental impact due to activities of Boryspil International Airport and, first of all, with regard to Martusivka village
3. To publish results of this examination in mass-media and at the same time to inform the community of Martusivka village through the village council and/or governing body of the unified territorial community.
4. To provide an opportunity for the repeated public discussion of the planned activities of Boryspil International Airport State Enterprise under applicable legislation.

Best regards,
I.M. Fitsev
Yu.O.Fitseva

Maryna Oleksandrivna Shymkus

From:	Andrey Fedirko <afed@ukr.net>
Sent on	23 September 2019 21:32
To:	Maryna Oleksandrivna Shymkus

Subject New runway in Boryspil Airport

Good evening.

It has recently become known about plans to build a new runway at Boryspil Airport. On the one hand, it is good, because it testifies that the airport itself and airline communication in Ukraine in general is developing. However, on the other hand, even the existing air traffic since spring 2019 began to cause discomfort to residents of several villages: Velyka Oleksandrivka, Chubynske, and Gora. In the result of the shortened flight trajectory, planes are descending and climbing right above the residential houses of the mentioned settlements.

I ask you, as a relevant ministry, to take part in planning of the mentioned works, and, in particular, to ensure comfortable living conditions for residents of adjacent villages (including but not limited to): Velyka Oleksandrivka village, Chubynske village, Gora village. At the same time, I ask you to look for alternative routes for planes during take-off and landing not over human settlements, as well to check whether the noise level with existing flight trajectory meets applicable norms and standards.

Thanking you in advance for assistance and information,

Andrii Anatolioivych Fedirko
+38 (050) 355 55 57
afed@ukr.net

Public reception office

From:	no-reply@menr.gov.ua
Sent on	23 September 2019 15:02
To:	Public reception office
Subject:	Citizen petition (2019/09/23; Number: 8623)

The Ministry of Ecology and Natural resources of Ukraine
Citizen petition
E-petition
Application Number 8623
Full name: Nykola Rusan
E-mail: rusannukolay@ykr.net
Phone: 0675099417
Address: Kyiv region, Boryspil district, Voronkiv village, 14a Myru Lane
Subject: Public hearing: File 20199134502/15506

Text: Today, airplanes coming for landing and taking off in Boryspil Airport are passing very low over Voronkiv village and my house. High noise is heard day and night, especially at nights depriving of sleep. Article 45 of the Constitution of Ukraine guarantees the right for rest. Now, this right is violated because no rest is possible under these conditions. Very often when the airplanes coming for landing and taking off, one can see black traces in the sky. Number of people in the village suffering from cancer and allergy has risen. According to Article 24 of the Law of Ukraine "On sanitary and epidemiologic well-being of population", noise at security objects in the result of performance of activities of any kind should not exceed levels provided by sanitary standards for the relevant day time. Under Decree of the Ministry of Health of Ukraine No. 463 of 22.02.2019 "On approval of the State sanitary standards on permissible noise levels in the premises of residential and public houses and in the territory of residential communities", paragraph 42, the following values are set: 55 at daytime, 45 at night time.

Date: 23.09.2019, 15:02:06
IP: 91.226.254.143

If this letter was received by you by accident, please, just delete it

To Minister of Ecology and Environment Protection of Ukraine
O.A.Orzhel
35 Metropolitan Vasyliy Lypkivskiy Str., Kyiv
From Liudmyla Semeniuk
6 Boryspilska Street, apt. 7
Martusivka village
Boryspil district
Kyiv region
Phone number: 06337252262

Objection to planned activities, scope of examination and the level of detail to be included into the Report on environmental impact assessment

Regarding construction of a new runway in Boryspil airport under Notification No.20199134502/15506 in the Unified Register of Environmental Impact Assessments, I inform hereby the following:

Notification contains no results of the examination of possible impact and does not indicate an authority it was performed by with regard to Martusivka village, which is located most closely to the airport.

No sanitary regulations with regard to noise are specified as well. Besides, no relevant rates of electromagnetic radiation, hazardous fuel-generated emissions, etc. are indicated in comparison with current indices.

Accordingly, Notification does not allow evaluation of consequences of the construction of new runway. In view of the above, I claim to do as follows:

1. Construction of runway and performance of other works should be prohibited until performance of independent examination of the environmental impact.
2. Such examination of environmental impact of economic activities of Boryspil International Airport should be arranged first of all with regard to Martusivka village.
3. The results of examination should be published in mass-media and brought to the notice of community of Martusivka village through the village council.
4. An opportunity should be found to carry out the repeated public discussion of planned activities of Boryspil International Airport State Enterprise according to applicable legislation.

Thank you in advance for understanding!

02.10.2019 Liudmyla Semeniuk

To the Ministry of Energy and
Environment Protection of Ukraine
35 Metropolitan Vasyliy Lypkivskiy Str., Kyiv 03035
eia@menr.gov.ua
Department of environmental impact assessment
m.shimkus@menr.gov.ua

From community of Gora village of Boryspil district

PETITION

Regarding assessment of the environmental impact made by the Project of Reconstruction of maneuvering area No.2 of Boryspil International Airport State Enterprise

Registration No. 20199134502/15506

We, the residents of Gora village, hereby reject to give our approval to the Project of reconstruction of maneuvering area no.2 of Boryspil International Airport, because it provides the following (see paragraph 8):

– flight routes will cross the territory of Gora village (see the flight scheme attached) in violation of paragraph 5.21 of applicable sanitary regulations approved by Decree of the Ministry of Health of Ukraine No. 173 of 19.06.1996,

– airport activities will result in air pollution by stationary and mobile pollutant emission sources in violation of provisions of the Law of Ukraine "On protection of the atmospheric air",

–noise exposure standards are exceeded – rates under Annex 16 to the State Sanitary Regulations approved by Decree of the Ministry of Health of Ukraine No.173 of 19.06.1996 are exceeded,

– electromagnetic radiation exposure limits are exceeded: rates under Annex 21 to the State Sanitary Regulations approved by Decree of the Ministry of Health of Ukraine No.173 of 19.06.1996 are exceeded.

Today, we, residents of Gora village, suffer from plane flights over our houses throughout the day and night, from exceeded noise level, from pollutant emissions that cause loss of agricultural crops, from harm to our health, from progression of various diseases village residents are suffered from, from polluted air.

We address to you with request to check Boryspil International Airport SE for conformity with the State Sanitary Regulations at the designing stage of reconstruction of maneuvering area No.2 of Boryspil International Airport SE, to bind airport to comply with applicable legislations as to prohibition of flights over residential houses in human settlements and to prepare an alternative plan of reconstruction with the runway relocated in direction opposite to human settlements.

A contact person to be duly notified upon review of the petition is Alyona Onyshchenko, tel. +38 066 411 06 26

Residents: total 38 signatures.

To the Ministry of Energy and Environment Protection of Ukraine
Department of environmental impact assessment
m.shimkus@menr.gov.ua
Registration No. 20199134502/15506

From community of Zatyshne village
of Boryspil district
Contact person: Natalia Kaplia
Tel. +38 067 706 74 55

CLAIM

as to the Project of Reconstruction of maneuvering area No.2 of Boryspil International Airport State Enterprise

In order to obtain a comprehensive and independent review as to the environmental impact assessment of the above project, we hereby request to bind Boryspil International Airport State Enterprise to submit the following evidences:

1. Flight schemes with routes that will cross over villages of Gora, Martusivka, and Zatyshne.
2. Layouts of radio beacons and, namely, of glide slope beacon, operating in frequency band of 329-335 MHz with indication of distance to residential houses of Gora, Martusivka, and Zatyshne villages.
3. Confirmation indicating distances to residential houses of Gora, Martusivka, and Zatyshne villages from buildings and facilities of maneuvering area No.2, direction and length of the primary taxiway, cross-over taxiways, and high-speed exit taxiways.
4. Substantiation of the hazardous impact from propagation of electromagnetic emission with indication of its area and distance to residential houses, impact on health of village residents with indication of indices provided by sanitary regulations.
5. Measures and ways to provide residents of Gora, Martusivka, and Zatyshne villages with compensation for damage to their health caused by round-the-clock flights over residential houses, pollutant emissions into atmosphere from stationary and mobile pollutant emission sources, exceeded noise and electromagnetic emission exposure limits.

16.10.2019
Community of Zatyshne village

To Maryna Shymkus

From:	Aleksandr Fitzev <aleks.fitzev@gmail.com>
Sent on	16 October 2019 23:48
To:	Maryna Oleksandrivna Shymkus; Public reception office
Subject:	Petition with regard to reconstruction of Boryspil Airport

To Minister of Ecology and Environment Protection of Ukraine
O. Orzhel
03035 Kyiv city
35 Metropolitan Vasyliy Lypkivskiy Str.,
m.shimkus@menr.gov.ua
gr_priem@menr.gov.ua

16 october 2019
Ihor Mykolaiovych Fitsev
Yuliia Oleksandrivna Fitseva
Kyiv city, Volodymyr Maiakovkyi Ave., 32 266
(050) 398-9446

PETITION

In connection with Notification No. 20199134502 in the National Register of the Environmental Impact assessments on reconstruction of maneuvering area No. 2 of Boryspil International Airport State Enterprise, I hereby inform as follows.

With regard to paragraph 8 of this Notification as to the types of possible environmental impact concerning, in particular, Martusivka village, where I live:
1. No assessment of acoustic impact is confirmed. And namely, there is no confirmation that acoustic impact on adjacent human settlements will remain within limits under applicable regulations. Obscure wording like "LAmax>80 dBA partially: [...] to the south-partially Zatyshne, Martusivka; to the west: some blocks of Gora", does not provide clear idea on:
a) applicable rates of acoustic impact
b) current rates of such impact
c) authority the expert examination was performed by and its conclusions,
which makes impossible the acoustic impact assessment.

2. It contains no information on electromagnetic emission, and, namely, on propagation of electromagnetic emission during operation of radio-navigational equipment. No assessment was provided. At the same time, under paragraph 5 concerning the General Technical Specifications, two radio beacons - localizer and glideslope transmitter – with operation range of 46 km and 18 km, respectively, as well as distance-measuring beacon will be installed. Accordingly, the following was not specified at all:
a) applicable rates of electromagnetic emission including for airports
b) current rates of emission for adjacent human settlements
c) authority the expert and scientific examination was performed by and its conclusions,
which makes impossible the electromagnetic impact assessment.

3. It does not provide any information on emissions to air. It is obvious that construction of the additional runway can result in at least 2-time increase of hazardous fuel-generated emissions. However, the general wording like "activities provide for pollutant emissions to the air by the stationary and mobile pollutant emission sources" does not state in any way the following:

a) applicable rates of hazardous emissions including for airports,
b) current rates of emission for adjacent human settlements,
c) expected emissions and authority the expert examination of impact was performed by,
which makes impossible the hazardous emission assessment.

In view of the above stated, I require the following:
1. To prohibit construction of the artificial runway and performance of other related works specified in Notification No. 20199134502 until an independent and qualified examination of environmental impact.
2. To perform qualified examination of the environmental impact due to activities of Boryspil International Airport and, first of all, with regard to Martusivka village
3. To publish results of this examination in mass-media and at the same time to inform the community of Martusivka village through the village council and/or governing body of the unified territorial community.
4. To provide an opportunity for the repeated public discussion of the planned activities of Boryspil International Airport State Enterprise under applicable legislation.

Sincerely,
I.M. Fitsev
Yu.O.Fitseva

Maryna Shymkus

From:	Mykola Rusan <rusannukolay@ukr.net>
Sent on	26 September 2019 09:30
To:	Environmental Impact Assessment Register
Subject:	Environmental impact assessment No. 20199134502/15506

Environmental impact assessment. File No. 20199134502/15506.

Today, airplanes landing and taking off in the Boryspil airport are passing over my house. It is noisy day and night. Life is impossible. It looks already like torture. In view of the Constitution of Ukraine, Article 27 “each person has inalienable right for life”, Article 45 “each person employed has right to rest”, Article 50 “each person has right to the environment being safe for life and health, and for indemnification for damage caused by violation of this right”, and Article 24 of the Law of Ukraine “On sanitary and epidemiologic well-being of population”, Decree of the Ministry of health of Ukraine No. 463 of 22.02.2019 and Article 84 of the Air Code of Ukraine, I ask to ensure reduction of noise levels according to applicable legislation Ukraine and emissions to air that certainly exceed all permissible rates. Planes pass over residential houses, school, hospital, and kindergarten that are located near my house.

Mykola Rusan
14 a Myru Lane
Voronkiv village
Boryspil district
Kyiv region

To the Ministry of Ecology and
Natural resources of Ukraine

To Chairperson of Kyiv Regional
State Administration
M. Bno-Airian

For attention of Director General
BORYSPIL IA SE
P. Riabikin

From residents of
Voronkiv village
of Boryspil district
Kyiv region
(2 Parkova Str., Voronkiv village,
Boryspil district,
Kyiv region)

We ask to facilitate solution of the following problem arisen in Voronkiv village, Boryspil district, Kyiv region: Planes approaching to BORYSPIL IA SE for landing are passing directly over the human settlement, and namely: residential houses, kindergarten, school, and hospital ambulance station, at extreme low and low heights. The number of planes passing over Voronkiv village, Boryspil district, Kyiv region, has highly increased. During the low height flights, human settlement is exposed to fuel combustion products, noise level is beyond the sanitary standards and has negative impact on human health. Disease rate among adults and children has risen.

We sent multiple requests to check discharges into Ikva river made by Boryspil International Airport State Enterprise; however, to our regret, we got no result. For two years, water with chemical additives is disposed into Ikva river going further go to wells, thus threatening the human life and health.

We request to consider the negative impact of Boryspil International Airport State Enterprise on the environment and health of Voronkiv residents when issuing permits and to promote elimination of the damage caused.

Residents of Voronkiv village, Boryspil district, Kyiv region: 86 signatures.

[4 pages numbered and stitched]
[Official seal of Voronkiv village council]
[Post envelope]

MARTUSIVKA VILLAGE COUNCIL
of Boryspil district,
Kyiv region

08343 Martusivka, 2 Boruspilska Str., Boryspil district, Kyiv region,
Tel./Fax +38 04395 3 75 42, email martusivka@3g.ua

To Minister of Ecology and Environment
Protection of Ukraine
O.A.Orzhel
35 Metropolitan Vasyliy Lypkivskiy Str., Kyiv

Objection
to planned activities, scope of examination and the level of detail to be included into the Report on environmental impact assessment

Regarding construction of a new runway in Boryspil airport under Notification No.20199134502/15506 in the Unified Register of Environmental Impact Assessments, I inform hereby the following:

Notification contains no results of the examination of possible impact and does not indicate an authority it was performed by with regard to Martusivka village, which is located most closely to the airport.

No sanitary regulations with regard to noise are specified as well. Besides, no relevant rates of electromagnetic radiation, hazardous fuel-generated emissions, etc. are indicated in comparison with current indices.

Accordingly, Notification does not allow evaluation of consequences of the construction of a new runway. In view of the above, I claim to do as follows:

1. Construction of runway and performance of other works should be prohibited until performance of independent examination of the environmental impact.
2. Such examination of environmental impact of economic activities of Boryspil International Airport should be arranged first of all with regard to Martusivka village.
3. The results of examination should be published in mass-media and brought to the notice of community of Martusivka village through the village council.
4. An opportunity should be found to carry out the repeated public discussion of planned activities of Boryspil International Airport State Enterprise according to applicable legislation.

Chairperson of Village Council [signed, sealed] V. Kosovets

284/14-19
of 04.10.2019

Department of ecological safety
and license operations

INNER OFFICE MEMO

From: Board of examination and analytical management support (Secretariat) (further, the Board).

Summary: about review of citizen petitions (objections to planned activities)

Subject: On 01.10.2019 at 17:44, 02.10.2019 at 16:32 the Public reception office of the Ministry of Ecology and Natural resources of Ukraine has been addressed with petitions (objections and proposals), as attached, from O. Savchuk, community of Zatyshne village, Boryspil district, Kyiv region, with regard to Environmental impact assessment No. 20199134502/15506 “Reconstruction of maneuvering area No. 2 of Boryspil International Airport State Enterprise”, which provides modernization of Kyiv/Boryspil airfield and its engineering and maintenance infrastructure at the following address: Gora village (outside the limits of human settlement), Boryspil district, Kyiv region.

Proposals: in view of the above, we herewith submit these petitions for further review

Attachment: on 6 pages, in 1 copy

Deputy Head of Department –
Head of Department of analytical
management support (one-stop window) [signed] N. Lutsko

Executed by Oksana Pidorina
Tel. 206 33 02

To Minister of Ecology and Environment Protection of Ukraine
O.A.Orzhel
03035 Kyiv City 35 Metropolitan Vasyliy Lypkivskiy Str.,
m.shimkus@menr.gov.ua
gr_priem@menr.gov.ua

From Oleksandr Savchuk
Martusivka village
Registered address
04205 15 Obolonskyi Ave., Apt. 295, Kyiv
+38 050 448 74 63

1 October 2019

Petition No.2

In connection with Notification No. 20199134502 in the National Register of the Environmental Impact assessments on reconstruction of maneuvering area No. 2 of Boryspil International Airport State Enterprise, I hereby inform as follows.

With regard to paragraph 8 of this Notification as to the types of possible environmental impact concerning, in particular, Martusivka village, where I live:

1. No assessment of acoustic impact is confirmed. And namely, there is no confirmation that acoustic impact on adjacent human settlements will remain within limits under applicable regulations. Obscure wording like "LAmax>80 dBA partially: [...] to the south-partially Zatyshne, Martusivka; to the west: some blocks of Gora", does not provide clear idea on:
a) applicable rates of acoustic impact
b) current rates of such impact
c) authority the expert examination was performed by and its conclusions,
which makes impossible the acoustic impact assessment.

2. It contains no information on electromagnetic emission, and, namely, on propagation of electromagnetic emission during operation of radio-navigational equipment. No assessment was provided. At the same time, under paragraph 5 concerning the General Technical Specifications, two radio beacons - localizer and glideslope transmitter – with operation range of 46 km and 18 km, respectively, as well as distance-measuring beacon will be installed. Accordingly, the following was not specified at all:
a) applicable rates of electromagnetic emission including those for airports
b) current rates of emission for adjacent human settlements
c) authority the expert and scientific examination was performed by and its conclusions,
which makes impossible the electromagnetic impact assessment.

3. It does not provide any information on emissions to air. It is obvious that construction of the additional runway can result in at least 2-time increase of hazardous fuel-generated emissions. However, the general wording like "activities provide for pollutant emissions to the air by the stationary and mobile pollutant emission sources" does not state in any way the following:
a) applicable rates of hazardous emissions including those for airports,
b) current rates of emission for adjacent human settlements,
c) expected emissions and authority the expert examination of impact was performed by,
which makes impossible the hazardous emission assessment.

In view of the above stated, I require the following:

1. Prohibit construction of the artificial runway and performance of other related works specified in Notification No. 20199134502 until an independent and qualified examination of environmental impact.
2. Perform qualified examination of the environmental impact due to activities of Boryspil International Airport and, first of all, with regard to Martusivka village
3. Publish results of this examination in mass-media and at the same time to inform the community of Martusivka village through the village council and/or governing body of the unified territorial community.
4. Provide an opportunity for the repeated public discussion of the planned activities of Boryspil International Airport State Enterprise under applicable legislation.

Sincerely,
[signed]
O. Savchuk

To the Ministry of Energy and
Environment Protection of Ukraine
Kyiv 03035
eia@menr.gov.ua
Department of environmental impact assessment
m.shimkus@menr.gov.ua
From community of Zatyshne village
of Boryspil district,

PETITION

Regarding assessment of the environmental impact made by the Project of Reconstruction of maneuvering area No.2 of Boryspil International Airport State Enterprise

Registration No. 20199134502/15506

We, the residents of Zatyshne village, hereby reject to give our approval to the Project of reconstruction of maneuvering area no.2 of Boryspil International Airport, because it provides the following (see paragraph 8):
– flight routes will cross the territory of Zatyshne village (see the flight scheme attached) in violation of paragraph 5.21 of applicable sanitary regulations approved by Decree of the Ministry of Health of Ukraine No. 173 of 19.06.1996,
– airport activities will result in air pollution by stationary and mobile pollutant emission sources in violation of provisions of the Law of Ukraine "On protection of the atmospheric air",
–noise exposure standards are exceeded – rates under Annex 16 to the State Sanitary Regulations approved by Decree of the Ministry of Health of Ukraine No.173 of 19.06.1996 are exceeded,
– electromagnetic radiation exposure limits are exceeded: rates under Annex 21 to the State Sanitary Regulations approved by Decree of the Ministry of Health of Ukraine No.173 of 19.06.1996 are exceeded.

Today, we, residents of Zatyshne village, suffer from plane flights over our houses throughout the day and night, from exceeded noise level, from pollutant emissions that cause loss of agricultural crops, from harm to our health, from progression of various diseases village residents are suffered from, and due to the fact that sewage disposal plants of Boryspil International Airport State Enterprise are located within 300 meters from residential houses and there is no minimal green area of the sanitary and protection zone (50 meters of trees and shrubberies) near sewage disposal plants, damage is caused to the health of village residents, various diseases are developing, and air is polluted.

We address to you with request to check Boryspil International Airport SE for conformity with the State Sanitary Regulations at the designing stage of reconstruction of maneuvering area No.2 of Boryspil International Airport SE, to bind airport to comply with applicable legislations as to prohibition of flights over residential houses in human settlements, to arrange planting of trees and shrubberies near the sewage disposal plants, and to prepare an alternative plan of reconstruction with the runway relocated in direction opposite to human settlements.

A contact person to be duly notified upon review of the petition is Natalia Kaplia, Tel. +38 067 706 74 55 9 Tiutiuna Str., Zatychne village, kaplya.natalia@gmail.com
Residents: total 38 signatures.

20/09/2019
Residents: 56 signatures.

289/14-19
of 04.10.2019

Department of ecological safety
and license operations

INNER OFFICE MEMO

From: Board of examination and analytical management support (Secretariat) (further, the Board).

Summary: about review of citizen petitions (objections to planned activities)

Subject: On 07.10.2019, the Public reception office of the Ministry of Ecology and Natural resources of Ukraine has been addressed with petitions (objections and proposals), as attached:
from community of Voronkiv village, Boryspil district, Kyiv region, with regard to Environmental impact assessment No. 20199134502/15506 “Reconstruction of maneuvering area No. 2 of Boryspil International Airport State Enterprise”, which provides modernization of Kyiv/Boryspil airfield and its engineering and maintenance infrastructure at the following address: Gora village (outside the limits of human settlement), Boryspil district, Kyiv region;
from O. Dzhyga of 05.10.2019, L. Beketova of 05.10.2019 with regard to Environmental impact assessment concerning the Project “Development of C4 bed on coal strata at the Ternivska-Pivdenna measured-in site of the Ternivska Mine” developed by the DTEK “Pavlogradvugillia”.

Proposals: in view of the above, we herewith submit these petitions for further review

Attachment: on 6 pages, in 1 copy

Deputy Head of Department –
Head of Department of analytical
management support (one-stop window) [signed] N. Lutsko

Executed by Oksana Pidorina, tel. 206 33 02

Public reception office

From:	no-reply@menr.gov.ua
Sent on	05 October 2019 17:40
To:	Public reception office
Subject:	Citizen petition (2019/10/05; Number: 8645)

The Ministry of Ecology and Natural resources of Ukraine
Citizen petition

E-petition
Application Number 8645
Full name: Olena Dzhyga
E-mail: elen.silaychik@ukr.net
Phone: 0990527757
Address: Boguslav village, Pavlograd district, Dnipro region
Subject: Illegal coal mining under the forest and village
Text: Good morning. I am not sure if you will find time to read my letter, but I strongly hope you find. In Boguslav village (Pavlograd district, Dnipro region), DTEK is planning to mine coal directly under the forest and to continue mining up to the village! Thus, large pine forest and residential houses will be inevitably destroyed resulting in lack of water in springs and wells. Nobody concerns with people opinion; they just create a fait accompli!!! We beg you much to come with reporters and cameras. Please, help us!!!
Date: 23.09.2019, 17:39:42
IP: 176.108.15.23

If this letter was received by you by accident, please just delete it

Public reception office

From:	no-reply@menr.gov.ua
Sent on	05 October 2019 18:52
To:	Public reception office
Subject:	Citizen petition (2019/10/05; Number: 8646)

The Ministry of Ecology and Natural resources of Ukraine
Citizen petition
E-petition
Application Number 8646
Full name: Lilia Beketova
E-mail: Tel. +38 0999827551 q@gmail.com
Tel. +38 0999827551
Address: 100 Pershotravneva Street, Boguslav village, Pavlograd district, Dnipro region
Subject: Environmental impact of mining

Text: DTEK Pavlogradvugillia Management has developed the project “Development of C4 bed on coal strata at Ternivska-Pivdenna measured-in site of Ternivska Mine” and intends to develop coal layers near residential houses, water pond, and under forest. These works may cause soil subsidence and lack of drinking water resulting in the upset of ecological state of Samara River. The project includes information with regard to such environmental impact, however DTEK Pavlogradvugillia have launched works without approval from Boguslav village residents. We already have negative examples of such activities with, for example, villages of Blagodatnoie, partially Verbky, Sosnovka, etc. For today, Samara river has shallowed to the critical level. In view of the above, I consider that actions of officials and representatives of the DTEK Pavlogradvugillia have signs of crime. I ask to take measures to eliminate violations and make the guilty persons liable.
Date: 23.09.2019, 18:51:36
IP: 176.108.15.72

If this letter was received by you by accident, please just delete it.

To Head of the Department of environmental impact assessment
of the Ministry of Ecology and Natural resources of Ukraine
Maryna Shymkus
35 Metropolitan Vasyliy Lypkivskiy Str., Kyiv. 03035

PUBLIC PETITION

Dear Ms. Maryna,

Public discussion with regard to the Report on assessment of environmental impact due construction of a new plant in the territory of KARPATNAFTOKHIM LLC (4 Promyslova Str., Kalush, Ivano-Frankivsk region) has been launched in Kalush city, Ivano-Frankivsk region. The above enterprise has the intention to install a propylene oxide production plant with a capacity of 2,700 tons per year. The plant will be installed in the territory of KARPATNAFTOKHIM LLC within the leased land site at the area of approx. 1,500 sq. m. The site is located in the south-west of the territory, near the company's railway station. The plant will be of approx. 177 sq. m of total construction area and of approx. 36 m height. The hydrogen peroxide storehouse will be located at the unbuilt site near the existing caustic soda storehouse; its minimal capacity will be of 240 cub.m. Hydrogen peroxide will be stored in three ground tanks, each of 80 cub.m capacity, one of which is unfit for use. Raw material demand amounts to 2,000 tons annually for propylene and almost 3,000 tons annually for 60% hydrogen peroxide solution.

Propylene oxide is a colorless transparent liquid with ether odor. It is poisonous, has cytotoxic and mutagenic effects. Propylene oxide is highly inflammable and explosive. Hydrogen peroxide is also highly inflammable.

The history of petrochemical factory in Kalush dates back to 1975. However, since foundation of KARPATNAFTOKHIM LLC in 2004, this company has caused the most severe damage to the environment of our city and Ukraine in general. Quite recently, on 12 January 2019 to be exact, the fire accident has happened at the enterprise. This fact evidences that company is not ready to launch new production. It should be noted that activities of KARPATNAFTOKHIM LLC are connected with a number of financial transactions that cause damage to our country and residents of Kalush, but are beneficial to a narrow circle of persons.

In view of the above, we, residents of Kalush, Ivano-Frankivsk region, request to prevent construction of the propylene oxide production plant with capacity of 2,700 tons per year in the territory of KARPATNAFTOKHIM LLC. It is because we would like to live in environmentally friendly place and we are worrying about our health.

Contact person: Andrii Zharskyi, 2/9 Tsylynsky Street, Kalush, Tel. +38 099 049 56 27

Sincerely yours,
Kalush residents: 65 signatures.

298/14-19
of 16.10.2019

Department of ecological safety
and license operations

INNER OFFICE MEMO

From: Board of examination and analytical management support (Secretariat) (further, the Board).

Summary: about review of citizen petitions (objections to planned activities)
Subject: On 15.10.2019, the Public reception office of the Ministry of Ecology and Natural resources of Ukraine has been addressed with the petitions (objections and proposals) as attached:

from L. Semeniuk of 02.10.2019 with regard to Environmental impact assessment No. 20199134502/15506 concerning "Reconstruction of maneuvering area No. 2 of Boryspil International Airport State Enterprise" providing modernization of Kyiv/Boryspil airfield and its engineering and maintenance infrastructure at the following address: Gora village (outside the human settlement), Boryspil district, Kyiv region;

from residents of Kalush city of 11.10.2019 with regard to environmental impact assessment concerning implementation of construction of the propylene oxide production plant by KARPATNAFTOKHIM LLC;

from A. Kozeletska of 13.10.2019 No.8656 with regard to environmental impact assessment No. 201812262526 concerning the project "Development of C4 bed on coal strata at Ternivska-Pivdenna measured-in site of Ternivska Mine" developed by DTEK Pavlogradvugillia of PAVLOGRAD Mine Administration (repeated; petitions No. 8650, 8651 of 09.10.2019 were covered by Inner Office Memo No. 291 of 09.10.2019).

Proposals: in view of the above we hereby submit these petitions for further review
Attachment: on 4 pages, in 1 copy

Deputy Head of Department –
Head of Department of analytical
management support (one-stop window) [signed] N. Lutsko

Executed by Oksana Pidorina
Tel. 206 33 02

Public reception office

From:	no-reply@menr.gov.ua
Sent on	13 October 2019 11:35
To:	Public reception office
Subject:	Citizen petition (2019/10/13; Number: 8656)

The Ministry of Ecology and Natural resources of Ukraine Citizen petition

E-petition
Application Number 8656
Full name: Anna Kozeletska
E-mail: ankagt911@gmail.com
Phone: 0668379860
Address: 27 Pershotravneva Street, Boguslav village, Pavlograd district, Dnipro region
Subject: Development of C4 bed on coal strata at Ternivska-Pivdenna measured-in site
Text: I consider it inadmissible to mine coal in vicinity of Boguslav village, which will result in air pollution, possible emissions of methane, contamination of water resources. Water which is used by local residents will be inappropriate for drinking, bathing, and household purposes and it will soon disappear at all. Negative impact on human health of people living in the mining area and exposed to, short life time, cancer diseases, etc. And one of the main reasons is possible loss of home, soil subsidence below 1 meter level which will cause cracks in house footings and negative effect to the residential houses in general. I consider the Report No. 201812262526 to be doubtful; it includes underevaluated consequences for humans and the environment.
Date: 13.10.2019, 11:34:52
IP: 176.108.15.169

If this letter was received by you by accident, please just delete it

308/14-19
of 17.10.2019

Department of ecological safety
and license operations

INNER OFFICE MEMO

From: Board of examination and analytical management support (Secretariat) (further, the Board).
Summary: about review of citizen petitions (objections to planned activities)
Subject: On 16.10.2019, the Public reception office of the Ministry of Ecology and Natural resources of Ukraine has been addressed with the petitions (objections and proposals) as attached: from community of Gora village, Boryspil district, Kyiv region, citizens I. Fitsev and Yu. Fitseva with regard to Environmental impact assessment No. 20199134502/15506 concerning "Reconstruction of maneuvering area No. 2 of Boryspil International Airport State Enterprise" providing modernization of Kyiv/Boryspil airfield and its engineering and maintenance infrastructure at the following address: Gora village (outside the human settlement), Boryspil district, Kyiv region.
Proposals: in view of the above, we hereby submit these petitions for further review

Attachment: on 5 pages, in 1 copy
Deputy Head of Department –
Head of Department of analytical
management support (one-stop window) [signed] N. Lutsko

Executed by Oksana Pidorina
Tel. 206 33 02

Appendix No. 13

Sheet 1 Document 1

Approved:
Deputy Director of the Ecology and Natural Resources Department of the Kyiv Regional State Administration

(official)

12 January 2017 [signature] *H. I. Tkalich*

Stamp here [round seal: Kyiv Regional State Administration]

MAXIMUM PERMITTED DUMPING (MPR) OF SUBSTANCES INTO THE UNNAMED POND and IKVA river WITH RETURN WATERS (including with sewage created due to atmospheric precipitations) REMOVED FROM THE TERRITORIES OF BORYSPIL IA SE and AMIC-UKRAINE PE

1 Ecology and Natural Resources Department of the Kyiv Regional State Administration

(authority approving MPR)

2 The MPR was approved on *12 January 2017*

for the term until *12 January 2022*

Details of the water user 20572069
Water user code according to the records according to form No. 2-TP (waterworks)

3 Name Boryspil IA SE

4 Department, union State Aviation Administration

5 Ministry, agency Ministry of Infrastructure of Ukraine

6 Region, district Kyiv region

7 Water user address; last name, job position and phone number of the official responsible for water use:
08307 Kyiv region, Boryspil-7 town, airport, S. I. Leibuk, chief engineer of Boryspil IA SE, tel. 281-74-62

8 The MPR was approved and agreed for 3 releases

9 Name of organization which elaborated the MPR draft – STC Ekoproetkt PE

Maximum permitted dumping (MPR) of substances into Ikva river with return waters (including with sewage created due to atmospheric precipitations) removed from the territory of Boryspil IA SE) by releases

Year of the MPR achievement 2016

1. Water user name Boryspil IA

code 20572069

2. Release No. 1 Category of return waters surface water run-offs

3. Name of water body accepting waters and dumping location: Ikva river

4. Water body code, distance of dumping to estuary

Chor Dnipro 20//768/25

5. Category of water use by water body fishery

6. Actual consumption of return waters 1648.6 thous. m^3/year; 2748 m^3/hour

7. Approved consumption of return waters for the MPR determination (not more than the value established in the permit for special water usage)

1648.6 thous. m^3/year; 2748 m^3/hour

8. Actual and approved composition and dumping of substances in return waters (it is forbidden to release any substances related to water user's activity except for the specified below):

No.	Values of return water composition	Actual concentration, g/m^3	Actual dumping, g/hour	Approved permitted concentration, g/m^3	Approved MPR, g/hour	Releases re-calculated in t/year (approx.)
1	Suspended solids	12.0	32,976.00	12.0	32,976.00	19.7832
2	Mineralization	290	796,920.00	290	796,920.00	478.094
3	COD	25.2	69,249.60	25.2	69,249.60	41.5447
4	BOD_5	5.67	15,581.16	5.67	15,581.16	9.3476
5	Sulfates	27.1	74,470.80	27.1	74,470.80	44.6771
6	Chlorides	33.5	92,058.00	33.5	92,058.00	55.2281
7	Ammonia nitrogen	0.66	1,813.68	0.66	1,813.68	1.0881
8	Nitrites	0.07	192.36	0.07	192.36	0.1154
9	Nitrates	0.63	1,731.24	0.63	1,731.24	1.0386
10	Phosphates	0.16	439.68	0.16	439.68	0.2638
11	Total iron	0.22	604.56	0.22	604.56	0.3627
12	Petroleum products	0.12	329.76	0.12	329.76	0.1978
	Total		1,086,367		1,086,367	651.7410

Appendix No. 14

APPROVED
Head of Quality Control Department
of Boryspil IA SE
[signature]
L. V. Khrulenko
[round seal: illegible]

DRAFT CALCULATION OF MAXIMUM PERMITTED RELEASES OF CONTAMINATING SUBSTANCES WITH RETURN WATERS (including with sewage created due atmospheric precipitation) REMOVED FROM THE TERRITORIES OF BORYSPIL IA SC and IKVA river

Executed by: STC EKOPROEKT PE

Director [signature] S. A. Denisevich

Kyiv-2016

Characteristics of existing treatment plants and storm water drainage system of Boryspil IA SE

There are two storm water drainage systems with one common release to Ikva river (Ikla river) in Boryspil IA SE. The first system includes drain-water inlets and drain-water networks from the territory of runway No. 1, taxiways A-4, A-3, A-2, RD-D, apron of ZOD SE, apron F, terminal D facilities (apron, ramp, parking stand), accumulating tank and pump station of storm drains. Water discharge is arranged in two directions:

- a part of discharge with flow volume of 310 l/s from the southern territory of maneuvering area No. 1 with gravity flow to the main trunk sewer and further on by the appropriate sewer is released to the treatment plans;
- another part of drains with flow volume of 1000l/s from the northern and central part of maneuvering are No. 1 with gravity flow is dumped to accumulating tank with volume of V=21,130 m^3 from where it is pumped with the pump station in the period between rains to the main trunk sewer and further on to the treatment plants. The drains are also collected from the soil part of maneuvering area No. 1 (the lowest terrain point) in the accumulating tank of volume V=720 m^3. When the tank is filled, the drains are pumped to the accumulating tank (V=21,130 m^3) of maneuvering area No. 1.

Another system of storm drains includes the storm drain intake and their transportation system from runway No. 2 and service area. To decrease the maximum flow of water arriving to the main truck sewer, there are two retention basins in the service area of the airport:

- retention basin with the volume of V=54,000 m^3 receives the drains from the side of the airport building, apron M and objects of centralized filling station (CFS);
- evaporation pond with the volume of V=2,000 m^3 is a transit tank accepting the drains from ATB hangar.

Release of storm drains from the territory of BF Servis LLC to the airport sewer is also envisaged. The drains undergo settlement at the facility settlement ponds and cleaning in the storage lagoon. Starting from 2010, the drains were not released in the sewer of Boryspil IA SE and won't be released in the years to come based on the information obtained from BF Servis LLC.

The rainwater from the territory of the airport is transferred by the existing main gravity flow sewer with diameter of 1000 mm to the treatment plants which have two sections divided by an oil-recovery wall. At first the drains come to the settlement section for mechanical cleaning. Possible oily contaminants and petroleum products come to the surface and get retained by the oil-recovery wall equipped with oil discharge tube for further outflow of retained petroleum products to the oil collection tank. After settlement and collection of petroleum products the sewage gets into the section of postaeration.

The treatment plants were designed as the holding pond for the period of rains and it became a biological one between the rain periods. The volume of the settlement pond is 50,347 m^3. It is envisaged for holding during 24 hours of sewage with the depth of precipitation of 20 mm which approximately corresponds to the frequency of rains in Kyiv region once a year.

The information about the areas allocated for runways (RW), taxiways (TW), parking places (PP), lawns etc. as of 2016 is presented in the table.

No.	Territory name	Area, ha
1	Existing territories of maneuvering area No. 2:	
	a) RW-2, TW	48.92
	b) PP, aprons	45.36
	c) SA, fuel filling station (local treatment plants on FFS No. 1), landside area, roads	52.26
	d) lawns	50.13
	e) buildings	8.4
	f) earth surfaces	174.96
	g) parking lots for motor transport (asphalted)	1.35
	h) parking lots for motor transport (rubbly surface)	0.19
	i) areas of terminal F (local treatment plants, OLV)	2.9
	j) parking lots for motor transport (concrete surface)	0.03
	Total on par. 1:	384.5
2	Territory of maneuvering area No. 1 (southern part, drains arriving by gravity flow sewer):	
	a) RW-1, TW	26.0
	b) earth surfaces	60.0
	c) apron	8.8
	Total on par. 2:	94.8
3	Territory of maneuvering area No. 1 (northern part, drains arriving in accumulating tank):	
	a) ARW, TW	29.74
	b) earth surfaces	53.28
	c) ZOD apron	4.7
	d) TW-D	5.5
	e) terminal D (apron, ramp, parking lots): - apron, roadsides (concrete surfaces)	33.5 19.0

	- roads, parking lots for special transport (asphalt concrete) - other roads - terminal (roof)	2.3 9.1 3.1
	f) parking lots for motor transport (asphalt, D-2, D-3 with sidewalks, LOS Solap-6, NPP-8)	10.19
	g) parking lots for motor transport (asphalt, LOS Rainpark BMO-200 and Oleopator-K NS20 (4 pcs.)	0.8
	Total on par. 3:	137.71
4	Total on par. 1-3:	617.01

QCD Head [signature] L. V. Khrulenko

[signature]
[rectangular stamp: ACCORDING TO THE ORIGINAL. A. V. Beliaiev]

A. V. Beliaiev, 281-78-40

CERTIFICATE
of condition of constructions related
to cleaning and disinfection of sewage at enterprises and other facilities

Name of enterprise or facility
Boryspil International Airport State Enterprise
Treatment plants of storm drains of the enterprise (Ikva river)
Ministry *Ministry of Infrastructure* **Institution _____**
In the catchment of river *Dnipro*
Postal address and phone number of enterprise *08307, Kyiv region. Boryspil town, Airport. tel. 281-74-96*

Main characteristics of treatment plants

Design and construction	Year	Organization
Design	1983	UDPTiNDI TsA Ukraeroproekt
Completion of design	1984	UDPTiNDI TsA Ukraeroproekt (design documentation, archive No. 1649-9/I)
Completion of construction	1985-1986	UkrTsAUVD Strela
Commissioning	-	Starting from 1994 on the balance sheet of Boryspil IA SE

Where from sewage arrives to the treatment plants, sewage characteristics, volume in m^3/year, m^3/day *Storm water from the territory of the enterprise with the area of 617.01 ha, clean water after LOS FFS-1, parking lots, CFS and terminal F. Contaminants: petroleum products, suspended substances, BOD_n, total nitrogen. Volume of storm water:* **1,935,786.3** *m^3/year.*

Volume of sewage per unit of product _____-_____

Composition of treatment plants and disinfecting devices (provide full description of treatment plants, design values of quality of sewage coming for treatment and following values after treatment; type of treatment)

Treatment plants in amount of 1 pcs.

The storm water comes from two storm water drainage systems with one general release to Ikva river. The first system includes drain-water inlets and drain-water networks from the territory of runway No. 1, taxiways A-4, A-3, A-2, RD-D, apron of ZOD SE, apron F, terminal D facilities (apron, ramp, parking stand), accumulating tank and pump station of storm drains. Water discharge is arranged in two directions:

- *a part of discharge with flow volume of 310 l/s from the southern territory of maneuvering area No. 1 with gravity flow to the main trunk sewer and further on by the appropriate sewer is released on the treatment plans;*
- *another part of drains with flow volume of 1000l/s from the northern and central part of maneuvering are No. 1 with gravity flow is dumped to accumulating tank with volume of V=21,130 m^3 from where it is pumped with the pump station in the period between rains to the main trunk sewer and further on to the treatment plants. The drains are also collected from the soil part of maneuvering area No. 1 (the lowest terrain point) in the accumulating tank of volume V=720 m^3. So far as the tank is being filled out the drains are pumped to the accumulating tank (V=21,130 m^3) of maneuvering area No. 1.*

Another system of storm drains includes the storm drain intake system and their transportation from runway No. 2 and service area. To decrease the maximum flow of water arriving to the main trunk sewer, there are two retention basins in the service area of the airport:

- *retention basin with the volume of V=54,000 m^3 receives the drains from the side of the airport building, apron M and objects of centralized filling station (CFS);*
- *evaporation pond with the volume of V=2,000 m^3 is a transit tank receiving the drains from ATB hangar.*

Release of storm drains from the territory of BF Servis LLC to the airport sewer is also envisaged. The drains undergo settlement at the facility settlement ponds and cleaning in the storage lagoon. Starting from 2010, the drains were not released in the sewer of Boryspil IA SE and won't be released in the years to come based on the information obtained from BF Servis LLC.

The rainwater from the territory of the airport is transferred by the existing main gravity flow sewer with diameter of 1000 mm and length of 5904 m to the treatment plants which have two sections divided by an oil-recovery wall. At first the drains come to the settlement section

for mechanical cleaning. Possible oily contaminants and petroleum products come to the surface and get retained by the oil-recovery wall equipped with oil discharge tube for further outflow of retained petroleum products to the oil collection tank. After settlement and collection of petroleum products the sewage get in the section of postaeration.

The treatment plants were designed as the holding pond for the period of rains and it became a biological one between the rain periods. The volume of the settlement pond is 50,347 m^3.

Designed output of treatment plants and actual volume of sewage arriving to the treatment plants (m^3/year, m^3/day).

Actual discharge: *1329.1 thous. m^3/year in Ikva river.*

Place of sewage discharge after treatment:

After treatment at the treatment plants the treated sewage are discharged in Ikva river head.

Treatment plant operation staff _____-_____

Existence of departmental laboratory, whether certified *laboratory of SHEI Kyiv University of Management and Entrepreneurship, certified (certificate No. PT-71/12, valid until 22.02.2017)*

Cost of treatment of 1 m^3 of sewage _____-_____

Comments when commissioning the treatment plants _____-_____

Deputy General Director
on Production and Airfield Technical
Support [signature] S. Ye. Hombolevskyi

Acting Director on Airfield Technical
Support [signature] V. S. Kopanytsia

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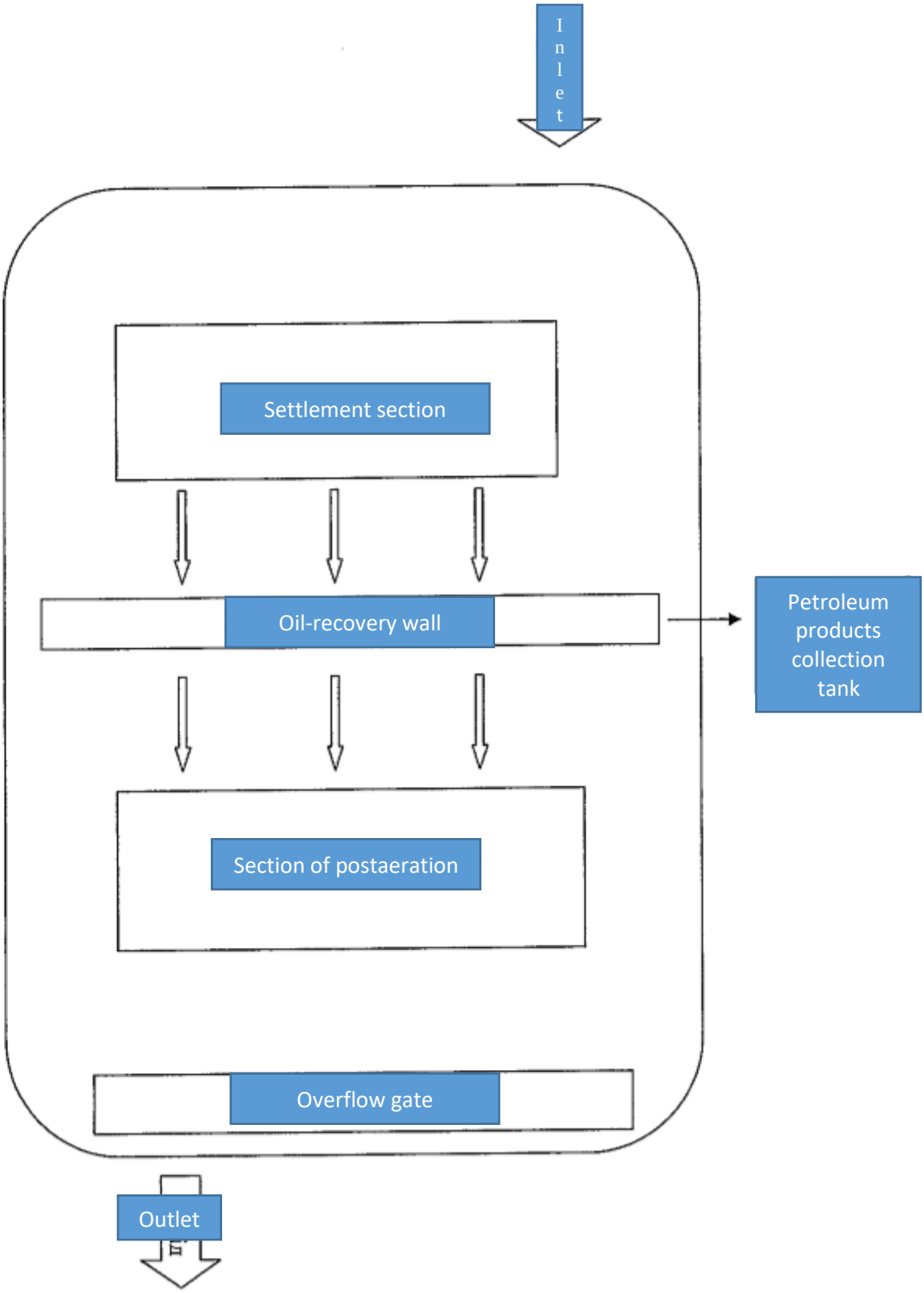
Date

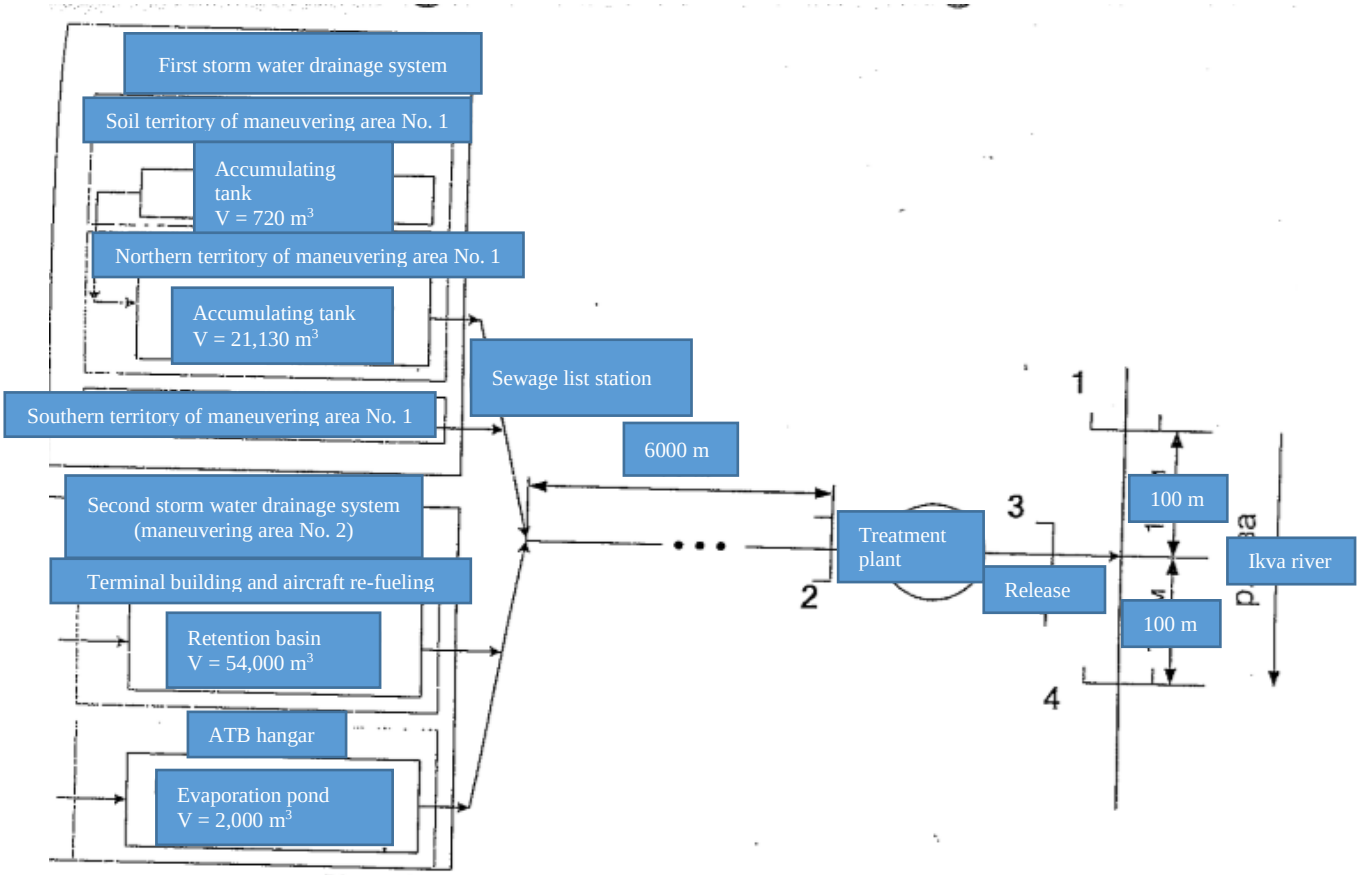
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/Head of [illegible] A. V. Beliaiev/

SCHEME OF TREATMENT PLANTS

Storm drain treatment plants (Ikva river)





Symbols:

1. Ikva river, 100 m above discharge. Background station.
2. Surface return waters before treatment.
3. Release No. 1. Surface return waters thereafter.
4. Ikva river, 100 m below discharge. Control station.

Linear network of stations for sampling and control station.

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Annex No. 15

Approved: Chief of the Main Directorate of the State Public Health and Epidemiology Service for Air Transport M. Korniienko [round seal: Main Directorate of the State Public Health and Epidemiology Service for Air Transport] [signature] *20.06.2014*	Approved: *Deputy* Director of the Ecology and Natural Resources of the Kyiv Regional State Administration *A. V. Andrushchenko* [round seal: illegible] [signature] *28 October 2014*

REGISTER CARD
on waste production object
(amended)

Registration number *2-08-09* Registration date *28.10.2014*

Object name: **BORYSPIL INTERNATIONAL AIRPORT STATE ENPERPRISE**

Director on Airfield Technical Support V. S. Kopanytsia

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/GIS chief A. V. Beliaev/

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I. General information

1. Name of WPO: Boryspil International Airport State Enterprise
2. Code under YeDRPOU: 20572069
3. Subordination: Ministry of Infrastructure of Ukraine
4. Code under SPODU: 17214
5. Form of business organization under KOPFG: State enterprise
6. Code under KOPFG: 140
7. Code under KOATUU: 3210500000
8. Address, contact phone:
Legal address: Boryspil Airport, Boryspil town, Kyiv region, 08307, tel.: (044) 281-74-96
Business address: Boryspil Airport, Boryspil town, Kyiv region, 08307
9. Production place location: Latitude (50.35)**, Longitude** (30.89)
10. Type of activity under KVED: Air transport auxiliary services
11. Code under KVED: 52.23
12. RC completion date: 11.06.2014
13. RC completing organization: NVO Ekoalians LLC
14. RC completing person: M.O. Samsonova, *(093) 699-49-59*

15. Waste production values for the reporting year:
15.1 Total scope of produced waste under the public health hazard class.

Hazard class	1st class (m1)	2nd class (m2)	3rd class (m3)	4th class (m4)
Scope of waste	1.7622	4.9554	12.7768	17,261.764

15.2 General waste production value: Pzuv = 29,189.304
15.3 Specific waste production value: Ppuv = 0.0027 where D = UAH 10,697,720

Director on Airfield Technical Support V. S. Kopanytsia

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV spoiled, used or contaminated filter media
2. Waste code under KV 7730.3.1.05
3. Other name of waste Used petroleum products
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2__ 3X 4__
7. Name of hazardous waste group Petroleum residues
8. Code of hazardous waste group 1.12.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12__, H13 X, H14__.
10. Hazardous waste components

Name	Code	Content, %
Hydrocarbons and their oxygen, nitrogen and (or) sulphur compounds	S81	95.0

11. Waste type:
mineral __, non-organic X, organic __, biological __, mixed __.

12. Aggregate (physical) state:
liquid __, solid __, slurry- or paste-like __, composite __, unanalyzed material X.

13. Mineral constituent content

Mineral name	Content, %
-	-

14. Heating capacity (kcal/kg) -
(for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Cellulose	$(C_6H_{10}O_5)_n$	50.0	-
Petroleum products	C_nH_{2n}	5.0	-
Plastics	$[-CH_2-CHCl-]_n$	45.0	-

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16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
0	0	0	0	0

Director on Airfield Technical Support V. S. Kopanytsia

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/GIS chief A. V. Beliaev/ *Environmental engineer [signature] O. Yu. Drach*

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 0.0	0	0	0	0
2015, 0.0	0.0	0.0	0.0	0.0
2016, 0.0	-	-	-	-
2017, 0.0	0.0	0.0	0.0	0.0
2018, 0.0	0.0	0.0	0.0	0.0

Environmental officer _____

(job position, last name, initials)

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV spoiled, used or contaminated filter media
2. Waste code under KV 7730.3.1.05
3. Other name of waste Used filter elements
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2__ 3X 4__
7. Name of hazardous waste group Petroleum residues
8. Code of hazardous waste group 1.12.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12__, H13 X, H14__.
10. Hazardous waste components

Name	Code	Content, %
Ferrum	S10	46.0
Hydrocarbons and their oxygen, nitrogen and (or) sulphur compounds which were not included in the table earlier	S81	2.0

11. Waste type:
mineral __, non-organic X, organic __, biological __, mixed __.

12. Aggregate (physical) state:
liquid __, solid __, slurry- or paste-like __, composite __, unanalyzed material X.

13. Mineral constituent content

Mineral name	Content, %
-	-

14. Heating capacity (kcal/kg) -
(for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Ferrum	Fe	46.0	
Cellulose	$(C_6H_{10}O_5)_n$	40.72	-
Synthetic rubber	$-(CH_2-CH=CH-CH_2)-$	11.28	
Petroleum products	C_nH_{2n}	2.0	-

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16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
0.1	-	-	-	0.1

Director on Airfield Technical Support V. S. Kopanytsia

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/GIS chief A. V. Beliaev/ *Environmental engineer [signature] O. Yu. Drach*

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 0.015	0	0	0	0.015
2015, 0.053	0.0	0.0	0.053	0.0
2016, 0.0	-	-	-	-
2017, 0.170	-	-	0.170	-
2018, 0.061	0.0	0.0	0.061	0.0

Environmental officer _____

(job position, last name, initials)

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV Sludge from unspecific industrial waste water treatment
2. Waste code under KV 9030.2.9.04
3. Other name of waste Sand with petroleum products impurities
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2__ 3X 4__
7. Name of hazardous waste group Oil sludge
8. Code of hazardous waste group 1.13.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12__, H13 X, H14__.
10. Hazardous waste components

Name	Code	Content, %
Silicon and its compounds	S15	25.0
Hydrocarbons and their oxygen, nitrogen and (or) sulphur compounds which were not included in the table earlier	S81	8.0

11. Waste type:
mineral X, non-organic __, organic __, biological __, mixed __.

12. Aggregate (physical) state:
liquid __, solid __, slurry- or paste-like X, composite __, unanalyzed material __.

13. Mineral constituent content

Mineral name	Content, %
Sand (SiO_2)	25.0

14. Heating capacity (kcal/kg) -
(for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Water	H_2O	30.0	-
Petroleum products	C_nH_{2n}	45.0	-
Sand	SiO_2	25.0	-

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16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
0	0	0	0	0

Director on Airfield Technical Support V. S. Kopanytsia

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 0.0	0	0	0	0
2015, 0.0	0.0	0.0	0.0	0.0
2016, 0.0	-	-	-	-
2017, 0.0	-	-	0.0	-
2018, 0.0	0.0	0.0	0.0	0.0

Environmental officer _____

(job position, last name, initials)

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV Waste from operation, technical servicing, repairs and restoration of equipment
2. Waste code under KV 7740.3
3. Other name of waste Used rubber materials
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2__ 3X 4__
7. Name of hazardous waste group Other waste
8. Code of hazardous waste group 1.48.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12__, H13 X, H14__.
10. Hazardous waste components

Name	Code	Content, %
-	-	-

11. Waste type:
mineral __, non-organic X, organic __, biological __, mixed __.

12. Aggregate (physical) state:
liquid __, solid X, slurry- or paste-like __, composite __, unanalyzed material __.

13. Mineral constituent content

Mineral name	Content, %
-	-

14. Heating capacity (kcal/kg) **-**
(for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Synthetic rubber	$-(CH_2- CH=CH-CH_2)-$	99.55	-
Carbon	C	0.45	-

16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
0	0	0	0	0

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 0.0	0	0	0	0
2015, 0.004	0.0	0.0	0.004	0.0
2016, 0.0	-	-	-	-
2017, 0.02	-	-	0.02	-
2018, 0.02 balance – 0.01	-	-	0.01	0.0

Environmental officer _____
(job position, last name, initials)

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV Waste from air transportation
2. Waste code under KV 6000.2.9.21
3. Other name of waste Solid household waste from aircraft
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2__ 3__ 4 X
7. Name of hazardous waste group Other waste
8. Code of hazardous waste group 1.48.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9 X, H10__, H11__, H12__, H13__, H14__.
10. Hazardous waste components

Name	Code	Content, %
Aluminum	S01	4.3
Ferrum	S10	4.8
Silicon and its compounds	S15	6.2

11. Waste type:
mineral __, non-organic __, organic __, biological __, mixed X.

12. Aggregate (physical) state:
liquid __, solid X, slurry- or paste-like __, composite __, unanalyzed material __.

13. Mineral constituent content

Mineral name	Content, %
-	-

14. Heating capacity (kcal/kg) 800-2000 (for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Cellulose	$(C_6H_{10}O_5)_n$	10.0	-
Fabric	$(C_6H_{10}O_5)_n$	10.0	-
Synthetic rubber	$-(CH_2-CH=CH-CH_2)-$	4.8	-
Polypropylene	$(C_3H_6)_n$	4.9	-
Glass	$Na_2O*CaO*6SiO_2$	6.2	-
Wood	$(C_6H_{10}O_5)_n$	10.0	-
Ferrum	Fe	4.8	-
Aluminum	Al	4.3	-
Proteins	$H_2N-CH(R)-COOH$	8.0	-
Fats	$CH_2-O-C(O)-R^1 \mid CH-O-C(O)-R^2 \mid CH_2-O-C(O)-R^3$	12.0	-

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Carbohydrates	$C_{12}H_{22}O_{11}$	25.0	-

16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
914.29	-	-	-	914.29

Director on Airfield Technical Support V. S. Kopanytsia

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/GIS chief A. V. Beliaev/ *Environmental engineer [signature] O. Yu. Drach*

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 857.670	0	0	0	857.670
2015, 870.76	0.0	0.0	0.0	870.76
2016, 929.164	0.0	0.0	0.0	929.164
2017, 1,095.38	-	-	-	1,095.38
2018, 1,354.43	-	-	-	1,354.43

Environmental officer _____

(job position, last name, initials)

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV Defect construction products (including after repairs of buildings and constructions, roads, bridges, overhead roads etc.)
2. Waste code under KV 4510.3.1.01
3. Other name of waste Construction waste
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2__ 3__ 4 X
7. Name of hazardous waste group Waste containing silicon and its compounds
8. Code of hazardous waste group 2.10.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9 __, H10__, H11__, H12__, H13 X, H14__.
10. Hazardous waste components

Name	Code	Content, %
Aluminum and its compounds	S01	3.72
Ferrum and its compounds	S10	1.3
Silicon and its compounds	S15	80.853

11. Waste type:
mineral X, non-organic __, organic __, biological __, mixed __.

12. Aggregate (physical) state:
liquid __, solid X, slurry- or paste-like __, composite __, unanalyzed material __.

13. Mineral constituent content

Mineral name	Content, %
Sand (SiO_2)	80.853
Carbon (C)	0.027
Calcium oxide (CaO)	14.1

14. Heating capacity (kcal/kg) -
(for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Sand	SiO_2	80.853	
Aluminum oxide	Al_2O_3	3.72	
Ferrous oxide	Fe_2O_3	1.3	
Calcium oxide	CaO	14.1	
Carbon	C	0.027	

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16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
5,168.2	-	-	5,168.2	-

Director on Airfield Technical Support V. S. Kopanytsia

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/GIS chief A. V. Beliaev/ *Environmental engineer [signature] O. Yu. Drach*

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 7,282.2	0	0	7,282.0	0
2015, 8,955.0	0.0	0.0	8,955.0	0.0
2016, 2,755.0	0.0	0.0	2,755.0	0.0
2017, 3,540.0	-	-	3,540.0	-
2018, 2,080.0	-	-	2,080.0	-

Environmental officer _____

(job position, last name, initials)

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV Kitchen organic waste suitable for composting
2. Waste code under KV 7710.3.1.11
3. Other name of waste Fats from grease traps
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2__ 3__ 4 X
7. Name of hazardous waste group Other waste
8. Code of hazardous waste group 1.48.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9 __, H10__, H11__, H12__, H13 X, H14__.
10. Hazardous waste components

Name	Code	Content, %
-	-	-

11. Waste type:
mineral __, non-organic __, organic X, biological __, mixed __.

12. Aggregate (physical) state:
liquid __, solid X, slurry- or paste-like __, composite __, unanalyzed material __.

13. Mineral constituent content

Mineral name	Content, %
-	-

14. Heating capacity (kcal/kg) -
(for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Fats	$(CH_2\text{-}O\text{-}C(O)\text{-}R^1 \mid CH\text{-}O\text{-}C(O)\text{-}R^2 \mid CH_2\text{-}O\text{-}C(O)\text{-}R^3)$	95.0	-
Oleic acid	$(C_{17}H_{33}COOH)$	3.0	-
Linoleic acid	$(C_{17}H_{31}COOH)$	1.0	
Linolic acid	$(C_{17}H_{29}COOH)$	1.0	

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16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
0	0	0	0	0

Director on Airfield Technical Support V. S. Kopanytsia

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/GIS chief A. V. Beliaev/ *Environmental engineer [signature] O. Yu. Drach*

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 0.0	0	0	0	0
2015, 0.0	0.0	0.0	0.0	0.0
2016, 0.0	0.0	0.0	0.0	0.0
2017, 0.0	-	-	-	0.0
2018, 0.0	-	-	-	0.0

Environmental officer _____

(job position, last name, initials)

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV Production and technological waste produced in the course of operation of motor vehicles and transportation (including waste from substances, materials and other components)
2. Waste code under KV 6000.2
3. Other name of waste Used mixture of petroleum products
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2__ 3X 4__
7. Name of hazardous waste group Petroleum residues
8. Code of hazardous waste group 1.12.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12 X, H13 X, H14__.
10. Hazardous waste components

Name	Code	Content, %
Ferrum and its compounds	S10	0.1
Silicon and its compounds	S15	1.0
Hydrocarbons and their oxygen, nitrogen and (or) sulphur compounds	S81	97.4

11. Waste type:
mineral __, non-organic __, organic X, biological __, mixed __.

12. Aggregate (physical) state:
liquid X, solid __, slurry- or paste-like __, composite __, unanalyzed material __.

13. Mineral constituent content

Mineral name	Content, %
Sand (SiO_2)	1.0
Sulphur (S)	0.8

14. Heating capacity (kcal/kg) -
(for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Monocyclic naphthenes	C_nH_{2n}	22.1	-
Bicyclic naphthenes	C_nH_{2n}	13.7	-
Monocyclic aromatic hydrocarbons with naphthene rings	C_nH_{2n}	14.3	-

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Bicyclic aromatic hydrocarbons with naphthene rings	C_nH_{2n}	11.9	-
Polycyclic aromatic hydrocarbons with larger amount of rings	C_nH_{2n}	11.8	-
Paraffin hydrocarbons	C_nH_{2n+2}	13.5	-
Isoparaffins	C_nH_{2n+2}	10.1	-
Sulphur	S	0.8	-
Sand	SiO_2	1.0	-
Ferrum	Fe	0.1	-
Water	H_2O	0.7	-

16. Quantitative indicators of waste handling

Produced during the year	**Re-processed or disposed of at the object**	**Discharged on the object**	**Transferred to other legal entities**	
			For discharge	**For further use**
4.109	-	-	-	4.109

Director on Airfield Technical Support V. S. Kopanytsia

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 2.149 balance as of 1.01.2015 1.064	0	0	0	1.631
2015, 1.596 balance as of 1.01.2016 2.66	0.0	0.0	0.0	0.0
2016, 0.952 balance as of 1.01.2017 3.162	0.0	0.0	0.0	0.450
2017, 0.891 balance as of 1.01.2018 0.611	-	-	-	3.442
2018, 1.60 balance 1.411	-	-	-	0.80

Environmental officer _____

(job position, last name, initials)

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV Other damaged or used batteries and accumulators
2. Waste code under KV 6000.2.9.08
3. Other name of waste Used accumulators without electrolyte
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2__ 3X 4__
7. Name of hazardous waste group Waste containing several potentially hazardous components
8. Code of hazardous waste group 2.52.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12 __, H13 X, H14__.
10. Hazardous waste components

Name	Code	Content, %
Ferrum and its compounds	S10	3.0
Cadmium and its compounds	S11	37.9
Nickel and its components	S23	41.6
Hydrocarbons and their oxygen, nitrogen and (or) sulphur compounds	S81	17.0

11. Waste type:
mineral __, non-organic X, organic __, biological __, mixed __.

12. Aggregate (physical) state:
liquid __, solid __, slurry- or paste-like __, composite __, unanalyzed material X.

13. Mineral constituent content

Mineral name	Content, %
-	-

14. Heating capacity (kcal/kg) -
(for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Nickel	Ni	41.6	-
Cadmium	Cd	37.9	-
Lithium hydroxide	LiOH	0.5	-
Ferrum	Fe	3.0	-
Plastics	$[-CH_2-CHCl-]_n$	17.0	-

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16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
0.675	-	-	-	0.675

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 0.315 balance as of 1.01.2015 0.002	0	0	0	0.315
2015, 0.133 balance as of 1.01.2016 0.015	0.0	0.0	0.0	0.120
2016, 1.260	0.0	0.0	0.0	1.275
2017, 0.635	-	-	-	0.635
2018, 3.342 balance 3.342	-	-	-	0.0

Environmental officer _____

(job position, last name, initials)

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV Waste produced during operation of motor vehicles and transportation which are not marked otherwise or combined
2. Waste code under KV 6000.2.9
3. Other name of waste Used oil filters
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2__ 3X 4__
7. Name of hazardous waste group Petroleum residues
8. Code of hazardous waste group 1.12.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12 __, H13 X, H14__.
10. Hazardous waste components

Name	Code	Content, %
Hydrocarbons and their oxygen, nitrogen and (or) sulphur compounds	S81	6.8
Ferrum and its compounds	S10	3.0

11. Waste type:
mineral __, non-organic X, organic __, biological __, mixed __.

12. Aggregate (physical) state:
liquid __, solid __, slurry- or paste-like __, composite __, unanalyzed material X.

13. Mineral constituent content

Mineral name	Content, %
Sulphur (S)	0.1

14. Heating capacity (kcal/kg) -
(for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Monocyclic naphthenes	C_nH_{2n}	1.7	-
Bicyclic naphthenes	C_nH_{2n}	0.9	-
Monocyclic aromatic hydrocarbons with naphthene rings	C_nH_{2n}	0.9	-
Bicyclic aromatic hydrocarbons with	C_nH_{2n}	0.7	-

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naphthene rings			
Polycyclic aromatic hydrocarbons with larger amount of rings	C_nH_{2n}	0.7	-
Paraffin hydrocarbons	C_nH_{2n+2}	1.2	-
Isoparaffins	C_nH_{2n+2}	0.7	-
Sulphur	S	0.1	-
Fabric	$(C_6H_{10}O_5)_n$	90.1	-
Ferrum	Fe	3.0	-

16. Quantitative indicators of waste handling

Produced during the year	**Re-processed or disposed of at the object**	**Discharged on the object**	**Transferred to other legal entities**	
			For discharge	**For further use**
0.252	-	-	-	0.252

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 0.400	0	0	0	0.400
2015, 0.309	0.0	0.0	0.0	0.309
2016, 0.147 Balance as of 1.01.2017 – 0.124	0.0	0.0	0.0	0.023
2017, 0.146	-	-	-	0.270
2018, 0.1575 balance as of 1.01.2019 – 0.0147	-	-	-	0.1428

Environmental officer _____

(job position, last name, initials)

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV Other damaged or used oils and engine and transmission oils
2. Waste code under KV 6000.2.8.10
3. Other name of waste Used oils
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2__ 3X 4__
7. Name of hazardous waste group Petroleum residues
8. Code of hazardous waste group 1.12.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12 X, H13 X, H14__.
10. Hazardous waste components

Name	Code	Content, %
Ferrum and its compounds	S10	0.1
Silicon and its compounds	S15	1.0
Hydrocarbons and their oxygen, nitrogen and (or) sulphur compounds	S81	97.4

11. Waste type:
mineral __, non-organic __, organic X, biological __, mixed __.

12. Aggregate (physical) state:
liquid X, solid __, slurry- or paste-like __, composite __, unanalyzed material __.

13. Mineral constituent content

Mineral name	Content, %
Sand (SiO_2)	1.0
Sulphur (S)	0.8

14. Heating capacity (kcal/kg) -
(for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Monocyclic naphthenes	C_nH_{2n}	22.1	-
Bicyclic naphthenes	C_nH_{2n}	13.7	-
Monocyclic aromatic hydrocarbons with naphthene rings	C_nH_{2n}	14.3	-
Bicyclic	C_nH_{2n}	11.9	-

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aromatic hydrocarbons with naphthene rings			
Polycyclic aromatic hydrocarbons with larger amount of rings	C_nH_{2n}	11.8	-
Paraffin hydrocarbons	C_nH_{2n+2}	13.5	-
Isoparaffins	C_nH_{2n+2}	10.1	-
Sulphur	S	0.8	-
Sand	SiO_2	1.0	
Ferrum	Fe	0.1	-
Water	H_2O	0.7	-

16. Quantitative indicators of waste handling

Produced during the year	**Re-processed or disposed of at the object**	**Discharged on the object**	**Transferred to other legal entities**	
			For discharge	**For further use**
2.9815	-	-	-	2.9815

Director on Airfield Technical Support V. S. Kopanytsia

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 4.780 balance as of 1.01.2015 0.710	0	0	0	4.898
2015, 0.510 balance as of 1.01.2016 0.223	0.0	0.0	0.0	0.997
2016, 6.202 balance as of 1.01.2017 5.705	0.0	0.0	0.0	0.720
2017, 6.165 balance as of 1.01.2018 6.165	-	-	-	5.705
2018, 6.568 balance as of 1.01.2019 12.753	-	-	-	0.0

Environmental officer _____

(job position, last name, initials)

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV Damaged, contaminated or unidentified calcium oxides and their residues which cannot be used as intended
2. Waste code under KV 3210.1.0.24
3. Other name of waste Used calcium carbide
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2__ 3X 4__
7. Name of hazardous waste group Other waste
8. Code of hazardous waste group 1.48.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12 __, H13 X, H14__.
10. Hazardous waste components

Name	Code	Content, %
-	-	-

11. Waste type:
mineral __, non-organic X, organic __, biological __, mixed __.

12. Aggregate (physical) state:
liquid __, solid __, slurry- or paste-like X, composite __, unanalyzed material __.

13. Mineral constituent content

Mineral name	Content, %
-	-

14. Heating capacity (kcal/kg) -
(for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Calcium carbide	CaC_2	100.0	-

16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
0.243	-	-	-	0.243

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 0.167	0	0	0	0.167
2015, 0.054	0.0	0.0	0.0	0.054
2016, 0.423 balance as of 1.01.2017 0.166	0.0	0.0	0.0	0.257
2017, 0.173	-	-	-	0.339
2018, 0.0	-	-	-	0.0

Environmental officer _____

(job position, last name, initials)

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV Damaged or used lead batteries
2. Waste code under KV 6000.2.9.04
3. Other name of waste Used accumulators
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2X 3__ 4 __
7. Name of hazardous waste group Waste containing lead and its compounds
8. Code of hazardous waste group 1.16.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12 X, H13 X, H14__.
10. Hazardous waste components

Name	Code	Content, %
Acid solutions or solid-state acids	S46	5.0
Ferrum and its compounds	S10	3.0
Lead and its compounts	S27	77.0
Hydrocarbons and their oxygen, nitrogen and (or) sulphur compounds	S81	15.0

11. Waste type:
mineral __, non-organic X, organic __, biological __, mixed __.

12. Aggregate (physical) state:
liquid __, solid __, slurry- or paste-like __, composite __, unanalyzed material X.

13. Mineral constituent content

Mineral name	Content, %
-	-

14. Heating capacity (kcal/kg) -
(for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Electrolyte	$H_2SO_4+H_2O$	5.0	
Lead	Pb	61.0	-
Lead sulfate	$PbSO_4$	14.0	-
Lead oxide	PbO	2.0	-
Ferrum	Fe	3.0	-
Plastics	$[-CH_2-CHCl-]_n$	15.0	-

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16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
4.9554	-	-	-	4.9554

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 8.892	0	0	0	8.892
2015, 8.307 balance as of 1.01.2016 2.467	0.0	0.0	0.0	5.840
2016, 27.221	0.0	0.0	0.0	29.688
2017, 10.718 balance as of 1.01.2018 0.434	-	-	-	10.234
2018, 10.369 balance as of 1.01.2019 10.853	-	-	-	0.0

Environmental officer _____

(job position, last name, initials)

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV Other junk ferrous scrap
2. Waste code under KV 7710.3.1.08
3. Other name of waste Ferrous scrap
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2__ 3__ 4 X
7. Name of hazardous waste group Waste containing ferrum and its compounds
8. Code of hazardous waste group 2.08.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12 __, H13 X, H14__.
10. Hazardous waste components

Name	Code	Content, %
Ferrum and its compounds	S10	100.0

11. Waste type:
mineral __, non-organic X, organic __, biological __, mixed __.

12. Aggregate (physical) state:
liquid __, solid X, slurry- or paste-like __, composite __, unanalyzed material __.

13. Mineral constituent content

Mineral name	Content, %
-	-

14. Heating capacity (kcal/kg) -
(for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Ferrum	Fe	96.0	-
Ferrum oxide	Fe_2O_3	4.0	-

16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
20.698	-	-	-	20.698

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 12.473 balance as of 1.01.2015: 0,394	0	0	0	12.473
2015, 20.084 balance as of 1.01.2016 8.791	0.0	0.0	0.0	11.687
2016, 24.159 balance as of 1.01.2017: 11,679	0.0	0.0	0.0	21,271
2017, 112,823 balance as of 1.01.2018 31.500	-	-	-	93.002
2018, 80.371 balance as of 1.01.2019 28.248	-	-	-	83.623

Environmental officer _____

(job position, last name, initials)

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV Other junk non-ferrous scrap
2. Waste code under KV 7710.3.1.09
3. Other name of waste Non-ferrous scrap
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2__ 3__ 4 X
7. Name of hazardous waste group Waste containing aluminum and its compounds
8. Code of hazardous waste group 2.01.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12 __, H13 X, H14__.
10. Hazardous waste components

Name	Code	Content, %
Aluminum and its compounds	S01	100.0

11. Waste type:
mineral __, non-organic X, organic __, biological __, mixed __.

12. Aggregate (physical) state:
liquid __, solid X, slurry- or paste-like __, composite __, unanalyzed material __.

13. Mineral constituent content

Mineral name	Content, %
-	-

14. Heating capacity (kcal/kg) -
(for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Aluminum	Al	99.0	-
Aluminum oxide	Al_2O_3	1.0	-

16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
0.596	-	-	-	0.596

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 0.299	0	0	0	0.299
2015, 0.855 balance as of 1.01.2016 0.458	0.0	0.0	0.0	0.397
2016, 0.632 balance as of 1.01.2017: 0.044	0.0	0.0	0.0	1.046
2017, 2.617 balance as of 1.01.2018 2.544	-	-	-	0.117
2018, 0.7997 balance 0.7997	-	-	-	2.547

Environmental officer _____

(job position, last name, initials)

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Form 1

Register card of WPO No. ____

II. Waste characteristics

1. Waste name under KV Used activated coal
2. Waste code under KV 3120.2.9.04
3. Other name of waste Filtration materials
4. Production name under KVED Air transport auxiliary services
5. Production code under KVED 52.23
6. Public health hazard class 1__ 2__ 3__ 4 X
7. Name of hazardous waste group Other waste
8. Code of hazardous waste group 1.48.00
9. Existence of hazardous properties
H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12 __, H13 X, H14__.
10. Hazardous waste components

Name	Code	Content, %
-	-	-

11. Waste type:
mineral X, non-organic X, organic __, biological __, mixed __.

12. Aggregate (physical) state:
liquid __, solid X, slurry- or paste-like __, composite __, unanalyzed material __.

13. Mineral constituent content

Mineral name	Content, %
Carbon (C)	100.0

14. Heating capacity (kcal/kg) -
(for combustibles)

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Carbon	C	100.0	-

16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
0	0	0	0	0

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 0.0	0	0	0	0
2015, 0.0	-	-	-	-
2016, 0.0	0.0	0.0	0.0	-
2017, 0.0	-	-	-	0
2018, 0.0	-	-	-	0.0

Environmental officer _____

(job position, last name, initials)

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REGISTER CARD OF WPO NO. ____

II. Waste characteristics

1. Waste name under KV Solid household waste
2. Waste code under KV 7720.3.1.01
3. Other name of waste Used articles of personal use
4. Activity name under KVED Air transportation infrastructure operation
5. Code under KVED 63.23.0
6. Public health hazard class 1__ 2__ 3__ 4 X
7. Name of hazardous waste group _____
8. Code of hazardous waste group _____
9. Existence of hazardous properties H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12 __, H13 __, H14__.

10. Hazardous waste components

Name	Code	Content, %
-	-	-

11. Waste type:
mineral X, non-organic __, organic __, biological __, mixed X.

12. Aggregate (physical) state:
liquid __, solid X, slurry- or paste-like __, composite __, unanalyzed material __.

13. Mineral constituent content

Mineral name	Content, %
-	-

14. Heating capacity (kcal/kg) _____

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Paper, cardboard	$[C_6H_7O_2(OH)_3]_n$	35	350,000
Polymers	$(-CN_2-CH_2-)_N$	15	150,000
Glass	Na_2O x CaO x $6SiO_2$	7	70,000
Kitchen waste		32	320,000
Wood	$[C_6H_7O_2(OH)_3]_n$	3	30,000
Metal	Al, Fe	8	80,000

16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
9,000.0	-	-	9,000.0	-

Deputy General Director on Airfield Technical Support – Environmental officer
(job position)
23 December 2008

Ye. S. Pankratiev
(last name, initials)
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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2009, 8,462.0	0	0	7,480.0	982.0
2010, 9,686.092	0	0	9,686.092	0
2011, 11,507.408	0	0	11,507.408	0
2012, 12,277.206	0	0	11,059.686	1,217.520
2013, 12,058.676	0	0	11,144.826	913.850

Deputy General Director on Airfield Technical Support – Environmental officer

_____
(full name)

Environmental engineer [signature] O. Yu. Drach

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 11,086.988	0	0	11,086.988	0
2015, 10,800.460	0.0	0.0	10,800.460	0.0
2016, 10,584.112	0.0	0.0	10,584.112	0.0
2017, 12,143.330	-	-	12,143.330	-
2018, 13,486.418	-	-	13,486.418	-

Environmental officer _____

(job position, last name, initials)

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REGISTER CARD OF WPO NO. ____

II. Waste characteristics

1. Waste name under KV Reservoir cleaning residues
2. Waste code under KV 6000.2.9.17
3. Other name of waste Oil sludge
4. Activity name under KVED Air transportation infrastructure operation
5. Code under KVED 63.23.0
6. Public health hazard class 1__ 2__ 3 X 4 __
7. Name of hazardous waste group petroleum products residues
8. Code of hazardous waste group 1.12.00
9. Existence of hazardous properties H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12 __, H13 **X**, H14__.
10. Hazardous waste components

Name	Code	Content, %
Oil	S80	15

11. Waste type:
mineral __, non-organic **X**, organic __, biological __, mixed X.
12. Aggregate (physical) state:
liquid __, solid __, slurry- or paste-like **X**, composite __, unanalyzed material __.
13. Mineral constituent content

Mineral name	Content, %
Sand SiO_2	85

14. Heating capacity (kcal/kg) _____
15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Hydrocarbons	$(CH\text{-}CH\text{-}CH)_n$	15	150,000

16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
5.0	-	-		5.0

Deputy General Director on Airfield Technical Support –
Environmental officer Ye. S. Pankratiev
(job position) (last name, initials)
23 December 2008 [signature]
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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2009, 0.0	0	0	0	0
2010, 0.0	0	0	0	0
2011, 0.0	0	0	0	0
2012, 0.0	0	0	0	0
2013, 0.0	0	0	0	0

Deputy General Director on Airfield Technical Support – Environmental officer

_____
(full name)

Environmental engineer [signature] O. Yu. Drach

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 0.0	0	0	0	0
2015, 0.0	-	-	-	-
2016, 0.0	-	-	-	-
2017, 0.013	-	-	-	0
2018, 0.115 balance as of 1.01.2019: 0.100	-	-	-	0.028

Environmental officer _____

(job position, last name, initials)

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REGISTER CARD OF WPO NO. ____

II. Waste characteristics

1. Waste name under KV Used tires
2. Waste code under KV 6000.2.9.03
3. Other name of waste Worn tires
4. Activity name under KVED Air transportation infrastructure operation
5. Code under KVED 63.23.0
6. Public health hazard class 1__ 2__ 3 __ 4 **X**
7. Name of hazardous waste group
8. Code of hazardous waste group
9. Existence of hazardous properties H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12 __, H13 __, H14__.
10. Hazardous waste components

Name	Code	Content, %
-	-	-

11. Waste type:
mineral __, non-organic __, organic **X**, biological __, mixed X.
12. Aggregate (physical) state:
liquid __, solid **X**, slurry- or paste-like __, composite __, unanalyzed material __.
13. Mineral constituent content

Mineral name	Content, %
-	-

14. Heating capacity (kcal/kg) _____
15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Synthetic rubber, isoprene	$CH_2=C(CH_3)CH=CH_2$	90.0	900,000
Sulphur	S	10.0	100,000

16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
20.0	-	-	-	20.0

Deputy General Director on Airfield Technical Support –
Environmental officer Ye. S. Pankratiev
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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2009, 15.0	0.0	0.0	0.0	15.0
2010, 12.208	0	0	12.208	0
2011, 19.257	0	0	19.257	0
2012, 20.917	0	0	20.917	0
2013, 12.152	0	0	12.152	0

Deputy General Director on Airfield Technical Support –
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(full name)

Environmental engineer [signature] O. Yu. Drach

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 18.044	0	0	0	18.044
2015, 8.087 balance as of 1.01.2016: 6.211	0.0	0.0	0.0	1.876
2016, 15.455 balance as of 1.01.2017: 7.307	0.0	0.0	0.0	14.359
2017, 16.637 balance as of 1.01.2018: 7.985	-	-	-	15.959
2018, 12.698 balance as of 1.01.2019: 8.745	-	-	-	8.745

Environmental officer _____

(job position, last name, initials)

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REGISTER CARD OF WPO NO. ____

II. Waste characteristics

1. Waste name under KV Used electrolyte from batteries and accumulators
2. Waste code under KV 600.2.9.09
3. Other name of waste Electrolyte
4. Activity name under KVED Air transportation infrastructure operation
5. Code under KVED 63.23.0
6. Public health hazard class 1__ 2 **X** 3 __ 4 __
7. Name of hazardous waste group used inorganic acid
8. Code of hazardous waste group 1.43.00
9. Existence of hazardous properties H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12 __, H13 **X**, H14__.
10. Hazardous waste components

Name	Code	Content, %
Sulfuric acid	S46 [crossed out] *S23* *U34*	99.0

11. Waste type:
mineral __, non-organic **X**, organic __, biological __, mixed X.
12. Aggregate (physical) state:
liquid **X**, solid __, slurry- or paste-like __, composite __, unanalyzed material __.
13. Mineral constituent content

Mineral name	Content, %
-	-

14. Heating capacity (kcal/kg) _____
15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Sulfuric acid	H_2SO_4	99.0	

16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
2.5	-	-	-	2.5

Deputy General Director on Airfield Technical Support – Environmental officer
(job position)
23 December 2008

Ye. S. Pankratiev
(last name, initials)
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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2009, 0.0	0.0	0.0	0.0	0.0
2010, 0.165	0	0	0.165	0
2011, 0	0	0	0	0
2012, 0	0	0	0	0
2013, 0	0	0	0	0

Deputy General Director on Airfield Technical Support – Environmental officer

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(full name)

Environmental engineer [signature] O. Yu. Drach

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 0.0	0	0	0	0
2015, 0	-	-	-	-
2016, 0.0	-	-	-	-
2017, 0.0	-	-	-	0
2018, 0.0	-	-	-	0.0

Environmental officer _____

(job position, last name, initials)

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REGISTER CARD OF WPO NO. ____

II. Waste characteristics

1. Waste name under KV Ventilation equipment filters
2. Waste code under KV 3102.2.9.03
3. Other name of waste Fiber-glass filters for painting
4. Activity name under KVED Air transportation infrastructure operation
5. Code under KVED 63.23.0
6. Public health hazard class 1__ 2 __ 3 __ 4 **X**
7. Name of hazardous waste group -
8. Code of hazardous waste group -
9. Existence of hazardous properties H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8__, H9__, H10__, H11__, H12 __, H13 **X**, H14__.
10. Hazardous waste components

Name	Code	Content, %
-	-	-

11. Waste type:
mineral __, non-organic __, organic **X**, biological __, mixed __.
12. Aggregate (physical) state:
liquid __, solid **X**, slurry- or paste-like __, composite __, unanalyzed material __.
13. Mineral constituent content

Mineral name	Content, %
SiO_2	72.0
Al_2O_3	0.9
CaO	10.0
Na_2O	14.6
MgO	2.5

14. Heating capacity (kcal/kg) _____
15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Organic paint	-	30	-

16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
0.5	-	-	-	0.5

Deputy General Director on Airfield Technical Support –
Environmental officer Ye. S. Pankratiev
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23 December 2008 [signature]
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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2009, 0.0	0.0	0.0	0.0	0.0
2010, 0	0	0	0	0
2011, 0	0	0	0	0
2012, 0	0	0	0	0
2013, 1.431	0	0	1.431	0

Deputy General Director on Airfield Technical Support –
Environmental officer

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(full name)

Environmental engineer [signature] O. Yu. Drach

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 0.0	0	0	0	0
2015, 0.0	-	-	-	-
2016, 0.0	-	-	-	-
2017, 0.0	-	-	-	0
2018, 0.100	-	-	-	0.100

Environmental officer _____

(job position, last name, initials)

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REGISTER CARD OF WPO NO. ____

II. Waste characteristics

1. Waste name under KV Used absorbent Elcosorb
2. Waste code under KV 7730.3.1.04
3. Other name of waste Used absorbent Elcosorb
4. Activity name under KVED Air transportation infrastructure operation
5. Code under KVED 63.23.0
6. Public health hazard class 1__ 2 __ 3 **X** 4 __
7. Name of hazardous waste group petroleum residues
8. Code of hazardous waste group 1.12.00
9. Existence of hazardous properties H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8 **X**, H9__, H10__, H11__, H12 __, H13 __, H14__.
10. Hazardous waste components

Name	Code	Content, %
Oil	-	14.4

11. Waste type:
mineral __, non-organic __, organic __, biological __, mixed **X**.
12. Aggregate (physical) state:
liquid __, solid __, slurry- or paste-like **X**, composite __, unanalyzed material __.
13. Mineral constituent content

Mineral name	Content, %
turf	85.6

14. Heating capacity (kcal/kg) _____
15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Hydrocarbons	$(CH\text{-}CH\text{-}CH)_n$	14.4	144,000

16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
4,0	-	-	-	4,0

Deputy General Director on Airfield Technical Support – Environmental officer
(job position)
23 December 2008

Ye. S. Pankratiev
(last name, initials)
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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2009, 0.38	0.0	0.0	0.38	0.0
2010, 1.026	0	0	1.026	0
2011, 1.255	0	0	1.255	0
2012, 1.075	0	0	1.075	0
2013, 0.734	0	0	0.734	0

Deputy General Director on Airfield Technical Support –
Environmental officer

_____
(full name)

Environmental engineer [signature] O. Yu. Drach

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 1.017	0	0	0	1.017
2015, 0.718	0.0	0.0	0.0	0.718
2016, 0.393 balance as of 01.01.2017: 0.264	0.0	0.0	0.0	0.129
2017, 0.632	-	-	-	0.896
2018, 0.711 balance as of 01.01.2019: 0.100	-	-	-	0.611

Environmental officer _____

(job position, last name, initials)

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REGISTER CARD OF WPO NO. ____

II. Waste characteristics

1. Waste name under KV Sand with admixed petroleum products
2. Waste code under KV 7730.3.1.04
3. Other name of waste Sand contaminated with petroleum products
4. Activity name under KVED Air transportation infrastructure operation
5. Code under KVED 63.23.0
6. Public health hazard class 1__ 2 __ 3 **X** 4 __
7. Name of hazardous waste group oil sludge
8. Code of hazardous waste group 1.13.00
9. Existence of hazardous properties H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8 __, H9__, H10__, H11__, H12 __, H13 **X**, H14__.
10. Hazardous waste components

Name	Code	Content, %
Oil	-	5.0

11. Waste type:
mineral __, non-organic **X**, organic __, biological __, mixed __.
12. Aggregate (physical) state:
liquid __, solid __, slurry- or paste-like **X**, composite __, unanalyzed material __.
13. Mineral constituent content

Mineral name	Content, %
Sand – SiO_2	95

14. Heating capacity (kcal/kg) _____
15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Hydrocarbons	$(CH\text{-}CH\text{-}CH)_n$	5.0	50,000

16. Quantitative indicators of waste handling

Produced during the year	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
10.0	-	-	-	10.0

Deputy General Director on Airfield Technical Support –
Environmental officer Ye. S. Pankratiev
(job position) (last name, initials)
23 December 2008 [signature]
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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2010, 0.369	0	0	0.369	0
2011, 0.377	0	0	0.377	0
2012, 0.294	0	0	0.294	0
2013, 0.227	0	0	0.227	0
2014, 0.09	0	0	0	0.09

Deputy General Director on Airfield Technical Support –
Environmental officer

_____
(full name)

Environmental engineer [signature] O. Yu. Drach

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2015, 0.288	0.0	0.0	0.0	0.288
2016, 0.115 balance as of 01.01.2017: 0.05	0.0	0.0	0.0	0.065
2017, 0.118	-	-	-	0.168
2018, 0.183	-	-	-	0.183

Environmental officer _____

(job position, last name, initials)

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REGISTER CARD OF WPO NO. ____

II. Waste characteristics

1. Waste name under KV Used rubber products
2. Waste code under KV 7710.3.1.17
3. Other name of waste Used rubber products
4. Activity name under KVED Air transportation infrastructure operation
5. Code under KVED **63.23.0**
6. Public health hazard class 1__ 2 __ 3 __ 4 **X**
7. Name of hazardous waste group -
8. Code of hazardous waste group -
9. Existence of hazardous properties H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8 __, H9__, H10__, H11__, H12 __, H13 **X**, H14__.
10. Hazardous waste components

Name	Code	Content, %
-	-	-

11. Waste type:
mineral __, non-organic __, organic **X**, biological __, mixed __.
12. Aggregate (physical) state:
liquid __, solid **X**, slurry- or paste-like __, composite __, unanalyzed material __.
13. Mineral constituent content

Mineral name	Content, %
-	-

14. Heating capacity (kcal/kg) _____
15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Isoprene synthetic rubber	$CH_2=C(CH_3)CH=CH_2$	75	750,000
Sulphur	S	25	250,000

16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
0.50	-	-	-	0.50

Deputy General Director on Airfield Technical Support – Environmental officer
(job position)
23 December 2008

Ye. S. Pankratiev
(last name, initials)
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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2009, 0.12	0.0	0.0	0.0	0.12
2010, 0.255	0	0	0	0.255
2011, 0.077	0	0	0.0	0.077
2012, 0.225	0	0	0	0.225
2013, 0.075	0	0	0	0.075

Deputy General Director on Airfield Technical Support –
Environmental officer

_____
(full name)

Environmental engineer [signature] O. Yu. Drach

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 0.005	0	0	0	0.005
2015, 0.526	0.0	0.0	0.0	0.526
2016, 0.02 balance: 0.02	0.0	0.0	0.0	0.0
2017, 0.025	-	-	-	0.045
2018, 0.105 balance as of 01.01.2019: 0.02	-	-	-	0.085

Environmental officer _____

(job position, last name, initials)

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REGISTER CARD OF WPO NO. ____

II. Waste characteristics

1. Waste name under KV Used wiping materials
2. Waste code under KV 7730.3.1.06
3. Other name of waste Rags smeared with petroleum products
4. Activity name under KVED Air transportation infrastructure operation
5. Code under KVED 63.23.0
6. Public health hazard class 1__ 2 __ 3 **X** 4 __
7. Name of hazardous waste group -
8. Code of hazardous waste group -
9. Existence of hazardous properties H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8 __, H9__, H10__, H11__, H12 __, H13 **X**, H14__.
10. Hazardous waste components

Name	Code	Content, %
oil	-	0.5

11. Waste type:
mineral __, non-organic **X**, organic __, biological __, mixed __.
12. Aggregate (physical) state:
liquid __, solid __, slurry- or paste-like __, composite **X**, unanalyzed material __.
13. Mineral constituent content

Mineral name	Content, %
-	-

14. Heating capacity (kcal/kg) _____
15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Hydrocarbons	$(CH\text{-}CH\text{-}CH)_n$	0.5	5,000

16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
1.50	-	-	-	1.50

Deputy General Director on Airfield Technical Support – Environmental officer
(job position)
23 December 2008

Ye. S. Pankratiev
(last name, initials)
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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2009, 1.19	0.0	0.0	1.19	0.0
2010, 1.042	0	0	1.042	0
2011, 2.064	0	0	2.064	0
2012, 2.216	0	0	2.216	0
2013, 0.937	0	0	0.937	0

Deputy General Director on Airfield Technical Support –
Environmental officer

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(full name)

Environmental engineer [signature] O. Yu. Drach

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16. Quantitative indicators of waste handling

Produced during the year, tons	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 0.632	0	0	0	0.632
2015, 0.290	0.0	0.0	0.0	0.290
2016, 0.497 balance as of 1.01.2017: 0.175	0.0	0.0	0.0	0.322
2017, 0.381	-	-	-	0.556
2018, 0.5555 balance as of 1.01.2019: 0.062	-	-	-	0.4935

Environmental officer _____

(job position, last name, initials)

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REGISTER CARD OF WPO NO. ____

II. Waste characteristics

1. Waste name under KV Other damaged and used luminescent lamps and waste containing mercury, other
2. Waste code under KV 7710.3.1.26
3. Other name of waste Luminescent lamps
4. Activity name under KVED Air transportation infrastructure operation
5. Code under KVED 63.23.0
6. Public health hazard class 1**X** 2 __ 3 __ 4 __
7. Name of hazardous waste group waste containing mercury and it compounds
8. Code of hazardous waste group 1.19.00
9. Existence of hazardous properties H1__, H2__, H3__, H4__, H5__, H6__, H7__, H8 **X**, H9__, H10__, H11__, H12 __, H13 __, H14__.

10. Hazardous waste components

Name	Code	Content, %
Mercury and its compounds	S26	2.3
Aluminum and its compounds	S01	2.5
Copper and its compounds	S19	8.2
Nickel and its compounds	S23	3,2
Glass	S08	72.5
Tin and its compounds (soldering)	S25	6.0

11. Waste type:
mineral __, non-organic __, organic __, biological __, mixed **X**.
12. Aggregate (physical) state:
liquid __, solid **X**, slurry- or paste-like __, composite __, unanalyzed material __.
13. Mineral constituent content

Mineral name	Content, %
Glass ($Na_2O*CaO*6SiO_2$)	72.3

14. Heating capacity (kcal/kg) _____

15. Chemical composition

Substance (component) Name	Chemical formula	Mass content, %	Concentration, mg/l or mg/kg
Mercury and its compounds	Hg	2.3	7,178
Aluminum and its compounds	Al	8.0	428,276
Copper and its compounds	Cu	8.2	104,709
Nickel and its compounds	Ni	3.2	37,670
Glass	$Na_2O*CaO*6SiO_2$	72.3	7,230,000
Tin and its compounds	S25	6.0	390,147

16. Quantitative indicators of waste handling

Produced during the year, pcs.	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities	
			For discharge	For further use
12,000	-	-	-	12,000

Deputy General Director on Airfield Technical Support – Environmental officer — Ye. S. Pankratiev
(job position) — (last name, initials)
23 December 2008 — [signature]
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16. Quantitative indicators of waste handling

Produced during the year, pcs	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2009, 6,997	0	0	6,997	0
2010, 2.043	0	0	2.043	0
2011, 8,242 pcs. (2.4726 t)	0	0	8242 pcs. (2.4726 t)	0
2012, 7891 pcs. (2.367 t)	0	0	7891 pcs. (2.367 t)	0
2013, 5874 pcs. (1.762 t)	0	0	5874 pcs. (1.762 t)	0

Deputy General Director on Airfield Technical Support – Environmental officer

_____
(full name)

Environmental engineer [signature] O. Yu. Drach

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16. Quantitative indicators of waste handling

Produced during the year, pcs. (t)	Re-processed or disposed of at the object	Discharged on the object	Transferred to other legal entities, tons	
			For discharge	For further use
2014, 7859 pcs. (2.358 t)	0	0	0	7859 pcs. (2.358 t)
2015, 2729 pcs. (0.819)	0.0	0.0	0.0	2729 pcs. (0.819)
2016, 10,442 pcs. (3133) balance as of 1.01.2017: 7021 pcs. (2.107)	0.0	0.0	0.0	3421 pcs. (1.026 t)
2017, 7432 pcs. / 2.230	-	-	-	14,453 pcs. (4.337 t)
2018, 9311 pcs. / 2.793	-	-	-	9,311 pcs (2.793)

Environmental officer _____

(job position, last name, initials)

(signature) “__” _____

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Form 1

Register card of WPO No. ____

III. Measures on decreasing of waste production scope

1. Expenses directed at:
1.1 Decreasing of waste production scope –
1.2 Decreasing of waste hazard degree –
1.3 Increasing of waste disposal or processing –

2. Description of measures taken:
- maintenance of primary current account of quality, type and content of the waste produced, filing of statistical reporting according to the established procedure;
- conduct of organizational, technological measures for separate collection of waste with various hazard classes which are produced by the enterprise according to the requirements DSanPiN 2.2.7.029-99;
- conduct of organizational measures to transfer the produced waste to the consumers or enterprises, institutions and organizations which deal with collection, processing, discharge and disposal of waste.

3. The effect of the measures is expected annually.

4. Quantitative values of waste production by years:

	1st hazard class	**2nd hazard class**	**3rd hazard class**	**4th hazard class**	**Pzuv**	**Ppuv**
Previous year	-	-	-	-	-	-
Reporting year	1.7622	4.9554	12.7768	17261.764	29189.304	0.0027
Next year (expected)	2.6436	12.03	44.328	10411.882	31861.282	0.003

*D (added value) = UAH 10,697,720

Director on Airfield Technical Support V. S. Kopanytsia
[signature] *12 June 2014*
(signature)
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[signature]
/GIS chief A. V. Beliaev/ *Environmental engineer [signature] O. Yu. Drach*

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Appendix No. 16

Identification code under YeDRPOU 2 0 5 7 2 0 6 9

State Statistical Survey

Confidentiality of statistical information is provided by articles 21 and 22 of the Law of Ukraine "On state statistics"

Violation of the procedure of submission or use of data of the state statistical surveys entails liability under article 186[3] of the Code of Ukraine on Administrative Offences

WASTE PRODUCTION AND HANDLING FOR 2018

607

Submitters:	Submission deadline	Form No. 1. Waste (yearly) APPROVED Order No. 243 of 19.08.2014 (as amended) of the State Statistics Service of Ukraine
legal entities, separate divisions of legal entities the activity of which is related with production and disposal of wastes of I-IV hazard classes according to the list determined by the authorities of state statistics to the territorial agency of the State Statistics Service	28 February at the latest	

Respondent:

Name: **BORYSPIL INTERNATIONAL AIRPORT STATE ENTERPRISE**

Location (legal address):
BORYSPIL-7, GORA village, BORYSPIL DISTRICT, KYIV REGION, 08300
(postal code, region/AR of Crimea, district, inhabited locality, street/lane, square etc., No. of building, No. of apartment/office)

Address of implementation of activities the reporting form is submitted in relation to (actual address):
BORYSPIL-7, GORA village, BORYSPIL DISTRICT, KYIV REGION, 08300
(postal code, region/AR of Crimea, district, inhabited locality, street/lane, square etc., No. of building, No. of apartment/office)

Form number 1 Number of forms 1

Does your enterprise hold any activity related to waste production and handling (line 100)
(put V mark in the appropriate cell)

Yes	V	>> go to line 101
No		>> form is completed

Category of the enterprise activity in relation to waste production and handling (line 101)
(put V mark in the appropriate cell)

Waste production (waste producer)		V	*>> go to section I*
Waste handling *(including waste deposits, disposal sites etc.)*	collection		
	disposal		*>> go to section II*
	removal		

Our ref. No. 47-11/1-3
as of 15.02.2019

Section I. Waste production and handling by production place

(to be filled in by waste producer)

(in tons, with three decimals after comma)

A	Waste name	Used air filters	Absorbents, damaged, used or contaminated	Filtering materials, damaged, used or contaminated	Wiping materials, damaged, used or contaminated	Rubber products or materials, damaged, used or contaminated
B	Waste code under classifier (DK 005-96)	3120.2.9.03	7730.3.1.04	7730.3.1.05	7730.3.1.06	7730.3.1.17
C	Waste category code by material	10.2	10.2	08	07.6	07.3
D	Waste hazard class	0104	0103	0103	0103	0104
E	Waste group code by the main hazardous component	1801	1104	1801	1104	1801
10	Waste as of the beginning of the year	-	-	-	-	-
11	Waste produced during the year	0.100	0.894	0.061	0.556	0.105
18	Waste burnt to generate energy (R1)	-	-	-	-	-
19	Waste burnt to generate heat processing (D10)	-	-	-	-	-
25	Waste disposed of operation code (R) scope	-	-	-	-	-
30	Waste removed operation code (D) scope	-	-	-	-	-
40	Waste transferred to third parties, total *(sum of 41, 42, 43 lines)*	0.100	0.794	0.061	0.494	0.085
	including					
41	for disposal	0.100	0.794	0.061	0.494	0.085
42	for removal	-	-	-	-	-
43	to individuals for use	-	-	-	-	-
50	Exported waste, total *(sum of 51, 52 lines)*	-	-	-	-	-
	including					
51	for disposal	-	-	-	-	-
52	for removal	-	-	-	-	-
60	Waste located at illegal dumping	-	-	-	-	-
70	Waste collected due to leaking, evaporation, fire, thefts	-	-	-	-	-
72	Availability of waste as of the end of the year *(lines (10+11-18-19-25-30-40-50-60-70)*	-	0.100	-	0.062	0.020

(in tons, with three decimals after comma)

A	Waste name	Wastes from equipment operation, maintenance repairs and restoration	Luminescent lamps and waste containing mercury, other waste damaged or used	Waste produced during operation of motor vehicles and transportation, not otherwise marked or combined	Residues after cleaning of reservoirs for petroleum products	Other medical devices (including syringes, thermometers, sets for diagnostic analysis, medical instruments etc.) which do not correspond to the established requirements, which are not properly marked, damaged or used
B	Waste code under classifier (DK 005-96)	7740.3	7710.3.1.26	6000.2.9	6000.2.9.17	8510.2.9.03
C	Waste category code by material	07.3	08	08	11	05
D	Waste hazard class	0104	0101	0103	0103	0104
E	Waste group code by main hazardous component	217	122	1102	1101	1001
10	Existence of waste as of the beginning of the year	-	-	-	0.013	-
11	Waste produced as of the end of the year	0.020	2.793	0.158	0.115	0.069
18	Waste burnt to generate energy (R1)	-	-	-	-	-
19	Waste burnt to generate heat processing (D10)	-	-	-	-	-
25	Waste disposed of operation code (R) volume	-	-	-	-	-
30	Waste removed operation code (D) volume	-	-	-	-	-
40	Waste transferred to third parties, total *(sum of 41, 42, 43 lines)*	0.010	2.793	0.143	0.028	0.046
	including					
41	for disposal	0.010	2.793	0.143	0.028	0.046
42	for removal	-	-	-	-	-
43	to individuals for use	-	-	-	-	-
50	Exported waste, total *(sum of 51, 52 lines)*	-	-	-	-	-
	including					
51	for disposal	-	-	-	-	-
52	for removal	-	-	-	-	-
60	Waste located at illegal dumping	-	-	-	-	-
70	Waste collected due to leaking, evaporation, fire, thefts	-	-	-	-	-
72	Availability of waste as of the end of the year *(lines (10+11-18-19-25-30-40-50-60-70)*	0.010	-	0.015	0.100	0.023

(in tons, with three decimals after comma)

A	Waste name	Damaged or used medical needles	Single-use, damaged or used equipment and medical instruments	Damaged or used pharmaceutical packing materials	Damaged, used or irreparable equipment in power industry, communication systems, construction, other types of activity (except for general-purpose electronic equipment)	Other damaged or used engine, transmission oils and lubricants
B	Waste code under classifier (DK 005-96)	8510.2.9.01	8210.2.9.02	8530.2.9.04	7740.3.1.03	6000.2.8.10
C	Waste category code by material	05	05	05	08	01.3
D	Waste hazard class	0104	0104	0104	0104	0103
E	Waste group code by main hazardous component	1001	1001	1003	1801	1002
10	Existence of waste as of the beginning of the year	0.003	-	-	-	6.165
11	Waste produced as of the end of the year	0.005	0.009	0.035	2.000	6.588
18	Waste burnt to generate energy (R1)	-	-	-	-	-
19	Waste burnt to generate heat processing (D10)	-	-	-	-	-
25	Waste disposed of operation code (R) volume	-	-	-	-	-
30	Waste removed operation code (D) volume	-	-	-	-	-
40	Waste transferred to third parties, total *(sum of 41, 42, 43 lines)*	0.007	0.007	0.027	2.000	-
	including					
41	for disposal	0.007	0.007	0.027	2.000	-
42	for removal	-	-	-	-	-
43	to individuals for use	-	-	-	-	-
50	Exported waste, total *(sum of 51, 52 lines)*	-	-	-	-	-
	including					
51	for disposal	-	-	-	-	-
52	for removal	-	-	-	-	-
60	Waste located at illegal dumping	-	-	-	-	-
70	Waste collected due to leaking, evaporation, fire, thefts	-	-	-	-	-
72	Availability of waste as of the end of the year *(lines (10+11-18-19-25-30-40-50-60-70)*	0.001	0.002	0.008	-	12.753

(in tons, with three decimals after comma)

A	Waste name	Production and technological waste produced during operation of motor vehicles and transportation (including waste of substances, materials and other components)	Tires, damaged before operation, used, damaged or soiled during operation	Damaged or used lead batteries	Other damaged or used batteries and accumulators	Other junk ferrous scrap
B	Waste code under classifier (DK 005-96)	6000.2	6000.2.9.03	6000.2.9.04	6000.2.9.08	7710.3.1.08
C	Waste category code by material	01.3	07.3	08.41	08.41	06.1
D	Waste hazard class	0103	0104	0102	0103	0104
E	Waste group code by main hazardous component	1103	1801	123	134	108
10	Existence of waste as of the beginning of the year	0.611	7.985	0.484	-	31.500
11	Waste produced as of the end of the year	1.600	12.698	10.369	3.342	80.371
18	Waste burnt to generate energy (R1)	-	-	-	-	-
19	Waste burnt to generate heat processing (D10)	-	-	-	-	-
25	Waste disposed of operation code (R) volume	-	-	-	-	-
30	Waste removed operation code (D) volume	-	-	-	-	-
40	Waste transferred to third parties, total *(sum of 41, 42, 43 lines)*	0.800	11.938	-	-	83.623
	including					
41	for disposal	-	11.938	-	-	83.026
42	for removal	-	-	-	-	-
43	to individuals for use	0.800	-	-	-	0.597
50	Exported waste, total *(sum of 51, 52 lines)*	-	-	-	-	-
	including					
51	for disposal	-	-	-	-	-
52	for removal	-	-	-	-	-
60	Waste located at illegal dumping	-	-	-	-	-
70	Waste collected due to leaking, evaporation, fire, thefts	-	-	-	-	-
72	Availability of waste as of the end of the year *(lines (10+11-18-19-25-30-40-50-60-70)*	1.411	8.745	10.853	3.342	28.248

(in tons, with three decimals after comma)

A	Waste name	Other junk non-ferrous scrap	Waste of transportation by air	Mixed municipal (city) waste, including garbage from litter bins	Sub-standard construction products (including from repairs of buildings and constructions, roads, bridges, overhead roads etc.)	Used transformer oils
B	Waste code under classifier (DK 005-96)	7710.3.1.09	6000.2.9.21	7720.3.1.01	4510.3.1.01	4010.2.9.02
C	Waste category code by material	06.2	10.1	10.1	12.1	01.3
D	Waste hazard class	0104	0104	0104	0104	0103
E	Waste group code by main hazardous component	134	1801	1801	1801	1102
10	Existence of waste as of the beginning of the year	2.544	-	-	-	0.480
11	Waste produced as of the end of the year	0.799	1,354.430	13,486.418	2,080.000	0.160
18	Waste burnt to generate energy (R1)	-	-	-	-	-
19	Waste burnt to generate heat processing (D10)	-	-	-	-	-
25	Waste disposed of operation code (R) volume	-	-	-	-	-
30	Waste removed operation code (D) volume	-	-	-	-	-
40	Waste transferred to third parties, total *(sum of 41, 42, 43 lines)*	2.544	1,354.430	13,486.418	2,080.00	-
	including					
41	for disposal	2.544	1,354.430	-	-	-
42	for removal	-	-	13,486.418	2,080.000	-
43	to individuals for use	0.800	-	-	-	-
50	Exported waste, total *(sum of 51, 52 lines)*	-	-	-	-	-
	including					
51	for disposal	-	-	-	-	-
52	for removal	-	-	-	-	-
60	Waste located at illegal dumping	-	-	-	-	-
70	Waste collected due to leaking, evaporation, fire, thefts	-	-	-	-	-
72	Availability of waste as of the end of the year *(lines (10+11-18-19-25-30-40-50-60-70)*	0.799	-	-	-	0.640

Section II. Waste handling

(to be filled in by enterprises holding operations on waste handling, including storage of waste in the waste removal locations)

(in tons, with three decimals after comma)

A	Waste name					
B	Waste code under classifier (DK 005-96)					
C	Waste category code by material					
D	Waste hazard class					
E	Waste group code by the main hazardous component					
10	Waste as of the beginning of the year	-	-	-	-	-
12	Waste collected, received, total (tons), *(sum of 13, 14, 15, 16 lines)*	-	-	-	-	-
	including					
13	from waste producers	-	-	-	-	-
14	from waste carriers, collectors	-	-	-	-	-
15	from households	-	-	-	-	-
16	from sphere of services	-	-	-	-	-
17	Imported waste	-	-	-	-	-
18	Waste burnt to generate energy (R1)	-	-	-	-	-
19	Waste burnt to generate heat processing (D10)	-	-	-	-	-
25	Waste disposed of operation code (R) scope	-	-	-	-	-
30	Waste removed operation code (D) scope	-	-	-	-	-
40	Waste transferred to third parties, total *(sum of 41, 42 lines)*	-	-	-	-	-
	including					
41	for disposal	-	-	-	-	-
42	for removal	-	-	-	-	-
50	Exported waste, total *(sum of 51, 52 lines)*	-	-	-	-	-
	including					
51	for disposal	-	-	-	-	-
52	for removal	-	-	-	-	-
72	Availability of waste as of the end of the year *(lines (10+12+17-18-19-25-30-40-50)*	-	-	-	-	-
73	Total scope of waste which was accumulated during operation in the designated locations or facilities (places for waste removal)	-	-	-	-	-

(in tons, with three decimals after comma)

A	Waste name					
B	Waste code under classifier (DK 005-96)					
C	Waste category code by material					
D	Waste hazard class					
E	Waste group code by the main hazardous component					
10	Waste as of the beginning of the year	-	-	-	-	-
12	Waste collected, received, total (tons), *(sum of 13, 14, 15, 16 lines)*	-	-	-	-	-
	including					
13	from waste producers	-	-	-	-	-
14	from waste carriers, collectors	-	-	-	-	-
15	from households	-	-	-	-	-
16	from sphere of services	-	-	-	-	-
17	Imported waste	-	-	-	-	-
18	Waste burnt to generate energy (R1)	-	-	-	-	-
19	Waste burnt to generate heat processing (D10)	-	-	-	-	-
25	Waste disposed of operation code (R) scope	-	-	-	-	-
30	Waste removed operation code (D) scope	-	-	-	-	-
40	Waste transferred to third parties, total *(sum of 41, 42 lines)*	-	-	-	-	-
	including					
41	for disposal	-	-	-	-	-
42	for removal	-	-	-	-	-
50	Exported waste, total *(sum of 51, 52 lines)*	-	-	-	-	-
	including					
51	for disposal	-	-	-	-	-
52	for removal	-	-	-	-	-
72	Availability of waste as of the end of the year *(lines (10+12+17-18-19-25-30-40-50)*	-	-	-	-	-
73	Total scope of waste which was accumulated during operation in the designated locations or facilities (places for waste removal)	-	-	-	-	-

Section III. Units for waste handling and designated locations and waste removal facilities as of the end of the year

1. Waste handling units

(in whole numbers)

Line No.	Unit types	Quantity, units	Determined output per year, tons
A	B	1	2
1.1	Units for waste burning to generate energy (R1)	-	-
1.2	Units for waste burning for waste heat processing (D10)	-	-
1.3	Units for waste disposal (processing) (R2-R11)	-	-
1.4	Other units for waste removal (except for burning) (D12)	-	-

2. Designated locations and waste removal facilities

(in whole numbers)

Line	Parameter name	Quantity, units	Volume, m^3		Area, m^2	
			rated	residual	rated	residual
A	B	1	2	3	4	5
2.1	Total	-				
2.2	including household waste	-				

Section IV. Industrial sewage sludge in dry matter

(in tons, with three decimals after comma)

Line	**Parameter name**	**Waste volume**
A	**B**	**1**
80	Produced	-
81	Removed (D1, D5 D12)	-
82	Burnt to generate energy (R1)	-
83	Burnt for waste heat processing (D10)	-

[round seal: Boryspil International Airport State Enterprise]

[signature] O. V. Struk
Place for signature of manager (owner) and/or (full name)
person responsible for accuracy of provided information

[signature] O. Yu. Drach
(full name)

telephone: /044/ 281-71-70 fax: _____ email: o.drach@kbp.aero

[signature]
/Head of [illegible] A. V. Beliaiev/
7.02.2019 [signature] O.T. Fedyna

Appendix No. 17

Document No. 3

ACTIVITY PLAN
on achievement of MPR of substances with return waters
BORYSPIL IA SE and AMIC UKRAINE PE

Water user name Boryspil IA SE, AMIC UKRAINE PE

code 20572069

No.	Activity name by stages	Achieved water-protective result	Implementation terms	Cost, UAH thous.	Provider
1	2	3	4	5	6
1	Sampling and chemical analysis of return waters of the enterprise coming to unnamed pond and Ikva river	Monitoring of compliance with the norms on MPR of pollutants in return waters	Quarterly, according to the schedule	According to the tender bids	Certified laboratory
2	Cleaning of storm water drainage system wells	Monitoring of compliance with the norms on MPR of pollutants in return waters	Continuously, during the year	Current expenses	Boryspil IA SE
3	Release No. 1				
	Storm water sewage treatment plants (Ikva river) – elaboration of upgrade project	Decrease of concentration of petroleum products	2018-2019	According to the investment plan	Boryspil IA SE
	Local treatment plants (LTP) at parking lots D2 and D3, replacement of absorption material - fibroil	Decrease of concentration of petroleum products, suspended solids	When necessary after TP efficiency inspection, 2017	According to the tender offers	Boryspil IA SE
	LTP of FFS-1 – replacement of oil-absorbing mats – 3 pcs.	Decrease of concentration of petroleum products, suspended solids	When necessary after TP efficiency inspection	According to the tender offers	Boryspil IA SE
	LTP of Rainpark BMO-200 and Oleopator-K NS20 at the parking lot for motor vehicles	Decrease of concentration of petroleum products, suspended solids	When necessary after TP efficiency inspection	According to the tender offers	Boryspil IA SE
4	Release No. 2				

1	2	3	4	5	6
	Treatment plants of storm water drainage at the warehouse of fuel and lubricants of Boryspil State International Airport – replacement of grit arrester	Decrease of concentration of suspended solids	When necessary, annually	Own funds	APZK Boryspil LLC
5	Release No. 3				
	Treatment plants of storm water drainage at the fuel and lubricants depot of AMIC Ukraine – cleaning of settlement pond accumulator	Decrease of concentration of suspended solids	When necessary after TP efficiency inspection	Own funds	AMIC UKRAINE LLC

Chief engineer of
Boryspil International Airport State Enterprise [signature] S. I. Leibuk
(official responsible for water use) (signature) (last name)
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ISO 9001
Certified
SIC

[Logo:] Institute
Ukrdorproekt

Feasibility Study (Adjusted)

Reconstruction of Manoeuvring Area No.2 of Boryspil International Airport State-Owned Enterprise

Volume 6

UA-KBP-02-TEO-ШЗ-6

Assessment of Noise Impact on the Environment

Contract No.37-14.3/5-30
Copy No.___

Kyiv, 2020

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Ukrdorproekt

Volume 6

Feasibility Study (Adjusted)

Reconstruction of Manoeuvring Area No.2 of Boryspil IA SOE

UA-KBP-02-TEO-ШЗ-6

Assessment of Noise Impact on the Environment

Customer	BORYSPIL INTERNATIONAL AIRPORT STATE-OWNED ENTERPRISE
Designer	INSTITUTE UKRDORPROEKT LLC
Director	Koretsky S.S.
Head of the Department for the Design of Aerodrome Complexes	Belov M.I.
Chief Project Engineer	Pelikhov G.I.

Contract No.37-14.3/5-30
Copy No.___

Kyiv, 2020

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M.1. Maximum Sound Level Contours (dBA) at current load of Boryspil IA SOE during the day (7:00-23:00)

M.2. Maximum Sound Level Contours (dBA) at current load of Boryspil IA SOE at night (23:00-7:00)

M.3. Maximum Sound Level Contours (dBA) at prospective load of Boryspil IA SOE during the day (7:00-23:00)

M.4. Maximum Sound Level Contours (dBA) at prospective load of Boryspil IA SOE at night (23:00-7:00)

Introduction

This design and survey work was carried out at the “Feasibility Study” stage in accordance with the conditions for adjusting the previously approved Feasibility Study “Reconstruction of Manoeuvring Area No.2 of Boryspil International Airport State-Owned Enterprise”, completed by Ukraeroproekt in 2010 in accordance with the Design Assignment (Feasibility Study adjustment) No. 58-25/1-2 approved on the 07 February 2019.

In this section, calculations of noise pollution around the aerodrome of Boryspil International Airport State-Owned Enterprise (hereinafter referred to as BORYSPIL IA SOE) have been carried out in order to assess the acoustic load in the aerodrome environs, taking into account the current aerodrome load and changes in acoustic load under the prospective scenario, which provides for the operation of new Runway-2.

Boryspil IA SOE has a class A aerodrome. It is located near the city of Boryspil and other settlements. Aircraft noise generated by aircraft operating in the vicinity of this airport may affect the population living on the outskirts of the airport.

Currently, the decisive impact on the environment comes from the types of aircraft that meet the requirements of Chapter 2, 3 of Volume 1 Aircraft noise. Annex 16 to the Convention of the International Civil Aviation Organization. ICAO. -4th ed. - 2005.

The most rational way to improve the acoustic climate in the aerodrome environs is to implement a balanced noise management program in accordance with the requirements of the International Civil Aviation Organization (ICAO), as stipulated in the ICAO Continuing Policy Statement, the main elements of which are set out in the guidance material.

When developing this section, the requirements of the international document (EU Regulation No 598/2014) and of ICAO documents regarding the procedures for the implementation of operational restrictions related to aircraft noise at aerodromes were taken into account, that is, it is envisaged to decommission/restrict the operation of aircraft whose noise characteristics are certified in accordance with requirements of Chapter 2, 3 of Annex 16 to the ICAO Convention (Volume 1 “Aircraft Noise”).

In this design and survey work, calculations of the acoustic load in the vicinity of Boryspil IA SOE were performed for two operating scenarios (according to the data provided by the Customer (Annex A)):

- For the intensity of flights as of 2018
- For the prospective intensity of flights, estimated for the design period until 2030.

Guiding Technical and Regulatory Materials that were used in the process of performing the Survey Work

National Regulatory Framework:

1. AIR CODE OF UKRAINE
2. STATE SANITARY RULES FOR PLANNING AND DEVELOPMENT OF SETTLEMENTS. APPROVED BY ORDER OF THE MINISTRY OF HEALTH OF UKRAINE NO. 173 DATED JUNE 19 1996.
3. DBN [UKRAINE'S NATIONAL BUILDING CODE] Б.2.2-12:2018 PLANNING AND DEVELOPMENT OF TERRITORIES.

International Requirements and Recommendations:

1. AIRPORT PLANNING MANUAL-LAND USE AND ENVIRONMENTAL MANAGEMENT (DOC 9184 - PART 2), 4TH EDITION, 2018.
2. RECOMMENDED METHOD FOR COMPUTING NOISE CONTOURS AROUND AIRPORTS (DOC 9911), 2ND EDITION, 2018.
3. ANNEX 16 ENVIRONMENTAL PROTECTION - VOLUME 1 - AIRCRAFT NOISE, 8TH EDITION, JULY 2017.
4. GUIDANCE ON THE BALANCED APPROACH TO AIRCRAFT NOISE MANAGEMENT -2ND EDITION 2008 (DOC 9829).
5. CONSOLIDATED STATEMENT OF CONTINUING ICAO POLICIES AND PRACTICES RELATED TO ENVIRONMENTAL PROTECTION. RESOLUTION A39-2 OF ICAO ASSEMBLY, 2016.
6. REGULATION (EU) NO 598/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 16 APRIL 2014 ON THE ESTABLISHMENT OF RULES AND PROCEDURES WITH REGARD TO THE INTRODUCTION OF NOISE-RELATED OPERATING RESTRICTIONS AT UNION AIRPORTS WITHIN A BALANCED APPROACH AND REPEALING DIRECTIVE 2002/30/EC.

7. DIRECTIVE 2002/49/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 25 JUNE 2002 RELATING TO THE ASSESSMENT AND MANAGEMENT OF ENVIRONMENTAL NOISE.
8. ADVISORY CIRCULAR 36-1G, NOISE LEVELS FOR U.S. CERTIFICATED AND FOREIGN AIRCRAFT, DATED 8/27/97.
9. ENVIRONMENTAL TECHNICAL MANUAL - VOLUME 1 - PROCEDURES FOR THE NOISE CERTIFICATION OF AIRCRAFT (DOC 9501-1), 3RD EDITION, 2018.
10. AIRCRAFT OPERATIONS - VOLUME I - FLIGHT PROCEDURES (DOC 8168-1), 6TH EDITION, 2018.
11. EUROCONTROL MEDIUM-TERM FORECAST FLIGHT MOVEMENTS (2005 - 2011). VOL. 1, 2004.

1. Characteristics of the Object and the Assessment Factor

1.1. Characteristics of the Object

Boryspil IA SOE has a class A aerodrome. Operating mode - round the clock. Local time: UTC +2/+3.

Currently, the airport has two runways with artificial turf with the following dimensions:

- Runway-1 - 4000x60;
- Runway-2 - 3500x63.

According to the Aeronautical Information Publication (AIP), runways have flight directions corresponding to the following designations RWY (Annex A2):

- Runway-1 - 18L, 36R;
- Runway-2 - 18R, 36L.

Additionally, as initial data, the Customer provided information on the operation of the runways in the current period and for the future (after the completion of the reconstruction of Runway-2) (Annex A3). According to this information, in the current period, takeoffs from Runway-2 are not performed due to the low PCN value.

The terrain is flat. The Terrain Factor is 1. Elevation above sea level is 130 m for the Aerodrome Reference Point (ARP: 502041N, 0305336E). The geographic coordinates of the ARP and the ends of Runway-1 and Runway-2, the flight scheme in the airport area (see Figure 2 and Figure 3 in Section 2) are taken from the Aeronautical Information Publication (AIP) (Annex A2). The coordinates of the new designed Runway-2 were provided by the Customer separately (Annex A3).

The airport is located at a distance of about 1 km to the west from the borders of the city of Boryspil and 6 km to the west from the center of the city of Boryspil, 29 km to the east of the centre of the city of Kyiv. In the area of the aerodrome of Boryspil IA SOE, there are such settlements: Boryspil, Hora, Martusivka, Zatyshne, Hlyboke, Voronkiv, Zherebyatyn, Revne, Petropavlivske, Velyka Oleksandrivka, Mala Oleksandrivka, Dudarkiv, Trebukhiv, Krasylivka, Velyka Dymerka, Kyiliv, etc.

Meteorological conditions

Meteorological conditions in the airport area directly affect the conditions for the generation and propagation of aircraft noise. Such meteorological factors as wind speed and direction, as well as air temperature, almost completely determine the possibility and acoustic efficiency of operational measures to reduce aircraft noise (AN).

The design temperature for the summer period is taken as 22°C according to the Aeronautical Information Publication. Atmospheric pressure is taken as 760 mmHg, as for the International Standard Atmosphere. The wind speed is 4 m/s.

The INM program uses the ARP geographic coordinate system to plot the airport runway. The local coordinate system (X and Y axes) is built automatically, and the origin point of the local coordinate system coincides with the ARP.

Operated aircraft fleet

Unlike other Ukrainian airports, Boryspil IA SOE has a significant number of wide-bodied aircraft types in its fleet (Figure 1).

[Figure 1]

7% - Wide-Bodied Aircraft

93% - Narrow-Bodied Aircraft

Figure 1. The share of narrow- and wide-bodied aircraft in the structure of Boryspil IA SOE fleet, 2018

The main types of aircraft currently in operation:

- Narrow-Bodied: B738 E190, A320, E145, A321, B739, B733, B734, DH8D, B735, A319, CRJ7, MD83.
- Wide-Bodied: B763, B772, A332.

Also in the structure of the aircraft fleet there are obsolete aircraft types: MD82, MD83, IL76, An12, Yk40, etc.), having noise characteristics according to the requirements of Chapter 2 (Volume 1 "Aircraft Noise", Annex 16 to the Convention of the International Civil Aviation Organization. ICAO. - Fourth Edition - 2005), create the main acoustic load and determine the maximum noise levels at the aerodrome area.

During the reconstruction, new Runway-2 will be built, the axis of which is offset parallel to the axis of the old Runway-2 by 80 meters to the west (Annex A3 - draft Feasibility Study).

The geometrical dimensions of the elements of Manoeuvring Area No. 2 is adopted in accordance with the standards and recommended practices of ICAO for aerodromes with a Reference Code of 4F.

The length of the new Runway-2, according to the Design Assignment, is 4000 m. The width of Runway-2 is assumed to be 45 m.

1.2. Assessment Factor

The problem of aircraft noise (AN) is currently relevant for Ukrainian airports in order to protect the environment from the impact of aircraft. The impact of noise generated by aircraft arriving at or departing from an airport depends on a number of factors, namely:

- Types of aircraft operated at the airport.
- Total number of aircraft take-offs and landings in the busiest week of the design year (determined by airport data).
- Distribution of aircraft by routes (determined by airport data).
- Operating conditions.
- Distribution of aircraft by periods of the day (determined by airport data).
- The number of runways and their use.
- Weather conditions and airport-specific flight rules.
- Forecast volumes of takeoff and landing operations and aircraft fleet structure in the long term.

The process of investigating the impact of noise around airports involves modeling "noise contours".

The noise contour is a line of constant value of the sound level of aircraft noise, averaged over a certain period of time, which is generated during the passage of various types of aircraft under normal operating conditions.

Territory zoning based on noise conditions

The restricted development areas are determined, depending on the AN impact, in accordance with Annex 18 and Annex 19 of the State Sanitary Rules for Planning and Development of Settlements No. 173 (hereinafter referred to as THE STATE SANITARY RULES). According to these requirements, the zones that determine the suitability of the territory in the vicinity of the airport for development are divided into A, B, C and D (Table 1 and Table 2) (with varying equivalent sound level L_{Aeqv} and maximum sound level L_{Amax} in dBA for daytime (with 07:00 to 23:00) and nighttime (from 23:00 to 07:00)).

Table 1

Zones of Suitability of the Territory in the Vicinity of the Airport for Development

Time of day	А	Б	В	Г
Day	$L_{Aeqv} \leq 60$ $L_{Amax} \leq 80$	$61 \leq L_{Aeqv} \leq 65$ $81 \leq L_{Amax} \leq 85$	$61 \leq L_{Aeqv} \leq 65$ $81 \leq L_{Amax} \leq 85$	$L_{Aeqv} > 65$ $L_{Amax} > 85$
Night	$L_{Aeqv} \leq 50$ $L_{Amax} \leq 70$	$51 \leq L_{Aeqv} \leq 55$ $71 \leq L_{Amax} \leq 75$	$56 \leq L_{Aeqv} \leq 60$ $76 \leq L_{Amax} \leq 80$	$L_{Aeqv} > 60$ $L_{Amax} > 80$

Table 2

Allowed/Prohibited Construction
In Restricted Development Areas around the Airport

Purpose of buildings	Construction of buildings in Areas			
	А	Б	В	Г
Residential Buildings, Kindergartens	Allowed	Allowed with increased sound insulation of external fences, which provide noise reduction, ΔL_A dBA 25 30		Prohibited
Polyclinics	Allowed in the part of the zone with levels in the daytime LAeqv≤55 dBA w/o restrictions, LAeqv≤56-60 dBA with increased sound insulation (ΔL_A=25 dBA)	Allowed with increased sound insulation that provides ΔL_A=30 dBA		Prohibited
Schools and Other Educational Institutions	Allowed	Allowed with increased sound insulation that provides ΔL_A=25 dBA		Prohibited
Hotels, Hostels	Allowed	Allowed with increased sound insulation that provides ΔL_A dBA 25 30		
Administrative Buildings, Design and Research Organizations	Allowed	Allowed	Allowed	Allowed if the required sound insulation is provided.

Zone Г is a territory unsuitable for residential development. **Zone Б and Zone В** are territories with restrictions and separate requirements for the application of measures to reduce the impact of noise, and **Zone А** is a territory without restrictions for the construction of structures of any purpose.

The boundaries of the zones of protection against the adverse impact of AN and the suitability of areas around airports and aerodromes for residential and public buildings is determined using the calculation method for assessing sound levels L_{Aeqv} and L_{Amax} (RECOMMENDED METHOD FOR COMPUTING NOISE CONTOURS AROUND AIRPORTS (DOC 9911), 2nd edition, 2018) and the corresponding computer program (INM Pre-approved List of Aircraft Substitutions) for constructing noise contours for regulatory values of sound levels and plotting contours on a map with reference to the Runway.

Determination of the contours of equal noise impact around the airport, taking into account the time and routes of movement, types of aircraft, traffic intensity, using programs for calculating noise levels on a PC at the nodes of the computational grid, which is determined within the vicinity of the airport.

In particular, the basic requirements for the means for determining the contours of the AN in the vicinity of the airport are set out in ICAO DOC 9911. The levels of noise contours that meet regulatory targets define the boundaries of noise zones around airports.

2. Initial Data

The assessment of the impact of aircraft noise from the flight of the aircraft was carried out on the basis of data provided by Boryspil IA SOE (Annex A). To determine the calculation scenarios, flight plans were used (Annex A1 - in electronic form). The assessment was carried out in accordance with the current regulatory documents and on the basis of acoustic calculations carried out as part of this design and survey work.

The initial data for calculations include:

- The volumes of take-off and landing operations (TLO) for 2018 (incomplete) are presented in Annex A1.
- Placement of runways, aerodrome plan, flight procedures (Figures 2, 3.) and routes of aircraft flights in the aerodrome area (Annex A2, A3).
- Types of aircraft, their acoustic characteristics, as well as characteristics that determine the trajectories of takeoff, flight, descent before landing, modes and time of engine testing (the listed data are stored in specialized databases certified for the specified calculations).
- the intensity of aircraft flights on routes for the daytime and nighttime (the parameters of the current intensity are determined for the period of the year with the maximum airport operation load).
- Forecast of the intensity of the TLO and the structure of the aircraft fleet - according to the data of Boryspil IA SOE (Annex A4, A5).

The regulated intervals for monitoring the impact of AN are: daytime (from 7:00 to 23:00 – 16 hours) and nighttime (from 23:00 to 7:00 – 8 hours).

The calculations of sound levels L_{Aeqv} and L_{Amax} around the airfield of Boryspil IA SOE were carried out using INM program in accordance with the Methodology for Calculating and Predicting Noise from Aircraft on the Ground, which meets the requirements of ICAO Doc.9911/1.

[Figure 2]

Figure 2. Approach and exit routes for MK 356°

[Figure 3]

Figure 3. Approach and exit routes for MK 176°

2.1. Current Calculation Scenario

To perform the calculations, the indicators of the schedule and aircraft fleet current as of 2018 were used according to the flight plans data (Annex A1).

The structure of the aircraft fleet that were operated at the airport in 2018 is as follows (see Figure 4):

[Figure 4]

Figure 4. Aircraft Fleet Structure, KBP Airport, 2018

The modern aircraft fleet operated at the airport includes such narrow-bodied aircraft types: B738 E190, A320, E145, A321, B739, B733, B734, DH8D, B735, A319, CRJ7, MD83 and wide-bodied aircraft types: B763, B772, A332.

Also in the structure of the aircraft fleet there are obsolete aircraft types: MD82, MD83, IL76, An12, Yk40, etc.), certified according to the requirements of Chapter 2 (ANNEX 16 - ENVIRONMENTAL PROTECTION - VOLUME 1 - AIRCRAFT NOISE, 8th edition, July 2017), which create the main acoustic load and determine the maximum noise levels at the aerodrome area.

The total estimated number of takeoffs and landings per day is shown in Table 3.

Table 3

Estimated Operating Scenario - **Current** Load, 2018

A319	2	2	1	1
A320	10	11	3	2
A321	5	7	6	3
A332	1	1	0	0
A333	2	2	0	0
B733	4	5	1	0
B734	2	2	1	1
B735	3	3	0	0
B738	54	57	6	4
B739	7	7	3	2
B763	4	4	2	1
B772	2	2	0	0
CRJ9	1	1	0	0
DH8D	2	3	1	0
E145	10	11	1	1
E190	12	14	2	1
MD83	0	1	1	0
IL76	0	1	0	1
<0.5%	5	4	2	1
Total	126	138	30	17

2.2. Prospective Calculation Scenario

The prospective calculation scenario for 2030 takes into account the predicted increase in flight intensity for the next ten years. After the commissioning of the new Runway-2, the use of Runway-1 and Runway-2 is forecast in the proportion of 50x50%, and the volume of annual TLO will reach 225,000 (Annex A5).

For the prospective design scenario in the daytime, aircraft with noise characteristics in accordance with the standards of Chapter 2 of Annex 16 of the ICAO are excluded from the calculation, which complies with the requirements of EU Regulation No. 598/2014 and ICAO documents. For night time, it is proposed to leave in operation only aircraft of Chapter 4 (ICAO noise certification requirements) and above (Annex A4).

Taking into account the above, reference data and information on airport development provided by Boryspil IA SOE and guided by current international recommendations (EC, ICAO) in the field of environmental protection in civil aviation, an estimated operating scenario was developed for prospective airport load (Table 4).

The distribution of aircraft types by routes and their intensity were determined as a percentage in accordance with the data provided by the customer. At this design stage, the "Feasibility Study" stage, the prospective distribution by routes and the possible introduction of new routes in the vicinity of Boryspil IA SOE were not taken into account.

Table 4

Estimated Operating Scenario – **Prospective** Load, 2030

Aircraft category/type	Time of day / Take-off or Landing Operation				Total
A+B	Day		Night		Total
	Take-off	Landing	Take-off	Landing	
GLEX	2	2	1	1	6
G280	2	2			4
R44	1	1			2
GLF6	2	2	1	1	6
LJ85	1	1			2
Be45	1	1			2
C680	2	2	1	1	6
FA7X	1	1			2

Aircraft category/type	Time of day / Take-off or Landing Operation				Total
Pa46	2	2			4
Total	14	14	3	3	34
Sum	28		6		5%
C	Day		Night		Total
	Take-off	Landing	Take-off	Landing	
B738/B738MAX8	76	76	14	14	180
E190E2	16	16	4	4	40
A320neo	14	14	4	4	36
An148	14	14	2	2	32
B739/B738MAX9	10	10	2	2	24
A321neo	8	8	2	2	20
B738	6	6	1	1	14
An148	4	4	1	1	10
B738/B738MAX8	4	4	1	1	10
B738	2	2	1	1	6
A319neo	4	4	1	1	10
CRJ9 /1000	2	2	1	1	6
An158	4	4	1	1	10
An140	4	4			8
Cl30	4	4			8
E175E2	4	4			8
Total	176	176	35	35	422
Sum	352		70		60%
D+E	Day		Night		Total
	Take-off	Landing	Take-off	Landing	
787-9	18	18	6	6	48
787-8	16	16	6	6	44
B772	14	14	2	2	32
A333	10	10	2	2	24
A332	6	6	1	1	14
A350XWB	8	8			16
B757-200	4	4			8
B747	4	4			8
B777-300ER	8	8			16
Total	88	88	17	17	210
Sum	176		34		30%
F	Day		Night		Total
	Take-off	Landing	Take-off	Landing	
A380-800	17	17			34
Sum	34		0		5%

3. The Results of Calculating the Aircraft Noise Levels for the Aerodrome of Boryspil IA SOE

In this design and survey work (the "Feasibility Study" stage), in order to substantiate the improvement of the acoustic climate at the aerodrome area, in connection with the construction of new Runway-2**, calculations of the restricted development areas were performed in accordance with the requirements of the State Sanitary Rules No.173 (hereinafter referred to as THE SSR-173) for two scenarios:**

I. Current aircraft traffic intensity in the area of Boryspil IA SOE.

II. Prospective aircraft traffic intensity in the area of Boryspil IA SOE at the "Feasibility Study" stage of the construction of new Runway-2. The results given in Tables 5, 6, 7 and 8 show that the noise levels LAmax for the night time LAmax = 80 dBA are decisive for the analysis of the conditions of the impact of AN in the aerodrome area.

3.1. Noise Contour Calculations for the Current Scenario as of 2018

For the current operating scenario (with current aircraft traffic intensity), the contours of noise pollution were calculated and built, and the contour areas of equivalent and maximum sound levels for the daytime and nighttime were determined (Tables 5 and 6 respectively).

Table 5

The contour areas of the regulatory equivalent sound levels for the existing aircraft traffic intensity (current calculation version)

$L_{Aекв}$, dBA	S, km ^{2}	
	Day	*Night*
50	-	83.12
55	-	29.74
60	23.82	11.58
65	9.16	-

Table 6

The contour areas of the regulatory maximum sound levels for the existing aircraft traffic intensity (current calculation version)

L_{Amax}, dBA	S, км^2	
	Day	*Night*
70	-	183.9
75	-	103.3
80	50.09	50.1
85	23.93	-

3.2 Noise Contour Calculations for the Prospective Scenario taking into account the Design Solutions for the Reconstruction of the Aerodrome (2030)

For the prospective operating scenario (with prospective aircraft traffic intensity at the "Feasibility Study" stage for the construction of new Runway-2), the contours of noise pollution were calculated and built, and the contour areas of equivalent and maximum sound levels for the daytime and nighttime were determined (Tables 7 and 8 respectively).

Table 7

The contour areas of the regulatory equivalent sound levels for the future aircraft traffic intensity (prospective calculation version)

$L_{Aекв}$, dBA	S, km^2	
	Day	*Night*
50	-	127.8
55	-	51.54
60	56.98	18.85
65	20.7	-

Table 8

The contour areas of the regulatory maximum sound levels for the future aircraft traffic intensity (prospective calculation version)

LAmax, dBA	S, km2	
	Day	Night
70	-	119.46
75	-	62.52
80	47.69	30.75
85	21.6	-

4. Description of Noise Contours and Definition of Restricted Development Area

The results of calculations of maximum sound levels and identified restricted development areas are provided in the form of a noise map and an explanatory note thereto. The noise map is a Satellite Image with the Runway and restricted development areas plotted thereon on a scale of 1:25 000 (**Annex B**):

4.1. Restricted Development Area under Current Operating Scenario

Based on the results of the completed calculations and the construction of noise maps in accordance with the requirements of the State Sanitary Rules for Planning and Development of Settlements No. 173, which define the restricted development areas (THE RDA) around airports from the conditions of aircraft noise impact, the following acoustic load occurs in the area around **Boryspil IA SOE**, in accordance with the design scenarios.

For the current scenario of flight intensity in Boryspil IA SOE, the contours of the maximum sound levels (night):

- 71 ≤LAmax ≤75 dBA partially cover the following settlements:
- Velyka Dymerka, Krasylivka, Trebukhiv, Dudarkiv, Velyka Oleksandrivka - north of the airport.
- Residential areas of high-rise buildings and the surroundings of the city of Borispol - in the east.
- Kyiliv, Voronkiv, Martusivka, separate buildings of Zatyshne - in the south.
- Hora - in the west.

Sound levels 71 ≤LAmax ≤75 dBA correspond to **Zone Б** according to the SSR-173. In Zone Б, the construction of residential buildings and kindergartens with increased sound insulation of external fences, ensuring noise reduction by ΔLA = 25 dBA, is allowed; construction of polyclinics with increased sound insulation, which provides ΔLA = 30 dBA, is allowed; construction of schools and other educational institutions with increased sound insulation which provides ΔLA = 25 dBA, is allowed; construction of hotels and hostels with increased sound insulation, which provides ΔLA = 20 dBA, is allowed; construction of administrative buildings, design and research organizations is allowed;

- **76 ≤LAmax ≤80 dBA** partially cover the following settlements:
- Trebukhiv, Dudarkiv (separate buildings), Velyka Oleksandrivka - north of the airport.
- Residential areas of high-rise buildings and the surroundings of the city of Borispol - in the east.
- Zatyshne, Martusivka - in the south.
- Hora - in the west.

Sound levels 76 ≤LAmax ≤80 dBA correspond to **Zone B** in accordance with the State Sanitary Rules. In Zone B, the construction of residential buildings and kindergartens with increased sound insulation of external fences, ensuring noise reduction by ΔLA = 30 dBA, is allowed; construction of polyclinics with increased sound insulation, which provides ΔLA = 30 dBA, is allowed; construction of schools and other educational institutions with increased sound insulation, which provides ΔLA = 25 dBA, is allowed; construction of hotels and hostels with increased sound insulation, which provides ΔLA = 25 dBA, is allowed; construction of administrative buildings, design and research organizations is allowed;

- LAmax >80 dBA partially cover the following settlements:
- Velyka Oleksandrivka - north of the airport.
- Separate residential areas of the city of Boryspil - in the east.
- Partially Zatyshne - in the south.
- Some areas of Hora - in the west.

Sound levels **LAmax> 80 dBA** correspond to **Zone Г** in accordance with the State Sanitary Rules. In Zone Г, the construction of residential buildings, kindergartens, polyclinics, schools and other educational institutions, hotels and hostels is prohibited; the construction of administrative buildings and design and survey organizations is allowed, provided there is the required sound insulation.

4.2. Restricted Development Area under Prospective Operating Scenario

For the prospective scenario of flight intensity for stage "П" of reconstruction and construction of new Runway-2 in Boryspil IA SOE, the contours of the maximum sound levels (night):

- 71 ≤LAmax ≤75 dBA partially cover the following settlements:
- Trebukhiv, Dudarkiv, Velyka Oleksandrivka - north of the airport.
- Residential areas of high-rise buildings and the surroundings of the city of Borispol - in the east.
- Most part of Voronkiv, Martusivka, separate buildings of Zatyshne - in the south.
- Hora - in the west.

Sound levels 71 ≤LAmax ≤75 dBA correspond to **Zone Б** in accordance with the SSR 173. In Zone Б, the construction of residential buildings and kindergartens with increased sound insulation of external fences, ensuring noise reduction by ΔLA = 25 dBA, is allowed; construction of polyclinics with increased sound insulation, which provides ΔLA = 30 dBA, is allowed; construction of schools and other educational institutions with increased sound insulation, which provides ΔLA = 25 dBA, is allowed; the construction of hotels and hostels with increased sound insulation, which provides ΔLA = 20 dBA, is allowed; construction of administrative buildings, design and research organizations is allowed.

- **76 ≤LAmax ≤80 dBA** partially cover the following settlements:
- Dudarkiv, Velyka Oleksandrivka - north of the airport.
- Residential areas of high-rise buildings and the surroundings of the city of Borispol - in the east.
- Voronkiv, Zatyshne, Martusivka - in the south.
- Hora - in the west.

Sound levels 76 ≤LAmax ≤80 dBA correspond to **Zone B** in accordance with the State Sanitary Rules. In Zone B, construction of residential buildings and kindergartens with increased sound insulation of external fences, ensuring noise reduction by ΔLA = 30 dBA, is allowed; construction of polyclinics with increased sound insulation, which provides ΔLA = 30 dBA, is allowed; construction of schools and other educational institutions with increased sound insulation, which provides ΔLA = 25 dBA, is allowed; construction of hotels and hostels with increased sound insulation, which provides ΔLA = 25 dBA, is allowed; construction of administrative buildings, design and research organizations is allowed.

- LAmax >80 dBA partially cover the following settlements:
- Velyka Oleksandrivka - north of the airport.
- Separate residential areas of the city of Boryspil - in the east.
- Partially Martusivka, most of Zatyshne - in the south.
- Some buildings of Hora - in the west.

Sound levels **LAmax> 80 dBA** correspond to **Zone Г** in accordance with the State Sanitary Rules. In Zone Г, the construction of residential buildings, kindergartens, polyclinics, schools and other educational institutions, hotels and hostels is prohibited; the construction of administrative buildings and design and survey organizations is allowed, provided there is the required sound insulation.

5. Conclusions and Recommendations

5.1. Conclusions

1. In this work, we assessed the noise pollution of the territory in the vicinity of **Boryspil IA SOE** for the reconstruction project with the construction of new Runway-2 at the “Feasibility Study” stage.
2. This design and survey work was carried out at the “Project” stage in accordance with the conditions for adjusting the previously approved Feasibility Study “Reconstruction of Manoeuvring Area No.2 of Boryspil International Airport State-Owned Enterprise”, completed by Ukraeroproekt in 2010 in accordance with the Design Assignment (Feasibility Study adjustment) No. 58-25/1-2 approved on the 07 February 2019.
3. In this section, calculations of noise pollution around the aerodrome of Boryspil International Airport State-Owned Enterprise (hereinafter referred to as BORYSPIL IA SOE) have been carried out in order to assess the acoustic load on the aerodrome territory, taking into account the current aerodrome load and changes in acoustic load under the prospective scenario, which provides the operation of the new Runway-2.
4. Aircraft Noise Levels were calculated in accordance with the requirements and recommendations of the International Civil Aviation Organization (ICAO), in particular in accordance with the requirements of ICAO RECOMMENDED METHOD FOR COMPUTING NOISE CONTOURS AROUND AIRPORTS (DOC 9911), 2nd edition, 2018.
5. The requirements of the EU Regulation No. 598/2014 have been taken into account, according to which types of aircraft with noise characteristics as per standards of Chapters 2 and 3 of Annex 16 of ICAO must be withdrawn from service. These, for example, include MD-83, Il-76, An-12, An-26 and others.
6. Zoning of the territory based on the conditions of exposure to aircraft noise was carried out in accordance with the requirements of the State Sanitary Rules for Planning and Development of Settlements No. 173 (The SSR No.173), taking into account the recommendations of ICAO, in particular GUIDANCE ON THE BALANCED APPROACH TO AIRCRAFT NOISE MANAGEMENT - 2ND EDITION 2008 (DOC 9829) *и* AIRPORT PLANNING MANUAL-LAND USE AND ENVIRONMENTAL MANAGEMENT (DOC 9184 - PART 2), 4th edition, 2018.

7. The initial data for calculations were provided by **Boryspil IA SOE** (Annex A).
8. In order to determine the change in acoustic load, calculations were made for two scenarios of flight intensity: current (as of 2018) and prospective (estimated period 2030).
9. From the results of the calculations, the noise contours of the maximum and equivalent sound levels were determined for both design scenarios for day and night periods of the day (see Tables 5, 6, 7 and 8). Also, indicators of changes (improvement) in acoustic load and justified areas of suitability of the territory for development were determined according to the criteria for maximum sound levels, which are given in Annex B.
10. The rationale for the restricted development areas is given in Section 4 of this work. According to the results obtained for the current and prospective calculation scenarios and in accordance with the requirements of the State Sanitary Rules for Planning and Development of Settlements No. 173 (the SSR No. 173), **the acoustic situation in the vicinity of Boryspil IA SOE will improve after reconstruction and construction of new Runway-2 (taking into account the possibility of meeting the requirements of the EU Regulation No. 598/2014)**. Compared to the current situation, the areas of the corresponding noise contours will reduce by 35% (Table 9).

Table 9

L_{Amakc}, dBA	S, km²				Restricted Development Area	
	2018		2030			
	Day	Night	Day	Night	Day	Night
$71 \le L_{Amax} \le 75$	-	183.9	-	119.46	-	Б
$76 \le L_{Amax} \le 80$	-	103.3	-	62.52	-	В
$81 \le L_{Amax} \le 85$	50.09	50.10	47.69	30.75	Б, В	Г
$L_{Amax} > 85$	23.93	-	21.6	-	Г	-

11. **According to the results of calculations carried out in this design and survey work, the construction of new Runway-2 of the aerodrome of Boryspil IA SOE, which provides for the operation of new types of aircraft, will lead to a significant decrease in the acoustic load on the territory adjacent to the aerodrome complex. Graphic material is given in Annexes M1-M4.**
12. **This work determines the parameters of the acoustic load on the aerodrome area, which allow for further design stages. At the next design stages, it will be necessary to determine the environmental capacity of the aerodrome complex in accordance with the factors and requirements defined by the ICAO Resolution, the Tax Code of Ukraine, Law of Ukraine "On Environmental Impact Assessment", and EU Directives.**

5.2. Recommendations

1. The assessment of the impact of aircraft noise on the environment in **Boryspil IA SOE** environs carried out in this work indicates that it is possible to work out a balanced solution to the problem of acoustic load in the process of further development of this airport and property development (including residential property development) on its outskirts, subject to the development and implementation a comprehensive program, in particular for the city of Boryspil and in general for **Boryspil IA SO**E environs.
2. Today, the International Civil Aviation Organization (ICAO) has determined a balanced approach to the problem of aircraft noise - the introduction of new technology (with improved acoustic characteristics), new rules for zoning of the territory and the implementation of measures for soundproofing buildings, etc., which limits the adverse impact of aircraft noise. This also includes means of objective control (monitoring systems) and economic levers applied to airlines to ensure noise reduction of their aircraft. Taking into account the requirements of the Operational Directive of Ukraine's State Aviation Administration ЕД -11-17 of 07/03/2017 and AIRPORT PLANNING MANUAL-LAND USE AND ENVIRONMENTAL MANAGEMENT (DOC 9184 - PART 2), 4th edition, 2018, a balanced approach at the “Project” stage has the following components:
   - Determining the configuration of an automatic aircraft noise control system, taking into account the requirements of ANNEX 16 -ENVIRONMENTAL PROTECTION - VOLUME 1 - AIRCRAFT NOISE, 8th edition, July 2017. The number of automatic monitoring stations for aircraft noise for Boryspil IA SOE has been determined (12 monitoring stations) (to be specified at “Project” stage).
   - Definition and implementation of operational methods for noise reduction, for example, in accordance with the requirements and recommendations of the following document: ICAO AIRCRAFT OPERATIONS - VOLUME I - FLIGHT PROCEDURES (DOC 8168-1), 6th edition, 2018.

- Introduction of a system of payment by airlines for noise generated during the operation of their aircraft fleet, for example, in accordance with the requirements and recommendations of the following document: ICAO GUIDANCE ON THE BALANCED APPROACH TO AIRCRAFT NOISE MANAGEMENT-2ND EDITION 2008 (DOC 9829).
- And other parameters specified in the Tax Code of Ukraine, Law of Ukraine "On Environmental Impact Assessment", Directive of Ukraine's State Aviation Administration ЕД - 11-17 of 07/03/2017 and AIRPORT PLANNING MANUAL-LAND USE AND ENVIRONMENTAL MANAGEMENT (DOC 9184 - PART 2), 4th edition, 2018.

In each individual case, the program can have certain features, but its components can be generalized based on the study of already implemented foreign experience, for example, in accordance with the requirements and recommendations of the following document: ICAO GUIDANCE ON THE BALANCED APPROACH TO AIRCRAFT NOISE MANAGEMENT -2ND EDITION 2008 (DOC 9829).

3. When coordinating the construction of new buildings and structures or the reconstruction of existing ones in the aerodrome territory of **Boryspil IA SOE**, it is required to adhere to the established restricted development areas and the requirements of the State Sanitary Rules for Planning and Development of Settlements No. 173 (The SSR-173). When coordinating construction in areas affected by aircraft noise (Areas A, B, C, D), the owner of the site where the construction is being designed must, in accordance with the requirements of the Air Code of Ukraine, provide evidence-based documentation regarding the possibility of development based on the conditions of exposure to aircraft noise.

[Pages 31 to 124 already in EN and bilingual EN-UK]

1. General Data

Adjustment of the previously developed Feasibility Study "Reconstruction of Manoeuvring Area No.2 of the Boryspil International Airport State-Owned Enterprise", completed by Ukraeroproekt in 2010, was carried out in accordance with the Design Assignment (Adjusted FS) No. 58-25/1-2, approved by the General Director of the International Airport Boryspil State-Owned Enterprise (hereinafter referred to as THE IAB SOE) on the 7th February 2019, as amended and restated on____2019, in accordance with the requirements of the current regulatory documents of Ukraine and the standards and recommended practices of ICAO in the design and operation of Aerodromes:

- SNiP 2.05.08-85 Aerodromes.
- Annex 10 to the Convention on International Civil Aviation. Volume I. Radio Navigation Aids. Sixth Edition, July 2006.
- Annex 14 to the Convention on International Civil Aviation. Volume I. Aerodromes. Design and Operations. Eighth Edition, July 2018.
- Annex 16 to the Convention on International Civil Aviation. Environmental Protection, Volume I. Aircraft Noise. Seventh Edition, July 2014.
- Annex 16 to the Convention on International Civil Aviation. Environmental Protection, Volume II. Aircraft Engine Emissions. Third Edition, July 2008.
- Aerodrome Design Manual. Part I. Runways. Third Edition, 2006.
- Aerodrome Design Manual. Part II. Taxiways, Aprons and Holding Bays. Fourth Edition, 2005.
- Aerodrome Design Manual. Part III. Pavements. Second Edition, 1983.
- Aerodrome Design Manual. Part IV. Visual Aids. Fourth Edition, 2004.
- Aerodrome Design Manual. Part V. Electrical Systems. Second Edition, 2017.
- Aerodrome Design Manual. Part VI. Frangibility. First Edition, 2006

New orig. inv. no											
Signature and date								UA-KBP-02-TEO-АПР-П3-Р1			
		Rev.	Quantity	Sheet	Doc No.	Signature	Date	Explanatory Note	Phase	Sheet	Sheets
Orig. inv. no		Head of Dept		Belov		[Signature]	04.19				
		Drawn by		Cherevko		[Signature]	04.19		FS	1	12
									INSTITUTE UKRDORPROEKT LLC		

- Airport Design Manual. Part 1. Master Planning. Second Edition, 1987.
- Airport Design Manual. Part 2. Land Use and Environmental Protection. Third Edition, 2002.
- Airport Services Manual. Part 6. Control of Obstacles. Second Edition, 1983.
- Airport Services Manual. Part 8. Airport Operational Services. First Edition, 1983.
- Airport Services Manual. Part 9. Airport Maintenance Practices. First Edition, 1984.
- Security Manual for Safeguarding Civil Aviation against Acts of Unlawful Interference. Volume III. Airport Security. Organization, Programme, and Design Requirements. Seventh Edition, 2009.
- IATA Airport Development Reference Guide.

Materials from Engineering Surveys performed by S.A.LANA Private Enterprise [PE] in 2019 were used to adjust the Feasibility Study:

- UA-KBP-02/C-1-1 – Engineering and Geodetic Surveys.
- UA-KBP-02/C-1-2 – Engineering and Geodetic Surveys.

The Drawings of this Section of the Project have been made, based on Topographic and Geodetic Surveying and a Digital Terrain Model made by S.A.LANA PE.

When adjusting the Feasibility Study, the materials of the Borispol Airport Master Plan prepared by Airport Consulting Vienna in 2017, were used as a reference in SWOT-Analysis, Air Traffic Analysis, Passenger Traffic Calculation, Air Traffic Forecast and the General Development Concept of the IAB SOE for the period up to 2045. Also, Proposals and Schematic Drawings for the Modernization and Reconstruction of Manoeuvring Area No.2, made by China Communications Construction/China Road and Bridge Corporation in 2018, were considered.

This Section of the FS covers:

- Completing a package of Preparatory Works.
- Vertical Levelling of Manoeuvring Area No.2, Critical and Sensory Areas of Localisers and Glide-Path Beacons (through to the Patrol Road).

- Construction of New Airfield Pavements for AR-2 [Artificial Runway-2], MT-2 [Main Taxiway-2], Connective Taxiways, High-Speed Exit Taxiways.
- Reconstruction of Apron S (between Taxiway-9 and Taxiway-19).
- Construction of an Aircraft Engine Test Site (Racing).
- Construction of an Isolated Parking Area.
- Construction of a Cargo Terminal Parking Area (in accordance with the Airport Development Concept 2045).

In the previous FS, the Aerodrome Planning Works section was presented only as an Explanatory Note. Therefore, in this FS, it has been totally re-written.

For the Aerodrome, the main differences from the 2010 Project are as follows:

- Planning Solutions - Schematic Drawings of Designed Airfield Pavements and placement of Radio Navigational and Landing Aids, taking into account their Critical and Sensory Areas.
- Vertical Levelling - Schematic Drawings for the Grading of Manoeuvring Area No.2 in conjunction with the existing Aerodrome Pavements of Apron M, Taxiway-10, Aprons C, S and G (since it was not covered in the previous FS).
- Construction of Aerodrome Pavements.

2. Preparatory Works.

The package of Preparatory Works includes: Dismantling of the Existing Aerodrome Pavements of Runway-2, Taxiways, Aprons S and G, Patrol Road Pavements, Driveways and Sites, Existing Engineering Networks, Drainage System Elements; and Dismantling of the Existing Structures, Lighting and Radio Equipment, Lighting Masts and Fencing of Manoeuvring Area No.2.

The Existing Aerodrome Pavements should be dismantled, taking into account:
- Their unsatisfactory condition.
- Operation over a period of more than 40 years, which significantly exceeds the time between their major overhauls.
- Condition of Drainage Elements along Existing Pavements.
- The Design Load significantly exceeds the existing one (the existing PCN is 39, after reconstruction it should exceed 100).

After dismantling, some of the materials will be removed as Construction Waste to a Landfill Site, but some can be used (as agreed with the Customer) for the Foundations of a New Patrol Road and the Arrangement of Auxiliary Driveways, Sites, etc.

The Existing Engineering Networks of the Airport, falling within the Planning Area of Manoeuvring Area No.2, should be moved away in accordance with the Technical Specifications provided by the Customer.

Engineering Networks that belong to third-party users and pass through Manoeuvring Area No.2 in transit, are subject to protection.

The composition and scope of Preparatory Works are shown in Drawing АПР-01.

3. Planning Concepts.

When adjusting the FS, Two Options for the Placement of the New Runway were considered and compared. Option 1 – Offset of the Axis of the New Runway. Option 2 - the Axis of the New Runway coincides with the Axis of the Old Runway.

Schematic Drawings for these Options are shown in Drawings АПР-2 and АПР-3.

The main criterion for choosing an Option for the Reconstruction of Manoeuvring Area No.2 is an Additional Land Allocation - the conveyance of plots around the airport, which have long been privately owned or owned by rural communities.

Another, no less important criterion is the Reconstruction of the existing Apron S with the provision, in the first and subsequent stages of construction, of the Aircraft Parking Area, which would allow for manoeuvring an aircraft simply from the thrust of its own engines.

The Main Indicators for the Options for placing New AR-2

Item No.	Item	Unit of measure	Quantity	
			Option 1	Option 2
			Axis Offset	No Axis Offset
1	Airfield Pavement Area, Total	m^2	1,064,105	1,016,010
2	Length of a New Additional Fence and Patrol Road	running meter	1,400	3,100
3	Additional Land Allocation Area	hectare	≈19.1	≈27.4

Upon comparison of both Options, the advantage (in view of the main indicators) should be given to Option 1, which envisages the Offset of the Axis of the New Runway.

The Planned Position of the New Runway with Artificial Turf (AR-2) is determined based on the provision of Regulatory Distances between the Aerodrome Elements; the Aerodrome Elements and Stationary and Moving Objects; placement of Lighting and Radio Equipment, taking into account their Critical and Sensory Areas; and Aviation Security Requirements for the Aerodrome Area.

The Axis of new AR-2 is offset parallel to the Axis of the Old Runway-2 by 80 meters to the west, which accommodates the Runway Strip and the Radio-Navigational/Landing Facilities within the Existing Airport Grounds.

The Northern End of the New AR-2 (18R) has been altered to take into account the Height of the Existing Fence, which should not be an obstacle for Aircraft carrying out Take-Off and Landing Operations.

The Geometrical Dimensions of the Elements of Manoeuvring Area No.2 have been adopted in accordance with the Standards and Recommended Practices of ICAO for Aerodromes with a Reference Code of 4F.

The Length of New AR-2, in accordance with the Design Assignment, is 3,800 meters. The AR Width is assumed to be 45 meters in accordance with the requirements of paragraph 3.1.10 of Annex 14.

In accordance with the recommendations of paragraph 3.2.2 of Annex 14, the Reinforced Shoulders have been adopted at 15m each and placed on both sides of New AR-2. Therefore, the Total Width of the Runway and its Shoulders is 75m. In the previous FS, the Total Width of the Runway and its Shoulders was 63m.

The Width of the Aerodrome Runway Strip, including the Runway equipped for a precision approach, is 280 meters in accordance with paragraph 3.4.3 of Annex 14 and is located symmetrically on both sides of the centre line of AR-2 and its extension for 140 meters. In the previous FS, the Runway Strip width was 300m (150m on both sides).

The length of the Runway Strip is 4,100m and includes sections of 150m beyond both Ends of AR-2.

Instrument Landing Systems [ILS] for radio navigation and landing are placed taking into account the regulatory requirements for their Critical And Sensory Areas, set forth to protect the structure of the radio signal from the curvature of the Earth's Surface, Mobile and Stationary So-Called 'Radio Opaque' Objects - Technical Buildings and Structures, Vehicles on the Patrol Road, Fences, Aircraft on Taxiways and Aprons, etc. (even objects located outside the airport can affect the operation of the ILS). The Project provides for an Additional Land Allocation to accommodate Localisers, Glide-Path Beacons and Lighting Facilities, which protects their Critical and Sensory Areas.

The Width of the Taxiways was adopted in accordance with the recommendations of paragraphs 3.9.4 and 3.10.1 of Annex 14 - 23 meters with two Reinforced Shoulders 10.5m wide on both sides (for taxiing a Code F Aircraft) and 7.5m wide (for taxiing a Code E Aircraft). In the previous Feasibility Study, the Width of the Main Taxiway was 25m, and the Width of the High-Speed Exit Taxiways and Connective Taxiways was 23m.

The Separation Distances between the Axes of Parallel Taxiways, between the Axes of Taxiways and Facilities, between the Axes of Aircraft Lead-In Lines to the Parking Area have been adopted in accordance with Table 3-1 of Annex 14 and take into account the location of Facilities, Buildings and Structures of the Existing Airport Infrastructure.

On Apron S, Reconstruction is envisaged, which ensures Manoeuvring and Parking of Codes C, D, E and F Aircraft. The Lead-In and Lead-Out of an aircraft is carried out from the thrust of its own engines.

The size of an Aircraft Parking Area for each code has been adopted in accordance with the recommendations of the IATA Airport Development Reference Guide.

The width of Two-Way Service Roads has been assumed to be 8m, of One-Way Roads - 4m.

Two Stands will be set up on the Apron for the treatment of Code F Aircraft with an Anti-Icing Liquid.

In accordance with the requirements of the Design Assignment, an Aircraft Engine Test Site will be set up behind the Cargo Sector Parking Area. A Shield will be set up around the Aviation Equipment Protection Site, Support Equipment, People and Structures, to absorb and deflect the Exhaust Blast of Aircraft Engines for Code F Aircraft.

The Isolated Parking Area will be located at a distance of 100m from the existing fencing and the designed objects of Manoeuvring Area No.2.

The Plan to arrange aircraft on the Apron, Parking Areas, Aircraft Engine Test Site and Isolated Parking Area is shown in Drawing АПР-04.

4. Grading Plan.

According to the materials of the Engineering and Geological Surveys, the natural basis of Aerodrome Pavements is solid, silty, and loess sandy loam of Type I Subsidence. No groundwater has been found when exploring ground 10 meters deep.

The project envisages the Grading of Manoeuvring Area No.2 so that Surface Runoff is collected and diverted beyond the Aerodrome Pavements, Runway Strip, Taxiway Shoulders, Critical and Sensory Areas of the ILS in a lower planning point.

The Longitudinal Profile (Drawing АПР-05) for new AR-2 and its extension provides direct visibility in front of the antennas of the Localisers in both directions.

Longitudinal Slopes of Artificial Pavements have been accepted within the Regulatory Limits; Transverse - min 0.005 on Taxiways, min 0.003 on Apron, and min 0.015 on AR.

Longitudinal Slopes of Unpaved Aerodrome Sections have been accepted from the minimum possible 0.002 when installing an Open Drainage System (Fortified Shallow Ditches outside the Runway Strip and Taxiway Shoulders) to the maximum possible 0.025. The arrangement of Shallow Open Fortified Ditches accelerates the process of Evaporation of Effluents and reduces their Infiltration into the Soil in comparison with the System of Soil Gutters.

The Design Surfaces for the planning of Airfield Pavements, Soft Surfaces of Manoeuvring Area and of Slopes to the Existing Relief have been made in the form of a Digital Model using the AutoCAD® Civil 3D® 2014 software product.

The Grading Plan is shown in Drawing АПР-06.

5. Earthworks.

The Earthworks Project envisages the following in Manoeuvring Area No.2:

- In the 'Trough' of new Aerodrome Pavements, removal of Vegetative Soil in full.
- On the Unpaved Sections of the Runway Strip and Taxiway Shoulders, removal of a Vegetation Soil Layer in full, followed by Restoration of a 20cm-thick layer to form a Sod Cover.
- On the Unpaved Sections outside the Runway Strip and on Design Slopes, removal of the top 20cm-thick layer of Vegetation Soil, followed by its Restoration to form a Sod Cover.

The Total Volume of Earthworks to form an Embankment (in the compacted state) makes 3,805,061m^3, including:

- In the 'Trough' of the Aerodrome Pavements 1,106,522m^3.
- On the Unpaved Sections of the Runway Strip 2,357,737m^3.
- On the Unpaved Sections outside the Runway Strip 340,802m^3.

The lack of Mineral Soil in the amount of 3,640,567m^3 for filling the Embankment will be imported from the Quarry.

The Earthworks Diagrams are shown in Drawings АПР-07, АПР-08, and АПР-09.

After the completion of all types of Earthworks and Grading and Levelling Works, Agrotechnical Works will be carried out in an Optimal Agronomic Season, on the Unpaved Sections of the Runway Strip and outside it, consisting of Pre-Sowing Treatment, Mineral Fertilization, and Sowing Mixed Grass Seeds.

The total area to cover is 261.3ha, including within the Runway Strip – 180.0ha, outside the Runway Strip – 81.3ha.

6. Artificial Aerodrome Pavements.

The new Aerodrome Pavements for the operation at the Design Load (at a standard load of 900 kN on the aircraft conditional gear and the tire pressure of 1.5 MPa) will be of a multi-layer rigid type, consisting of:

- Soil Foundation with K-factor K_s=40MH/m^3.
- Artificial Base – Sand Cement from Ready-Mix M 75, 30cm thick.
- Bottom Layer of the Pavements – 'Lean' Concrete B 10/150, 30cm thick.
- Top Layer of the Pavements – Monolithic Cement Concrete B_{tb} 4.4/55, 45cm thick.

The Aerodrome Pavements that had been adopted in the previous FS, consisted of the following layers:

- Sand Cement M40, 15cm thick.
- 'Lean' Concrete, 30cm thick.
- Cement Concrete B_{tb} 4.0/55, 45cm thick.

In the Upper Layer of the Pavements, it is planned to form Transverse Seams with Pin Connections. In the Longitudinal Seams that divide the 8m-wide Plates into two 4m-wide Plates, Seams with Pin Connections will also be formed. A Tongue-and-Groove Connection will be used in the Longitudinal Through Seams.

In the Lower Layer of the Pavements from 'Lean' Concrete, it is planned to cut Transverse and Longitudinal Seams aligned with the Seams of the Upper Layer.

Reinforced Shoulders will be made of 30cm-thick Cement Concrete based on 15cm-thick Ready-Mixed Sand Cement.

The Dimensions of the Plates of the Load-Bearing Cement-Concrete Pavements have been taken as 7.5m×7.5m; 4m×7.5m; Plates of the 'Lean' Concrete Pavements 7.5m×15m; 8m× 15m. The Dimensions of the Plates of The Cement-Concrete Pavements of the Reinforced Shoulders have been taken as 7.5m×7.5m.

According to Preliminary Theoretical Calculations, the PCN of New Airdrome Pavements of Manoeuvring Area No.2 will exceed 102.

For comparison, theoretically calculated PCN of Aerodrome Pavements of AR-1 of Manoeuvring Area No.1, put into operation in 2001, was 80. In 2018, it was determined that the actual PCN of AR-1 is 113.

The total area of Aerodrome Pavements will be 1,062,905m^2, including:

- AR-2 – 171,000m^2, Shoulders and Ends 88,850m^2.
- Main Taxiway-2 – 87,400m^2, Shoulders 50,360m^2.
- Main Taxiway as a Connective Taxiway – 87,400m^2, Shoulders 49,590m^2.
- High-Speed Exit Taxiways – 105,600m^2, Shoulders 58,800m^2.
- Connective Taxiway – 41,900m^2, Shoulders 21,870m^2.
- Taxiway-9 – 17,540m^2, Shoulders 10,980m^2.
- Taxiway-10 and Apron G – 11,160m^2, Shoulders 1,900m^2.
- Taxiway-16 – 2,830m^2, Shoulders 1,935m^2.
- Taxiway-17 – 2,730m^2, Shoulders 1,895m^2.
- Taxiway-18 – 2,285m^2, Shoulders 1,090m^2.
- Aircraft Engine Test Site – 19,620m^2, Shoulders 330m^2.
- Isolated Parking Area – 13,070m^2, Shoulders 3,060m^2.
- Apron S – 121,430m^2, Shoulders 5,700m^2.
- Parking Area – 83,300m^2, Shoulders 480m^2.

Elements of the Aerodrome Pavements and their sections are shown in Drawing АПР-10.

7. Environmental Protection under the APW Section.

In terms of environmental protection, this section of the FS provides:

- Drainage of Wastewater from new and existing Aerodrome Pavements of Manoeuvring Area No.2 into the designed Drainage System and transportation to Treatment Facilities.
- Protection of Natural Resources on the Occupied and Allocated Lands:

- Removal and restoration of Vegetative Soil on the Unpaved Sections of the Runway Strip and beyond.
- Removal of Vegetative Soil in the 'Trough' of Artificial Pavements and its transfer to improve the Airport Territory.
- Creating a Sod Cover that will prevent Soil Erosion.

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List
Of recalculated coordinates

Used software: Geodetic calculator. DGM Geoportal (dgm. Gki.com.ua Version 2.0)
Developer: НДІК

Date of recalculation: 22.12.2018
Task: Recalculation between coordinate systems
Input coordinates system: УСК - 2000 GK3 axial meridian 30°
Output coordinates system: WGS-84 (B, L)

		Input coordinates		Output coordinates	
No.	Item	x, м	y, м	B,	L,
1	3900	5596240.946	339924.054	50 29 44.24670	30 33 39.62182
2	18	5580683.77	362786.09	50 21 13.63302	30 52 50.07210
3	36	5576685.77	362647.46	50 19 04.31149	30 52 40.67498

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List
Of recalculated coordinates

Used software: Geodetic calculator. DGM Geoportal (dgm. Gki.com.ua Version 2.0)
Developer: НДІК

Date of recalculation: 22.12.2018
Task: Recalculation between coordinate systems
Input coordinates system: УСК - 2000 GK3 axial meridian 30°
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3	36	5576685.77	362647.46	50 19 04.31149	30 52 40.67498

To Director
Of Institute Ukrdorproekt LLC
Koretsky S.S.

Re Initial Data to assess the Aircraft Noise Impact

Dear Sergey Stepanovich,

As part of the Design And Survey Works on the Project “Reconstruction of Manoeuvring Area No.2 of Boryspil International Airport State-Owned Enterprise”, please take into account the following Baseline Data:

1. *Operation scenario on the most "typical" day for “The Boryspil International Airport State-Owned Enterprise” Airfield Complex in accordance with the load for 2018.*

   1.1. Total Number of Operations:
   - 152-155 Take-Offs
   - 151-155 Landings

   1.2. Number of Operations at Night:
   - 30 Take-Offs
   - 17 Landings

   1.3. Runway Load Distribution:
   - Runway 1 - 85%
   - Runway 2 - 15% (only landing aircraft due to low PCN)

   1.4. To accept the types of aircraft for calculations using the Flight Plans for 2018 (submitted to Institute Ukrdorproekt LLC by previous letters).

2. *To assess the aircraft noise impact, the Scenario of the Long-Term Operation of “The Boryspil International Airport State-Owned Enterprise” Airfield Complex.*

   The total number of operations by type of aircraft has been determined by the Master Plan of the Boryspil Airport developed by Airport Consulting Vienna (paragraph 21 of the Design Assignment No. 58-25/1-2 dated the 7th February 2019). At the same time, we request you to accept the following weights (%) for each type of aircraft: Codes A, B - 5%; Code C - 60%; Codes D, E - 30%; Code F - 5%, when preparing the Feasibility Study. The forecast for the number of Annual Take-

Off/Landing Operations until 2045 and the types of Design Aircraft are attached hereto.

2.1. Number of Operations at Night - we accept this as proportional to the actual situation and in accordance with regulatory requirements.

2.2. Runway Distribution (starting from 2030):

- Runway 1 - 50%
- Runway 2 - 50%

2.3. Operational Requirements:

- For daytime, leave Aircraft of Chapter 3 (ICAO Noise Certification Requirements) and above.
- For the night-time, leave Aircraft of Chapter 4 (ICAO Noise Certification Requirements) and above.

Sincerely,
Deputy General Director for Commercial Activities
and Strategic Development G.Yu. Zubko

Prepared by: Petrichenko A.I., 044 281-76-55

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FORECAST FOR AIRCRAFT TAKE-OFF AND LANDING OPERATIONS (BASIC SCENARIO)

The long-term forecast for aircraft take-off and landing operations at the Boryspil airport shows the following results:

FORECAST FOR AIRCRAFT TAKE-OFF AND LANDING OPERATIONS FOR 2010 - 2045 rr.

[GRAPH]

Illustration 5-21: forecast for aircraft take-off and landing operations at the Boryspil airport (Basic scenario)

The volumes of aircraft take-off and landing operations at the Boryspil airport in Basic scenario will reach 406 720 in 2045.

- Aircraft take-off and landing operations of basic airline prevail during the forecast period (59.69% in 2045)

- Share of aircraft take-off and landing operations on domestic flights will increase slightly and will reach 13.18% in 2045 (56,619 aircraft take-off and landing operations)

- Total take-off and landing operations will increase as follows from 74,313 in 2016:

Aircraft take-offs and landings	***2020***	***2045***
Basic airline	71.627	242.790
Other airlines	46.284	154.505
Business aviation airlines	1.609	2.203
Cargo airlines and others	1.940	7.222

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Annex M.4. Maximum Sound Level Contours (dBA) at prospective load of Boryspil IA SOE at night (23:00-7:00)

Legend

Restricted Development Zones

as per the SSR 173

Zone Б	71 dBA ≤LAmaxN ≤ 75 dBA
Zone В	76 dBA ≤LAmaxN ≤ 80 dBA
Zone Г	LAmaxN >80 dBA

Scale 1:50000

Agreement	No.UA-KBP-02/C-2 dated 03 April 2019
Customer	Boryspil IA SOE
Contractor	INSTITUTE UKRDORPROEKT LLC
Subcontractor	Sole Trader Chaikovska Olena Anatoliivna

Head of the Project _____ Chaikovskyi M. Yu

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Annex M.3. Maximum Sound Level Contours (dBA) at prospective load of Boryspil IA SOE during the day (7:00-23:00)

Legend

Restricted Development Zones

as per the SSR 173

Zone Б,В	81 dBA ≤LAmaxD ≤ 85 dBA
Zone Г	LAmaxD >85 dBA

Scale 1:50000

Agreement	No.UA-KBP-02/C-2 dated 03 April 2019
Customer	Boryspil IA SOE
Contractor	INSTITUTE UKRDORPROEKT LLC
Subcontractor	Sole Trader Chaikovska Olena Anatoliivna

Head of the Project _____ Chaikovskyi M. Yu

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Annex M.2. Maximum Sound Level Contours (dBA) at current load of Boryspil IA SOE at night (23:00-7:00)

Legend

Restricted Development Zones

as per the SSR 173

Zone Б	71 dBA ≤LAmaxN ≤ 75 dBA
Zone В	76 dBA ≤LAmaxN ≤ 80 dBA
Zone Г	LAmaxN >80 dBA

Scale 1:50000

Agreement	No.UA-KBP-02/C-2 dated 03 April 2019
Customer	Boryspil IA SOE
Contractor	INSTITUTE UKRDORPROEKT LLC
Subcontractor	Sole Trader Chaikovska Olena Anatoliivna

Head of the Project _____ Chaikovskyi M. Yu

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Annex M.1. Maximum Sound Level Contours (dBA) at current load of Boryspil IA SOE during the day (7:00-23:00)

Legend

Restricted Development Zones

as per the SSR 173

Zone Б,В	81 dBA ≤LAmaxD ≤ 85 dBA
Zone Г	LAmaxD >85 dBA

Scale 1:50000

Agreement	No.UA-KBP-02/C-2 dated 03 April 2019
Customer	Boryspil IA SOE
Contractor	INSTITUTE UKRDORPROEKT LLC
Subcontractor	Sole Trader Chaikovska Olena Anatoliivna

Head of the Project _____ Chaikovskyi M. Yu