URANIUM GIS OPERATION PROJECT OF THE *"ADRAR EMOLES 3"* RESEARCH PERMIT (AGADEZ REGION, NIGER)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

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Executive Summary

Note: This Executive Summary includes the latest figures on Mineral Resources and Reserves as quoted in the 9 Jan 2023 Feasibility Study, for regulatory alignment. Other project, environmental and social information which has become available since the ESIA was developed is addressed in the ESIA Addendum (10 February 2023).

Introduction

The Canadian TSX listed company, Global Atomic Corporation (GAC), through its subsidiary Global Atomic Fuels Corporation (GAFC), owns an 80% interest in Société Miniere de DASA S.A. (SOMIDA), the remaining 20% of which is owned by the Government of Niger. GAC is proposing the development of the "Adrar Emoles 3" research permit uranium mining project.

In accordance with Nigerien legislation, in particular law n° 98-56 of 29 December 1998 on the framework law relating to environmental management, law n° 2018-28 of 14 May 2018 determining the fundamental principles of environmental assessment in Niger, and its implementing decree n° 2019- 027/PRN/MESU/DD of 11 January 2019, the project was the subject of an environmental and social impact study dated November 2020 prepared by Niger based environmental consulting firm Art & Genie, which was approved by the Ministry in charge of the Environment.

As part of an initiative to move towards compliance with the Equator Principles and the International Finance Corporation (IFC) Performance Standards, GAC retained Niger based environmental consulting firm FEED Consult to update the Art & Genie ESIA report.

Niger has significant mining potential which is largely under-exploited. Resources include uranium, oil, gold, mineral coal, cassiterite, etc. Uranium has been exploited since the 1970s and remains an important industry for the country, despite recent reductions in its contribution to GDP (down from 10.8 % in 2013 to 6 % today). To enhance the impact of mining on poverty reduction, the state introduced a provision in the mining law in 2006 that devotes 15% of all mining revenue to the communes of the regions concerned.

GAC holds six mining exploration permits for uranium and related substances. It has been present in Niger since 2007 and has an office in Niamey, a regional office in Agadez and an exploration camp at the site of the proposed mine.

The company's staff is made up of Nigerien technical staff and numbers around 50 permanent employees and several dozen temporary employees. Support services such as drilling, geophysics, analysis, consulting, transport, security etc. are procured locally.

Since arriving in the Agadez region, GAC has made a significant contribution to local development by financing actions to benefit the populations living near its exploration sites. This amounts to around 291 million CFA which has funded water supply infrastructure, food donations, an ambulance and medical equipment. In addition, SOMIDA has prioritized two key CSR programmes: training and apprenticeships for the local population; and support of local market gardening initiatives to provide agricultural training, infrastructure and irrigation.

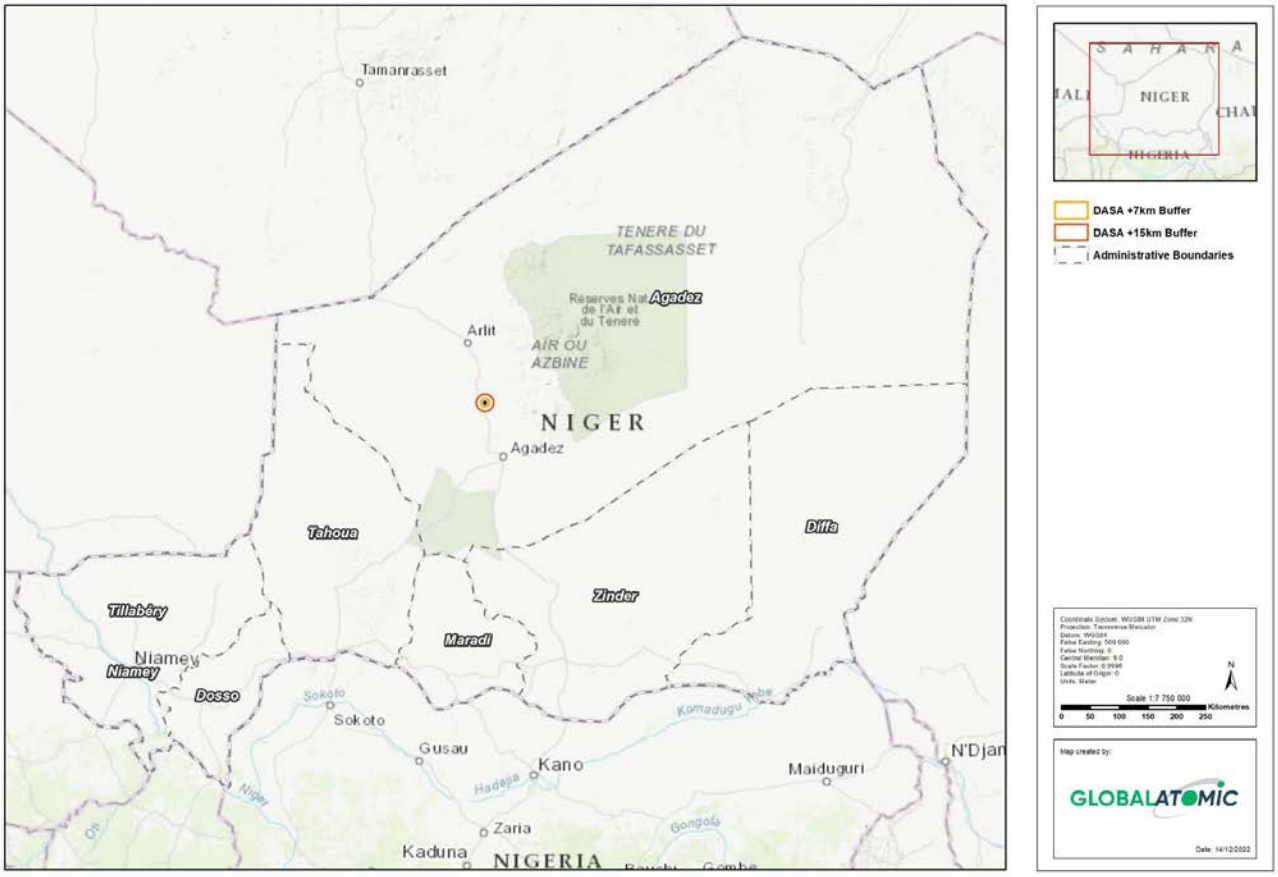
The proposed mine

The area of the exploitation permit, which is the subject of this project, covers an area of 25.01 km² located in the rural commune of Tchirozérine (Department of Tchirozérine, Agadez Region). The Project is known as the Dasa Mine. Phase I operations anticipate the underground mining of approximately 45 million pounds of uranium oxide (U_3O_8 or "Yellowcake") over a 12-year mine life. The Dasa Mine will be managed by an experienced uranium mining team previously responsible for running the nearby Cominak Uranium Mine.

The Niger Government deems yellowcake a "strategic product". Therefore, it will be transported from the mine site to the Port of Cotonou, Benin, by the Niger Government's transportation company, the National Company for the Transport of Strategic Products ("CNTPS") in their trucks and accompanied by armed security. From the point of collection at the mine, the transport of yellow cake is the responsibility of the CNTPS.

All known uranium deposits in Niger are located in sandstones and conglomerates of the Tim Mersoi basin. They are all classified as belonging to the tabular sedimentary type. The best grade and tonnage of uranium in the Adrar Emoles 3 deposit is found in the sandstone of the Tchirozérine 2 formation, the same formation that also contains the large ORANO Imouraren deposit, located about 40 km to the northwest.

The uranium in the Tchirozérine 2 formation occurs mainly as hexavalent uranium minerals in an oxidised environment. Uranophane is the most abundant mineral and is commonly associated with chrysocolla and boltwoodite. Metatyuyamunite, coffinite, chalcocite, native copper and pitchblende are also found in small amounts. The ore occurs as massive sulphide mineralisation in microcracks with galena and spalerite, and as interstitial deposits in the sandstones.



Location Map

Mineral resource and reserve estimates

The project will process 4.066 Mt of uranium-bearing ore grading 5,267 ppm U_3O_8 over a 12-year mine plan to produce 44.1 Mlb of recovered Yellowcake, with an average steady state metallurgical recovery of 94.15% (overall average 93.4%).

The Mineral Resource Estimate (MRE) (2019) is summarized below. The MRE includes Inferred Mineral Resources that are normally considered too speculative geologically to have economic considerations applied to them that would enable them to be categorized as Mineral Reserves. It is reasonably expected that most of the Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued infill drilling.

Category	Million tonnes	eU_3O_8 (ppm)	Contained eU_3O_8 (Mlb)
Indicated (Open pit)	25.59	1,711	96.5
Indicated (Underground)	0.71	3,250	5.1
Total Indicated	26.30	1,752	101.6
Inferred (Open pit)	18.93	1,357	56.6

Category	Million tonnes	eU_3O_8 (ppm)	Contained eU_3O_8 (Mlb)
Inferred	3.38	4,151	31.0
(Underground)	22.31	1,781	87.6
Total Inferred			

Source: Dasa Uranium project Phase 1 Feasibility Study, NI43-101 Technical report 9 Jan 2023

Mineral Reserves are reported in the Probable category as shown below, effective 15th Nov 2021.

Mineral Reserve Category	Run of Mine (Mt)	U_3O_8 (ppm)	U_30_8 (kt)	U_3O_8 (Mlb)
Proven Mineral Reserve	-	-	-	-
Probable Mineral Reserve	4.1	5,267	21.5	47.2
Total Mineral Reserve	4.1	5,267	21.5	47.2

Source: Dasa Uranium project Phase 1 Feasibility Study, NI43-101 Technical report 9 Jan 2023

The mine will be an underground operation with an initial life of 12 years, producing ore at a rate of 4.13 million tonnes per annum. Water consumption is calculated to be approximately 100 m^3/hr, fuel usage 2000 l/d, and processing reagents use 93 t/d. A total of 450 direct and indirect jobs will be created during construction, and 450 direct and an estimated 500 indirect jobs during operations.

Financial and economic impact of the project

The implementation of the project will generate financial and economic impacts in terms of improved revenues from the payment of taxes and royalties. This is in addition to the creation of direct and indirect employment opportunities. Ultimately, it's estimated the project will generate the following revenues expressed in millions of US dollars:

- Tax revenue: 92
- Mining royalties: 141
- Nigerien labour costs: 64
- Expenditure on corporate social responsibility (CSR): 1.2

Project activities

The main project activities are set out below.

Project phase	Activities
Development (Preparation and construction)	• Development of access roads/tracks and fencing of surface infrastructure. • Site preparation (stripping or removal of overburden) for the construction of temporary facilities. • Installation of temporary infrastructure (living quarters for the construction personnel, laydown areas etc.). • Borrow pits and quarries (operated by third party). • Construction of surface structures and equipment (employee living quarters, administrative and technical blocks, processing plant and support services including maintenance workshops/garages, warehouses, sulphuric acid plant, ponds, dams, boreholes, tailings facility, power generation system, etc.). • Development of the underground mine (ramps, galleries, ventilation holes) and support services (garage, workshops, crushing plant etc).
Operation	• Extraction of ore from underground (drilling, blasting, transport of ore to the primary crusher, conveying to surface). • Storage of inputs (chemicals including sulphur, hydrocarbon products). • Operation of workshops. • Ore storage, crushing and conveying to the plant. • Processing plant (grinding and classification, leaching, liquid/solid separation, clarification, precipitation, purification, uranate drying/calcination and smelting). • Waste rock and paste tailings backfill to underground workings. • Dewatering and storage of excess tailings from ore processing. • Loading and shipping of uranate. • Periodic maintenance of the plant.
Closure	• Dismantling of facilities. • Site clean-up. • Site redevelopment/restoration.

Water supply and efficiencies

Water for the mine and support services will be supplied from groundwater. The aquifers in the Téloua formation and Tchirozérine 2 will be the main sources. Dewatering water from the mine will also be used in processing to reduce overall abstraction. Hydrogeological surveys have also highlighted the possibility of exploiting other aquifers such as the Gezouman and Tarat.

Pump tests carried out on boreholes in the Teloua aquifer have given flow rates varying between 15 and 25 m^3/h. According to the Feasibility Study, the process plant will require 64.1 m^3/hour, the underground mine will require 30.4 m^3/h for dust suppression, drilling, cleaning, etc. and the camp 3.3 m^3/h, totaling approximately 100 m^3/hr.

Electricity supply and efficiency

Electricity supply during construction will be provided by diesel generators, including for the water supply systems. Diesel for the generators will be stored in a protected area equipped with spill kits and associated oil/water separators.

In the operational phase, power will be provided by the national power company, SONICHAR, with back-up diesel generators, battery storage and a 13.5 MW solar power plant. A 5 km connection will be built from the existing line which runs along the main road between Agadez and Arlit, to a substation within the operational area. The power line and substation are the only Associated Facilities identified for the project.

Base-case operations-phase greenhouse gas (GHG) emissions are estimated at 65,395 tonnes per annum (tpa) including 12,477 tpa scope 1 emissions and 52,919 scope 2 emissions. This assumes that most of the Project's electricity requirements will be provided by a state-owned coal-fired power station via the Nigerien national grid with a solar photovoltaic (PV) panels component and diesel back-up, and that vehicles will be fueled by diesel. There is an optimized plan to install solar photovoltaic (PV) panels linked to battery storage and back-up diesel, with the intent of providing approximately 20% of the Project's total requirement as renewable energy. This would reduce the total estimated GHG emissions to 52,871 tpa to include 21,275 tpa scope 1 emissions and 31,596 tpa scope 2 emissions. Furthermore, there is a conceptual plan to reduce the mine site power demand from 12 megawatts (MW) to 9 MW which, coupled with solar PV and battery storage, and back-up diesel, would target a reduction in GHG emissions to 43,000 tpa; a 34% reduction from the base case scenario to include 18,691 tpa scope 1 emissions and 24,422 tpa scope 2 emissions.

GHG emissions will exceed 25,000 tpa and will therefore need to be measured and reported on an annual basis in order to comply with IFC PS3. Power for the construction phase is expected to be provided via diesel fuel (vehicles and generators).

In line with IFC PS3, SOMIDA has an obligation to continuously seek and implement cost effective measures for improving efficiency in its consumption of energy, as well as water and other natural resources and material inputs. SOMIDA plans to introduce battery electric vehicles (BEV) to the underground and surface fleets over time to the extent practical.

UN Sustainable Development Goal #7 is to ensure access to affordable, reliable, sustainable and modern energy for all. According to the European Nuclear Society, 1 kg of natural uranium is equivalent to 14,000 kg of coal and enables the generation of 45,000 kWh of electricity, so the production of approximately 45 million pounds of U_3O_8 in yellowcake, after enrichment, will be transformed into 17,580,000 kg of natural uranium which replaces 246 mt of coal and generate 791,100 million kWh of electricity.

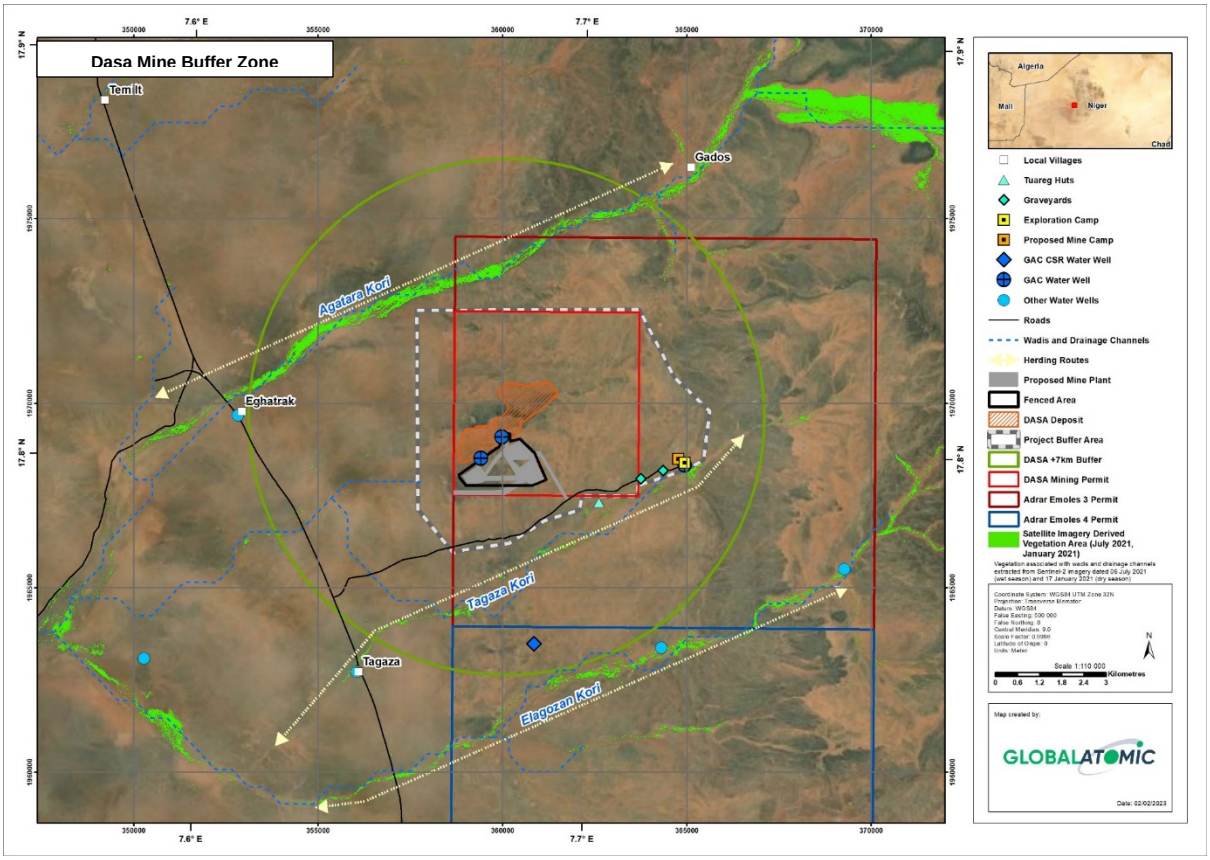
Geographical boundaries and types of impacts

Taking into account the environmental and social issues related to this type of project, three main impact zones were defined. These include the direct impact zone, the intermediate impact zone and the diffuse impact zone:

- Zone of direct impact: This corresponds to the deposit area, the exploitation permit area (a regulatory limit defined by the corners of the exploitation permit) and a radius of 15 km. This includes a 40 km^2 operational area within which areas close to surface infrastructure measuring roughly 2 km^2 will be fenced, and from which domestic animals and community members will be excluded. Within this area, disturbance will be caused to elements of the biophysical and human environment and direct and indirect impacts are assessed. This area includes the villages of Gados, Issakanane, Tagaza, Egatrak, Timelt-Abouss and Ouford.
- Intermediate impact zone: This corresponds to the zone beyond the 15 km radius. Within this zone, some positive (in terms of job creation, economic development, health, education, water supply, etc.) and negative (emissions) impacts of the project will be felt or perceived.
- Diffuse impact zones: this is a large zone in which the project's impacts will be perceived on a regional or even national scale, particularly in relation to the improvement of tax revenues. This includes consideration of any potential transboundary effects associated with the mine, for example airshed and catchment considerations. Other than the overall contribution of the project to greenhouse gas levels in the atmosphere, no potential transboundary effects have been identified.

Stockbreeding is the primary economic activity of the inhabitants of the region. It is carried out by all sectors of the population, irrespective of ethnic group, gender or social category. Except for some large-scale stock farmers, the herds are family capital managed on behalf of the family members by the head of household. Family stock farming involves several species of animals including goats, sheep, donkeys, and camels. In the Project area, it is understood that the east-northeast to west-southwest trending koris are used as transit or nomadic herding corridors on a limited basis, in connection with the “Cure Salee”, a meeting of Kel Tamashek (Tuareg) from around the region which celebrates the end of the rainy season and is held at the Town of In-gal, located approximately 150 km south-west of Dasa.

Crop farming is an important activity that is carried out by a small number of men and women in the Project area. This activity is carried out in the main valleys, is irrigation-based and takes place practically all year round. The market gardens are laid out on both sides of the koris. The main crops are lettuce, bell peppers, cabbage, carrots, squashes, onions, potatoes and alfalfa. In the Project area, FEED Consult (2022) found approximately 7.3 ha under cultivation within an approximate 15 km radius around the Project site, the closest being the market gardens of Elagozan, approximately 5 km to the south.



In the Project vicinity, the vast majority of the population lives in villages, of which Eghatrak and Tagaza are nearest to the Project site, more than 5 km to the west. The area surrounding the mine site is sparsely populated, with small clusters of huts occupying land along the koris. Settlement within the koris is limited to families with small groups of animals on an approximate 200-300 m spacing. The inhabitants typical live within the kori during April to June and September to December. During the wet season from July to September and winter season from December to March, the inhabitants move to the edges of the koris where it is dryer and warmer respectively. The nearest settlement to the Project site is a collection of three huts approximately 1.5 km to the east-southeast. There are not believed to be any permanent residents within the 40 km^2 buffer area around the site.

Cumulative impacts have been considered, which includes other industries or development projects which might be taking place in the area and which may add to pollution loads or stresses on the environment and communities or enhance positive effects such as economic development.

Initial state of the environment

Relief

The relief of the study area is heterogeneous. The setting is characterised by the presence of the Aïr massif to the east, from which koris (ephemeral channels) flow to the extensive rocky plateaus and sandy plains to the west.

Climate

The climate of the Agadez region is tropical and sub-desert, characterised by a very high level of aridity. There are two main seasons, a long dry season from November to May and a very short rainy season from June to September. These are further subdivided into a dry and cold period (November to March), a hot season (April to June), a rainy season from June to September, and an intermediate transition period (September to November).

According to the 10-year record from the nearby Tchirozérine station, seven years out of 10 have recorded rainfall greater than 100 mm and three years out of 10 have rainfall less than 100 mm. The maximum recorded during the period is 271.6 mm and the minimum 48.8 mm. Maximum temperatures range from 26 to 42 °C and minimum temperatures from 12 – 26 °C.

Soils

Soils are relatively poor, saturated and sometimes overexploited and their agricultural development requires significant amendments (mineral fertilisers and organic matter).

The project area is located in an area of Quaternary deposits composed of sands, gravels and clays.

Geology

The geology of the project area is marked by two major groups: the basement (Air crystalline massif) which occupies the eastern part of the Agadez region and the sedimentary basin (Tim Mersoi basin) which occupies the western part of the region.

The basement is formed of crystalline rocks of Precambrian age and granite intrusions. Volcanic events and tectonic movements have shaped the region. The Tim Mersoi Basin is essentially made up of clay, clay-sandstone and sandstone sequences of Carboniferous and Lower Cretaceous ages. This basin forms the eastern part of the larger Iullemmeden basin located south of the Hoggar mountains.

Within the perimeter of the permit, sedimentary formations outcrop, mainly Carboniferous and Permo-Triassic. These contain the uranium mineralisation of the Akouta and Arlit deposits.

Water resources

The surface waters are made up of temporary streams known as koris and semi-permanent streams. The koris are seasonally flowing valleys that drain the western slopes of the Air massif and provide limited recharge to groundwater.

The hydrogeology of the region consists of a multi-layered aquifer system comprising the Guezouman, the Tarat and the Izégouandane aquifers in the eastern part of the In-Azaoua-Arlit fault. In the western part, these are overlain by a permeable horizon which hosts the Tchirozérine and Téloua aquifers.

Abstraction in the area is insignificant overall, despite abstractions by companies to the southwest of the site. Monitoring in 2013, 2018, and 2022 showed no change in the aquifer levels in the area. Rainfall recharge is thought to be low, based on aquifer levels over time, and there is thought to be limited connectivity between the aquifers based on the same data. Major faults may provide increased transmissivity.

Hydrochemistry

Both physico-chemical and bacteriological analyses were carried out on the water samples from three boreholes and compared to WHO standards. All results were below limit values apart from one exceedance at one borehole for fluoride.

Air quality

Baseline monitoring of air quality covered fine and coarse particulate matter (PM), heavy metals in aerosols and black carbon. PM_{10} and $PM_{2.5}$ were monitored in four locations and the results compared to WHO standards. $PM_{2.5}$ levels were exceeded at two sites and PM_{10} at four sites. PM_{10} concentrations vary with windspeed while $PM_{2.5}$ concentrations are more consistent.

Metals levels in the $PM_{2.5}$ fraction are within WHO/EU limits with the exception of chromium. Metal levels in the PM_{10} fraction show no exceedances. Exceedances are thought to be due to the desert environment, harmattan winds and the factories in Agadez, including the Sonichar power station at Tchirozérine.

The area is subject to sandstorms that often originate in the Sahara, exacerbated by sparse vegetation cover. Approximately 70% of the total area of the region has a *"very high"* level of vulnerability. Sandstorms affect the movement of people with disruption to visibility.

Dust deposition monitoring was not carried out, as due to the above, any baseline readings would exceed any recognised standards for dust deposition. Sensitive receptors are generally located several kilometers from the mine site. For this reason, air quality modelling has not been carried out, but mitigation measures are built into project procedures.

Noise environment

Ambient measurements were carried out at five sites based on the direction of the prevailing winds. The values obtained vary from 29.1 to 57.9 dB. WHO Environmental Noise Guidelines (WHO, 1999) are 55 dB during the day and 45 dB at night. Average values do not exceed WHO standards; there are no current noise generating activities within the permit area.

Background radiation

The Project area is located in a region of elevated background radiation due to the natural presence of high concentrations of uranium in the rocks and soils. Key exposure (dose) routes for workers and local residents are based on external atmospheric radiation, external radiation received from the ground, inhaled dust and gases, and ingestion of radionuclides on foodstuffs and contained in drinking water.

The radiological baseline was measured as follows:

- Measurements of external exposure dose rates at several points in and around the uranium deposit area and along two axes through the site;
- Measurements on soil samples; and,
- Measurements on water samples from all the supply points (wells and boreholes) of the villages and camps within a radius of 20 km of the deposit. External exposure dose rate measurements were also carried out where water samples were taken.

Based on the results of recorded external exposure dose rate measurements, the annual natural external exposure dose that would be received by a member of the public living in the area varies between 2.20 mSv (with a continuous dose rate of 250 nSv/h) and 0.53 mSv (with a continuous dose rate of 60 nSv/h).

The mass concentrations of uranium was measured in the soil samples; results vary from 0.99 mg/Kg to 4.28 mg/Kg.

In the water samples, the overall alpha activity concentrations are high in three wells (Gani, Tilkin, Adelay) and two boreholes (Base camp, Taden Sikiret), being greater than the WHO recommendation of 0.50 Bq/l/. The same is true for the overall beta activity concentration in the Taden Sikiret borehole, compared to the 1 Bq/l recommended by WHO. Apart from Adelay, the water points with high radiological levels are on the same Base camp-Taden Sikiret alignment.

The results of the ambient dose rate measurements are highly variable and reflect the heterogeneous nature of the terrain. They provide a good baseline, but in order to complement them and also to comply with the requirements for radiological environmental monitoring, GAC established four dosimeter stations to monitor alpha, beta, gamma and radon on a quarterly basis for a period of 12 months. An additional assessment of potential exposure will be calculated and compared with exposure rates elsewhere to Naturally Occurring Radioactive Materials (NORM) and health-based dose rates.

Biodiversity

A desktop-based biodiversity GIS review and Critical Habitat (CH) Screening Assessment were undertaken in 2021, with the aim of further aligning the Project with the requirements of IFC PS6, building on information and fieldwork provided by the 2020 ESIA.

The CH screening included identification and initial assessment of biodiversity features present within, or potentially impacted by the development of the project and was conducted in accordance with the requirements of the IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC PS6) and the accompanying Guidance Note 6 (GN6).

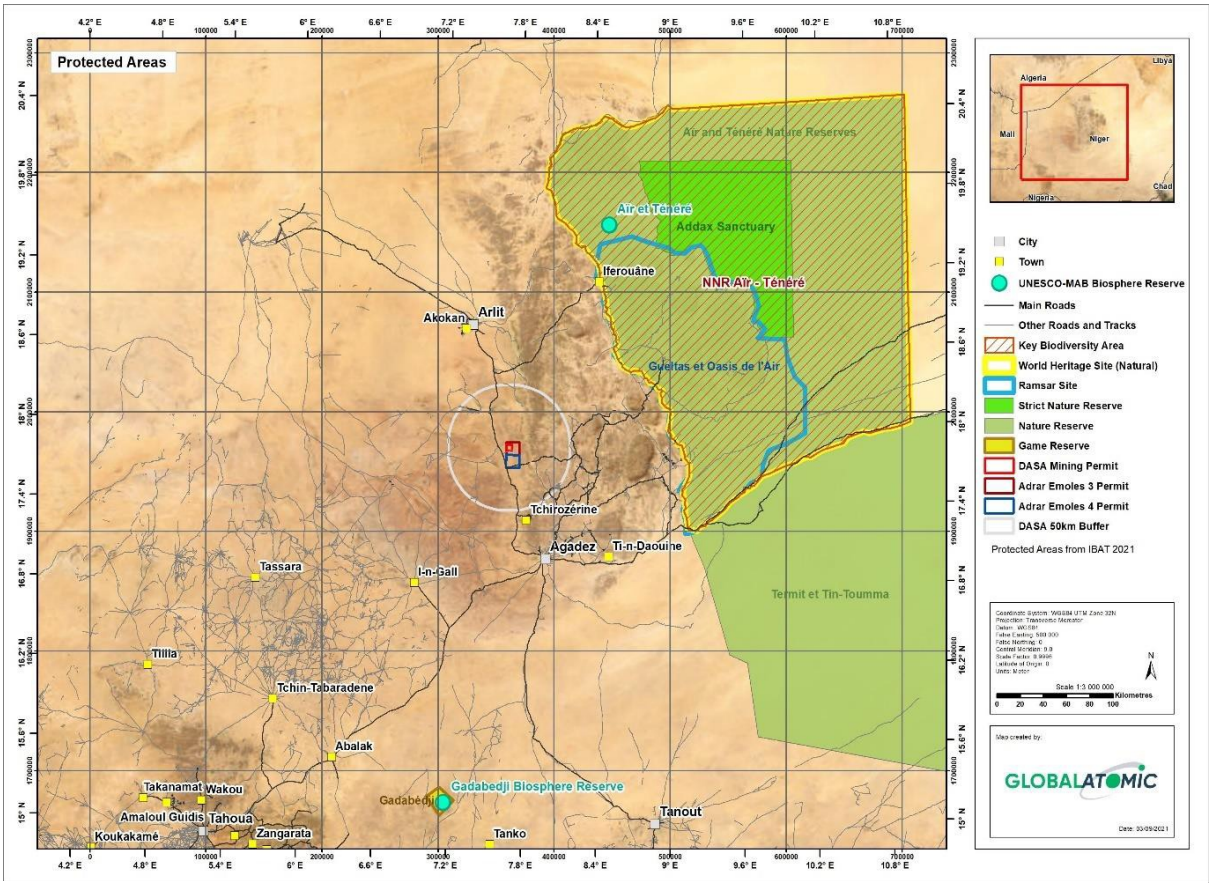
A “Landscape Study Area” (LSA) was identified for broad screening of biodiversity features which includes the DASA Project area, the entirety of the Adrar Emoles III and IV Exploration Permit Areas and any additional areas within a 50 km buffer around the Project location The assessment used spatial data, existing project related reports, publicly available biodiversity data, and the results of searches from internationally recognised biodiversity data sources (including the Integrated Biodiversity Assessment Tool (IBAT)).

IFC PS6 requires the identification and assessment of “Modified” or “Natural Habitat”; either of these may also be identified as “Critical Habitat” if they support certain high biodiversity values.

Seven legally protected areas have been identified during biodiversity studies, but all are understood to be more than 100 km from the Project site. The sites are:

- Aïr et Ténéré MAB UNESCO World Heritage Site;

- Aïr and Ténéré Natural Reserve UNESCO World Heritage Site;
- National Nature Reserve of the Aïr and the Teneré, Key Biodiversity Area and Important Bird Area. This shares the same boundary as the Aïr and Ténéré Natural Reserve;
- Gueltas et Oasis de l'Aïr Ramsar site;
- Addax Sanctuary, an IUCN Management Category Ia site and Strict Nature Reserve within the Aïr and Ténéré Natural Reserve;
- Termit et Tin-Toumma Natural Reserve; and,
- Gadabedji MAB UNESCO designation.



Legally Protected and Internationally Recognized Areas (Source: TEC/AGC Report 2021, IBAT 2021

The CH screening assessment was completed using a range of desktop sources. Thirteen species of conservation concern listed under the IUCN Red List of Threatened Species were conservatively assessed as having the potential to occur within the LSA based on overlap with the species IUCN distribution and/or the likely presence of suitable habitat. Of these species, three nomadic/ wide ranging mammals, North-west African Cheetah, Addax, and Dama Gazelle, have the potential to qualify the area as Critical Habitat. This potential required further field assessment which was carried in the dry and wet seasons (2021-2022).

Based on GIS spatial assessment, desktop CH screening, historical and current fieldwork

there is no critical habitat in the project's area of influence; defined as a 50 km circle around the mine site under IFC PS6 IBAT Report criteria.

Field surveys and GIS analysis confirmed that areas of perennial vegetation exist in association with koris and in lowland areas. The extent of vegetation cover is similar across both the dry and wet seasons, suggesting areas of permanent (likely woody) vegetation. The study carried out in the radius of 7 km, 15 km and surrounding areas established the baseline situation with regard to vegetation. A total of 29 species were recorded in and around the permit area in the dry season, including 17 herbaceous and 12 woody; whereas in the wet season 38 species were recorded, including 25 herbaceous and 13 woody. No species of conservation concern listed in the IUCN Red List have been identified from previous reports.

During the dry season, a total of 54 animal species were observed, including 34 birds, 13 mammals and 7 reptiles. These included Dorcas Gazelle and Aoudad which are classified as Vulnerable on the IUCN Red List, and the Spiny tailed lizard which is classified as Near Threatened.

Bird species included the Lappet-faced Vulture and the Egyptian Vulture which are classified as Endangered on the IUCN Red List, and appear in CITES Appendix II and CMS Appendix II/I for the Egyptian Vulture and CMS Appendix I for the Lappet-faced Vulture.

The rainy season survey identified 49 animal species including 34 birds, 10 mammals and 4 reptiles. Virtually the same mammals were recorded during the two missions. The only difference is the distribution, due to the abundance of grazing during the wet season.

The field surveys confirmed the following species of conservation concern to be present in the study area:

- Dorcas Gazelle *Gazella dorcas* (VU);
- Aoudad *Ammotragus lervia* (VU);
- Egyptian Vulture *Neophron pernopterus* (EN);
- Lappet-faced Vulture *Torgos tracheliotos* (EN); and,
- Tawny Eagle *Aquila rapax* (VU).

A full CH assessment has not been completed to determine if there are any CH qualifying species, but all five species are noted as unlikely to trigger CH due to being wide ranging species. High level mitigation measures for the vultures/raptor are included in the Biodiversity Management Plan.

Baseline surveys have not confirmed any alien invasive species in the study area. Future surveys will continue to monitor for the presence of alien invasive species, and procedures will be put in place to prevent future accidental spread of such species.

An ecosystem services assessment was carried out, focusing on the different uses of vegetation (for food, medicine, fuel wood, grazing, etc.) and animals by local communities. This revealed that despite the food, economic, ecological, pharmaceutical, etc. services it provides for local communities, biodiversity is now threatened in the project area. The main causes are from human actions (degradation and/or destruction of wildlife habitat, overexploitation of animal and plant resources, etc.) and climate change

(decrease in rainfall, recurrent droughts, poor distribution of rainfall, extreme temperatures). This results in a decrease in plant and animal diversity and consequently in ecosystem services, which could lead to increased food and nutritional insecurity, increased poverty, and a decline in pastoral activities.

Population

The population of the Agadez region was estimated at 487,620 inhabitants in the 2012 general population and housing census. Based on the region's natural growth rate (3.6% per year), this population is estimated to be 669,004 in 2022, 51% male and 49% female.

During the study, it was established that 14,830 people live in the villages 15 km from the centre of the deposit. Approximately 10,000 of these are permanent residents, compared to 4,830 seasonal residents. The villages are also more populated during the hot dry season. There are no permanent residents within the 40 km^2 operational zone around the core area or the fenced 2 km^2 area. This population of Tuareg origin is made up of several tribes belonging to the Kel Ewey Confederation. These tribes belong to three chiefdoms: Sultan, Anastafidat and Imakitan, which range beyond the Agadez and Timia communes. The nomadic Tuaregs have historical connections with their natural environment and temporarily migrate between regions and between departments in search of pasture and seasonal jobs. It is mainly the men who travel while the women stay in their village. The social group hierarchy remains very much intact; the elders and opinion leaders react, talk, and make decisions on behalf of the group.

The Tuareg, or Kel Tamashek, are recognised as an indigenous people by UNHCR’s World Directory of Minorities and Indigenous Peoples. The greatest number of Tuaregs, around one million, live in Niger, mostly south and west of Air Massif in the vicinity of the Dasa project. Tuareg society is highly stratified and consists of several castes including nobles, a free but subordinate group, a religious group and workers, who help tend the palm groves and vegetable gardens. These sources acknowledge that many Tuareg, although having suffered marginalization in the past, now live interspersed alongside other ethnicities throughout the country and have a long history of coexistence with these other groups. In the region of the project, the population and administrative structures are dominated by Tuaregs, and form a key part of the workforce at the uranium mines in Arlit where they are represented in managerial, semi-skilled and un-skilled positions. The Prime Minister of Niger from 2011 to 2021 was a Tuareg from the Agadez region.

Socio-economic activities

In the area of the Adrar Emoles 3 research permit, livestock breeding is the main activity of the population, due to the abundance, availability and accessibility of grazing land as well as the presence of water points in the area, which are used daily. Livestock consists of camels, donkeys, horses, sheep and goats, with a total of around 15,000 animals. The water infrastructure includes pastoral wells, traditional wells, boreholes and temporary ponds. Despite its vast size, the region is subject to a reduction in pastoral areas and fodder resources due to the exploitation of subsoil resources and increased agriculture.

The Agadez region has significant potential for market gardening and fruit growing, particularly in the many valleys of the Aïr. In the project area, only market gardening is practised by the population in the valleys along the koris. The estimated area under cultivation is 7.29 ha in 2020/21. The main crops are vegetables, lettuce, peppers,

cabbage, carrots and watermelons. The crops are partly consumed locally and the rest sold at the markets of Arlit, Tchirozérine and Agadez. They provide substantial income to local communities, enabling them to improve their livelihoods.

In the permit area, commercial activities are mainly based on small-scale trade, in particular the sale of livestock products, market gardening, woodcutting and charcoal making. There are two main markets in the main towns of the communes (Dannet and Tchirozérine) as well as many others in the villages of the area such as Tindawene, Azzel, etc. in the commune of Tchirozérine.

Archaeology and cultural heritage

Interviews with local communities around the Adrar Emoles 3 exploration licence, coupled with site visits, have helped to highlight the existence of cultural and archaeological heritage in some villages in the area. These include fossil dinosaur tracks, prehistoric rock carvings, and historic and cultural ruined mosques and old cemeteries. Only the Dabous giraffe is known worldwide. It is managed by the community and has a warden guide. Other sites are known by the communities but are not visited and have no management mechanism except for the Gani (Mouloud) cultural space. The state of conservation of these sites is acceptable despite some natural (erosion, wind) and human threats of denaturation. The ancient cemetery of Tagaza, two newer grave areas and the site of the ancient mosque of Eghatrak, are located within 7 km of the centre of the deposit. Apart from Gani (Mouloud) in Tagaza, all other sites are located within 15 km of the site. A procedure for chance finds is in place.

Access to water and sanitation

In the permit area, more than 150 water points of all categories were identified in the commune of Tchirozérine and 83 modern water point equivalents in Dannet. Access to sanitation is poor, with the majority of households in the region (54%) having no provision, 20% having basic services and only 10% having optimal facilities.

Access to health services

The health infrastructure identified in the commune of Tchirozérine includes a SONICHAR hospital, one functional CSI, 13 functional health posts, one public pharmacy, and one private pharmacy. In the rural commune of Dannet, there is an integrated health centre and 12 health posts.

The types of recurrent diseases include dermatitis, chickenpox, and vector-borne diseases such as malaria and yellow fever, and food- and water-borne diseases such as cholera, diarrhoea and gastroenteritis. The ratio of doctors to population in 2019 in the region is 1:14,419 (WHO standard 1:10,000). The ratio of nurses to population is 1:1,529 (WHO standard 1:5,000). The number of women of childbearing age per midwife is 1:6,729.

Education

The commune of Tchirozérine has four secondary schools with 1,071 pupils. At the primary level, there are 91 primary schools, including 67 "traditional" schools, six "community" schools and two "bilingual" schools (French-Tamasheq), 15 Franco-Arabic schools and one public school. These schools have a total of 7,801 pupils, including 3,502 girls (45%) and 4,299 boys. In addition, this commune has 34 functional literacy centres

for a total of 850 learners. These centres operate with the support of partners such as UNICEF and AFRICAIRE. The rural commune of Dannet has six General Education Colleges (CEG) and 30 primary schools for a total of 984 primary school pupils, including 536 boys and 448 girls.

Gender-based violence assessment

Stakeholder interviews undertaken identified child labuor on gold panning sites, sexual abuse, rape, sexual assault, unwanted pregnancies, physical violence, marital violence, child marriage, psychological violence and economic violence as potentially occurring in the region. According to the results of the survey, the types of GBV that could be encountered at the project site are sexual abuse, physical violence, exploitation, child marriage, sexual assault and psychological violence. GBV clauses will be integrated into contracts for the project.

Policy, legal and institutional framework

Policy framework

The national policy framework for the project includes key Nigerien legislation as follows:

- National Policy on Environment and Sustainable Development, 2016;
- National Environment Plan for Sustainable Development (PNEDD),1998;
- Sustainable Development and Inclusive Growth Strategy (SDDCI Niger 2035);
- Economic and Social Development Plan (PDES) 2022-2026;
- National Spatial Planning Policy: 2014;
- Framework document of the National Occupational Safety and Health Policy 2017; and,
- National Mining Policy (PMN 2020-2029): 2020.

International legal framework

The international legal framework is made up of the international texts signed and ratified by Niger and which can be activated within the framework of the activities of the project.

Title of the agreement	Signature date / entry into force	Date of signature / ratification by Niger
Convention on the World Cultural and Natural Heritage	16 November 1972	23 November 1974
Convention on Biological Diversity	11 June 1992 / 24 March 1994	11/06/92 / 25/07/95
International Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification	14 October 1994 / 19 January 1996	14 October 1994 / 19 January 1996

Title of the agreement	Signature date / entry into force	Date of signature / ratification by Niger
United Nations Framework Convention on Climate Change	11 June 1992 / 24 March 1994	11/06/92 / 25/07/95
Stockholm Convention on the Protection of Human Health and the Environment from Persistent Organic Pollutants (POPs)	22 May 2001 / 17 May 2004	Niger joined on 12 April 2006
Bamako Convention on the Ban of the Import into Africa of Hazardous Wastes and on the Control of Transboundary Movement and Management of Hazardous Wastes products in Africa.	30 January 1991 / 20 March 1996	30 June 1991 / 27 July 1996
The Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, Rotterdam	10/09/1998 / 24/02/2004	Accession by Niger on 16/02/2006
Work Environment (Air Pollution, Noise and Vibration) Convention No. 148	20 June 1977	28 July 1979
Convention No. 155 on Occupational Safety and Health	22 June 1981	Ratified by Niger and entered into force 11 August 1983.
Convention No. 161 on occupational health services	25 June 1985	Ratified by Niger and entered into force on 17 February 1988
Convention No. 187 on the Promotional Framework for Safety and Health at Work.	15 June 2006	Ratified by Niger and entered into force on 20 February 2009
Equal Remuneration Convention No. 100	29 June 1951 / 23 May 1953	9 August 1966 / 9 August 1968
Convention No. 102 concerning Minimum Standards of Social Security	28 June 1952 / 27 Apr 1955	9 August 1966 /9 August 1968
Convention 138 on the minimum age for employment	26 June 1973 / 19 June 1976	4 December 1978 / 4 December 1980

Title of the agreement	Signature date / entry into force	Date of signature / ratification by Niger
Worst Forms of Child Labour Convention No. 182	17 June 1999 / 19 Nov. 2000	23 October 2000 / 23 October 2001

IFC Environmental and Social Sustainability Performance Standards

IFC's PS are an integral part of its Sustainability Framework and outline its strategic commitment to promoting sustainable development. They are intended to provide guidance to clients in identifying risks and impacts and are designed to help them avoid, mitigate and manage risks and impacts in order to operate in a sustainable manner. In this regard, they also cover the clients' obligations to collaborate with stakeholders and communicate information about project-level activities.

Of these eight standards, all are applicable to the project.

Equator Principles

The Equator Principles (EP) are intended to provide a common basis and framework for financial institutions to identify, assess and manage environmental and social risks in project finance. There are ten (10) principles that apply globally and across all business sectors. The table below outlines how the EP will be applied to the project.

Principle	Applicability to the project
EP1: Review and Categorisation	As this project has major potential impacts, it is classified as category A in accordance with this principle.
EP2: Environmental and Social Assessment	In order to comply with the provisions of this principle, the 2021 ESIA has been carried out and assessed the environmental and social risks and impacts associated with the project and to propose mitigation measures. Also, specialised studies have been carried out on biodiversity, cultural heritage, air quality, climate change, impacts on human rights (e.g. GBV issues).
EP3: Applicable environmental and social standards	The ESIA was carried out in accordance with the national texts in force on the subject and the provisions of the Equator Principles which in turn refers to the IFC PS.
EP4: Environmental and Social Management System (ESMS) and Equator Principles Action Plan (EP Action Plan)	In order to comply with the provisions of this principle, an Environmental and Social Management Plan (ESMP) has been drafted. It includes measures to manage the environmental and social risks and impacts that will be associated with the implementation of the project.
EP5: Stakeholder participation	As part of the ESIA a stakeholder consultation process was carried out (administrative, communal and customary authorities, local populations, etc.) and enabled their opinions, concerns and recommendations to be taken into account in relation to the implementation of the project. In

Principle	Applicability to the project
	addition, a Stakeholder Engagement Plan was drawn up.
EP6: Grievance mechanism	In order to bring the project into line with this principle, a Complaints Mechanism has been developed which will allow anyone who feels aggrieved by the implementation of the project to register their complaint so that it can be dealt with in a fair and equitable manner.
EP7: Independent review	The project to exploit the deposits of the Adrar Emoles research permit will be subject to this obligation in order to comply with the provisions of these principles.
EP8: Covenants	An ESAP or EPAP will be agreed between the financing parties and the company and implemented over the course of the construction and operation of the project, and audits will be carried out by an Independent Environment and Social Consultant (IESC) appointed by the project Lenders.
EP9: Independent Monitoring and Reporting	The Niger Government through the National Environmental Assessment Office will carry out periodic evaluations (every 6 months) of the implementation of the ESMP. In addition, the IESC appointed by the Project Lenders will conduct periodic evaluations during the tenure of their Loans.
EP10: Reporting and Transparency	The project that has undergone an ESIA in accordance with the provisions of PS 1 will take all necessary steps to comply with the provisions of this principle.

International Atomic Energy Agency standards

Niger is a member state of the International Atomic Energy Agency (IAEA) which establishes safety standards and measures for protection against ionizing radiation. The following references are applicable for strategies and protocols for the location, design, construction, operation and closure of facilities necessary to protect the workforce, the public and the environment from the impacts of radioactive waste resulting from mining and crushing of ores (including tailings, waste rock, mineralized waste rock, process water, leach solutions, precipitation, seepage from stockpiles, and uranium mill areas):

- Basic Safety Principles for the Protection of People and the Environment (IAEA, 2006);
- International Basic Standards (IAEA, 2014); and,
- The Safety Guide (IAEA, 2002).

In addition, the IAEA (2012) establishes the Regulations for the Safe Transport of Radioactive Material, which includes the requirement to establish a radiation protection programme for the transport of radioactive material to ensure safety and to protect

persons, property and the environment from the effects of radioactivity in the transport of radioactive material.

The requirements of these documents will be implemented through site specific occupational health and safety procedures and associated monitoring of workplaces.

National legal framework

Many national laws will apply to the project, ranging from the Constitution to laws on public utility, environmental management, cultural heritage, forestry, mining, labour, environmental assessment, public health, water and the control of hazardous materials and activities.

A number of Ministries are involved in aspects of the project, namely Ministry of Environment and Combating Desertification; Ministry of Employment, Labour and Social Protection; Ministry of Public Health, Population and Social Affairs; Ministry of Mines; Ministry of Water and Sanitation; Ministry of the Interior and Decentralisation; High Atomic Energy Authority (HANEA); Nuclear Safety and Regulation Authority (ARSN); and the National Environment Council for Sustainable Development.

Civil society organisations

Civil society organisations with an interest in the project include:

- Association Nigérienne des Professionnels en Études d'Impact Environnemental (ANPÉIE): a non-political, non- profit organisation formed in 1999 to promote the inclusion of environmental concerns in development policies, plans, strategies, programmes and projects;
- Groupe de Réflexion et d'Action sur les Industries Extractives (GREN): a network of Nigerien civil society organisations working in the extractive sector to promote good governance and environmental protection;
- Réseau des Organisations pour la Transparence et l'Analyse Budgétaire (ROTAB, Publish What You Pay Niger): a collective of several associations, NGOs and trade unions in Niger that collaborate to actively participate in the global Publish What You Pay campaign; and,
- Association des Femmes du Secteur des Industries Extractives du Niger (AFSIEN): promotes women in the extractive sector and improving the living and working conditions of women working in extractives or living on extractive sites.

Assessment of impacts

The approach used to identify the impacts on the environment is based on:

- Description of the project, which identifies the activities which can be sources of impacts during different phases;
- Description of the environment, which provides an understanding of the environmental and social context of the project, and consultations with stakeholders, which identify concerns associated with the project; and,
- The interrelationship between the impact-causing activities and the components (biophysical and human) of the environment likely to be affected by the project activities.

Activities causing impacts

Impact-causing activities are defined as all activities that are likely to modify positively or negatively the components of the biophysical and human environment. This covers Construction, Operation and Closure. Likely activities are listed below.

Construction: Construction/development of access roads/tracks, site preparation for temporary equipment, installation of temporary infrastructure and equipment, borrow pits and quarrying (sand, gravel, laterite, etc.), movement of construction equipment and the supply of construction materials and equipment to the site, preparation of the rights of way for permanent project facilities, construction/installation of surface works and equipment, underground mine development and support services, maintenance of fixed and mobile equipment on site, fuel storage and supply, recruitment of labour, and operation of the base camp.

Operations: Recruitment and presence of the workforce on site (owners team, contractors and subcontractors), extraction of ore from underground (drilling, blasting, transport of ore to the primary crusher, conveying to surface), supply truck movements, storage of reagents (chemicals including sulphur, hydrocarbon products, etc.), operation of workshops (maintenance of machinery and equipment) and the acid plant, ore storage, crushing and conveying to the plant, ore processing, dewatering and storage of tailings as cemented backfill or on surface, storage of effluent in ponds, construction of new ponds, borrow pits for laterite and gravel, loading and shipping of uranate, periodic maintenance of the plant, movement of project and subcontractor equipment.

Closure: Dismantling of facilities, site clean-up, site redevelopment/restoration, movement of machinery.

Impact assessment methodology

The methodology for assessing impacts is based on the nature of the impact (positive or negative), its intensity, extent and duration.

The value of an environmental component expresses its relative importance in the environmental and social context of the area concerned. Its evaluation is based on the appreciation of its intrinsic environmental value as well as its social value. The social value assesses the popular or political will to preserve the integrity or the particular character of an environmental component.

The degree of disturbance expresses the extent of the modifications that affect the characteristics of an environmental component. It can be low, medium or high.

Significance of impact is determined by combining the intensity, scope, and duration of impact, taking into account the value of the receptor and degree of disturbance. The significance is classified as major, medium, or minor.

Impact assessment

This is a descriptive and qualitative assessment, not based on numerical or predictive modelling. The following table summarises the results of the impact assessment.

Component	Intensity	Scope	Duration	Significance (I+S+D)
Construction phase				
Soil resources	Medium	Limited	Short	Minor
Soil pollution	Medium	Local	Short	Medium
Air quality	Medium	Local	Short	Medium
Water resources	Medium	Local	Short	Medium
Fauna	Medium	Specific	Medium	Medium
Flora	High	Specific	Medium	Medium
Landscape	Medium	Specific	Short	Medium
Worker H&S	High	Local	Short	Medium
Jobs and economy	High	Regional	Medium	Major +
Noise & vibration	Medium	Specific	Short	Medium
Grazing	Medium	Specific	Long	Medium
Traditions & culture	Low	One off	Short	Minor
Archaeology	Low	Specific	Medium	Minor
Operations				
Soil resources	Medium	Local	Long	Medium
Air quality	Medium	Local	Long	Medium
Water resources	Medium	Local	Long	Medium
Water pollution	Medium	Local	Long	Medium
Fauna	Medium	Specific	Long	Medium
Flora	Medium	Local	Long	Medium
Landscape	Medium	Local	Long	Medium
Health & Safety	Medium	Local	Long	Medium
Jobs and economy	High	Regional	Long	Major +
Noise & vibration	Medium	Local	Long	Medium
Grazing	Low	Local	Long	Medium
Traditions & culture	Medium	Local	Long	Medium
Archaeology	Low	Local	Long	Medium
Closure				
Soil during closure	Low	One-off	Short	Minor
Soil after closure	High	One off	Long	Major +
Air during closure	Medium	Local	Medium	Medium
Air after closure	Medium	Local	Long	Medium+
Water quality	Medium	Local	Short	Medium
Fauna during closure	Low	Specific	Short	Minor
Fauna after closure	Medium	Local	Long	Medium+
Flora	High	Local	Long	Major +
Landscape	Low	Local	Long	Medium+
Health & safety	Medium	Local	Short	Medium
Jobs and economy	High	Regional	Long	Major
Noise & vibration	Low	Local	Short	Minor
Grazing	Low	Specific	Long	Minor
Traditions & customs	Low	One-off	Short	Minor
Archaeology	Low	One-off	Short	Minor

Human rights risks of the project

The constitution of Niger gives every citizen the right to a healthy environment and the

duty to contribute to its protection and improvement. Despite being a real opportunity for the local populations, the project may have negative environmental and social impacts in terms of respect for human rights. These include the consumption of water and the disruption of the local hydrological regime, the alteration of water quality, reduced air quality, the destruction of vegetation and the disturbance of fauna that provide ecosystem services. In terms of social aspects, this project will generate health risks, including radiological contamination for workers and local populations, the reduction of available grazing, the risk of destruction of cultural and archaeological sites, the degradation of the visual quality of the landscape and the risk of gender-based violence.

Vulnerability to climate change

Climate change is significantly affecting the frequency, incidence and duration of extreme events such as droughts, floods, high winds, etc., which have negative impacts on development infrastructure. In Niger, six categories of extreme weather events are considered: droughts, heavy rains/floods, sand and/or dust storms, high temperatures, locust invasions and bushfires/fires which have impacts on agriculture, livestock, fisheries, health, environment and industry including mining.

In terms of the project, the infrastructure (water management, tailings management facilities, roads and access tracks, telecommunications infrastructure, etc.) could be affected by climate change, particularly during the mining and post-mining phases. These include degradation, failure or destruction due to temperature variations, heavy rainfall and high winds. High humidity could also affect the structural and functional performance of structures. Permanent infrastructure that will be built as part of the mine rehabilitation will be more vulnerable to climate change because it will be in operation for many years after mine closure, compared to infrastructure that will be dismantled at the end of its useful life.

Planning and design of structures and management of mining activities must take into account historical weather data but also climate change induced variability. This has been incorporated into the project design in the Feasibility Study, in the selection of return periods and the calculation of flood lines. This has influenced the siting of infrastructure (for example the TSF) and the design of infrastructure.

Project Alternatives

The mine and non-mine options were evaluated, and the mine option selected as bringing more benefits than impacts. Alternatives to operational aspects considered include:

- Ore processing method – various different flow sheet options were considered and the process optimized for recovery;
- Power supply – alternatives to grid power include diesel generation, solar and battery back-up;
- Mine water supply – different aquifers were tested and water management measures to minimize fresh water make up incorporated;
- Staff accommodation and services – the development of a new camp with improved facilities over expanding the old one is preferred;
- Management of waste rock and mine tailings – reuse of as much mined material as possible has been selected, including the use of cemented backfill in the

underground workings to provide support and store part of the tailings stream; alternative tailings disposal sites and methods were evaluated;

- Management of non-mining waste – alternatives to disposal, such as reuse and recycling is preferred, using licensed carriers and sites;
- Wastewater treatment – different treatment and management methods considered, conventional sewage treatment plants will be used at the mine and the camp;
- Stormwater management – management of sediment in storm water using settling ponds has been adopted in the design; and,
- Redevelopment, rehabilitation, and management of the site post closure – various options for closure management have been considered, as well as uses for the site (existing facilities) post closure.

Mitigation of impacts

The initial assessment of impacts illustrates the worst-case scenario should impacts not be mitigated. Throughout the development and design of the project, opportunities to apply the mitigation hierarchy have been explored. This means that as far as possible, impacts have been anticipated and avoided, minimised or reduced. The impacts remaining when these principles have been applied are the residual impacts, and these are managed, compensated or offset.

Mitigation measures are proposed for the preservation of soils, air, water, flora and fauna, landscape, noise and vibration, health and safety, economic impacts, grazing, traditions and customs and archaeological and cultural sites during construction, operations and closure, and residual impacts are rated.

Mitigation measures are aligned with good international industry practice (GIIP) and will be further elaborated and implemented through a series of policies, management plans and procedures, all controlled by an Environmental & Social Management System.

The table below summarizes pre- and post-mitigation impact ratings. Note the methodology used for assessment does not allow for 'Minor' ratings for anything other than short duration, low intensity and one-off impacts. Therefore, elimination of an impact through mitigation measures (or on closure) will still rank as medium. This means that even with mitigation measures applied, the impact rating does not often change.

Valued environmental and social component	Construction		Operation		Closure	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Physical elements						
Soil	Medium	Medium	Medium	Medium	Minor	Medium +
Air	Medium	Medium	Medium	Medium	Medium	Medium +
Water	Medium	Medium	Medium	Medium	Medium	Medium
Wildlife	Medium	Medium	Medium	Medium	Medium +	Medium+
Flora	Medium	Minor	Medium	Medium	Major +	Major +
Human elements						
Landscape	Minor	Minor	Medium	Medium	Medium +	Medium +
Health & Safety	Medium	Medium	Medium	Medium	Medium	Medium
Economy	Major +	Major +	Major +	Major +	Major	Medium
Noise & vibration	Medium	Minor	Medium	Medium	Medium +	Medium +

Pastoral	Medium	Medium	Medium	Medium	Minor +	Minor +
Traditions	Minor	Minor	Medium	Medium	Minor	Minor
Archaeology	Minor	Minor	Medium	Minor	Minor	None

The single Major negative impact in the above table relates to the loss of employment upon mine closure. To mitigate the loss of jobs and income associated with the closure, the measure that will be implemented is a study on the retraining of workers in other occupations. This may be expected to identify a range of transferrable skills that workers have that could increase their chances of employment in other industries, and or setting up their own businesses.

A programme of demobilization, identifying and delivering training requirements, is likely to be implemented. The Closure Plan, which will be reviewed and updated regularly during operations (at least every five years and three years before planned closure) will include consideration of the social aspects of closure, in terms of direct workers, indirect livelihoods and associated communities (those with a high proportion of workers or suppliers of goods and services) to ensure that the impacts of closure are mitigated as far as possible.

Cumulative Impacts

Cumulative impacts have been identified for the project. It is recognized that many environmental and social management challenges arise as a result of impacts from several activities, either project related, other projects, or by third parties. Individually, these impacts are typically insignificant; however, cumulatively they can have regional or even global repercussions.

The Cumulative Impact Assessment (CIA) draws on baseline data and the impact assessment undertaken for all environmental and social disciplines as well as data gathered during site visits and consultations undertaken.

Other active Projects in the region have been identified and shared environmental and social receptors reviewed. These include the following:

- Cominak mine - Uranium mine located close to the town of Arlit, approximately 110km north of Dasa. The mine closed on 31 Mar 2022 having operated since 1978 and is now in the closure phase, which focuses on technical issues, employees and affected communities. Closure is expected to take 11 years, with a 5 year environmental monitoring phase to follow;
- Somair uranium mine – Open pit mine, owned by Orano, also near Arlit. Began operating in 1971, and predicted to continue producing until at least 2035;
- Imouraren project - Located about 50 miles south of Arlit this deposit, discovered in 1966, contains one of the largest uranium reserves in the world. Following a 2007 feasibility study, Orano was awarded an operating permit in early 2009. Work to bring the site into production has been suspended pending more favourable market conditions. Annual production capacity of 5,000 tons and lifespan of 35 years;
- Madouela project - Owned by Goviex, situated 10 km south-east of Arlit. Feasibility Study released in Sep 2022, for a 19-year open pit plus two underground operations with a life of 19 years. Molybdenum may be produced as a by-product; and,

- Sonichar coal mine and power station - 80km to the south of Dasa, the open cast coal mine is around 2 km from the power station. Principal consumers have been the Cominak and Somair mines in Arlit. The mine, in operation since 1980, uses borehole water from 30 km away for cooling. Water is also reticulated to Tchirozérine but not surrounding villages. Water from the mine and plant are discharged to the environment without treatment; effluents show very high levels of sulphates, aluminium, iron, manganese, nickel and selenium. It is not known if the power plant has any pollution control measures on stack emissions.

The following table summarises the cumulative impacts.

Impact	Receptors and spatial extent	Temporal extent
Environmental pollution (air quality, noise)	Local and regional area, key communities (Arlit, Tchirozérine)	Mid-term (construction and operational phase)
Impacts to water resources	No permanent surface water courses in the area but should all projects come on stream at the same time, there may be regional effects on groundwater flow. These are thought to be influenced by the Aïr Massif to the east of all the projects. All mines are located in the Niger river catchment.	Mid-long term (construction, operation, closure and post-closure)
Impacts to Biodiversity	While impacts on vegetation are localised, some of the animal species of conservation concern identified as being present in the Dasa area have huge ranges which could also include the other mines. Further assessment to the nearby protected area, namely the Aïr massif, may be required.	Long term (construction, operation, closure and post-closure)
Greenhouse Gas Emissions and Climate Change	National and Global reaches.	Long term
Socioeconomics and Employment	Local, regional and national levels of receptors. The extent of these impacts could cover Agadez region as well as more widely in Niger.	Long term
Accommodation	Arlit region, particularly for workers moving to the area to find jobs.	Mid-long term (construction, operation)
Tourism Industry	Potential rejuvenation of tourism to the cultural heritage sites (e.g. the Dabbous giraffe) and Aïr mountains	Long term
Community Health, Safety and Human Rights	Vulnerable groups, key community members and existing residents located in surrounding villages and towns.	Mid-long term (construction, operation)
Road Traffic Network	Main route RN25 from Arlit to Agadez, particularly the northern stretch.	Mid-term (construction and operation)

Impact	Receptors and spatial extent	Temporal extent
	Increased risk of RTAs, noise and air pollution.	
Ecosystem services	Increased population pressures on habitats, water resources, soils and grazing. Habitats might become degraded or destroyed in order to graze more animals or grow more crops.	Mid-long term (construction, operation)
Social structures	Increased economic activity might result in induced migration, where job seekers from elsewhere in Niger or neighbouring countries travel to find work and find lodgings in local communities. Alternatively, young people might move away from rural areas to the nearby towns to find work and better living conditions.	Mid-long term(construction, operation)

Cumulative impacts associated with the project are not expected to significantly hinder either the development of the project itself or other planned or ongoing projects in the region. Management and mitigation for cumulative impacts will be covered in topic specific management plans and the Environmental and Social Management System (ESMS). Specific requirements regarding cumulative impacts will be considered within the Biodiversity Management Plan, Water Management Plan and the Conceptual Mine Closure Plan.

Community Engagement & Support

GAFC has been engaging with local communities since their arrival in the area in 2007. Initiatives generally consist of informal engagement with village elders and is ongoing.

Formal consultation engagement undertaken as part of the 2020 ESIA took the form of a series of meetings in the communities around the project area, including Tagaza, Agatara, Issakanan, Sikiret/Tadant, Oufound, Mizeine, Ghalab, the Kelezeret Tribe and Inolamane.

Environmental concerns noted included potential effects of uranium mining, contamination of the food chain, human and animal health risks, occupation and loss of pastoral areas and crop lands, destruction of vegetation and loss of wildlife habitat, impacts to water resources, management of waste from the mining operations and restoration and rehabilitation of the mine.

Social concerns included population displacement, marginalization of local communities, the security of cultural and tourist sites, employment opportunities for young people from the local communities and management of labour risks.

Additional consultation took place around the 2022 ESIA, focusing on the villages of Issakanan, Inolamane, Tagaza, Temil Daabous, Eghatrak, Galelo, Oufoud and Gados. The 2022 engagement also included regional authorities, town hall and the prefecture. These consultations raised a number of concerns regarding the project, many of which

are addressed by the impact assessment and associated Management Plans, and a list of development goals for their areas of jurisdiction. In many cases, these are basic infrastructure needs that are more commonly provided by the state.

The comments received have been used to develop current community support programs which cover food security, medical support, infrastructure, local business support/procurement and regional and national procurement. Future development support will be delivered in partnership with NGOs currently active in country and will provide targeted benefits to women including enhanced irrigation, training and support of existing market gardening initiatives, support for development of goods and services related to workers apparel and PPE and associated education, training, and mentoring programs.

Environmental and social management plan

The Environmental and Social Management Plan (ESMP) is a management tool that defines the operational arrangements for implementing the proposed measures. It describes the measures required to prevent, minimise, mitigate or compensate for negative environmental and social impacts or to enhance positive impacts.

The project ESMP, developed to address project impacts and agreed with the Ministry of Environment, is structured around:

- Impact mitigation and/or enhancement programme;
- Environmental monitoring programme;
- Environmental inspection programme; and,
- Capacity building programme for stakeholders.

This plan brings forward the mitigation measures identified in the ESIA and also identifies those responsible for implementation, implementation indicators and an indicative cost. GAFC is in the process of developing a series of management plans to align the requirements with other project documentation. These plans will be part of the ESMS and will ensure that all potential impacts are managed and monitored during all stages of the project life.

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LIST OF ACRONYMS AND ABBREVIATIONS

AEP: Drinking water supply

AFSIEN: Association of Women in the Extractive Industries Sector of Niger

IAEA: International Atomic Energy Agency

ANPÉIE: Association Nigérienne des Professionnels en Etude d'Impacts Environnemental

ARSN: Autorité de Régulation et de Sûreté Nucléaire

ASN: Autorité de Sureté Nucléaire

BNEE: National Environmental Assessment Office

ECOWAS: Economic Community of West African States

CEG: Colleges of General Education

CES: Secondary Education Complex

CES/DRS: Water and Soil Conservation/Soil Defence and Restoration

CH: Critical Habitat

CNEDD: National Environment Council for Sustainable Development

CNSS: National Social Security Fund

CORAC: French Accreditation Committee

IHC: Integrated Health Centre

DEM/EC: Directorate of Mining Environment and Settlements

DGSD: Directorate General for Sustainable Development

DGEF: Directorate General of Water and Forests

DGT: Directorate General of Labour

DMC: Direction des Mines et des Carrières

DNHPES: National Directorate of Public Hygiene and Health Education

DR INS: Regional Directorate of the National Institute of Statistics

DRE/LCD: Direction Régionale de l'Environnement et de la Lutte Contre la Désertification

DSST: Occupational Safety and Health Directorate

ESIA: Environmental and Social Impact Assessment

EPC: Collective Protection Equipment

PPE: Personal Protective Equipment

ESMS: Environmental and Social Management System

GAC: Global Atomic Corporation

GAFC: Global Atomic Fuels Corporation

GIS: Geographic Information Systems

GREN: Reflection and Action Group on Extractive Industries

H2S: Hydrogen Sulphide

HANEA: High Nigerien Atomic Energy Authority

IBAT: Integrated Biodiversity Assessment Tool

IFC: International Finance Corporation

INS: National Institute of Statistics

STI/HIV/AIDS: Sexually Transmitted Infections/Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome

IT: Labour Inspection

ME/LCD: Ministry of the Environment and the Fight against Desertification

MH/A: Ministry of Water and Sanitation

NO2: Nitrogen dioxide

NP: Performance Standards

SDGS: Sustainable Development Goals

OHADA: Organisation for the Harmonisation of Business Law in Africa

WHO: World Health Organization

CSO: Civil Society Organisations

PC: Cemented wells

PDDE: Ten-Year Education Development Programme

PDES: Economic and Social Development Plan

WMP: Waste Management Plan

ESMP: Environmental and Social Management Plan

PM: Particular materials

TDC: Human Powered Pump

PMN: National Mining Policy

PNAT: National Spatial Planning Policy

PNEDD: National Environment Plan for Sustainable Development

POI: Internal Operations Plan

PROSEHA: Water, Sanitation and Hygiene Sector Programme

PSEF: Education and Training Sector Programme

RNNAT: National Nature Reserve of Aïr and Ténéré

ROTAB: Network of Organisations for Transparency and Budget Analysis

CSR: Corporate Social Responsibility

SDDCI: Sustainable Development and Inclusive Growth Strategy

SOMIDA: Societe Miniere de DASA

SO2: Sulphur dioxide

GER: Gross Enrolment Rate

UEMOA: West African Economic and Monetary Union

IUCN: Union for Conservation of Nature

UNICEF: United Nations Children's Fund

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INTRODUCTION

A Sahelian country of 1,267,000 km^2 and a population estimated at around 20 million inhabitants in 2017 (INS, 2017), Niger faces multiple challenges in terms of socio-economic development, including access to drinking water, quality education, health, energy, various development infrastructures, etc.

To meet these challenges, several strategic development documents have been drawn up and implemented by the government. These include the Sustainable Development and Inclusive Growth Strategy (SDDCI Niger 2035), the Economic and Social Development Plan (PDES 2022-2026), the National Mining Policy adopted in 2020 and covering the period 2020-2029, etc.

Thus, through the implementation of these strategic instruments, the government plans to make the mining sector, particularly uranium, a real lever for development while creating favourable conditions for investment in the sector.

It is within this framework that Global Atomic Corporation (GAC), through *Global Uranium Niger Inc, is* considering the implementation of the "*Adrar Emoles 3"* research permit uranium mining project.

In accordance with the texts in force in terms of environmental management, in particular law n°98-56 of 29 December 1998 on the framework law relating to environmental management, law n°2018-28 of 14 May 2018 determining the fundamental principles of environmental assessment in Niger and its implementing decree n°2019-027/PRN/MESU/DD of 11 January 2019, the project was the subject of an environmental and social impact study sanctioned by an environmental compliance certificate issued by the Ministry in charge of the Environment.

In order to comply with the Equator Principles and the International Finance Corporation (IFC) Performance Standards, the ESIA report has been updated.

The approach adopted included the preparatory meeting, the document review, the development of data collection tools, the field mission, the analysis and interpretation of the data and the drafting of the report structured around the following points

- Introduction;
- Full project description;
- Analysis of the initial state of the site and its environment;
- Outline of the policy, legal and institutional framework;
- Assessment of likely changes;
- Analysis of possible alternatives to the project;
- Impact mitigation and/or enhancement measures;
- Environmental and Social Management Plan
- Conclusion;
- Appendices.

1. FULL DESCRIPTION OF THE PROJECT

1.1. Background and justification of the project

Niger has significant mining potential which has long remained unexploited or under-exploited. These include uranium, oil, gold, mineral coal, cassiterite, etc. Indeed, the uranium reserves, located in the Tim Mersoi basin covering more than 500,000 km^2, have been exploited since the early 1970s in Arlit by the French group ORANO, through its entities SOMAÏR and COMINAK (now in the process of being closed).

The extractive industries have a prominent place in the country's economic and social development planning. However, the weight of the extractive sector in the Gross Domestic Product (GDP) fell from 10.8% in 2013 to 6.2% in 2017. This decline could be explained by the decrease in mining production. In addition to the decline in volume, the uranium sector has also seen a sharp drop in its price, from 73,000 FCFA in 2013 to 56592 FCFA in 2014. This downward trend unfortunately continues today. Indeed, although the sector, particularly uranium, accounts for more than half of exports, its share of GDP remains around 6%. For the period 2011-2015, it generated revenues of around 258 billion CFA francs. To improve the impact of mining on poverty reduction, the state introduced a provision in the mining law in 2006 that devotes 15% of all mining revenue to the communes of the regions concerned.

Also, with the aim of diversifying its partners in the mining sector in general and ensuring the safeguarding of the uranium sector in particular, the Government of Niger has decided to facilitate and support any initiative aimed at opening new mines. It is within this framework that Global Atomic Fuels Corporation, through its Nigerien company "*Global Uranium Niger Inc.*", plans to start production of its project called "***ADRAR EMOLES 3" research permit*** by 2022-2023.

1.2. Presentation of the promoter

Global Atomic Corporation, a Canadian company, holds six (06) mining exploration permits for uranium and related substances. It has been present in Niger since 2007 where it conducts mining exploration activities in the Agadez region from its country office located in Niamey and its liaison office located in Agadez.

In accordance with the provisions of the Treaty of the Organisation for the Harmonisation of Business Law in Africa (OHADA), the company's operations in Niger are managed by a company under Nigerien law called *Global Uranium Niger Inc. which was* created in 2009.

The address of this company is

- Headquarters: Koira Kano North, Block 5724
- BP: 10.539 Niamey, Niger
- Tel: 0022720370013
- Fax: 0022720370014
- Website: www.globaatomiccorp.com

The company's staff is essentially made up of Nigeriens trained in the fields of geology, mining, prospecting, logistics, accounting, labour law, etc. During all the years of its presence in Niger, the company's staff numbered around fifty (50) permanent employees and several dozen temporary jobs. The company's technical partners are mainly local companies providing services in the fields of drilling, geophysics, analysis, consulting, transport, transit, security, audits, etc.

The concept of corporate social responsibility (CSR) is increasingly a concern in all development projects, particularly mining projects. This is why in Niger, the government has given pride of place to this concept by including provisions in the mining conventions that require mining companies to contribute to the development of local communities. Thus, since its installation in the Agadez region, the Global Atomic Corporation has made a significant contribution to local development by financing actions to benefit the populations living near its exploration sites. ***The funds invested in these actions (rehabilitation and construction of hydraulic works, food donations, ambulance and medical equipment donations) for several rural communes, villages and nomadic camps amount to nearly 291 million CFA francs***.

Global Atomic Corporation has identified seven (7) principles representing its core values and responsibilities.

These are:

- ***Social responsibility and respect for diversity***
    - Global Atomic Corporation believes that the achievement of the greater good can be facilitated by a company that demonstrates, through its corporate citizenship practices, its support for human rights, social justice and environmental stewardship, and is poised to thrive in an increasingly competitive marketplace.
    - Global Atomic Corporation will be committed to supporting and strengthening local communities;
    - Global Atomic Corporation will encourage and support partnerships and cooperation to strengthen social and economic resources;
    - Global Atomic Corporation will respect the multicultural diversity of local communities;
    - Global Atomic Corporation will involve the public and local community leaders in the planning and implementation of its project
- ***Responsible exploration and exploitation***
    - This Statement of Corporate Values and Responsibilities reflects the obligations and partnerships that naturally accompany the various licenses Global Atomic Corporation receives to operate in countries and communities with varying degrees of economic development. These licences are generally subject to review and renewal and must therefore be continually earned.
- ***Leadership***
    - Global Atomic Corporation will strive to excel in good corporate citizenship towards governments, international agencies, partners, host communities,

employees, contractors and stakeholders.

- ***The human person, our true wealth***
  - o Global Atomic Corporation will respect the dignity of every individual and the rights of all people to pursue their ambitions.
- ***Continuous staff training and secure and decent jobs***
  - o Global Atomic Corporation shall be committed to the principle that people at its project sites and offices work in safe and healthy conditions and receive fair compensation;
  - o Global Atomic Corporation will give its staff equal opportunities, without discrimination, to improve their living conditions and to acquire knowledge, skills and experience.
- ***Environmental responsibility and innovation***
  - o Global Atomic Corporation believes that people have a right to a healthy environment, clean air and clean water.
  - o Global Atomic Corporation is committed to implementing best environmental management practices to achieve internationally recognised levels of environmental, health and safety performance.
- ***Integrity and transparency***
  - o Global Atomic Corporation shall be committed to promoting honesty, integrity and accountability in its business activities;
  - o Global Atomic Corporation will require good professional and ethical conduct from its employees, agents and directors;
  - o Global Atomic Corporation will make information and communication with all stakeholders its credo.

1.3. Presentation of the Project

The Canadian company Global Atomic Corporation, which has been conducting mining research in Niger since 2007, is considering the exploitation of the uranium deposit it has discovered in the "Adrar Emoles 3" research permit.

The area of the exploitation permit, which is the subject of this project, covers an area of 25.01 km² and is located in the rural commune of Tchirozérine (Department of Tchirozérine, Agadez Region). The geographical coordinates (Latitude/Longitude, ADINDAN - Clarke 1880) of the limits of the licence area are given in Table 1 below. Figure 1 illustrates this on a topographic background.

Table 1 Coordinates of the vertices of the exploitation perimeter

Point	Longitude	Latitude
A	7° 39' 8''	17° 50' 08''
B	7° 42' 50''	17° 50' 08''
C	7° 42' 50''	17° 47' 26''
D	7° 39' 8''	17° 47' 26''

The Project is known as the Dasa Mine. The Mine License Area has been transferred into a Nigerien subsidiary Company; SOMIDA, which is owned 80% by Global Atomic Fuels Corporation and 20% by the Niger Government. Global Atomic Fuels Corporation is a 100% owned subsidiary of Global Atomic Corporation. Phase I operations anticipate the underground mining of approximately 45 million pounds U308 ("Yellowcake") over a 12-year mine life. The Dasa Mine will be run by an experienced uranium mining team previously responsible for running the Cominak Uranium Mine located approximately 100 kilometres north of the Dasa Mine. Mining operations will be run with a priority focus on mine safety and will adhere to international best practices. Air and Water baseline studies have been conducted and will be updated on a regular basis going forward.

The Niger Government has deemed yellowcake a "strategic product" and as such Dasa Mine production will be transported from the mine site to the Port of Cotonou, Benin by the Niger Government's transportation company: National Company for the Transport of Strategic Products ("CNTPS") in Company owned trucks and accompanied by armed security. From the point of collection at the mine, the transport of yellow cake is the responsibility of the CNTPS.

CNTPS has been responsible for yellowcake transportation from nearby Areva Mines for many years over which time it has developed comprehensive accident prevention, contingency and spill management plans aligned with IAEA guidance.

Since beginning exploration in 2008 Global Atomic Fuels Corporation and now SOMIDA has engaged in community social relations ("CSR") programmes including famine relief, medical assistance, improvements existing community water wells and the drilling of new community water wells, local procurement, training and employment opportunities. In addition to the above listed initiatives, SOMIDA has prioritized two key CSR programmes;

1) training and apprenticeship programmes focused on the local population and
2) support of local market gardening initiatives in collaboration with the Dov Centre; a long standing in- country NGO to provide agricultural training, infrastructure and irrigation.

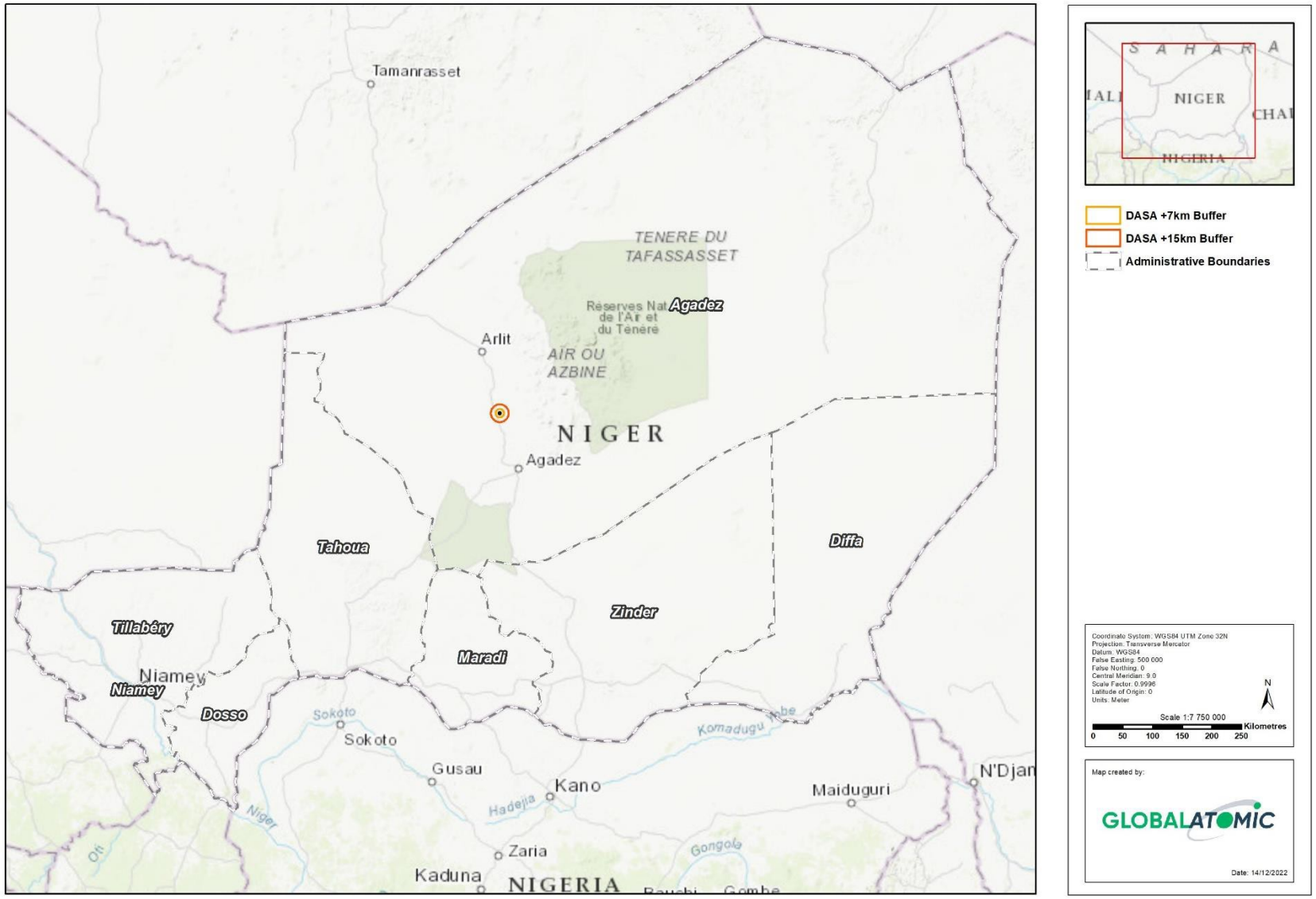

Figure 1 Location Map

1.3.1. Project objectives

The overall objective of the project is to develop the uranium deposit discovered in the "Adrar Emoles 3" exploration permit.

The specific objectives are:

- Construct and install the permanent surface infrastructure (base camp, buildings including administrative and technical blocks, sanitary installations, water and electricity networks, ponds, various workshops and garages, shops and warehouses for various products and equipment, etc.);
- Construct the underground mine (access ramp (tunnel), galleries, shafts/ventilation holes) and all associated facilities (garage, workshops, crushing plant, various cables, signalling, instructions, etc.);
- Build the ore processing plant and the various support services (administrative and technical blocks, workshops, garage, warehouses, various networks, contact for the production of sulphuric acid, hydraulic works, sluices, various input storage areas, etc.);
- Processing the ore to uranate, smelting it and transporting it to potential markets;
- Create temporary and permanent jobs and contribute to the improvement of people's living conditions;
- To contribute significantly to the improvement of tax revenues at local, regional and national levels as well as to socio-economic development through investments in various sectors;
- Redevelop all the sites operated at the closure of the project.

1.3.2. Expected results

The main results expected from the implementation of the project are:

- the permanent surface infrastructure (base camp, administrative and technical buildings, sanitary facilities, water and electricity networks, ponds, various workshops and garages, shops and warehouses for various products and equipment, waste rock and tailings disposal areas, etc.) are built and/or installed within a 3.5km radius operational area of, within which areas proximal to surface infrastructure will be fenced;
- the underground mine (access ramp (tunnel), galleries, shafts/ventilation holes) and all associated facilities (garage, workshops, crushing plant, various cables, signalling, instructions, etc.) are constructed and/or installed;
- the ore processing plant and the various support services (administrative and technical blocks, workshops, garage, warehouse, various networks, contact for the production of sulphuric acid, hydraulic works, slurry pits, slurry pits, various storage areas for inputs, etc.) are built;

- the ore extracted is processed, the uranate obtained is smelted and transported to potential outlets;
- temporary and permanent jobs are created and the living conditions of the people in the area are improved;
- a significant contribution to the improvement of tax revenues at local, regional and national levels as well as to socio-economic development through investments in various sectors is made;
- all operated sites are redeveloped at project closure.

1.3.3. Description of the deposit

All known uranium deposits in Niger are located in sandstones and conglomerates of the Tim Mersoi basin. They are all classified as belonging to the tabular sedimentary types.

Sandstone-hosted uranium deposits are marked by epigenetic concentrations of uranium in fluvial/lacustrine or deltaic sandstones deposited in fluvial continental environments frequently in transition zones from higher to lower flow regimes, such as along paleo ridges or domes. Roll-front deposits contain impermeable shales or mudstones overlying or underlying or separating the mineralised sandstones and ensuring that fluids move along the sandstone bodies.

In sandstone-type deposits, uranium is usually precipitated by oxidising fluids from reducing agents such as plant material, amorphous humate, sulphides, iron minerals and hydrocarbons. The oxidation and reduction facies display typical colours and can assist in the selection of exploration targets. Fluid migration and deposition of uranium leaves a colour change from red hematite (oxidised) to grey-green (reduced). The main uranium minerals in most sandstone-type deposits are uraninite, pitchblende, coffinite

In general, it can be noted from north to south in eastern Niger that uranium mineralisation appears to occur in increasingly younger strata. This is most likely a combination of a change in source zones and uranium supply over time, and the fact that in the south the younger strata are exposed at the surface, necessitating increasingly deeper drilling in the southern areas (e.g. Carboniferous - older targets).

The best grade and tonnage of uranium in the Adrar Emoles 3 deposit is found in the sandstone of the Tchirezrine 2 formation, the same formation that also contains the large ORANO Imouraren deposit, located about 40 km northwest of Adrar Emoles 3.

In contrast to the carboniferous mineralisation in the Arlit area, the uranium in the Tchirezrine 2 formation occurs mainly as hexavalent uranium minerals in an oxidised environment. Uranophane is the most abundant mineral. It can form small aggregates or appear as a continuous coating parallel to the layering. Uranophane is commonly associated with chrysocolla and in small quantities also with boltwoodite. Metatyuyamunite has also been found. Coffinite exists in the residual reduced areas, as well as chalcocite and native copper. Pitchblende was observed in small quantities. This mineralisation occurs in two main forms: interstitial in the sandstones, and massive sulphide mineralisation in the microcracks with galena and blende.

1.3.4. Mineral resource and reserve estimates

The mineral resources of the deposit have been estimated based on the proposed mining method, which is ***underground mining***. They are summarised in Table 2 below.

Table 2 Resource and Mineral Reserve Estimates

Disconnection	Category	Tons	eU3O8	Metal content
eU3O8 pm		Mt	ppm	Mlb
100	Proven	81,6	718	129,1
	Probable	96,1	606	128,4
300	Proven	34,4	1146	109,6
	Probable	37,6	1260	104,6
1000	Proven	9,6	3885	82,1
	Probable	10,2	3308	74,2
2000	Proven	4,6	6624	66,8
	Probable	4,5	5713	56,8
2500	Proven	3,6	7849	61,9
	Probable	3,4	6838	51,4
5000	Proven	1,6	13186	46,8
	Probable	1,6	10805	37,2
10000	Proven	0,6	24401	31,1
	Probable	0,8	14598	25,3
15000	Proven	0,3	34236	24,3
	Probable	0,1	21493	4,0

1.3.5. Key production data

The main production data for the "Adrar Emoles 3" exploration permit is shown in Table 3 below.

Table 3 Production profile

Life in the mine	Years	12
Total ore production	Million tonnes	4,13
Total treatment plant	Million tonnes	4,03
Total sterile production	Million tonnes	0,99
Cut-off grade	Ppm	5396
Global recovery shredder	%	92
Resource consumption	Drinking water	For the record
	Industrial water	55 m^3 /h
	Electrical energy	10 MW
	Fuel	2000 l/d
	Processing reagents	93 t/d
Jobs	Direct	307
	indirect	500

The total number of direct and indirect jobs during the operation of the mine will be 307 and 500 respectively. However, it should be noted that during the construction phase of the mine, the project will generate over 450 direct and indirect jobs.

1.3.6. Financial and economic impact of the project.

The implementation of the project will generate financial and economic impacts in terms of improved tax revenues from the payment of various taxes and mining royalties that will improve investment levels and economic development in general. In addition, the creation of direct and indirect employment opportunities (especially through subcontracting) will improve income, tax revenues and economic development. Global Atomic Corporation has already, during its exploration activities, made repeated use of local service providers, including ENYSA, LEGENI, ESAFOR, SAHEL LAB SA, EMIG, EMAIR, to name but a few.

Ultimately, the project would generate the following financial flows expressed in millions of US dollars:

- *Tax revenue* *92*
- *Mining royalties* *141*
- *Nigerien labour costs* *64*
- *Expenditure on corporate social responsibility (CSR)* *1,2*

1.3.7. Project activities

The main activities that will be implemented within the framework of the "Adrar Emoles 3" exploration permit are given in Table 4 below.

Table 4 Project activities

PROJECT PHASES	ACTIVITIES
Development (Preparation and construction)	- Construction/development of access roads/tracks and fencing of, areas proximal to surface infrastructure will be fenced - Site preparation (stripping or removal of overburden) for the construction of temporary facilities - Installation of temporary infrastructures and equipment that will contribute to the construction of the project (living quarters for the personnel of the construction companies, equipment base, etc.) - Borrowing and quarrying (sand, gravel, laterite, etc.) - Preparing the right-of-way for the facilities - Construction/installation of surface structures and equipment (employee living quarters, administrative and technical blocks, plant and support services including machine maintenance and reconditioning workshops/garages, boiler rooms, pneumatics, etc., input warehouses, contact workshop for sulphuric acid production, ponds, dams, boreholes, tailings facility, waste treatment facilities, power generation system, etc.)

PROJECT PHASES	ACTIVITIES
	- Construction of the underground mine (ramps, galleries, ventilation holes) and its support services at the bottom (garage, workshops, crushing plant, various networks, signposts and instructions, etc.).
Operation	- Extraction of ore from the underground mine (drilling, blasting, transport of ore to the primary crusher, conveying to daylight through a conveyor belt) - Storage of inputs (chemicals including sulphur, hydrocarbon products, etc.) - Operation of workshops (maintenance of machinery and equipment, reconditioning of machinery, manufacture of spare parts, etc.) - Ore storage, crushing and conveying to the plant - Plant level ore processing (crushing, grinding and classification, etching, liquid/solid separation, clarification, precipitation, purification, uranate drying/calcination and smelting) - Storage of tailings from ore processing - Loading and shipping of uranate - Periodic maintenance of the plant
Closing	- Dismantling of facilities - Site clean-up - Site redevelopment/restoration

1.3.8. Main project infrastructure

The main infrastructure to be built under the project:

- the living quarters: staff housing, sanitary, social, cultural, educational, electrical and drinking water infrastructures, roads, fencing of areas proximal to surface infrastructure will be fenced.
- the mining area: mine access roads, overburden, ore heaps, explosives storage, mechanical workshops, storage shops, truck loading facilities and other related infrastructure such as internal roads, buildings (administration, changing rooms, etc.) and services.
- the ore processing plant, the contact workshop for the production of sulphuric acid and the solvent extraction process for uranium.
- transport tracks, service corridors, overhead power lines and water pipes.
- Tailings storage facilities and waste rock piles - Tailings from the mill will be stored dry in a clay-lined tailings storage facility. Mine waste rock will be dumped in waste rock piles.

1.3.9. Equipment and materials of the project

The main equipment and materials required for the implementation of the project are given in Table 5 below.

Table 5 Project infrastructure/equipment

EQUIPMENT/MATERIALS	NUMBER
Bulldozers	1
Backhoe loaders	1
Graders	2
Drills	6
Trucks	6
Loaders	4
Conveyor belts	2
Tanker trucks	1
Crushers	1
Shredders	1
Sprayers	0
Injection and dewatering pumps	2
Maintenance and repair materials and equipment	2
Workpiece turning machines	1
Welding machines	5
Laboratory materials and equipment	1
Extraction materials and equipment	Not determined at this stage
Filtration and washing materials and equipment	Not determined at this stage
Materials and equipment for purification, drying and fume removal	Not determined at this stage

1.3.10. Water supply and efficiencies

The supply of industrial and drinking water will be based on the capture of aquifers identified for this purpose. These are mainly the water table of the Téloua geological formation and secondarily that of Tchirozérine 2. However, dewatering water from the mine will also be injected into the industrial water pumping circuit.

The hydrogeological programmes carried out on the permit have also highlighted the possibility of exploiting other aquifers such as the Gezouman and Tarat.

Pumping tests carried out by Global Atomic Corporation on boreholes tapping the Teloua aquifer have given flow rates varying between 15 and 25 m^3 /h.

According to the December 2021 Definitive Feasibility Study, the Dasa process plant is estimated to require 64.1 m^3/hour.

Item	Parameter	Units	Value
1	Pug Leaching including water in Reagents	m^3/h	4.2
2	Belt Filtration Tails Washing & Flocculants	m^3/h	32.0
3	Solvent Extraction & Precipitation Processes	m^3/h	4.8
	TOTAL (for process plant)	**m^3/h**	**41.0**
4	Services (dust suppression, acid plant etc)	m^3/h	23.1
	TOTAL (plant & Services)	**m^3/h**	**64.1**

In addition to this, the underground mine area will require on average 30.4 m^3/h for dust suppression, drilling, cleaning, etc. and the camp will only require 3.3 m^3/h, based on 400 persons at camp and 200 liters per person per day.

To summarize, approximately 100 m^3/hr of water will be required at the site.

As described in the 2021 Definitive Feasibility Study, extensive testwork has been completed to provide the optimized flow sheet at the Dasa process plant.

In the back-end of the process plant, the uranium is precipitated from the loaded strip liquor solution as sodium di-uranate followed by solid-liquid separation. The precipitation of uranium as sodium di-uranate and recycling of the barren liquor to strip provide the following benefits:

- Reduces reagent consumption
- Improves the water balance

The majority of the Semi Autogenous Grinding (SAG) mills operating around the world utilise water to move the broken ore particles as a slurry through the process plant. In contrast, the Dasa SAG mill will be a dry milling arrangement, thus reducing water use in the grinding circuit.

As described in Section 1 above, to reduce GHS emissions the intention is to install 13.5 MW_{DC} of solar panels. The installation of the solar panels is yet another example of the resource efficiencies being designed into the Dasa mine and mill.

1.3.11. Electricity supply and efficiency

Electricity supply during the construction phase will be provided by diesel generators, including for the water supply systems. Diesel for the generators will be stored in a protected area equipped with spill kits and associated oil/water separators.

In the operational phase, the needs will be provided by the SONICHAR network together with back-up diesel generators, battery storage and solar power. To this end, electrical lines connecting the site to the existing line which runs along the main road between Agadez and Arlit, a distance of around 5km, and an associated substation within the

operational area will be built. The power line and substation are the only Associated Facilities identified for the project.

The options available to SOMIDA for the Dasa Mine include the combination of the following power sources:

- Coal-fired power plant at SONICHAR supplying to the grid
- On-site diesel power generation
- On-site solar power generation

Based on the work completed to-date has estimated its base-case operations-phase GHG emissions as 65,395 tonnes per annum (tpa) which includes 12,477 tpa scope 1 emissions and 52,919 tpa scope 2 emissions and assumes that the majority of the Project's electricity will be provided by coal-fired power via the Nigerien national grid, and that vehicles will be fueled by diesel.

There is an optimized plan to install solar photovoltaic (PV) panels linked to battery storage and back-up diesel, with the intent of providing approximately 20% of the Project's total requirement as renewable energy. This would reduce the total estimated GHG emissions to 52,871 tpa to include 21,275 tpa scope 1 emissions and 31,596 tpa scope 2 emissions. Furthermore, there is a conceptual plan to reduce the mine site power demand from 12 megawatts (MW) to 9 MW which, coupled with solar PV and battery storage, and back-up diesel, would target a reduction in GHG emissions to 43,000 tpa; a 34% reduction from the base case scenario to include 18,691 tpa scope 1 emissions and 24,422 tpa scope 2 emissions.

Regardless, GHG emissions will exceed 25,000 tpa and will therefore need to be measured and reported on an annual basis in order to comply with IFC PS3. Power for the construction phase power is expected to be provided via diesel fuel (vehicles and generators).

UN Sustainable Development Goal #7 is to ensure access to affordable, reliable, sustainable and modern energy for all. According to the European Nuclear Society, Fuel comparison - ENS (euronuclear.org) one kg of natural uranium following a corresponding enrichment and used for power generation in light water reactors is equivalent to 14,000 kg of coal and enables the generation of 45,000 kWh of electricity.

The Dasa Phase 1 mine is expected produce approximately 45 million pounds of U_3O_8 in yellowcake. This yellowcake, after enrichment, will be transformed into 17,580,000 kg of natural uranium. This amount of natural uranium can replace 246 million tonnes of coal. A Climate Change Risk Assessment will be carried out ahead of construction.

1.3.12. Determination of geographical boundaries and types of impacts

Taking into account the environmental and social issues related to this type of project, three main impact zones were defined. These include the direct impact zone, the intermediate impact zone and the diffuse impact zone.

- *Zone of direct impact:* This corresponds to the deposit area, the exploitation permit area (which is a regulatory limit defined by the four points of the exploitation permit granted to GAC) up to 15 km in all directions. Indeed, the deposit area will be the focus of all the work that will take place in the context of the implementation of the project (construction of the mine, related infrastructure and equipment) as well as the exploitation. This includes a 40 ha buffer zone within which a 2ha area proximal to surface infrastructure will be fenced and from which domestic animals and community members will be excluded. Within this area, disturbances will be caused to elements of the biophysical and human environment including risks associated with pollutant emissions. In this area, which includes the villages of Gados, Issakanane, Tagaza, Egatrak, Timelt- Abouss and Ouford, direct and indirect impacts of the project are assessed.
- *Intermediate impact zone:* This corresponds to the zone beyond the 15 km radius and includes the commune or even departmental level. Within this zone, certain positive (in terms of job creation, economic development, health, education, water supply, etc.) and negative (emissions) impacts of the project will be felt or perceived.
- *Diffuse impact zones:* this is a sufficiently large zone in which the project's impacts will be perceived on a regional or even national scale, particularly in relation to the improvement of tax revenues (through various taxes and fees), which are the basis for investments in basic social sectors. This will also include consideration of any potential transboundary effects associated with the mine, for example air shed and catchment considerations. Other than the overall contribution of the project to greenhouse gas levels in the atmosphere, no potential transboundary effects have been identified.
- In addition, cumulative impacts will be considered. This includes other industries or development projects which might be taking place in the area, may add to pollution loads or stresses on the environment and communities or enhance positive effects such as economic development.

2. INITIAL STATE OF THE SITE AND ITS ENVIRONMENT

2.1. Location of the project

The "Adrar Emoles 3" uranium mining project is located in the Agadez region, which itself is situated in the northern part of Niger between longitudes 6° and 15° and latitudes 16° and 22°. It is located 100 km north of the town of Agadez, the capital of the region, and is accessible via the RN 25. Figure 2 below shows the location map of the project.

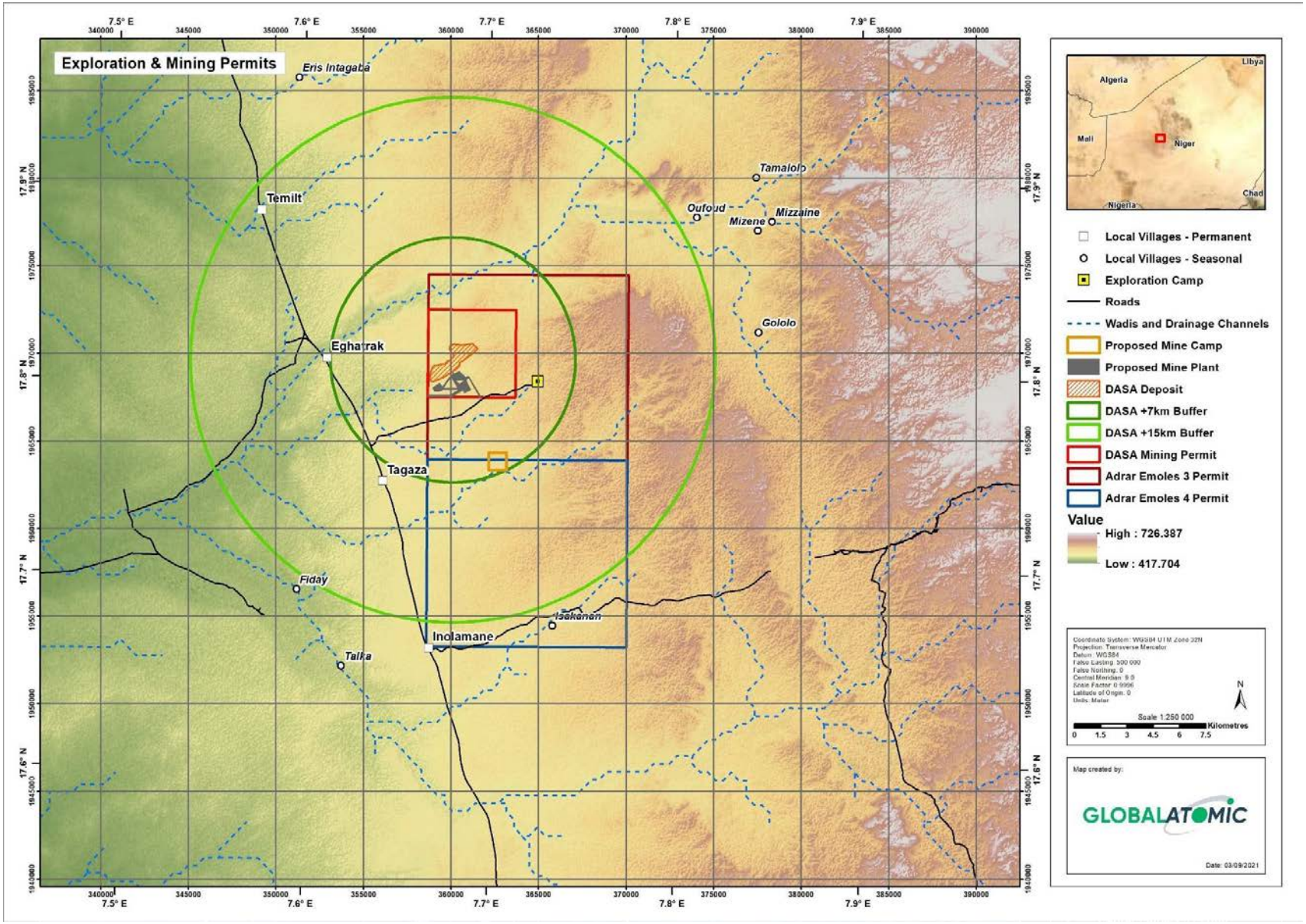

Figure 2 Location map of the project site

2.2. Biophysical environment

2.2.1. Relief

The relief of the Agadez region is characterised by seven (7) major geomorphological zones which are:

- the Aïr Massif: Drainage valleys and surface water reclamation which extends over the departments of Tchirozérine, Arlit and Iférouane;
- the Irhazer plain and regs broken by granite rocky hills in the South (Issaraydagan) and in the North-East which extends over the departments of Ingall and Arlit;
- talak and tamesna: on the Ingall department which is a spreading plain, favourable to wheat cultivation, Irhazer project, pastoral activities (salt cures) on the Ingall department;
- the Kawar in the Bilam and Dirkou department, which is a dune complex containing oasis basins for the production of dates, market gardening, citrus fruits and the breeding of small ruminants;
- the North Tadress plateaus extending over the departments of Aderbissinat and moving north-eastwards towards the Ergs of the Sahara;
- the Ténéré Desert extending over the departments of Arlit, Bilma and Iférouane
- and the Oases of Kaouar and the North-East plateaus in the department of Bilma.

The relief of the study area is heterogeneous and is characterised by plateaus, plains fed by koris, mountain ranges crossed by koris (Aïr massif) and by sandy areas in the East.

2.2.2. Climate

The climate of the Agadez region is tropical and sub-desert, characterised by a very high level of aridity. There are two main seasons (a long dry season from November to May and a very short rainy season from June to September), which can be broken down into four (4) main periods: a dry and cold period (November to March), a hot season (April to June), a rainy season from June to September, and an intermediate transition period (September to November).

According to the ten (10) year record obtained from the National Meteorological Directorate for the Tchirozérine station, it can be seen that seven (07) years out of ten (10) have recorded rainfall in excess of 100 mm and three (03) years out of ten (10) have rainfall of less than 100 mm. The maximum recorded during this period is 271.6 mm in 2015 and the minimum 48.8 mm in 2013 (see Figure 3 below).

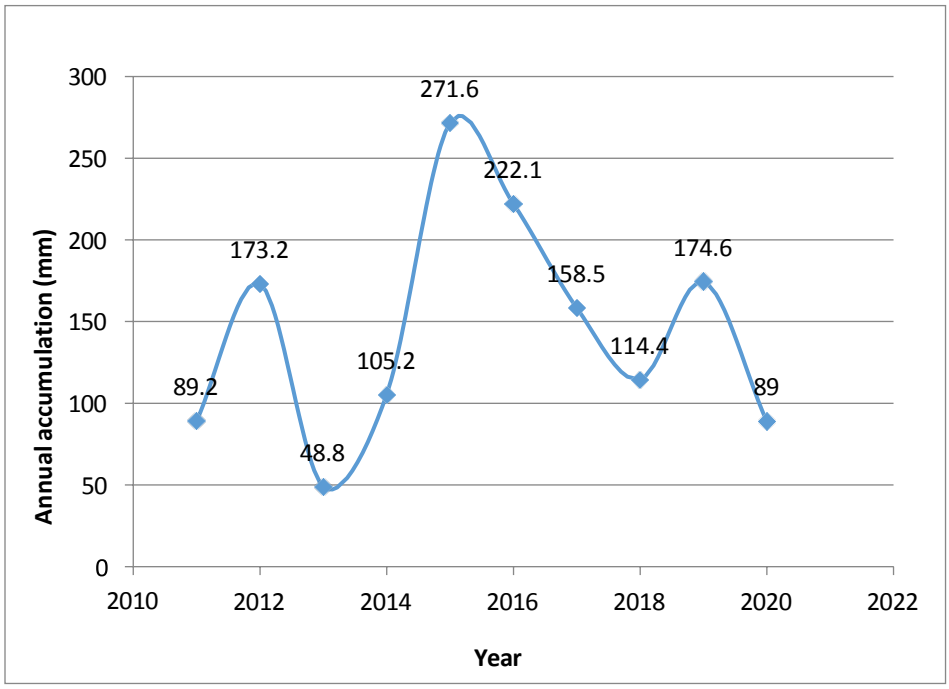

Figure 3 Ten-year rainfall

With regard to temperatures, the maximum and minimum recorded during 2021 are illustrated in figures 4 below.

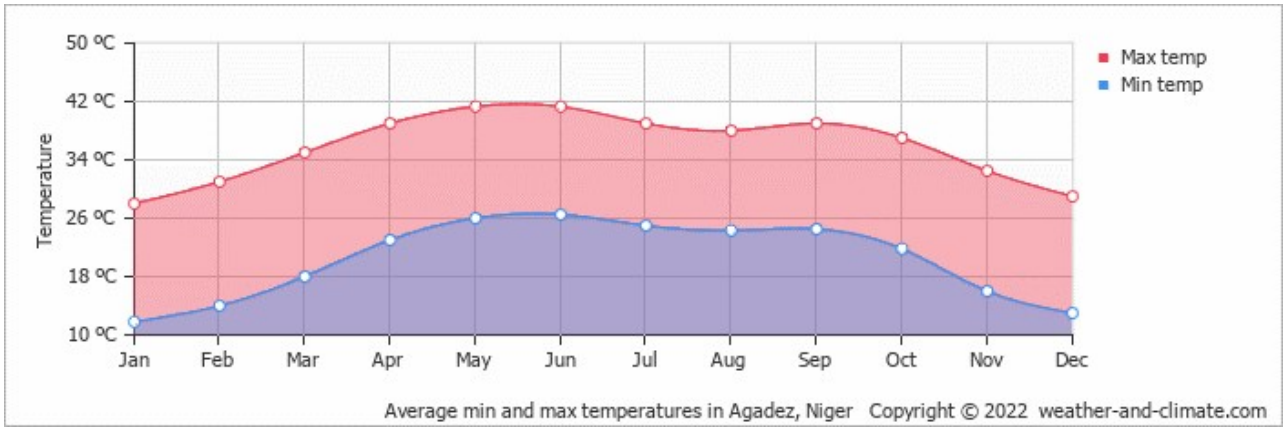

Figure 4 Minimum and Maximum temperatures Agadez, Niger

2.2.3. Soils

The region can be divided into seven (7) agro-ecological zones, whose lithology follows the main relief features. The soil resources of these features have the following textures:

- classified soils, granitic mountains, sandy soils with silty hooves in the deep valleys for the Aïr area;
- iso-humic, calc-magnetic and sodic soils in the alluvial plains with outwash and temporary swamps in IRHAZER;
- sandy to sandy-clay soils in the lowlands of the TADRESS;
- clayey loam soils in the TALAK and TAMESNA;

- shallow sandy soils in the KAWAR:
- and the shifting sandy soil (eolian accumulation) of the TENERE.

These soils are relatively poor, saturated and sometimes overexploited and their agricultural development requires significant amendments (mineral fertilisers and organic matter).

The project area is located in a soil context belonging to the Quaternary deposits which are composed of:

- sands: they are the result of water erosion in the Aïr and wind erosion in the Ténéré;
- Gravels: these are largely the result of erosion of the Aïr. These deposits are generally found within the beds of koris,
- clays with detrital elements: these clays correspond in part to the fine particles transported by the koris and also result from the erosion of the Irhazer.

The mineralogical composition of these soils, which can be considered similar to that of the soils of the Imouraren permit (30 km from the permit), is given in Table 6 below.

Table 6 Mineralogical composition of soils

Metals	Concentrations
Cu	Between 3 and 55 mg/kg DM
Fe	Between 10 000 and 40 000 mg/kg DM
S	< 500 mg/kg DM
Mg	Between 100 and 780 mg/kg DM
Pb	Between 100 and 780 mg/kg DM
Zn	Between 10 and 42 mg/kg DM
As	< 5 mg/kg DM
Nor	Between 3 and 26 mg/kg DM
Cr	Between 10 and 50 mg/kg DM
Mo	< 5 mg/kg DM
Go to	Between 12 and 76 mg/kg DM
Cd	< 0.5 mg/kg DM
Hg	Between 0.02 and 0.09 mg/kg DM
Al	Between 2 and 40 mg/kg DM
Co	Between 4 and 14 mg/kg DM

Source: *EIA, Imouraren Niger 2008, AREVA*

2.2.4. Geology of the project area

The geological context of the project area is marked by two major groups: the basement (Air crystalline massif) which occupies the eastern part of the Agadez region and the sedimentary basin (Tim Mersoi basin) which occupies the western part of the region.

- ✓ ***The base***

Known as the Air Massif, the base belongs to the immense Hoggar mountain range, of which it is an entity in the same way as the Adrar des Iforas, its western counterpart. It is formed of crystallophyllous rocks of Precambrian age and granite intrusions. The various volcanic phenomena and tectonic movements have led to a shape whose characteristics derive from the lithological nature of the terrain.

- ✓ ***The Tim Mersoi Basin***

It is essentially made up of clay, clay-sandstone and sandstone sequences whose age is between the Carboniferous and the Lower Cretaceous. This basin is a subset of the Iullemmeden basin. The Iullemmeden basin is a huge basin located south of the Hoggar and is bordered to the north by the Adrar des Iforas, Hoggar and Air basement. In the south, it extends as far as the rise of the basement at the level of the major cities of Niger: Niamey, Maradi and Zinder. The northern part of this vast structural basin is divided by the submeridian ridge of In Guezzam into two basins: the Tamesna basin (to the west) and the Tim Mersoi basin (to the east). The following stratigraphic log summarises the characteristics of the main geological formations. The different series dated from the Lower Viséen to the Lower Cretaceous are, in chronological order of deposition: the Teradah series, the Tagora series, the Izegouandane series, the Aguelal series, the Goufat series, the Wagadi series, the Dabla series, and the Tegama group (cf. Figure 6 below).

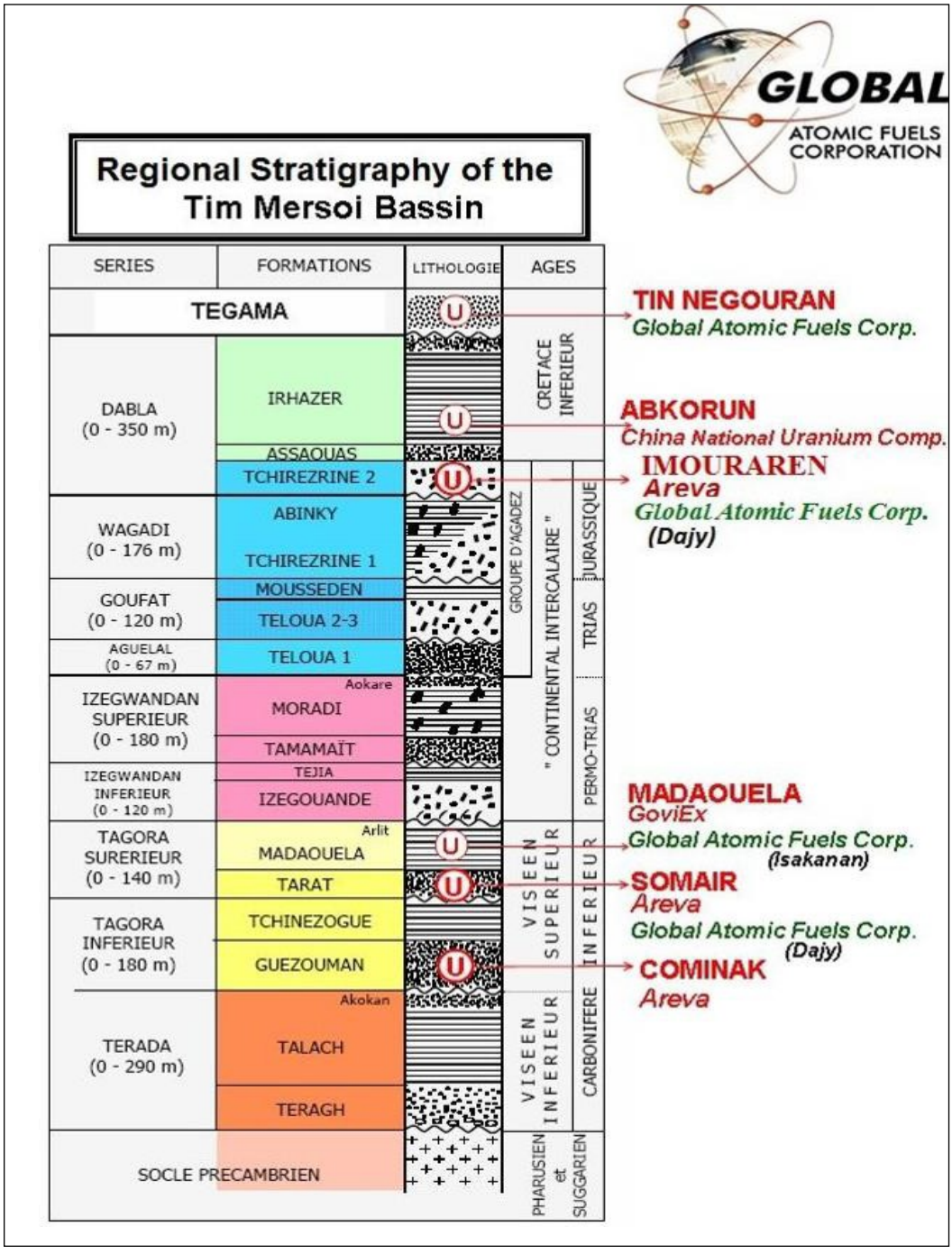

Figure 5 General stratigraphic log of the eastern part of the Tim Mersoi Basin

Within the perimeter of the permit, sedimentary formations outcrop, mainly Carboniferous and Permo-Triassic. These are mainly Carboniferous formations containing the uranium mineralisation of the Akouta and Arlit deposits.

Structurally, the perimeter of the 'Adrar Emoles 3' permit is characterised by its location on the eastern flank of the Arlit Flexure-Fault. The major tectonic structures that intersect it are the Azouza NE-SW regional fault (on which the Azelik uranium deposit is located)

and the Adrar Emoles NNE-SSW flexure. Figure 7 below illustrates the litho-structural setting of the site and surrounding licences.

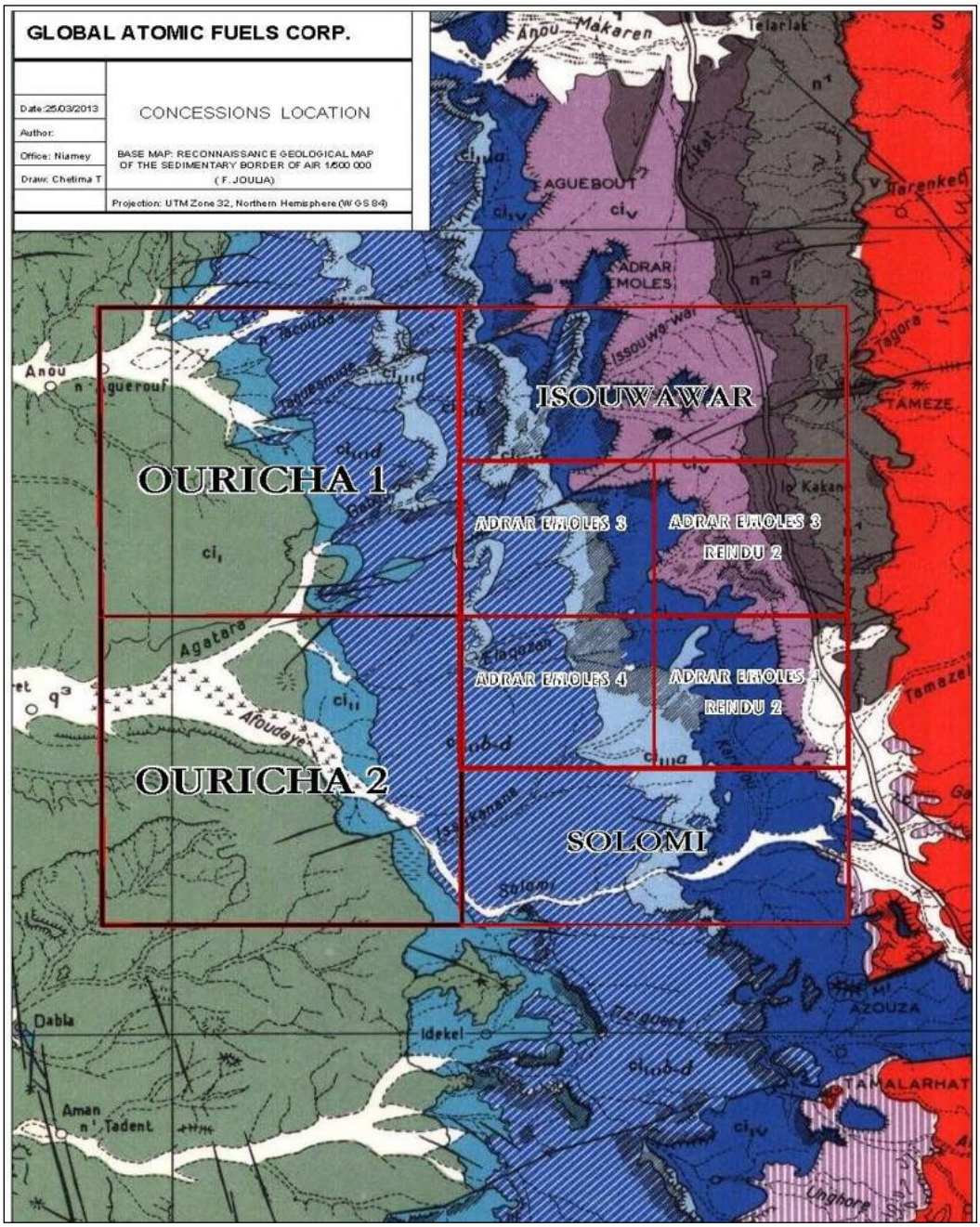

Figure 6 Litho-structural framework of the site and surrounding permits

2.2.5. Water resources

Water resources in the Agadez region consist of surface and groundwater. Surface water flow in the wider region is towards the southwest. and the Niger river, which passes through western Niger southwards to Benin and Nigeria.

2.2.5.1. Surface water

The surface waters are made up of the more temporary streams particularly known as koris and semi-permanent streams. The koris are seasonally flowing valleys that drain the western slopes of the Air massif and flow into the three (3) major collectors of the region which are:

- The Anou Zangarène;
- The Anou Makarene;
- The Irhazer Wan Agadez.

These three (3) collectors converge about 200 km west of AIR to form the AZAOUAK, which marks the location of an ancient river that flows into the Dallol Bosso.

The Koris de Téloua is one of the best known of all the Koris that crosses the city of Agadez and which is assumed to recharge the Téloua aquifer that currently supplies the city of Agadez.

The semi-permanent watercourses are located in the irhazer valleys and in the fracture zones of the AIR, the main ones being the ponds of Tchintaborak, Aderbissanat and the artificial pond of Bilma created by an artesian well and the springs of Azelik, Toubak, Geleli and the thermal spring of Tafadek.

2.2.5.2. Groundwater

The hydrogeology of the region is formed by a multi-layered aquifer system comprising the Guezouman aquifer, the Tarat aquifer and the Izégouandane water table in the eastern part of the In-Azaoua-Arlit fault. In the western part, these nappes are surmounted by a permeable horizon which hosts the Tchirozérine aquifer and the Téloua aquifer, the subject of the study in the permit area.

✓ *Gezouman aquifer*

The Guézouman aquifer is contained in the sandstone levels of the Guézouman, a deposit that hosts the uranium mineralisation exploited by COMINAK (Bigotte and Obellianne, 1968). The reservoir is characterised by significant lateral variations in thickness and facies, with the Talak clay formation as the wall and the Chinézogue formation as the roof (Joulia, 1959; Joulia and Obellianne, 1976; Yahaya, 1992). The direction of flow is currently SSE (south-southeast) to NNW (north-northwest). It is captive as a whole.

✓ *Tarat aquifer*

This aquifer is made up of coarse to medium sandstones, limited at the base by microconglomeratic sandstones with clayey intercalations (Dodo, 1992; SCETAGRI, 1985; AMAN, 2013). These formations also host the uranium mineralisation to be mined by SOMAÏR. The wall of the Tarat aquifer is constituted by the impermeable clays of the Chinézogue and its roof is constituted by the Madaouéla siltstone. Flow rates in the permit area of around 30 m^3 /h, or even more (Roufai and faiçal).

✓ *The Izégouadane aquifer*

This aquifer overlies the Carboniferous and is more important from south to north in the study area. It is generally made up of arkosic sandstone. It is not very productive in the study area but offers flows of up to 30 m3/h towards the north (Arlit).

- ✓ *Teloua aquifer*

This aquifer, generally composed of feldspathic sandstones, overlies the Moradi clays, unlike the first three layers mentioned, it widens from south to north and is composed of three successive levels: Teloua I, Teloua II and Teloua III, as well as the Mousseden and Tchirezerine I. It offers good flows of 20 m3/h in our area (Roufai and Faiçal).

- ✓ *Chirozerine 2 aquifer*

This geological formation is practically composed of coarse to medium arkosic sandstone, which also outcrops in the study area before disappearing from the north to the south. It offers very low flows in the area (Roufai and Faiççal)

2.2.6. Hydrodynamic parameters

The hydrodynamic parameters in the study area are given in Table 7 below.

Table 7 Summary of Hydrodynamic Parameters of the Study Area

Aquifers	NS: Static level (m)	Q: Flow rate (m3/h)	Specific flow rate Q/s (m3/h/m)	Transmissivity T (m2/s)	Permeability: K (m/s)	Storage coefficient: S (%)
The Chirozerin II layer	30 à 45	Low productivity				
The Teloua Nappe (Tchi I, Teloua 1, 2 and 3)	30 à 80	20	0,46	2.10-4	5.10-6	
The izegouanda aquifer	25 à 45	3	0,02	3.3.10-5	1.4.10-6	1.5.10-5
The Tarat aquifer	30 à 50	30	0,82	1,02.10-4	3.10-6	4.10-4

2.2.6.1. Hydrodynamic characteristics of the aquifers in the study area

To better understand the flow regimes of the aquifers, piezometric data from the steady state period (non-pumping conditions) were used to determine the general trend of the piezometry on the one hand, and to study the potential lateral and vertical exchanges between the four aquifers on the other. The monitoring of water levels thus makes it possible to understand the effect of anthropogenic or natural modifications on the reserve in place, and therefore on the availability of the resource. Piezometric monitoring carried out between 2013, 2018, 2021 and 2022 has shown that fluctuations in levels are negligible. This shows that there is not a lot of abstraction in the area and that rainwater does not affect the water levels of the aquifers too much. These aquifers are considered to be fossilised, but we believe that they are recharging at a very low level.

2.2.6.2. Hydrochemistry of the study area

Both physico-chemical and bacteriological analyses were carried out on the water samples from boreholes GIHF 1, GIHF 2 and GIHF 4 in accordance with WHO standards. The results are shown in Table 8 below.

Table 8 Results of physico-chemical analysis of water samples from the boreholes and the camp borehole

DETERMINATIONS	SAMPLE CAMP	SAMPLE GIHF1	SAMPLE GIHF2	SAMPLE GIHF4	STANDARDS WHO
Sodium (mg/l)	" "	87	50	200	<=200mg/l
Potassium (mg/l)	1	0,05	" "	1	<= 12 mg/l
Calcium (mg/l)	2	8	" "	1,60	<= 20mg/l
Magnesium (mg/l)	1,2	2,4	" "	0	<= 50 mg/l
Total hardness of CaCO3(mg/l)	" "	" "	" "	4	<=200mg/l of CaCO3
Chlorides (mg/l)	21	11	150	24,85	<=250mg/l
Fluorides (mg/l)	0,09	0,22	0,04	**4,18**	<= 1.5mg/l
Total iron (mg/l)	0,07	0,05	" "	0,05	<= 0.3mg/l
Nitrates (mg/l)	17,6	16	5	0	<= 50 mg/l
Nitrite (mg/l)	0,033	0,01	0,03	0,23	<= 3 mg/l
Sulphates (mg/l)	13	17	" "	132	<=250mg/l
Manganese (mg/l)	0	" "	0,004	0	<= 0.4mg/l
Copper (mg/l)	0	" "	" "	0,02	<= 1 mg/l
Nitrous nitrogen (N)	" "	" "	0,006	" "	0.50mg/l
Bicarbonates	" "	213,5	" "	" "	

2.2.7. Hydrogeological conceptual model

For the conceptual hydrogeological model of the area, there is a lack of data, but the broad outlines can be defined only for the Teloua aquifer, as this is the only aquifer for the moment that has been the subject of a fairly in-depth study in the area and which will be affected by future exploitation. The data available for the design of this model are as follows:

- ✓ *Water withdrawals*

Water abstraction in the area is insignificant compared to the billions of m3 of water available, however there is also abstraction from other companies that are located to the southwest of the site but this is not felt on the site as with monitoring carried out in 2013, 2018, and 2022 there was no change in the piezometric surface in the area. This can be explained by the numerous faults in the area which can act as screens for the aquifers.

- ✓ *Inputs from rivers or rainwater*

The study area being a purely desert zone, watercourses are very rare and the few that exist are seasonal and flow in a brutal manner (a few hours only) in the sector and the soil is sandstone with very consolidated cement; this makes it almost impossible for water to infiltrate the sector. The contributions if they exist, are very insignificant, whether they come from watercourses or from rainwater. This is confirmed above with the data from the piezometric monitoring over a period of 5 months and during the period of rising water, where a maximum variation of 7 cm was noted in the Chirezerine II water table, 33 cm in the Teloua water table, 6 cm in the Tarat water table and 23 cm in the Iezgaounda water table.

- ✓ *Interactions between aquifers*

In the project area, no link has been established between the different aquifers, although

extensive studies have not been carried out in this respect, but through the few boreholes carried out as part of the identification of the aquifers, all the aquifers are separated by impermeable layers, which implies that exchanges between them are non- existent.

However, there are fractures that can facilitate this exchange. On the other hand, in the grabben area (the area of the deposit), signs of exchange between the aquifers have been noted, as there are areas of geological unconformity in these places.

2.2.8. Hydrogeological Synthesis

The hydrogeological summary of the project area is given in Table 9 below.

Table 9 Hydrogeological summary

Aquifers	**Geological formation**	**Formation thickness (m)**	**NS: Static level (m)**	**Q: Flow rate (m3/h)**	**Specific flow rate Q/s (m3/h/m)**	**Transmissivity T (m2/s)**	**Permeability: K (m/s)**	**Storage coefficient: S (%)**
The Chirozerin II layer	Chirozerin II	25 à 40	30 à 45	Not very productive				
The Teloua Nappe (Tchi I, Teloua 1, 2 and 3)	Chirozerin I, Teloua1,2 and 3	30 à 50	30 à 80	20	0,46	2.10^{-4}	5.10^{-6}	
The izegouanda tablecloth	Izegouanda	80 à 120	25 à 45	3	0,02	$3.3.10^{-5}$	$1.4.10^{-6}$	$1.5.10^{-5}$
The Tarat slick	Tarat	20 à 40	30 à 50	30	0,82	$1,02.10^{-4}$	3.10^{-6}	4.10^{-4}

2.2.9. Air quality

The analysis of the initial air quality status concerned sulphur dioxide (SO2), nitrogen dioxide (NO2), fine and coarse particulate matter (PM), heavy metals in aerosols and black carbon while establishing air quality limits and/or quantities that are expected to increase as a result of site emissions.

Standards used for comparison are WHO standards for PM10 and PM2.5, Dust deposition monitoring was not carried out, as the site is located in a desert and is subject to sandstorms and the Harmattan wind from the Sahara. Therefore, any baseline readings would exceed any recognised standards for dust deposition. Sensitive receptors are located several kilometers from the mine site. For this reason, air quality modelling has not been carried out, but mitigation measures are built into project procedures. An Air Quality Management Plan will be developed ahead of construction.

The collection of particulate matter samples on the PM2.5 and PM10 filters was carried out at four measurement points around the site. These are:

- Site 1 (north side base camp): 17°47'58" north latitude and 7°45'44" east longitude;

- Site 2 (south side base camp): 17°47'52'' north latitude and 7°43'34'' east longitude;
- Site 3 (Tagaza): 17°48'36'' north latitude and 7°36'45'' east longitude;
- Site 4 (Egatrak): 17°44'45'' north latitude and 7°48'37'' east longitude.

The data collection period is from 9 to 15 December 2021. The measurement time for each point is 24 hours and each equipment allows the simultaneous realization of PM10 and PM2.5 and only the Camp site (base camp) was sampled every day for 5 days. On the other hand, the Tagaza and Egatrak sites were sampled once (1) each. The wind direction was north-east. The results are provided by XRF analysis in ppm and are converted to ug/m^3.

2.2.9.1. Field materials/equipment

Two (2) types of particulate matter (PM10 and PM2.5) receptors were used. These are:

- a low-flow sampler (18 litres/min) of the Gent Stacked Filter unit type, equipped with two PM10 and PM2.5 heads, enabling the fine fraction (PM2.5) and the coarse fraction (PM10) to be sampled separately. The filters are made of polycarbonate (spi and whatman) placed in series with a porosity of 8µm for the first and 0.4µm for the second respectively for PM10 and PM2.5. The duration of the sampling is 24 hours per filter, the flow rate, the volume of air drawn in and the meteorological parameters were recorded on each sampling day. The collected filters were conditioned in a desiccator (oven) and the weighing of the filters before and after each sampling was carried out in a laboratory environment. The following Photo 1 shows the measuring device (GENT) used in this work.

Photo 1 GENT measuring device

- A low flow sampler (2.3 m^3 /hour) KLEINFILTERGERAT (LECKEL GmbH) (see

Photo 2) equipped with a PM2.5 head. The filters are made of microfibre glass with a diameter of 47 mm and a porosity of 0.4 um (whatman).

Photo 2 Measuring device LECKEL GMBHMeasuring device LECKEL GMBH

- A DAVIS-type weather station was used to collect meteorological parameters such as temperature (degrees Celsius), relative humidity (%), rainfall (mm), pressure (hPa), wind speed (m/s) and direction. The device is illustrated in Photo 3 below.

Photo 3 DAVIS weather measuring device

2.2.9.2. Measurement results

✓ *Concentration of particulate matter*

The results of the measurements for particulate matter (PM2.5 and PM10) are presented in Table 10 below. Exceedances of the WHO standards are highlighted.

Table 10 Average concentration of particulate matter (PM2.5 and PM10)

PM10, PM2.5 CONCENTRATION IN $\mu G/M^3$				WEATHER VALUES	
WEBSITE	**PARTICLES**	**AVERAGE**	**WHO STANDARD/DAY**	**TEMPERATURE IN °C**	**WIND SPEED IN (KM/H)**
Site 1	PM2.5	54,65	25	32	1,44
Site 2	PM10	113,27	50	29	1,44
	PM2.5	22,24	25		
	PM2.5/PM10	0,196	<0.5		
Site 2	PM10	68,73	50	32	4,68
	PM2.5	14,10	25		
	PM2.5/PM10	0,205	<0.5		
Site 3	PM10	61,84	50	33	6,48
	PM2.5	32,74	25		
	PM2.5/PM10	0,529	<0.5		
Site 4	PM10	135,70	50	29	4,78
	PM2.5	23,95	25		
	PM2.5/PM10	0,176	<0.5		

In general, the average concentration of deposited mass is relatively higher in PM10 than in PM2.5. However, it is noted that the concentration of fine particles is much more dominant at site 1 (54.65 µg/m^3), which is still higher than the WHO standard (25µg/day) due to the harmattan winds and the factories in Agadez, including the Sonichar power station at Tchirozerine, located approximately 60km to the south.

It should also be noted that on specific days, the PM10 concentrations are very high due to the variation of meteorological conditions at the base and EGHATRAK (113.27 and 135.70 respectively).

Finally, it should be noted that the higher the wind speed, the lower the concentration of particles, which proves that the wind favours their dispersion (see Figure 7).

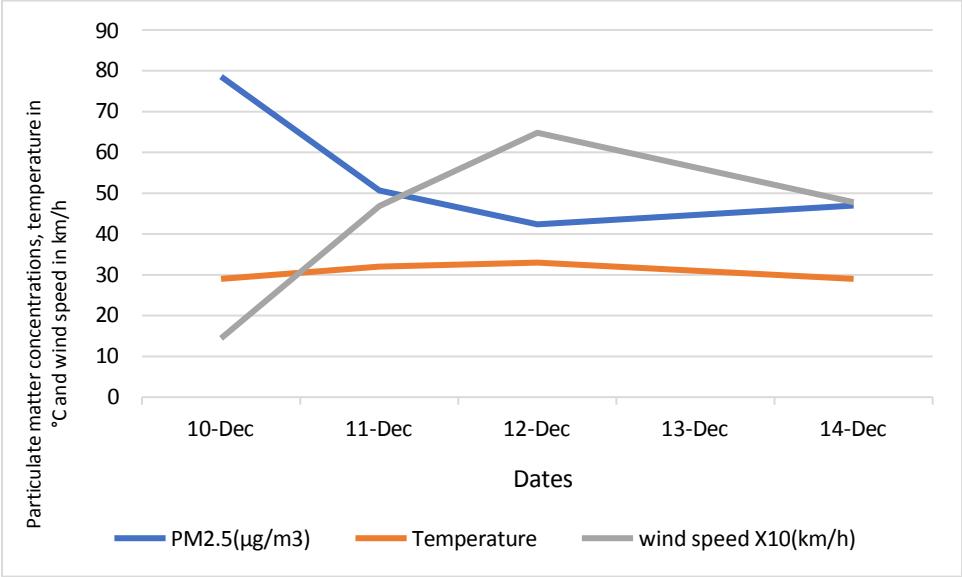

Figure 7 Influence of meteorological parameters on PM2.5 at site 1

On the other hand, for sites 2, 3 and 4, the PM10 concentration is clearly higher than that of PM2.5 due to terrigenous inputs and the resuspension of large particles in the air by desert winds.

Nevertheless, the fine particles vary little under the influence of wind, and the temperature remains almost constant throughout the sampling period (see figure 8).

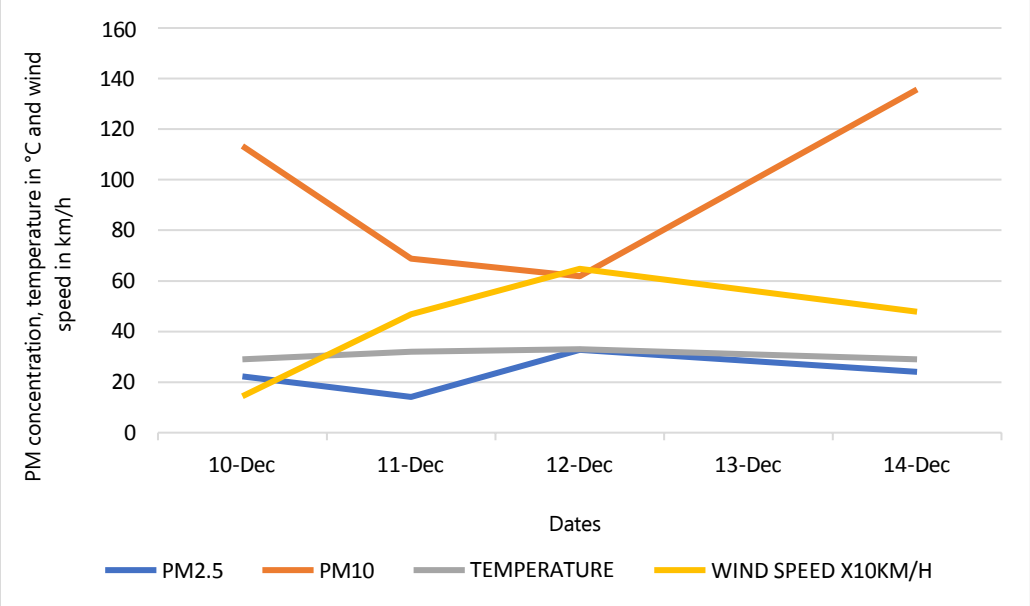

Figure 8 Influence of meteorological parameters on PM at sites 2, 3 and 4

✓ *Elemental chemical composition (heavy metals)*

Within the framework of the study eight (8) main elements were analysed by nuclear

analysis techniques (X-ray fluorescence). The results of the PM2.5 analysis of site 1 show that the most abundant element is zinc followed by vanadium, barium and titanium (see table 11 below).

Table 11 Concentration of heavy metals at site 1

ELEMENTS	MAX	MIN	AVERAGES	WHO/EU/IARC STANDARDS (µg/m³) ANNUAL
Ba	1,4457	0,7289	0,9563	-
Cr	0,1497	0,0511	0,0997	0,0002
Fe	0,8800	0,2605	0,4483	-
Mn	0,1580	0,0000	0,0395	70
Sr	0,0862	0,0377	0,0550	10
Ti	1,7129	0,1080	0,9179	120
V	1,8150	1,0424	1,2588	500
Zn	4,5964	2,3817	3,1122	3000

It should be noted that all the values obtained for heavy metals are clearly below the WHO, EU and IARC standards, with the exception of chromium (0.0997 µg/m3), which is above the WHO standard (0.0002 µg/m3).

Finally, apart from iron and manganese which are considered to be of natural origin, the other elements (Ba, Mn, Sr, Ti, V and Zn) are of anthropogenic origin probably transported by the wind coming from Arlit. Figure 10 below shows the variation in elemental concentrations at this site as a function of the sampling days. Thus, it should be noted that on the first day of sampling (10/12/21), the concentrations of the elements (Ti, V, Fe, Zn and Ba) are higher and a slight constancy is observed on the following days (11 to 13/12/21) except for Zinc which increases and Ti which decreases on the last day.

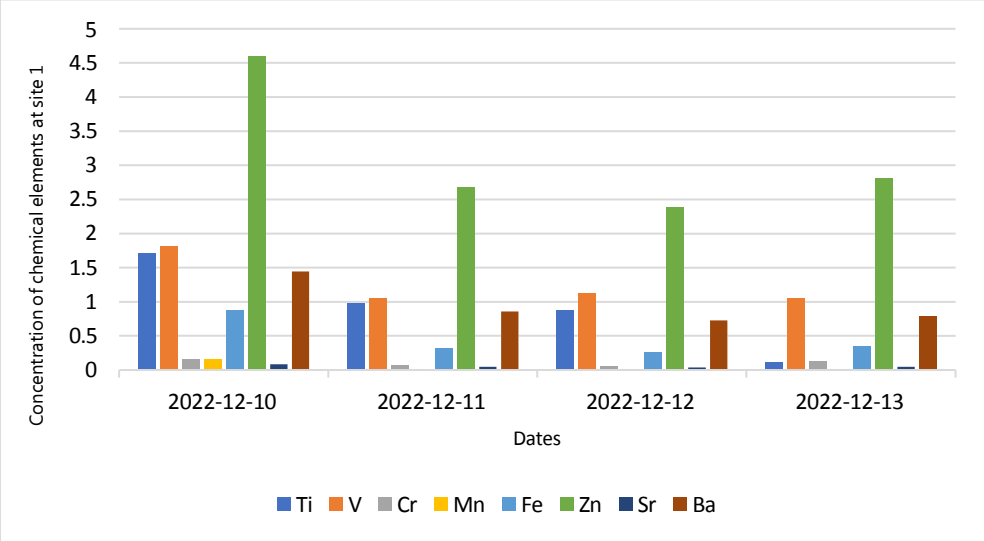

Figure 9 Variation in elemental concentration (site 1)

Concerning sites 2, 3 and 4, the concentrations of these elements are given in Table 12

below. Thus, at the base of life, Tagaza village and Egatrak (respectively sites 2, 3 and 4), five (5) elements were identified, of which iron is the only one of natural origin present in the two (2) fractions and more abundant in the PM10. While titanium is only present in PM10, the elements Chromium, Zinc and Barium are present in small quantities in both fractions.

Table 12 Concentration of elements at the sites

SITES	ELEMENTS	Ti	Cr	Fe	Zn	Ba
1	PM2.5	64000	7225	30755	227000	69400
2 south	PM10	-	-	31300	983	4969
	PM2.5	-	773	6427	-	-
2 North	PM0	8125	-	24900	-	-
	PM2.5	-	-	10100	358	-
3	PM10	5611	1392	31000	677	-
	PM2.5	-	-	6831	-	-
4	PM10	-	-	15300	582	5573
	PM2.5	-	-	582	-	5573

The variations in concentrations at these sites are illustrated in Figure 10 below. It should be noted that iron is the most abundant element followed by titanium and barium during the sampling period while chromium and zinc are present in low concentrations.

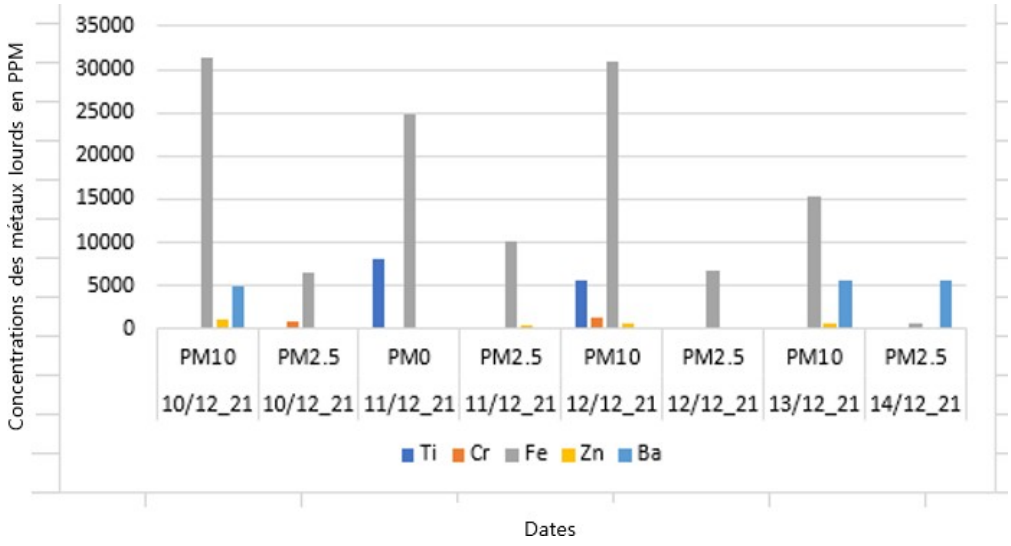

Figure 10 Variation in metal concentration at sites 2, 3 and 4

✓ *Black carbon concentration*

The average values of black carbon in fine and coarse particles are shown in Table 13 below. The maximum value is 1.84 at TAGAZA (Site 3); it slightly exceeds the WHO standard of 1.8 µg/m^3.

Table 13 Concentration of black carbon in particles

WEBSITES	CATEGORIES	ug/m³)
Site 1	BC (PM2.5)	1,1208
Site 2 South	BC (PM10)	1,3382
	BC (PM2.5)	0,3153
	BC (PM10)	0,6062
Site 2 North	BC (PM2.5)	1,0969
Site 3	BC (PM10)	1,8423
	BC (PM2.5)	0,1026
Site 4	BC (PM10)	0,4668
	BC (PM2.5)	0,6178

Source: Field survey (FEED), 2021

The trends in terms of variations illustrated in the table above show that at sites 2 south, and 3, the values obtained show that the concentration of black carbon in coarse particles (PM10) is higher than in fine particles (PM2.5).

At sites 1, 2 north and 4, the concentrations of carbon in fine particles are more dominant.

2.2.9.3. Vulnerability of the project area to sandstorms

Located in the Agadez region, the area is subject to sandstorms that often originate in the Sahara. In general, this phenomenon is favoured by the low vegetation cover of the ecosystems. Thus, in case of sandstorms, almost 70% of the total area of the region has a *"very high"* level of vulnerability. Figure 11 below shows the vulnerability map of the Agadez region to sandstorms.

In the project area, this phenomenon mainly affects the movement of people with disruption of visibility.

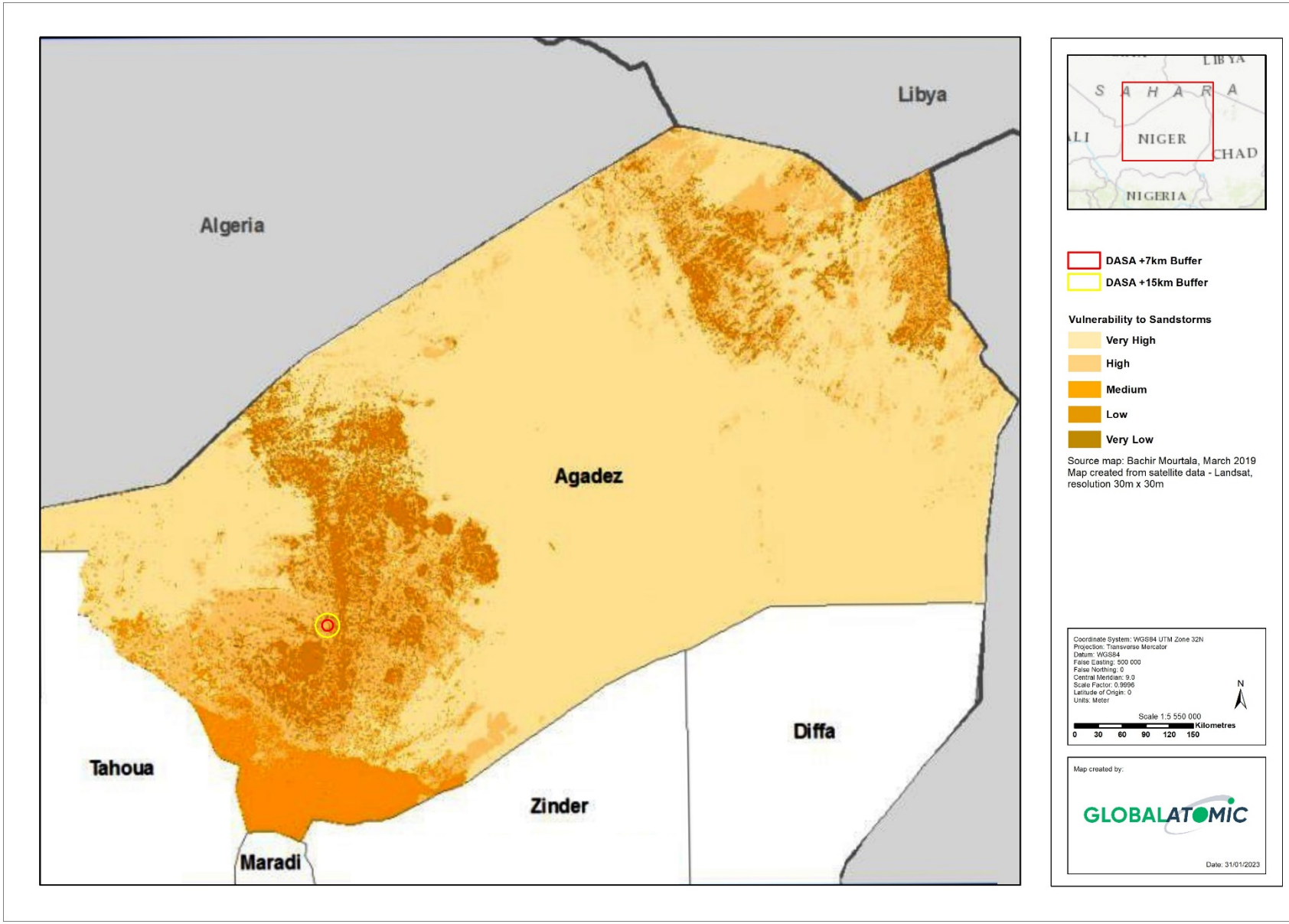

Figure 11 Vulnerability map of the area to sandstorms (Source: PDIPC, 2019)

2.2.10. Noise environment

✓ *Receptor potentials*

During the implementation of the project, the noise that will be generated by the fixed and mobile machinery will cause a change in the sound environment with the following potential receptors: the workers who will be involved in the different phases and levels of implementation of the project, the populations surrounding the sites and those of the localities located along the roads that will be used by the trucks transporting the raw materials to supply the plant and the shipment of the uranate.

✓ *Measurement results*

Ambient measurements were carried out at the sites with a sound level meter. The choice of these sites was based on the direction of the prevailing winds. The values obtained vary from 29.1 to 57.9 dB as shown in Table 14 below. It should be noted that at the heart of the deposits (length 17°47'82''; lat. 7°41'123''; altitude 483m), the readings on 12 December 2021, gave a maximum of 64.4 dB and a minimum of 28.9 dB at 11:01.

Table 14 Noise levels measured at the stations

Sites	Recorded noise level in decibels			
	MIN.	MAX.	MOY.	WHO Standard
1	36,6	51,1	43,85	55/Day
2 North	36,6	51,1	43,85	55/Day
2 South	46,8	**72,5**	59,65	55/Day
3	29,1	37,1	33,1	55/Day
4	29,6	**57,9**	43,75	55/Day
Core of the deposit	**28,9**	**64,4**	**46,65**	45/Night

The ambient sound quality limits according to the WHO Environmental Noise Guidelines (WHO, 1999) are 55 during the day and 45 at night. However, the maximum values recorded at the core of the deposit and at sites 2 south and 4 are above the WHO standards.

Finally, it should be mentioned that the values above the WHO standards are either related to the proximity of the measuring station to the RTA road or to varying meteorological conditions such as wind speed. Finally, the low noise values are explained by the fact that there are no noise generating activities within the perimeter of the permit.

2.2.11. Background radiation

The Project area is located in a region of elevated background radiation due to the natural presence of high concentrations of uranium in the rocks and soils. Key exposure (dose) routes for workers and local residents are based on external atmospheric radiation, external radiation received from the ground; inhaled dust and gases; ingestion of

radionuclides on foodstuffs and contained in drinking water.

The initial radiological status of the site and its surroundings is very important for monitoring the radiological impacts associated with the implementation of the Adrar Emoles 3 exploration permit. The elements of the initial radiological status are:

- measurements of external exposure dose rates at several points in and around the uranium deposit area and along two perpendicular directions that pass approximately through the centre of this area;
- measurements on soil samples at certain points;
- measurements on water samples from all the supply points (wells and boreholes) of the villages and camps within a radius of 20 km of the deposits (see Figure 12 for sampling points and radioactivity measurements).

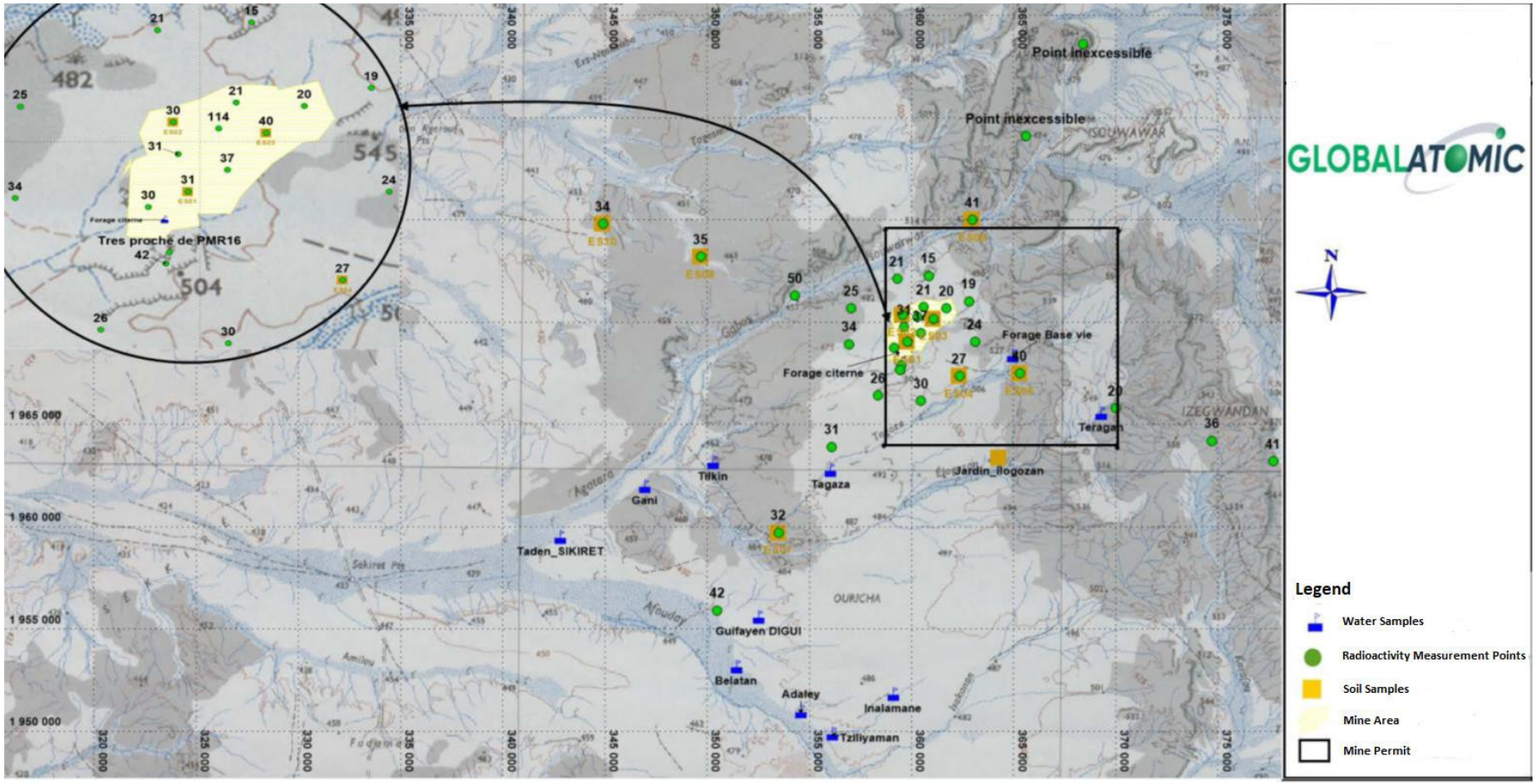

Figure 12 View of the sampling and measurement points for radioactivity (Source: REIES GAC, 2021)

2.2.11.1. External exposure dose rate measurements

The devices used were a GPS (brand GARMIN, etrex 10) to geo-reference the points and a radiation meter (brand ATOMTEX AT6130, serial number S/N: 20378) to measure the external exposure dose rates, at about one metre from the ground surface. The results are presented in Tables 15 and 16 below.

Table 15 External exposure dose rate measurement points on and around the left-hand deposits

Point number		1	2	3	4	5	6	7
Contact details Geographic in UTM	**X**	359149	359803	360453	359496	359642	359557	360303
	Y	1968752	1969047	1969452	1967989	1969763	1970370	1970248
Ambient dose rates at 1 m in nSv/h		**110**	**140**	**130**	**ND**	**130**	**80**	**320**
Point number		8	9	10	11	12	13	14
Contact details Geographic in UTM	**X**	361086	360596	361709	362810	360841	359275	357049
	Y	1970166	1970741	1970680	1971022	1972270	1972099	1970668
Ambient dose rates at 1 m in nSv/h		**100**	**130**	**60**	**80**	**70**	**80**	**230**
Point number		15	16	17	18	19	20	
Contact details Geographic in UTM	**X**	356964	359441	358370	360462	362345	363104	
	Y	1968919	1967671	1966411	1966154	1967353	1969041	
Ambient dose rates at 1 m in nSv/h		**160**	**90**	**160**	**200**	**120**	**140**	

Table 16 External exposure dose rate measurement points in and around the right-hand deposits

ITEM		*GISEMENT, SOUTH-EAST*				*DEPOSIT, NORTH WEST*		
Point number		21	22	23	24	25	26	27
Contact details Geographic in UTM	**X**	365300	370000	374700	377703	354300	349700	344900
	Y	1967500	1965800	1963206	1962500	1971300	1973200	1974800
Ambient dose rates at 1 m in nSv/h		**100**	**70**	**110**	**100**	**170**	**110**	**130**
ITEM		*DEPOSIT, NORTH-EAST*				*DEPOSIT, SOUTH-WEST*		
Point number		28	29	30		31	32	33
Contact details Geographic in UTM	**X**	363000	365600	368400		365100	353500	350500
	Y	1975000	1979100	1983600		1963900	1959700	1955900
Ambient dose rates at 1 m in nSv/h		**240**	**-**	**-**		**250**	**160**	**180**

In addition to the originally planned points, external exposure dose rate measurements were carried out at other points where water samples were taken. The coordinates of these points and the results of the measurements are presented in Tables 17 and 18 below.

Table 17 Additional measurement points and water sampling

VILLAGE OR CAMP		TILKIN	TADEN	GUIFAYEN DIGUI	ADALEY	BELATEN	TZILIYAMAN TEGAZAOU	TERAGAN
Contact details Geographic in UTM	X	350281	342822	352314	354592	351429	356137	369277
	Y	1963089	1959424	1955531	1950913	1953108	1949834	1965506
Ambient dose rates at 1 m in nSv/h		110	230	100	110	80	70	100

Table 18 Additional measurement points and water sampling (continued)

VILLAGE OR CAMP		GANI	INOLAMANE	TAGAZA	ELAGOZAN ''GARDENS	GLOBAL ATOMIC CAMP	DRILLING WATER SUPPLY
Contact details Geographic in UTM	X	346950	359125	356044	364311	364950	359420
	Y	1961916	1951762	1962722	1963373	1968322	1968508
Ambient dose rates at 1 m in nSv/h		110	110	140	160	100	130

Note: Based on the results of recorded external exposure dose rate measurements, the annual natural external exposure dose that would be received by a member of the public living in the area varies between 2.20 mSv (with a continuous dose rate of 250 nSv/h) and 0.53 mSv (with a continuous dose rate of 60 nSv/h).

2.2.11.2. Measurements of the radiological level of soils

Soil surface samples with a thickness of between 0 and 5 mm were taken, using a small shovel and plastic sample holders, at certain points in the area of the deposit and in the environment. These samples are intended for radiological analysis, specifically to determine the mass concentrations or mass activities of uranium-238 and radium-226. The sampling concerned the Elagozan gardens (7.94 km), points PMR21 (5 km), PMR26 (10 km), PMR27 (15 km), PMR28 (5 km), PMR32 (10 km), points PMR2, PMR6 and PMR8 located on the deposit and PMR19 which is in its immediate vicinity. The samples were coded as shown in Table 19 below.

Table 19 Sampling points and codes for sand samples

Sampling point	PMR2	PMR6	PMR8	PMR19	PMR21	Elagozan ''Gardens	PMR32	PMR26	PMR28	PMR27
Sample code	ES01	ES02	ES03	ES04	ES05	ES06	ES07	ES08	ES09	ES10

✓ *Results of radiological analysis of soil samples*

Soil samples taken in the project area were analysed by the Laboratoire d'Analyses Environnementales (LAE) of ALGADE, located in Bessines-sur-Gartempe, France, to determine the mass concentrations of uranium. The results of the analyses of the ten samples vary from minus 0.99 mg/Kg to 4.28 mg/Kg (the result sheets are attached to this report).

2.2.11.3. Measurement of the radiological level of water points (wells and boreholes)

All villages or nomadic settlements in the area within 20km of the deposit were visited and water samples were taken from wells and boreholes. Plastic bottles with a capacity of 1.5 litres each were used for this purpose. Thirteen samples were taken for radiological analysis to determine the volume concentrations of alpha and beta activity and the total indicative dose (TID).

The geographical coordinates of the wells and boreholes where samples were taken are presented in Tables 20 and 21 below.

Table 20 Sampling points and codes for water samples (village and type of structure).

VILLAGE OR CAMP	TILKIN	TADEN SÉKIRET	GUIFAYEN DIGUI	ADALEY	BELATAN	TZILIYAMAN TEGAZAOU
Work	Well	Drilling	Drilling	Well	Well	Well
Sample code	EE03	EE02	EE05	EE06	EE13	EE07

Table 21 Continuation of sampling points and water sample codes (village and type of structure).

VILLAGE OR CAMP	TERAGAN	GANI	INOLAMANE	TAGAZA	ELAGOZAN ''GARDENS	GLOBAL ATOMIC CAMP	DRILLING WATER SUPPLY
Work	Well	Well	Drilling	Drilling	Well	Drilling	Drilling
Sample code	EE01	EE04	EE08	EE09	EE11	EE10	EE12

✓ *Results of radiological analysis of water samples*

Water samples taken from the drinking water supply points (boreholes and wells) in the project area were analysed by the Laboratoire d'Analyses Environnementales (LAE) of ALGADE, located in Bessines-sur-Gartempe, France. This is a recognised laboratory for the measurement of radioactivity in the environment, approved by the French Nuclear Safety Authority (ASN) and accredited by the French Accreditation Committee (COFRAC).

The results of the analyses of samples EE01 to EE10, as published by the LAE laboratory, are appended to this report. It should be noted that, without any disturbance of the environment resulting from human activity, the overall alpha activity concentrations, in comparison with the World Health Organisation (WHO) recommendation (0.50 Bq/l), are high in three wells (Gani, Tilkin, Adelay) and two boreholes (Base Vie, Taden Sikiret). The same is true for the overall beta activity concentration in the Taden Sikiret borehole, compared to the 1 Bq/l recommended by the WHO. It should also be noted that, apart from Adaley which is isolated, all the water points with high radiological levels are on the same *Base Vie-Taden Sikiret* strip.

2.2.11.4. Recommendations

The results of the ambient dose rate measurements are highly variable and reflect the heterogeneous nature of the terrain. They provide a good baseline, but in order to complement them and also to comply with the requirements for radiological environmental

monitoring, it would be necessary to implement a programme over a period of twelve consecutive months, subdivided into four monitoring periods of three months each. This is very important as the regulatory dose limits for exposure to ionising radiation are set in national regulations and international standards for a period of one year.

Based on the results to date, the annual natural external exposure dose which would be received by a member of the public living in the area varies between 2.80 milli Sieverts (mSv) at a continuous dose rate of 320 nSv/h) and 0.53 milli Sieverts (mSv) at a continuous dose rate of 60 nSv/h).

GAC established four dosimeter stations to monitor alpha, beta, gamma and radon on a quarterly basis for a period of twelve12 months. With the baseline data complete, an (Appendix 6). An additional assessment of potential exposure will be calculated and compared with exposure rates elsewhere to Naturally Occurring Radioactive Materials (NORM) and health-based dose rates. This assessment will consider the nomadic characteristics of some of the local population and their reliance on their livestock for milk, cheese, and meat. A realistic exposure scenario will be defined with the relevant state institutions in order to establish a formula for calculating the cumulative exposure doses that these populations are likely to receive in a year including increased exposure attributable to the uranium mining operations. This work will be carried out ahead of mining operations.

2.3. Biodiversity

A desktop-based biodiversity GIS review and Critical Habitat (CH) Screening Assessment were undertaken in 2021 (Treweek Environmental Consultants (TEC) Ltd and Abell Geospatial Consulting (AGC) Ltd, 2021), with the aim of further aligning the Project with the requirements of IFC PS6, building on information and fieldwork provided by Groupe Art & Génie (2020).

The CH screening included identification and initial assessment of biodiversity features present within, or potentially impacted by the development of the Adrar Emoles III project and was conducted in accordance with the requirements of the International Finance Corporation Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC PS6) and the accompanying Guidance Note 6 (GN6).

A “Landscape Study Area” (LSA) was identified for broad screening of biodiversity features which includes the DASA Project area, the entirety of the Adrar Emoles III and IV Exploration Permit Areas and any additional areas within a 50km buffer around the Project location (Figure 14). The assessment used spatial data provided by GAC, existing Project related reports, publicly available biodiversity data, as well as the results of searches from internationally recognised biodiversity data sources (including the Integrated Biodiversity Assessment Tool (IBAT)) were also consulted and reviewed.

IFC PS6 requires the identification and assessment of three classes of area based on habitat condition. Land areas may be defined as “Modified” or “Natural Habitat” and either of these classes may also be identified as “Critical Habitat” if they support certain high biodiversity values. Habitat mapping has not yet been completed for the Project to allow this assessment to be completed.

Definitions of the three classes of habitat are outlined below.

Natural Habitat is defined as: '*areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition'*[1]. Natural Habitat is not restricted to pristine habitats. It is assumed that the majority of habitats designated as natural will have undergone some degree of historic anthropogenic impact.

Modified Habitat is defined as: '*areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition'*[2]. For example, areas managed intensively for agriculture, forest plantations, settlements and urban areas. Definitions of what might constitute a modified or degraded area vary, are location specific and may be influenced by the broader landscape context.

Critical Habitat is defined as '*areas of Natural and/or Modified Habitat that support high biodiversity value'* based on the presence of one or more of the following[3]:

Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species; Criterion 2:

Endemic and/or restricted-range species;

Criterion 3: Globally significant concentrations of migratory and/or congregatory species;

Criterion 4: Highly threatened and/or unique ecosystems; and/or

Criterion 5: Areas associated with key evolutionary processes.

The presence of any one of these types of biodiversity features in the LSA may "trigger" a determination of Critical Habitat, based on their extent or abundance within an Ecologically Appropriate Area of Analysis (EAAA) defined for each feature. For Criteria 1 to 3, presence of CH is confirmed by assessment against quantitative thresholds. Expert judgement is needed to determine presence of CH for Criteria 4 and 5. Legally Protected Areas and Internationally Recognised Areas may also qualify an area as CH depending on the reasons for designation.

2.3.1. Legally protected areas and international recognised areas

Seven legally protected areas have been identified during biodiversity studies, but all are understood to be more than 100 km from the Project site (Figure 14).Aïr et Ténéré MAB covers an area of almost 24 million hectares and is designated as an UNESCO World Heritage Site. The flora of the area comprises about 300 higher plants, while the fauna boasts an outstanding variety of wild animals including three threatened antelope species, the Loder's gazelle (Gazella leptoceros), Dama gazelle and Addax.Aïr and Ténéré Natural Reserve is listed as a UNESCO World Heritage Site. It is one of the largest protected areas in Africa and covers more than 7.7 million ha. It represents a small, isolated pocket of Sahelian plant life with Sudanese and Saharo-Mediterranean elements. One sixth of its total area is classified as a protected sanctuary.National Nature Reserve of the Aïr and the Teneré is classified as a Key Biodiversity Area and

[1] IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources 2012, Paragraph 13.
[2] IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources 2012, Paragraph 11.
[3] IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources 2012, Paragraph 16.

Important Bird Area. This protected area shares the same boundary as the Aïr and Ténéré Natural Reserve described above.

The Gueltas et Oasis de l' Aïr Ramsar site was designated in 2005 and covers an area of 49,241 km2 within the Aïr and Ténéré Natural Reserve. The site is a complex of permanent and temporary streams, oases and marshes at the centre of Niger's part of the Sahara Desert. This isolated area hosts a number of threatened species such as the Cheetah (CR), Dorcas Gazelle (CR), Addax (CR) and Barbary Sheep (VU). The site hosts 290 species of flowering plants and 150 bird species, including permanent residents and Palearctic migrants.

The Addax Sanctuary is an IUCN Management Category Ia site and a Strict Nature Reserve within the Aïr and Ténéré Natural Reserve. It covers an area of approximately 12,800 km2 and exists to protect habitat for the Critically Endangered Addax.

Termit et Tin-Toumma Natural Reserve is located to the south of the Aïr and Ténéré Natural Reserve. It covers an area of 90,507 km2 and is assigned to the IUCN management category IV. This natural reserve contains a large variety of desert habitats and is home to one of the last remaining wild populations of the critically endangered Addax, Dama Gazelle, North-west African Cheetah and Barbary Sheep.

Gadabedji MAB is located over 250 km south of the Project area. It covers an area of 1,413,625 ha and comprises a mosaic of savannas, depressions, pits and sand dunes. The fauna is diverse and includes large mammals such as the Dorcas Gazelle, Pale Fox and Golden Jackal.

2.3.2. Field Surveys

The CH screening assessment was completed using a range of desktop information sources including the ECS and ESIA reports previously compiled for the Project, IBAT Report, GIS data, Protected Planet, and scientific literature. Thirteen species of conservation concern listed under the IUCN Red list of threatened species were conservatively assessed as having the potential to occur within the LSA based on overlap with the species IUCN distribution and/or the likely presence of suitable habitat. Of these species, three nomadic/ wide ranging mammals: North-west African Cheetah, Addax and Dama Gazelle have the potential to qualify the LSA as Critical Habitat under Criterion 1 (Critically Endangered and Endangered species). The potential for threatened species to be present within the study area required further field assessment and in 2021 FEED Consult were commissioned to undertake field surveys in the dry and wet seasons (2021-2022).

Based on GIS spatial assessment, desktop CH screening, historical and current fieldwork there is no critical habitat in the project's area of influence; defined as a 50 kilometer circle around the mine site under IFC PS6 IBAT Report criteria.

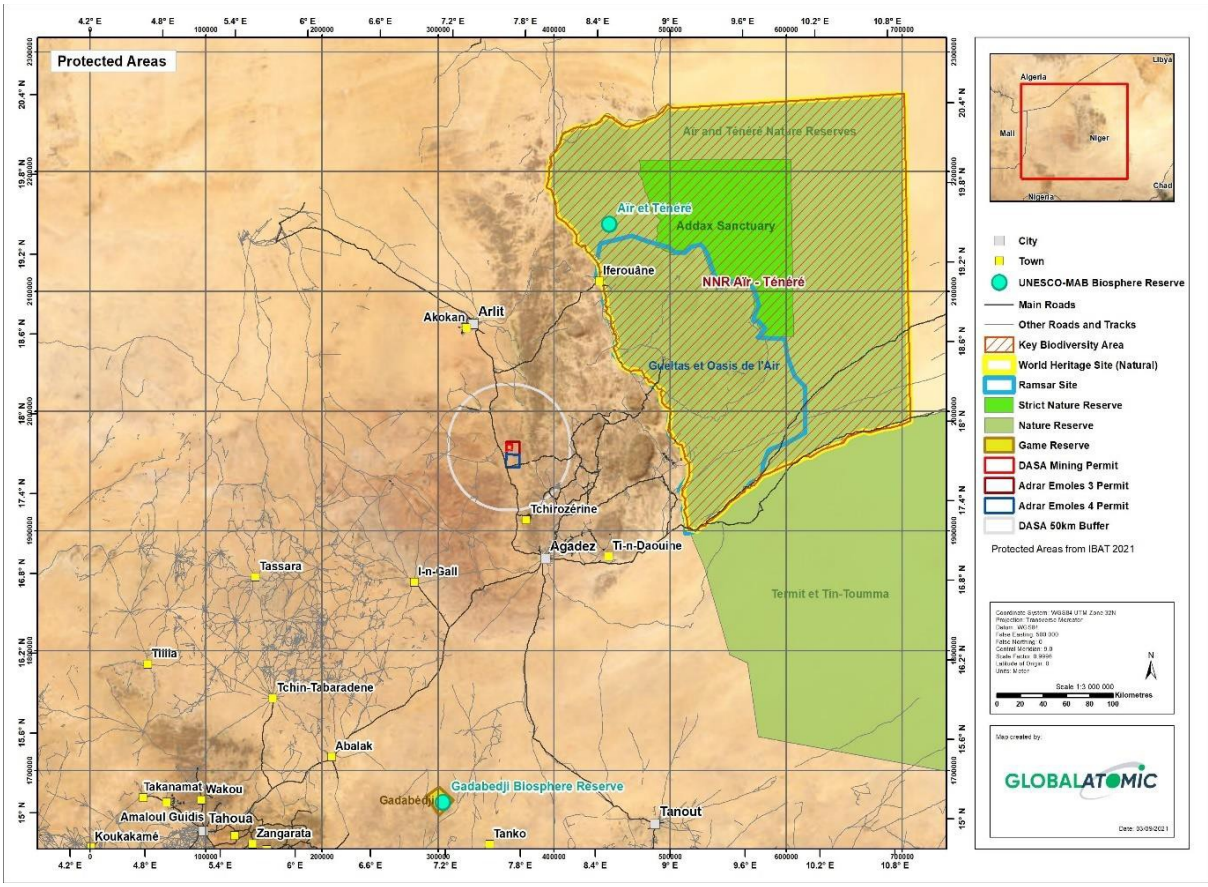

Figure 13 Legally protected areas and internationally recognised areas (Source: TEC/AGC Report 2021, IBAT 2021)

2.3.3. Vegetation

Field surveys and GIS analysis confirmed that areas of perennial vegetation exist in association with koris and in lowland areas. The extent of vegetation cover is similar across both the dry and wet seasons, suggesting areas of permanent (likely woody) vegetation.

Woody plant species previously listed as present in the Project area (Groupe Art & Génie, 2011 & 2020) include: V. flava (syn. Acacia Ehrenbergiana), V. tortilis (syn. Acacia tortilis), V. tortilis subsp. raddiana (syn. Acacia raddiana), Balanites aegyptiaca, Boscia senegalensis, Calotropis procera, Zizyphus mauritiana, Maerua crassifolia, Leptadenia pyrotechnica and Salvadora persica. The exotic species, Prosopis juliflora is also present around koris and lowland areas. The herbaceous layer is largely dominated by Panicum turgidum, however Cornulaca monacantha, Stipagrostis pungens and Schouwia thebaica were also noted as present (Groupe Art & Génie, 2011).

There is no regulation in Niger covering the protection of threatened plant species. A tree abatement restriction is defined in Act No 74 of March 04, 1974. This Act determines the rules for managing national forests, classified forests and protected forests and lists 15 tree species that are protected against abatement, unless authorised. Only one of these 15 species has been identified in the Project area: Desert Date (Balanites aegyptiaca),

which is described as being of average abundance (Groupe Art & Génie, 2020).

No species of conservation concern listed in the IUCN Red List have been identified from previous reports.

In 2021 and 2022 FEED Consult carried out surveys (dry and wet seasons) to characterize the vegetation of the Project area and the field findings are described below.

The natural vegetation of the region is located along the Koris, around the wadis or on a drainage area. Generally speaking, the woody species present are essentially concentrated in the Aïr and the plains. The vegetation groups thus formed form important forest massifs, the main ones being: the Tamazalak forest, the Dabaga forest, the Kerbouibou forest, the Afassas forest, the Tidène Egandawel forest, the Boughel forest and finally the Abardak forest (DR INS Agadez, 2017) This characteristic vegetation becomes rarer as one moves from south to north and remains a function of the orogeny and edapho-climatic characteristics.

In the permit area, the study carried out on the radius of 7 km, 15 km and surrounding areas established the baseline situation with regard to vegetation. It covered two seasons (dry and rainy).

Thus, during the study conducted in the dry season, 31 habitat points were traversed across the different geomorphological units within a radius of 15 km from the exploitation permit and surrounding areas and allowed the identification of pastoral zones (grassy steppe and tree steppe), agricultural production zones (modified habitats) listed, and heavily vegetated zones (valley, plain).

2.3.3.1. Results of the field surveys

- ✓ *Habitat characterisation*

The characterisation of the habitats in terms of terrain geomorphology, floristic composition, type of formation, average height of the flora as well as geographical coordinates and altitude is given in Table 22 below.

Table 22 Characterisation of habitats along the transects

REPORTS	READING POINTS	GEOMORPHOLOGY	FORISTIC COMPOSITION	TYPE OF TRAINING	AVERAGE HEIGHT OF the flora	LATITUDE	LONGITUDE	ALTITUDES (M)
R1	T1	Valley / sandy-clay soil	*Balanites aegyptica, Acacia raddiana, Panicum turgidum, Acacia ehrenbergiana, Cyperus conglomeratus*	Gallery forest	6 m	17,94736111	7,5845833	449,8628467
R2	T1	Rocky plateau	*Panicum Trigidium , Phragmites australis, Acacia ehrenbergiana*	Panicum steppe	2 m	17,7985	7,7358056	502,2858884
R3	T1	Rocky plateau	*Panicum turgidum, Phragmites australis*	rocky expanse	--	17,79619444	7,7455556	513,8677233
R4	T1	Plain	*Acacia ehrembergiana, Balanites aegyptiaca, hyphaene thebeica, Panicum turgidum, Phragmites australis*	Steppe with *Panicum turgidum*	3 m	17,75669444	7,7692222	504,7241695
R5	T1	Rocky plateau	*Phragmites australis, Panicum turgidum, Acacia ehrembergiana*	Grassy steppe	2 m	17,74330556	7,7985	522,0969217
R6	T1	Sandy soil	*Acacia ehrembergiana, Panicum trigidium*	--	5 m	17,72716667	7,8192222	-
R7	T2	Rocky Plateau	*Acacia ehrenbergiana, Phragmites australis*	Serum on the mineral soil part	3 m	17,82325	7,7799722	505,3337397
R8	T2	Mineral soil	*Balanites aegyptica, Maerua crassifolia, Panicum turgidum, Acacia ehrenbergiana, Calotropis procera,*	---	6 m	17,862	7,7880833	485,8274916
R9	T2	Raw mineral soil plain	*Calotropis procera, Acacia ehrenbergiana, Balanites aegyptiaca, Panicum turgidum*	Steppe with *Panicum turgidum* and *Calotropis procera*	6 m	0	0	-
R10	T2	Sandy clay soil	*Bossia senegalensis, Balanites aegyptiaca, Acacia ehrenbergiana, Panicum turgidum*	Gallery forest	6 m	17,86008333	7,7111111	464,1877476
R11	T2	Rocky plateau	*Balanites aegyptiaca, Acacia ehrenbergiana, Panicum turgidum*	Sparse formation	3 m	17,85252778	7,6754722	473,6360866
R12	T2	Rocky plateau	*Acacia Ehrenbergiana, Panicum turgidum, Cyperus conglomeratus, Aristida funiculata or Aristida hordeacea*	Steppe with *Panicum turgidum*	2 m	17,88113889	7,6848889	501,6763182
R13	T3	Koris	*Acacia ehrenbergiana, Calotropis procera, Maerua crassifolia, Balanites aegyptiaca, Ziziphus mauritiana, Hyphaene thebeica, Panicum turgidum, Corchorus depressus*	Tree steppe with Calotropis and Panicum	6 m	17,75544444	7,7252222	480,9509296
R14	T3	Plateau covered with mineral soil	*Acacia ehrenbergiana, Maerua crassifolia, Panicum turgidum, Phragmites australis*	Steppe with Panicum turgidum	3 m	17,76811111	7,7084722	492,5327644

REPORTS	READING POINTS	GEOMORPHOLOGY	FORISTIC COMPOSITION	TYPE OF TRAINING	AVERAGE HEIGHT OF the flora	LATITUDE	LONGITUDE	ALTITUDES (M)
R15	T3	Plateau covered with raw mineral soil	*Acacia ehrenbergiana, Maerua crassifolia, Panicum turgidum, Phragmites australis, Balanites aegyptiaca*	steppe with Panicum turgidum	6 m	17,77513889	7,6873333	480,3413593
R16	T3	Sandy plateau tray	*Panicum turgidum, Phragmites australis, Cyperus conglomeratus, corchorus depressus*	Panicum steppe	2 m	17,78677778	7,6817222	494,9710454
R17	T3	Sandy plateau	*Panicum turgidum, Phragmites australis, Maerua crassifolia, Acacia ehrenbergiana, ziziphus mauritiana*	Panicum steppe	3,5 m	17,80333333	7,6551111	462,3590369
R18	T3	Sandy plateau	*Panicum turgidum, Maerua crassifolia, Phragmites autralis, Cyperus conlomeratus*	Serum on the mineral soil part	3 m	17,85416667	7,6211667	467,2355989
R19	T3	Rocky plateau	*Acacia ehrenbergiana, Phragmites australis, Panicum turgidum*		2 m	17,81461111	7,6083056	457,1776897
R20	T4	Rocky plateau	*Phragmites australis, Panicum turgidum, Acacia ehrrenbergiana, Maerua crassifolia*		2 m	17,79441667	7,6006667	470,2834502
R21	T4	Rocky plateau	*Acacia ehrenbergiana, Maerua crassifolia, Panicum turgidum, Phragmites autralis, Cyperus conglomeratus*	Panicum steppe	4 m	17,76497222	7,6324444	465,102103
R22	T4	Valley	*Balanites aegyptiaca, Acacia ehrenbergiana, Panicum turgidum, Maerua crassifolia, Phragmites australis, Eragrostis tremula*	Gallery forest	6 m	17,75966667	7,6529444	469,0643097
R23	T4	Plateau	*Panicum turgidum, Phragmites australis, Acacia ehrenbergiana*	Sparse vegetation	2 m	17,74325	7,6649444	479,1222188
R24	T4		*Cyperus conglomeratus, Phragmites australis, Panicum turgidum, Acacia ehrenbergiana, Maerua crassifolia*	Panicum steppe	5 m	17,73730556	7,687	469,6738799
R25	T5	Plateau	*Phragmites australis, Cyperus conglomeratus, Panicum turgidum, Acacia ehrrenbergiana, Maerua crassifolia*	Grassy steppe	3 m	17,693	7,6416389	465,4068881
R26	T5	Rocky plateau	*Phragmites australis, Acacia ehrenbergiana, Maerua crassifolia, Panicum turgidum*	Steppe with trees open to the sandy parts of the plateau	3m	17,70947222	7,62275	462,3590369
R27	T5	Plateau	*Pragmites australis*	Phragmites Steppe	60 cm	17,76183333	7,5638333	436,4523011
R28	T5	Valley	*Denine, Balanites aegyptica, Acacia ehrenbergiana*	Forestry gallery	6 m	17,75094444	7,5828889	437,6714416
R29	T5	Plain	*Acacia ehrenbergiana stand*		5 m	17,76172222	7,5650278	443,462359

REPORTS	READING POINTS	GEOMORPHOLOGY	FORISTIC COMPOSITION	TYPE OF TRAINING	AVERAGE HEIGHT OF the flora	LATITUDE	LONGITUDE	ALTITUDES (M)
R30	T5	Plateau	*Corchorus depressus, Phragmites australis, Acacia ehrenbergiana*	Localized herbaceous vegetation in depressions	4 m	17,25819444	7,5011111	453,8250533
R31	T5	Plateau	Phragmites australis, Cyperus conglomeratus	----	--	17,81983333	7,5216944	442,2432185

✓ *Floristic composition*

A total of 29 species were recorded in and around the permit area: 17 herbaceous and 12 woody. The woody species are divided into 7 families including Mimosaceae (4 or 33%), Arecaceae (2 or 17%), Capparaceae (2; 17%), Zygolaceae (1 or 8%), Asclepiadaceae (1; 8%), Rhamaceae (1 or 8%) and Burseraceae (1 or 8%) (see Table 23 below).

Table 23 Woody species identified in the project area

WOODY	FAMILY
Acacia ehrenbergiana	Mimosaceae
Acacia raddiana	Mimosaceae
Accacia nilotica	Mimosaceae
Accacia Senegal	Mimosaceae
Balanites aegyptiaca	Zygophyllaceae
Boscia senegalensis	Capparidaceae
Calotropis procera	Asclepiadaceae
Commiphora Africana	Burseraceae
Hyphaene thebaica	Arecaceae
Maerua crassifolia	Cappariacae
Phoenix dactylifera	Arecaceae
Ziziphus Mauritania	Rhamnaceae

The status of woody species according to IUCN and national texts is shown in Table 24 below.

Table 24 Status of woody species

SCIENTIFIC NAME	FAMILY	LOCAL NAME	IUCN STATUS	NIGER STATUS
Acacia ehrenbergiana	Mimosaceae	Tamat	Least Concern	--
Acacia raddiana	Mimosaceae	Afagak	Least Concern	--
Accacia nilotica	Mimosaceae	tiggaert	Least Concern	Protected in Niger
Accacia senegal	Mimosaceae	dibshi	Least Concern	Protected in Niger
Balanites aegyptiaca	Zygophyllaceae	Aborak	Least Concern	Protected in Niger
Boscia senegalensis	Capparidaceae	Tedent	Least Concern	--
Calotropis procera	Asclepiadaceae	Tirza	Least Concern	--
Commiphora africana	Burseraceae	Adäras	Least Concern	--
Hyphaene thebaica	Arecaceae	Taggeyt	Least Concern	Protected in Niger
Maerua crassifolia	Cappariacae	Agar	Least Concern	--
Phoenix dactylifera	Arecaceae	Talizouk	Least Concern	--
Ziziphus mauritania	Rhamnaceae	Abaka	Least Concern	Protected in Niger

As for the herbaceous plants, they are distributed in 10 families, of which the Graminae represent the most important (7 species or 41%), Caesalpiniaceae (1 species or 6%), Amaranthaceae (1 species or 6%), Poaceae (1 species or 6%), Capparidaceae (1 species or 6%), Tiliaceae (2 species or 11%), Cyperaceae (2 species or 11%), Fabaceae (1 species or 6%), and Aizoaceae (1 species or 6%) (see Table 25).

Table 25 Herbaceous areas inventoried in and around the permit area

Herbaceous	**Family**
Andropogon gayanus	Gramineae
Aristida Sp	Gramineae
Cassia obtusifolia	Caesalpiniaceae
Celosia trigyna	Amaranthaceae
Cenchrus bilorus	Poaceae
Chrysopogon aucheri	Graminae
Cleome africana	Capparidaceae
Corchorus depressus	Tiliaceae
Corchorus olitorius	Tiliaceae
Cymbopogon sp	Gramineae
Cyperus Alopecuroides	Cyperaceae
Digitaria Horizontalis	Gramineae
Eragrostis tremula	Gramineae
Indicofera Nummulariifolia	Fabaceae
Limeum Viscosum	Aizoaceae
Panicum turgidum	Gramineae
Schoenoplectus corymbosus	Cyperaceae

Figure 14 below shows the floristic composition map of the permit area.

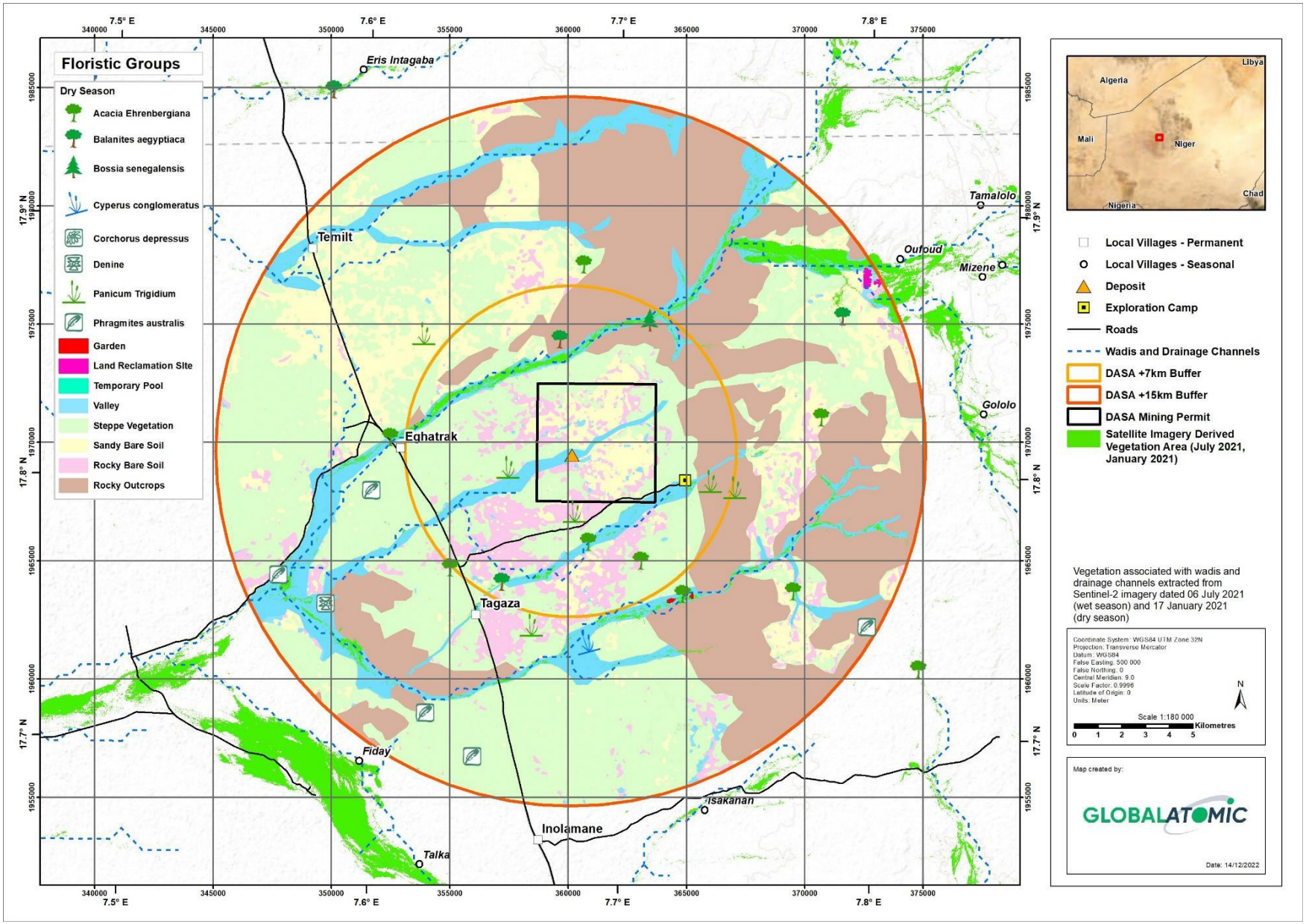

Figure 14 Floristic composition of the permit area

During the rainy season, the biodiversity (flora) survey identified a total of 38 species (25 herbaceous and 13 woody) in and around the area compared to 29 species in December 2021 (dry season). This difference is due to the rainy season, which allowed the identification of certain herbaceous species. The woody species are distributed in 8 families including Mimosaceae (4 or 30%), Arecaceae (2 or 15%), Capparaceae (2; 15%), Zygolaceae (1 or 7%), Asclepiadaceae (1; 7%), Rhamaceae (1 or 7%) and Burseraceae (1 or 7%), Tiliaceae (1 or 7%) (see table 6 below).

Compared to the December 2021 mission, there is little change in woody species. In addition, the phenology of the trees is completely green and regeneration is observed at some survey points.

Table 26 below shows the status of the species recorded during the two (2) seasons.

Table 26 Plant species recorded during the two seasons

SPECIES	DRY SEASON	RAINY SEASON
Acacia ehrenbergiana	X	X
Acacia raddiana	X	X
Accacia nilotica	X	X
Accacia senegal	X	X
Andropogon gayanus	X	X
Aristida Sp	X	X
Balanites aegyptiaca	X	X
Boerhavia repens		X
Boscia senegalensis	X	X
Calotropis procera	X	X
Cassia italica		X
Cassia mimosoides		X
Cassia obtusifolia	X	X
Celosia trigyna	X	X
Cenchrus bilorus	X	X
Chrysopogon aucheri	X	X
Citrillus colocynthis		X
Cleome africana	X	X
Cleome viscosa		X
Commiphora africana	X	X
Corchorus depressus	X	X
Corchorus olitorius	X	X
Cryptolepis sanguinolenta		X
Cymbopogon sp	X	X
Cyperus Alopecuroides	X	X
Digitaria Horizontalis	X	X
Eragrostis tremula	X	X
Euphorbia aegyptiaca		X

SPECIES	DRY SEASON	RAINY SEASON
Grevia tenax	X	X
Hyphaene thebaica	X	X
Indicofera Nummulariifolia	X	X
Indigofera cordifolia		X
Limeum Viscosum	X	X
Maerua crassifolia	X	X
Panicum turgidum	X	X
Phoenix dactylifera	X	X
Schoenoplectus Corymbosus	X	X
Ziziphus mauritania	X	X

- ✓ *Vegetation cover of the permit area*

The average cover of vegetation during the dry season is between 1 and 75%. The highest cover is found in R1, R3, R8, R9, R14, R20, R23, R29, R31, which varies between 50-75%. The lowest cover is found in R2, R5, R6, R10, R12, R16, R18, R21, R22, R25, R27, R30, with a cover of between 1-5%. Table 27 below gives the overlap per survey.

Table 27 Vegetation cover (dry season)

TRANSECTS	SECTOR	PLANT COVER
T1	R1	50 - 75 %
T1	R2	1 - 5 %
T1	R3	50 - 75 %
T1	R4	20 - 50 %
T1	R5	1-5%
T2	R6	1 - 5 %
T2	R7	20 - 50 %
T2	R8	50 - 75 %
T2	R9	50 - 75 %
T2	R10	1 - 5 %
T2	R11	20 - 50 %
T2	R12	1 - 5 %
T3	R13	> 75 %
T3	R14	> 75 %
T3	R15	20 - 50 %
T3	R16	1 - 5 %
T3	R17	20 - 50 %
T3	R18	1 - 5 %
T3	R19	1 - 5 %
T3	R20	50 - 75 %
T3	R21	1 - 5 %
T4	R22	1 - 5 %

TRANSECTS	SECTOR	PLANT COVER
T4	R23	50 - 75 %
T4	R24	5 - 20 %
T4	R25	1 - 5 %
T4	R26	5 - 20 %
T4	R27	1 - 5 %
T4	R28	5 - 20 %
T5	R29	50 - 75 %
T5	R30	1 - 5 %
T5	R31	50 - 75 %
T5	R32	5 - 20 %
T5	R33	5 - 20 %
T5	R34	5 - 20 %

During the rainy season, the vegetation cover situation is shown in Table 28 below.

Table 28 Vegetation cover (rainy season)

SURVEY	PLANT COVER
R1	1 - 5 %
R2	50 - 75 %
R3	1 - 5 %
R4	20 - 50 %
R5	1 - 5 %
R6	1 - 5 %
R7	> 75 %
R8	50 - 75 %
R9	1 - 5 %
R10	> 75 %
R11	> 75 %
R12	50 - 75 %
R13	50 - 75 %
R14	20 - 50 %
R15	5 - 20 %
R16	20 - 50 %
R17	5 - 20 %
R18	50 - 75 %
R19	50 - 75 %
R20	20 - 50 %
R21	1 - 5 %
R22	> 75 %
R23	50 - 75 %
R24	> 75 %
R25	> 75 %

SURVEY	PLANT COVER
R26	20 - 50 %
R27	5 - 20 %
R28	> 75 %
R29	> 75 %
R30	1 - 5 %
R31	20 - 50 %
R32	> 75 %
R33	> 75 %
R34	> 75 %
R35	20 - 50 %
R36	50 - 75 %
R37	> 75 %

It should be noted that the average recovery ranges from 1 to over 75%. Thus, the lowest overlap, which is 1-5%, is recorded at R1, R3, R5, R6, R9, R21, R31 while the highest, which is over 75%, is recorded at R7, R10, R11, R22, R24, R25, R29 and R32 (see Table 28 above).

✓ *Floristic groups*

During the dry season survey, seven (7) floristic groupings associated with the morphology of the land were observed. They are given in Table 29 below and represented in Figure 15 below.

Table 29 Plant groups associated with the morphology of the land (dry season)

FLORISTIC GROUPING	CHARACTERISTIC SPECIES	GEOMORPHOLOGY	GEOGRAPHICAL COORDINATES	
G1	*Acacia ehrenbergiana, Acacia tortilis, Panicum turgidum, Balanites aegyptiaca*	Valley	N 17°56'50.5''	E 007°35'04.5''
G2	*Calotropis procera, Acacia ehrenbergiana, balanites aegyptiaca*	Plain	N 17°45'19.6''	E 007°43'30.8''
G3	*Balanites aegyptiaca, Acacia ehrenbergiana*	Plain	N 17°45'34.8''	E 007°39'10.6''
G4	*Balanites aegyptiaca, Acacia ehrenbergiana, Boscia senegalensis*	Valley	N 17°51'36.3''	E 007°42'40.0''
G5	*Phragmites australis* (specific stand)	Plain	N 17°45'42.6''	E 007°33.49.8''
G6	*Acacia ehrenbergiana* (specific stand)	Plain	N 17°45'42.2''	E 007°33'54.1''
G7	*Panicum turgidum, Phragmites australis, Acacia ehrenbergiana*	Sandy plateau / rocky plateau	N 17°46'05.2''	E 007°42'30.5""

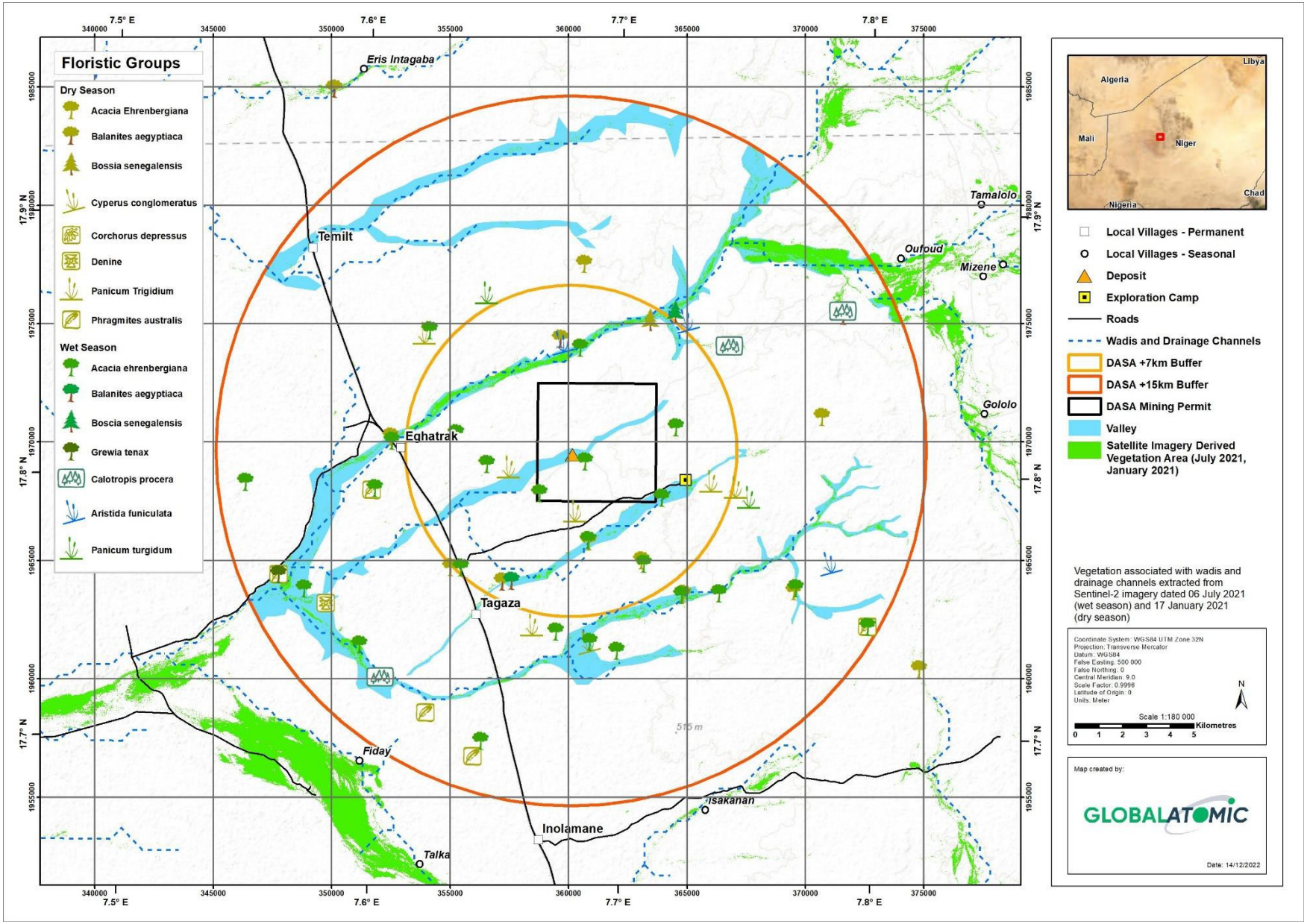

Figure 15 Floristic groups in the permit area

Photos 4, 5 and 6 illustrate some of the associations observed in terms of clustering in the permit area.

Photo 4 Tree steppe with a herbaceous carpet

Photo 5 Specific grassy steppe of Panicum turgidum

Photo 6 Stand of Acacia ehrenbergiana

The study on biodiversity conducted during the rainy season revealed seven (7) types of plant associations or groupings indicated in Table 30 below. These are distributed in the three (3) geomorphological units which are *the Plateaux, Plains and Valleys.*

Table 30 Plant groups associated with the morphology of the terrain (rainy season)

FLORISTIC GROUPING	CHARACTERISTIC SPECIES	GEOMORPHOLOGICAL UNITS	CONTACT DETAILS	
G1	- *Acacia ehrenbergiana,* - *Acacia radiana,* - *Panicum turgidum,* - *Balanites aegyptiaca*	Valley	N 17°56'50.5''	E 007°35'04.5''
G2	- *Calotropis procera,* - *Acacia ehrenbergiana,* - *Balanites aegyptiaca*	Plain	N 17°45'19.6''	E 007°43'30.8''
G3	- *Balanites aegyptiaca,* - *Acacia ehrenbergiana*	Plain	N 17°45'34.8''	E 007°39'10.6''
G4	- *Balanites aegyptiaca,* - *Acacia ehrenbergiana,* - *Boscia senegalensis*	Valley	N 17°51'36.3''	E 007°42'40.0''
G5	- *Aristida finiculata (specific stand)*	Plain	N 17°45'42.6''	E 007°33.49.8''
G6	- *Acacia ehrenbergiana (specific stand)*	Plain	N 17°45'42.2''	E 007°33'54.1''
G7	- *Panicum turgidum,* - *Aristida finiculata,* - *Acacia ehrenbergiana*	Sandy plateau/rocky plateau	N 17°46'05.2''	E 007°42'30.5""

Figure 16 below shows the combined floristic groups for the dry season.

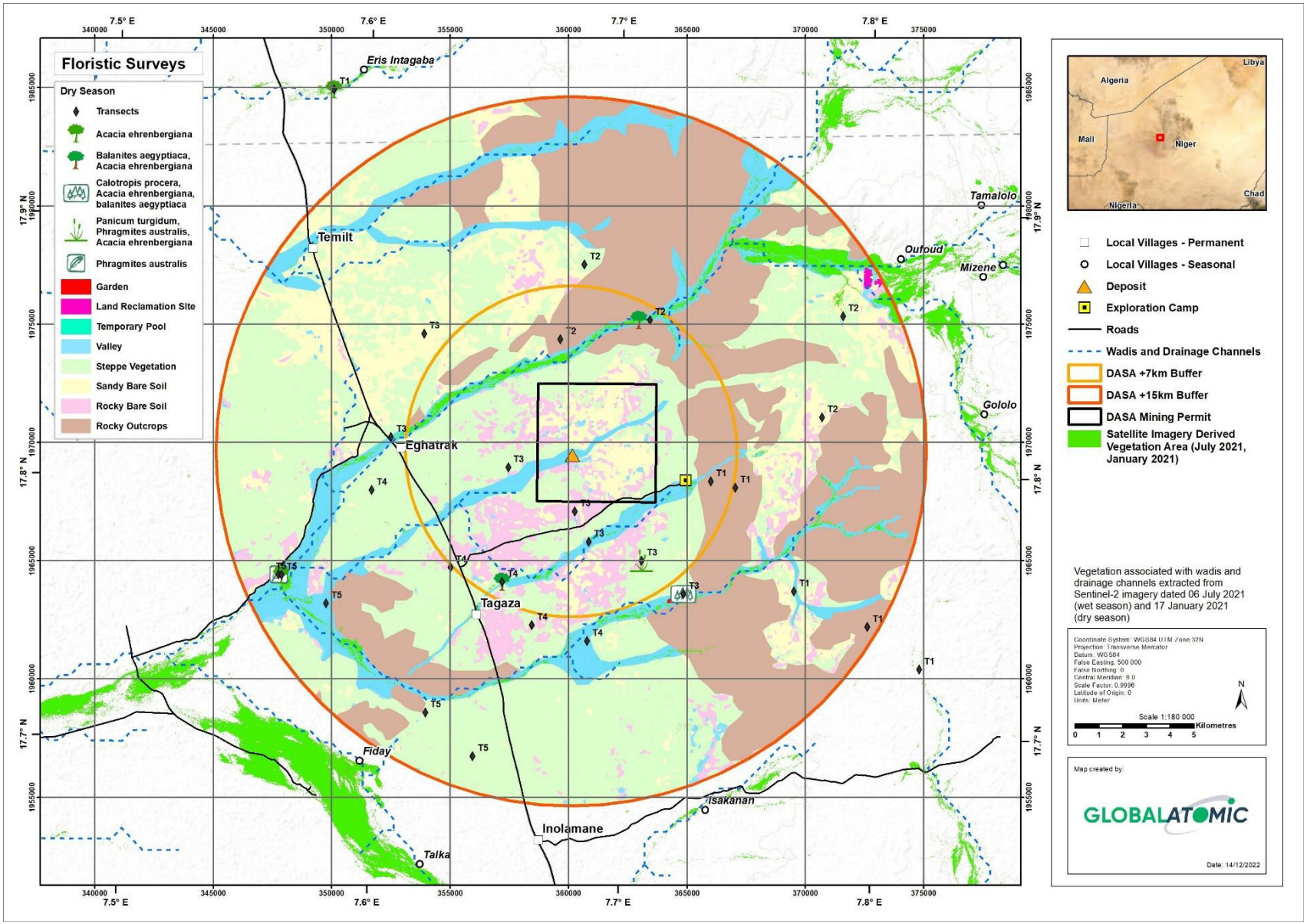

Figure 16 Floristic survey points

2.3.4. *Services provided by flora to local communities*

As part of this update of the Environmental and Social Impact Assessment (ESIA) of the Adrar Emoles 3 Exploration Permit, an assessment of ecosystem services was carried out and concerned the different uses of vegetation (food, medicine, fuelwood, grazing, etc.) by local communities. The results are shown in Table 31 below.

Table 31 Services provided by flora to local communities

SCIENTIFIC NAME	FAMILY	LOCAL NAME	Animal FOOD	HUMAN FOOD	PHARMACOPHY	OTHER
Woody species						
Acacia ehrenbergiana	Mimosaceae	Tamat	Yes	Yes	Yes	Firewood, construction
Acacia raddiana	Mimosaceae	Afagak	Yes	No	No	Firewood
Accacia nilotica	Mimosaceae	tiggaert	Yes	No	Yes	Firewood
Accacia senegal	Mimosaceae	dibshi	Yes	No	Yes	Firewood
Balanites aegyptiaca	Zygophyllaceae	Aborak	Yes	Yes	Yes	Firewood, Handicrafts
Boscia senegalensis	Capparidaceae	Tedent	Yes	Yes	Yes	Firewood
Calotropis procera	Asclepiadaceae	Tirza	Yes	No	Yes	Firewood
Commiphora africana	Burseraceae	Adäras	ND	ND	ND	Firewood
Hyphaene thebaica	Arecaceae	Taggeyt	Yes	Yes	Yes	Firewood
Maerua crassifolia	Cappariacae	Agar	Yes	No	Yes	Firewood
Phoenix dactylifera	Arecaceae	Talizouk	Yes	Yes	Yes	Firewood
Ziziphus mauritania	Rhamnaceae	Abaka	Yes	Yes	Yes	Firewood
HERBACEOUS VEGETATION						
Andropogon gayanus	Gramineae	Katagoêts	ND[4]	ND	ND	ND
Aristida Sp	Gramineae	Tazmei	ND	ND	ND	ND
Cassia obtusifolia	Caesalpiniaceae	Abaezzey	Yes	Yes	Yes	ND
Celosia trigyna	Amaranthaceae	Tajelanghitayt.	ND	ND	ND	ND
Cenchrus bilorus	Poaceae	Wajjag	Yes	No	No	ND
Chrysopogon aucheri	Graminae	Taezmé	ND	ND	ND	ND
Cleome africana	Capparidaceae	Taedak	ND	ND	ND	ND
Corchorus depressus	Tiliaceae	Amadghos	ND	ND	ND	ND
Corchorus olitorius	Tiliaceae	Melahya	Yes	Yes	Yes	ND
Cymbopogon sp	Gramineae	Tebéremt	Yes	No	Yes	ND
Cyperus Alopecuroides	Cyperaceae	ND	ND	ND	ND	ND
Digitaria Horizontalis	Gramineae	Ishibaen	yes	yes	ND	ND

[4] Not determined

SCIENTIFIC NAME	FAMILY	LOCAL NAME	Animal FOOD	HUMAN FOOD	PHARMACOPHY	OTHER
Eragrostis tremula	Gramineae	Tegit	yes	ND	ND	ND
Indicofera Nummulariifolia	Fabaceae	Agarof	Yes	Yes	Yes	ND
Limeum Viscosum	Aizoaceae	Tamasalt	ND	ND	ND	ND
Panicum turgidum	Gramineae	Afazo	Yes	No	No	Construction secko
Schoenoplectus corymbosus	Cyperaceae	Alögi	ND	ND	ND	ND

2.3.5. Wildlife

Groupe Art & Génie (2011 & 2020) describe the presence of animal species at a widespread regional scale. Populations of wild animals within the Tchirozerine department and Agadez region have substantially declined in recent years as a result of poaching and habitat destruction. Most residual wildlife populations have taken refuge in, and are now confined to the Aïr Mountains and nature reserves.

The Agadez region is the ideal zone for Sahelo-Saharan fauna, which plays important roles for local communities, particularly in terms of food, money, culture and science. Indeed, the region constitutes a strategic territory in the migratory movements of the Addax (*Addax nazomaculatus*), of which Niger is the only country in the world still hosting a viable wild population (DR INS Agadez, 2017).

In addition, the Aïr and Ténéré National Nature Reserve (RNNAT) is formed by the major part of the Aïr mountain massif occupying an area of 77,360 km² (6,807,070 ha), and which includes a central zone of 928,300 ha of integral reserve called the Addax sanctuary. Finally, the reserve presents a natural ensemble of exceptional quality in terms of landscape, vegetation, fauna and habitats. It contains important sites of cultural, historical and wildlife interest in the Aïr.

Following on from the CH screening assessment and in order to have the initial baseline situation of the fauna in the permit area, a specific field study was carried out as part of the ESIA update. It covered the radii of 7 km, 15 km and surrounding areas from the centre of the deposits to be exploited under the project. It was conducted during the two (2) seasons (dry season and rainy season).

The methodological approach included the following stages: (i) reconnaissance and mapping of the terrain; (ii) systematic monitoring based on five (5) north-west-south-east transects spaced 5 km apart; (iii) use of photographic traps (Reconyx cameras) and a Mavic pro 2 type drone; (iv) socio-ecological surveys in eight (8) villages (Tagaza, Gololo, Temilt-dabous, Oufoud, Inolamane, Gados, Issakanane).

2.3.5.1. Results of the field observations

During the monitoring mission, direct and indirect observations were made and recorded. In practice, these observations mainly concerned the most easily observable mammals, birds and reptiles.

The two (2) photographic traps used during five (5) nights, i.e. 10 different positions, allowed the field team to record some carnivores that were difficult to observe during the day.

In addition, the socio-ecological surveys allowed us to confirm the presence of certain species in the area.

Thus, during the dry season, a total of 54 animal species were observed, including 34 birds, 13 mammals and 7 reptiles. Figure 17 below illustrates the observation points of the species (mammals, reptiles, birds).

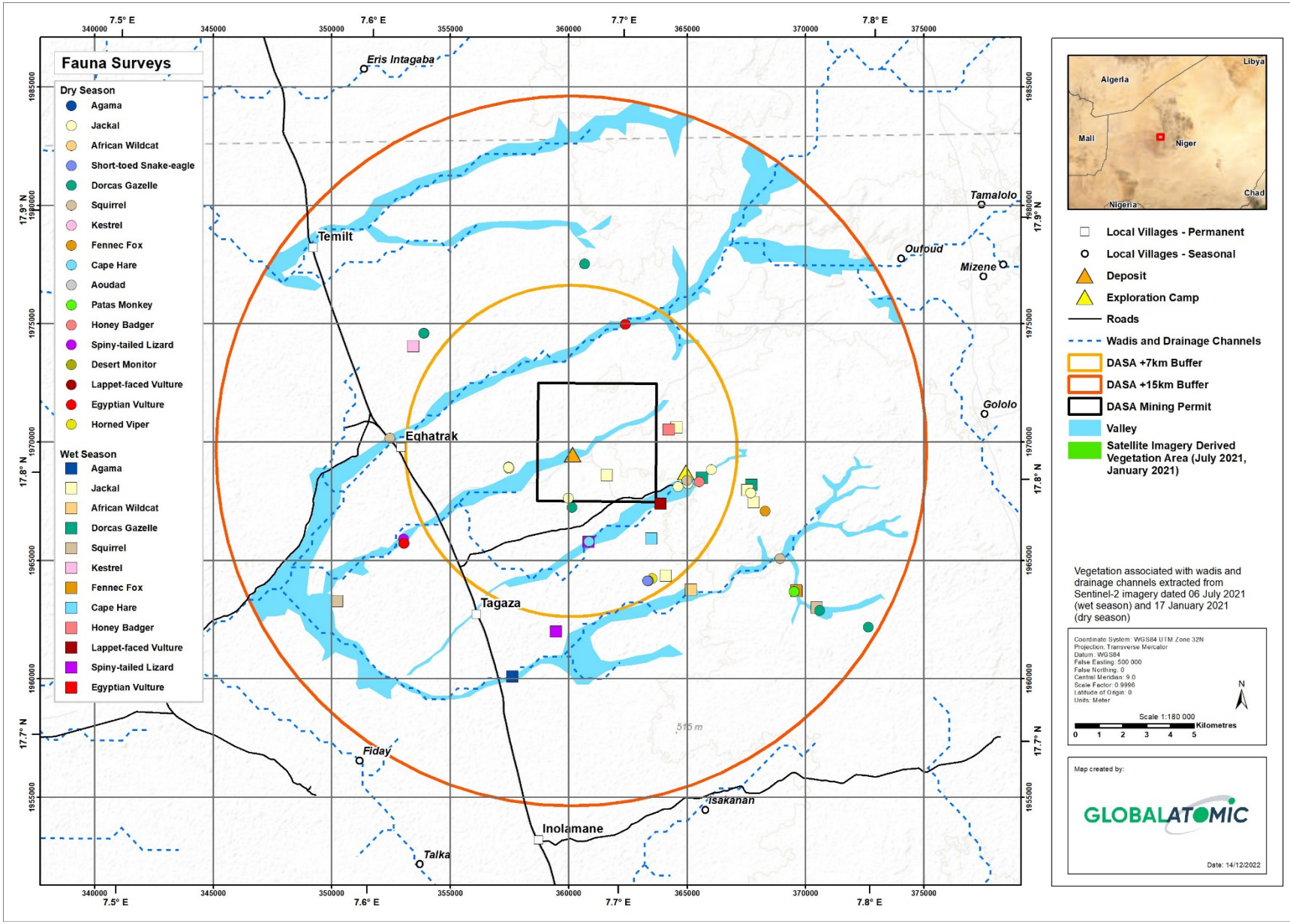

Figure 17 Wildlife observation points

✓ *Mammals and reptiles*

During this mission 6 Dorcas gazelles were observed in two direct observations with a flight distance of about 300-500 m, plus 4 squirrels, 1 Golden jackal and 5 Cape hares.

Indirect observations included Dorcas gazelles, Aoudad, Patas monkeys, Golden jackal, Fennec, Pale fox, and African wildcat. Photo 7 below shows a Fennec photographed by a camera trap.

Of these mammals, only the Dorcas Gazelle and the Aoudad are classified as vulnerable on the IUCN red list.

Photo 7 Fennec photographed by the camera

As far as reptiles are concerned, among the species inventoried are snakes including the Horned Viper, Cobra, Sand Boa, plus the Uromastix (see Photo 8 below) and the common lizards.

Photo 8 View of a Uromastyx (direct observation)

The IUCN status of these species (mammals and reptiles) is given in Table 32 below.

Table 32 Status of mammal and reptile species

SPECIES	SCIENTIFIC NAME	LOCAL NAME	IUCN STATUS
Squirrel	*Xerus erytropus*	KolanKolan	Least Concern
Fennec	*Vulpeszerda*	Ezagaz	Least Concern
Dorcas	*Gazella dorcas*	Azankat	Vulnerable
Cape Hare	*Lepus capensis*	Tamarwarlt	Least Concern
Aoudad	*Ammotragus lervia*		Vulnerable
Common Patas Monkey	*Erythrocebus patas*		Least Concern
Ratel	*Mellivora capensis*		Least Concern
African Wildcat	*Felis lybica Felis silvestris*		Least Concern
Golden Jackal	*Canis aureus*		Least Concern
Lesser jerboa	*Jaculus jaculus*		Least Concern
Crested Porcupine	*Hystrix cristata*	Takonichit	Least Concern
Pale Fox	*Vulpes pallida*		Least Concern
Desert Hedgehog	*Paraechinus aethiopicus*		Least Concern
Uromastyx (Spiny tailed lizard)	*Uromastyx geyri*	Amakachaw	Near Threatened
Common Agama	*Agama agama*		Least Concern
Desert Monitor	*Varanus griseus*		Least Concern
Cobra	*Najanigri collis*	Safaltas	Least Concern
Horned Viper	*Cerastes ceraste*	Tachile	Least Concern
Western Yellow Bellied sand Snake	*Psammophissibilansor Psammophissubtaeniatus*	Koumoetcho	Least Concern
Sand Boa	*Eryx j.*		Least Concern

✓ *Birds*

Several bird species were observed in the project area. Identification was made using the Birds of Western Africa guide, 2ème edition by Nik Borrow and Ron Demey and resulted in 34 species being identified. The raptors observed were the Lappet-faced Vulture, Egyptian Vulture, Great Horned Owl, Short-toed Eagle and Kestrel. The following pictures 9 and 10 illustrate respectively a Lappet-faced Vulture and an Egyptian Vulture observed in the project area.

Photo 9 Lappet-faced Vulture

Photo 10 Egyptian vulture

Of these birds, only the Lappet-faced Vulture and the Egyptian Vulture are classified as endangered on the IUCN Red List (see Table 33 below), in CITES Appendix II and CMS

Appendix II/I for the Egyptian Vulture and CMS Appendix I for the Lappet-faced Vulture.

Table 33 Status of bird species in the project area

COMMON NAME	SCIENTIFIC NAME	IUCN STATUS
Black-scrub Robin	*Cercotrichos podobe*	Least Concern
Rufous-tailed Scrub-robin	*Cercotrichas galactotes*	Least Concern
Striolated bunting	*Emberiza striolata*	Least Concern
Hornbill	*Tockus nasutus*	Least Concern
Crested Lark	*Galerida cristata*	Least Concern
African Silver Bill	*Euodice cantans*	Least Concern
Greater Blue-eared Starling	*Lamprotornis chalybaeus*	Least Concern
Short-toed Snake-eagle	*Circaetus gallicus gallicus*	Least Concern
Brown-necked Raven	*Corvus ruficollis*	Least Concern
Fan-tailed Raven	*Corvus rhipidurus*	Least Concern
Pied Crow	*Corvusalbus*	Least Concern
Blue-napped mousebird	*Urocolius macrourus*	Least Concern
Fulvus Babbler	*Turdoides fulvus*	Least Concern
Kestrel	*Falco tinnunculus*	Least Concern
Chestnut-bellied Sandgrouse	*Pterocles exustus*	Least Concern
Lichtensteins Sandgrouse	*Pterocles lichtensteinii*	Least Concern
African Hoopoe	*Upupa epops senegalensis*	Least Concern
Pharaoh Eagle-owl	*Bubo ascalaphus*	Least Concern
Common Hoopoe	*Upupa epops*	Least Concern
Little Swift	*Apus affinis*	Least Concern
Golden Sparrow	*Passer luteus*	Least Concern
Black-crowned Sparrow-lark	*Eremopterix nigriceps*	Least Concern
Egyptian Vulture	***Neophron percnopterus***	**Endangered**
Green Bee-eater	*Merops orientalis*	Least Concern
Iberian Grey Shrike	*Lanius meridionalis*	Least Concern
Speckled Pigeon	*Columba guinea*	Least Concern
Helmeted Guinea Fowl	*Numida meleagris*	Least Concern
Laughing Dove	*Streptopelia senegalensis*	Least Concern
Namaqua Dove	*Oena capensis*	Least Concern
Mourning Collared Dove	*Streptopelia decipens*	Least Concern
White-crowned Wheatear	*Oenanthe leucopyga*	Least Concern
Desert Wheatear	*Oenanthe desertii*	Least Concern
Isabelline Wheatear	*Oenanthe isabelline*	Least Concern
Lappet Faced Vulture	***Torgos tracheliotos***	**Endangered**

- ✓ *Threatened or extinct species*

Interviews with local communities suggested that Dama gazelle (Nanger dama), Oryx and

Common Ostrich (Struthio camelus) were once present in the area, but have completely disappeared due to poaching, drought and climate change.

Today, these species have completely disappeared due to poaching, combined with drought and climate change.

2.3.6. Results of the observations for the dry and rainy seasons

The rainy season faunal survey identified 49 animal species including 34 birds, 10 mammals and 4 reptiles.

Tables 34 and 35 below show the species (avian, mammal and other) recorded during the two (2) seasons (dry and rainy).

Table 34 Bird species recorded during the two seasons (dry and wet)

SPECIES	SCIENTIFIC NAME	DRY SEASON	RAINY SEASON	RESIDENCE STATUS
Black scrub robin	*Cercotrichos podobe*	X	X	Resident
Rufous-tailed scrub robin	*Cercotrichas galactotes*	X	X	Resident
Tawny Eagle (Vulnerable)	*Aquila rapax*		X	Resident
Red-billed Firefinch	*Lagonosticta senegala*	X	X	Resident
Striolated bunting	*Emberiza striolata*	X	X	Resident
Hornbill	*Tockus nasutus*	X	X	Resident
Crested lark	*Galerida cristata*	X	X	Resident
African silverbill	*Euodice cantans*	X	X	Resident
Greater blue-eared starling	*Lamprotornis chalybaeus*	X	X	Resident
Short-toed snake eagle	*Circaetus gallicus gallicus*	X		Migratory
Brown-necked Raven	*Corvus ruficollis*	X	X	Resident
Fan-tailed Raven	*Corvus rhipidurus*	X	X	Resident
Pied Crow	*Corvusalbus*	X	X	Resident
Blue-naped Mousebird	*Urocolius macrourus*	X	X	Resident
Fulvous Babbler	*Turdoides fulvus*	X	X	Resident
Kestrel	*Falco tinnunculus*	X	X	Migratory
Chestnut-bellied Sandgrouse	*Pterocles exustus*	X	X	Resident
Lichtenstein's Sandgrouse	*Pterocles lichtensteinii*	X		Resident
White-throated Bee-eater	*Merops albicollis*		X	Migratory
African Hoopoe	*Upupa epops senegalensis*	X	X	Migratory/resident
Pharaoh Eagle-owl	*Bubo ascalaphus*	X	X	Resident
Eurasian hoopoe	*Upupa epops*	X	X	Resident
Little Swift	*Apus affinis*	X	X	Resident
Golden Sparrow	*Passer luteus*	X	X	Resident
Black-crowned Sparrow-lark	*Eremopterix nigriceps*	X	X	Resident
Spotted Thick-knee	*Burhinus capensis*		X	Resident
Egyptian Vulture	*Neophron pernopterus*	X	X	Migrant/Resident
Green Bee-eater	*Merops orientalis*	X	X	Resident
Iberian Grey Shrike	*Lanius meridionalis*	X	X	Resident

SPECIES	SCIENTIFIC NAME	DRY SEASON	RAINY SEASON	RESIDENCE STATUS
Speckled Pigeon	*Columba guinea*	X	X	Resident
Helmeted Guineafowl	*Numida meleagris*	X	X	Resident
Laughing Dove	*Streptopelia senegalensis*	X	X	Resident
Namaqua Dove	*Oena capensis*	X	X	Migratory/resident
African Mourning Dove	*Streptopelia decipens*	X	X	Resident
White-crowned Wheatear	*Oenanthe leucopyga*	X	X	Resident
Isabelline Wheatear	*Oenanthe isabellina*	X	X	Migratory
Lappet-faced Vulture	*Torgos tracheliotos*	X		Resident

It should be noted from Table 34 above that among the birds recorded, some species were observed during the two (2) missions, most of which are residents, which explains their presence throughout the year, and other species are migratory, such as the White-throated Bee-eater, the Short-toed Snake Eagle and the Kestrel, which are seasonal species that are only observed during their migration period. Other species are partially migratory and resident at the same time (e.g. Egyptian Vulture).

For mammals and other species recorded during the two (2) seasons (dry and rainy), the situation is given in Table 35 below.

Table 35 Mammals and others recorded during the two seasons (dry and rainy)

SPECIES	SCIENTIFIC NAME	DRY SEASON	RAINY SEASON
Squirrel	*Xerus erytropus*	X	X
Fennec	*Vulpeszerda*	X	X
Dorcas	*Gazella Dorcas*	X	X
Cape Hare	*Lepus capensis*	X	X
Aoudad	*Ammotragus lervia*	X	X
Common Patas Monkey	*Erythrocebus patas*	X	X
Ratel	*Mellivora capensis*	X	X
African Wildcat	*Felis lybica Felis silvestris*	X	X
Golden Jackal	*canis aureus*	X	X
Lesser Jerboa	*Jaculus jaculus*	X	X
Crested Porcupine	*Hystrix cristata*	X	X
Pale Fox	*Vulpes pallida*	X	X
Desert Hedgehog	*Paraechinus aethiopicus*	X	X
Uromastyx (Spiny-Tailed Lizard)	*Uromastyx geyri*	X	X
Common Agama	*Agama agama*	X	X
Desert Monitor	*Varanus griseus*	X	X
Cobra	*Najanigri collis*	X	X
Horned Viper	*Cerastes ceraste*	X	X
Western Yellow Bellied Sand Snake	*Psammophissibilansor Psammophissubtaeniatus*	X	X
Sand Boa	*Eryx jaculus*	X	X
Emperor Scorpion	*Pandinus imperator*	X	
Agile Frog	*Rana dalmatina*		X

From Table 35 above, it should be noted that practically the same mammals were recorded by direct or indirect observation during the two (2) missions. The only difference is the distribution which is much more important during the last study conducted in the rainy season. This is due to the abundance of grazing during the said season.

2.3.6.1. Summary of Wildlife Species

The field surveys conducted in the dry and wet season (2021-2022) confirmed the

following species of concern to be present in the study area:

- Dorcas Gazelle *Gazella dorcas* (VU)
- Aoudad *Ammotragus lervia* (VU)
- Egyptian Vulture *Neophron pernopterus* (EN)
- Lappet-faced Vulture *Torgos tracheliotos* (EN)
- Tawny Eagle *Aquila rapax* (VU).

Cheetah, Oryx, Addax and Dama Gazelle were not found and interviews with local communities suggested the species are no longer present in the study area. While a full CH assessment has not been completed to determine if there are any CH qualifying species to trigger CH. However, all five species above are noted as unlikely to trigger CH due to being wide ranging species. High level mitigation measures for the vultures/raptor are included in the Biodiversity Management Plan.

Alien invasive species

Baseline surveys have not confirmed any alien invasive species in the study area. Future surveys will continue to monitor for the presence of alien invasive species, and procedures will be put in place to prevent future accidental spread of such species. In addition, eradication and control measures will be identified in a biosecurity plan/invasive species management plan which will be developed and implemented by the project.

2.3.7. Use of wildlife by local communities

The different uses of wildlife (ecosystem services) in the project area were obtained through consultations with local communities. The related results are given in Table 36 below.

Table 36 Services provided by wildlife to local communities

N°	SPECIES	SCIENTIFIC NAME	LOCAL NAME	USES/SERVICES
1	Squirrel	*Xerus erytropus*	KolanKolan	--
2	Fennec	*Vulpeszerda*	Ezagaz	--
3	Dorcas	*Gazella Dorcas*	Azankat	Consumption
4	Cape Hare	*Lepus capensis*	Tamarwarlt	Consumption, ornament of nature
5	Aoudad	*Ammotragus lervia*	--	Consumption
6	Common Patas monkey	*Erythrocebus patas*	--	--
7	Ratel	*Mellivora capensis*	--	Snake hunter
8	African Wildcat	*Felis lybica Felis silvestris*	--	--
9	Golden Jackal	*canis aureus*	--	Traditional medicine
10	Lesser Jerboa	*Jaculus jaculus*	--	--
11	Crested Porcupine	*Hystrix cristata*	Takonichit	--
12	Pale Fox	*Vulpes pallida*	--	--

N°	SPECIES	SCIENTIFIC NAME	LOCAL NAME	USES/SERVICES
13	Desert Hedgehog	*Paraechinus aethiopicus*	--	--
14	Uromastyx (Spiny-tailed Lizard)	*Uromastyx geyri*	Amakachaw	Traditional medicine
15	Common Agama	*Agama agama*	--	--
16	Desert Monitor	*Varanus griseus*	--	Traditional medicine
17	Cobra	*Najanigri collis*	Safaltas	--
18	Horned Viper	*Cerastes ceraste*	Tachile	--
19	Western yellow-bellied sand snake	*Psammophissibilans or Psammophissubtaeniatus*	Koumoetcho	--
20	Sand Boa	----------	--	--
21	Emperor Scorpion	*Pandinus imperator*	Tazardimet	--

2.3.8. Vulnerability of ecosystem services

Despite the food, economic, ecological, pharmaceutical, etc. services it provides for local communities etc., biodiversity (flora and fauna) is now threatened in the project area. The main causes are between human actions (degradation and/or destruction of wildlife habitat, overexploitation of animal and plant resources, etc.) and climate change (decrease in rainfall, loss of biodiversity). The main causes are between human actions (degradation and/or destruction of wildlife habitat, overexploitation of animal and plant resources, etc.) and climate change (reduced rainfall, recurrent droughts, poor distribution of rainfall in time and space, extreme temperatures, etc.). This results in a decrease in plant and animal diversity and consequently in ecosystem services, which could lead to increased food and nutritional insecurity, increased poverty, a decline in pastoral activities, etc.

Thus, at the end of the interview with the communities, it emerged that certain plant species such as *Acacia nilotica* are rare in the area. Also, certain animal species that existed have disappeared completely. These include the dama gazelle (*Nanger dama*), the Oryx and the Red-necked Austria *(Struthio camelus*).

2.4. Human environment

2.4.1. Population

The population of the Agadez region was estimated at 487,620 inhabitants in the 2012 general population and housing census. Based on the region's natural growth rate (3.6% per year), this population is estimated to be 585,737 in 2018 (INS 2018) and 669,004 in 2022, of which 341,019 will be male and 327,985 female (INS, 2019).

Within a radius of 7 km from the center of the project's deposits and 15 km from the centre of the project's deposits, 14,830 people live in the villages surveyed during the course of the study, 10,000 of whom are permanent residents, compared to 4,830 seasonal residents (Source: field survey, 2021). These villages are also more populated during the hot dry season (see Table 37). It should also be noted that there are no permanent residents within the 7km zone around the core area or the subset 3.5km radius operational area of which areas proximal to surface infrastructure will be fenced. This population of Tuareg origin is made up of several tribes belonging to the Kel Ewey Confederation. These tribes belong to three chiefdoms: Sultan, Anastafidat and Imakitan, which range beyond Agadez and Timia communes.

The nomadic Tuaregs have historical connections with their natural environment and temporarily migrate between regions and between departments in search of pasture and seasonal jobs. It is mainly the men who travel while the women stay in their village. The social group hierarchy remains very much intact with the Tuaregs. The elders and opinion leaders react, talk, and make decisions on behalf of the group.

With the decline in traditional livelihoods, young people migrate to urban areas in search of alternative lifestyles. Economic activities are traditional and mostly based on livestock. The Tuareg were true nomads and followed their herds following source of browse, mostly in or near wadis. Many Tuaregs live in tented camps near kouris and some move seeking pasture for their livestock.

Table 37 Population living near the site (residents and seasonal)

TYPES OF RESIDENTS	VILLAGES								Total
	DABOUS-TEMILT	EGATRAK	GADOS	GALELO	ISSAKANAN	OUFOUD	TAGAZA	INOLAMANE	
Permanent	3,000	400	200	500	600	300	1,000	4,000	**1,0000**
Seasonal workers	1,000	200	100	100	200	30	200	3,000	**4,830**
Total	**4,000**	**600**	**300**	**600**	**800**	**330**	**1,200**	**7,000**	**14,830**

Source: Field survey (FEED), 2021

The local population is predominantly Tuareg or Kel Tamashek who are recognised as indigenous people by UNHCR's World Directory of Minorities and Indigenous Peoples and the World Directory of Minorities and Indigenous Peoples. The greatest number of Tuaregs, around one million, live in Niger, mostly south and west of Air Massif in the vicinity of the Dasa project. Tuareg society is highly stratified and consists of several castes including nobles, a free but subordinate group, a religious group and workers, who help tend the palm groves and vegetable gardens. These sources acknowledge that many Turaeg, although having suffered marginalization in the past, now live interspersed alongside other ethnicities throughout the country and have a long history of coexistence with these other groups. In the region of the project, the population and administrative structures are dominated by Tuaregs, and form a key part of the workforce at the uranium mines in Arlit where they are represented in managerial, semi-skilled and un-skilled positions. The Prime Minister of Niger from 2011 – 2021 is a Tuareg from the Agadez

region.

PS7 is applicable due to the presence of the Tuareg population, but the requirement for free, prior, informed consent (FPIC) is deemed not to be triggered as the conditions outlined in paragraphs 13 – 17 of PS7 are not met.

2.4.2. Socio-economic activities

2.4.2.1. Breeding

Livestock breeding is the main activity of the people of the Agadez region, who have many grazing areas with high fodder potential that are dependent on climatic hazards. This situation places the region in a cycle of almost annual fodder deficit. The region has a large livestock population consisting mainly of camels, goats, sheep, donkeys and cattle. This livestock population was estimated in 2013 at 1,536,430 head, all species combined, of which 240,758 head were raised in sedentary mode and 1,295,672 in nomadic mode (DR INS Agadez, 2017). In 2019, there are 1,824,328 head, or 173 livestock units (DRE, Agadez).

In the area of the Adrar Emoles 3 research permit, livestock breeding is also the main activity of the population. Indeed, due to the abundance, availability and accessibility of grazing land as well as the presence of water points in the area, the latter constitutes a daily focal point for the herders who drive their flocks there.

As in the region, the livestock in the project area consists of large animals (cattle, camels, donkeys and horses) and ruminants (sheep and goats).

Table 38 below shows that the area has 15,0167 head of livestock, of which 33% are goats, 28.49% sheep, 19.76% camels and 18.92% other species.

Table 38 Livestock in the study area

LIVESTOCK	VILLAGES								Total	%
	DABOS	EGATRAK	GALELO	GADOS	ISSAKANAN	OUFOUD	TAGAZA	INOLAMANE		
Cattle	600	1,000	50	20	2,000	300	2,000	700	**6,670**	**4.4**
Sheep	2,000	6,000	2,000	250	7,000	3,000	20,000	2,500	**42,750**	**28.5**
Goats	2,000	6,000	1,000	300	6,000	1,500	30,000	2,500	**49,300**	**32.8**
Camels	2,000	3,000	300	80	4,000	300	10,000	10,000	**29,680**	**19.8**
Donkeys	300	5,000	100	100	5,000	250	1,000	5,000	**16,750**	**11.1**
Horses	0	0	0	0	5	0	4	8	**17**	**0.01**
Total	6,900	21,000	3,450	750	24,005	5,350	63,004	20,708	**150,167**	**100**

Source: Field survey (FEED), December 2021

The water infrastructure that constitutes the watering points for livestock in the area are essentially pastoral wells, traditional wells, boreholes and the temporary ponds of Gololo and Temilt. It is important to note that all the villages surveyed in the framework of the study have at least one type of water facility, except for the village of Issakanan, which does not have any in the camp.

Thus, the inhabitants of this village water their animals in the villages of Inolamane and Tagaza.

As far as grazing is concerned, the following plant species are found in the project area:

Panicum tirgidum, *Chrysopogon Aucheri, Acacia raddiana, Balanites aegyptiaca*, *Boscia Senegalensis*) which are palatable to animals, and which unfortunately are moderately available all year round due to overloading (the heavy weight of the herd leading to overexploitation) and the scarcity of rainfall.

Furthermore, as regards pastoral rangelands (passage corridors), there are none in the project area in accordance with its vocation as a "pastoral zone" in accordance with the provisions of Law No. 61-05 of 26 May 1961 setting a northern limit for crops and Ordinance No. 93-015 of 2 March 1993 setting the guiding principles of the Rural Code.

Finally, it should be noted that despite its vast size, the region is subject to a reduction in its pastoral areas due to the exploitation of subsoil resources but also to the advance of the agricultural front. The region is also facing strong pressure on its fodder resources, leading to epizootic diseases and the multiplication of conflicts around water points (DR INS Agadez, 2017).

In the Project area, it is understood that the east-northeast to west-southwest trending koris are used as transit or nomadic herding corridors on a limited basis, in connection with the “Cure Salee”, a meeting of Kel Tamashek (Tuareg) from around the region which celebrates the end of the rainy season and is held at the Town of In-gal, located approximately 150 km south-west of Dasa.

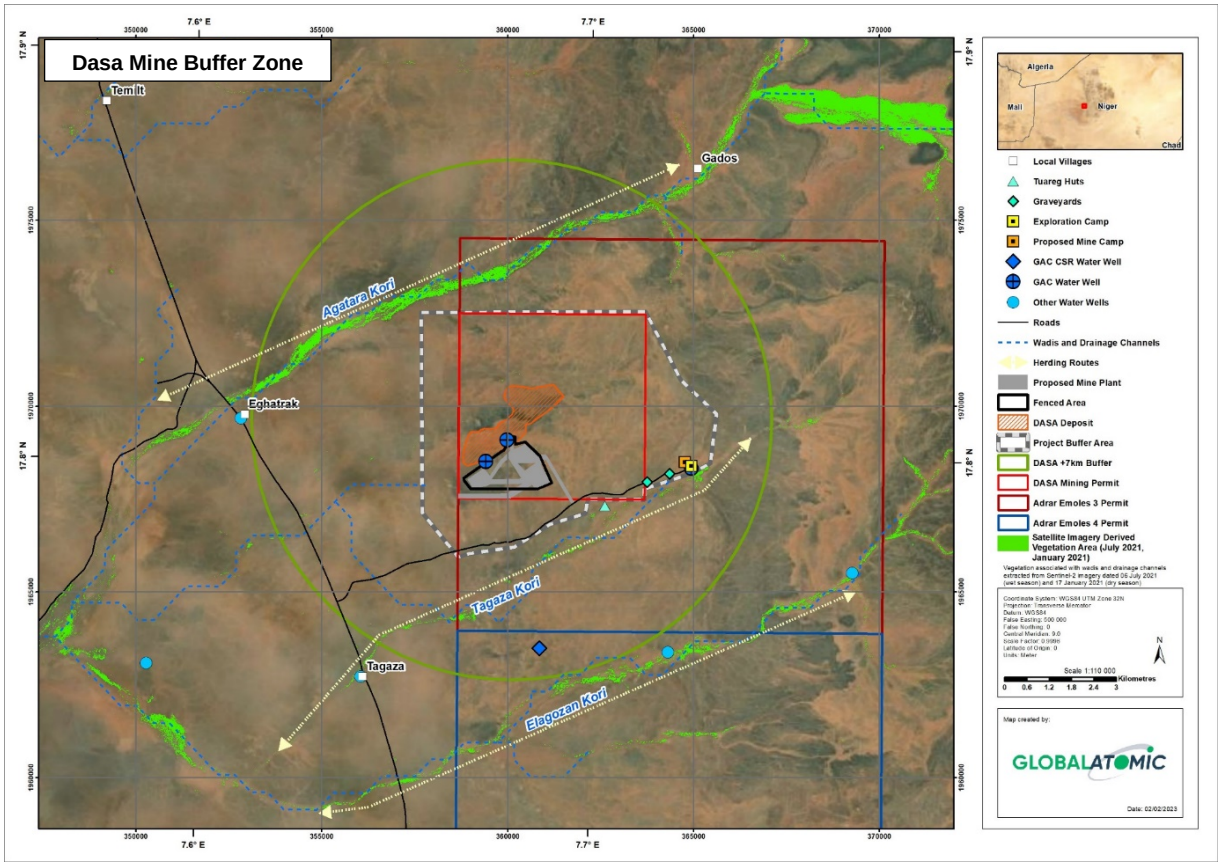

Figure 18 Dasa Mine Buffer Zone

In the Project vicinity, the vast majority of the population lives in villages, of which Eghatrak and Tagaza are nearest to the Project site, more than 5 km to the west. The area surrounding the mine site is sparsely populated, with small clusters of huts occupying land along the koris. Settlement within the koris is limited to families with small groups of animals on an approximate 200-300 m spacing. The inhabitants typical live within the kori during April to June and September to December. During the wet season from July to September and winter season from December to March, the inhabitants move to the edges of the koris where it is dryer and warmer respectively. The nearest settlement to the Project site is a collection of three huts approximately 1.5 km to the east-southeast. A fenced area of approximately 2km^2 will surround surface infrastructure, outside of which is a 40 km^2 buffer area. Access through this buffer area will not be restricted, although longer-term occupancy (e.g. building camps) will be discourage via public consultation and awareness raising. There are not believed to be any permanent residents within the buffer area around the site.

2.4.2.2. Agriculture

The Agadez region has significant potential (land, water) for market gardening and fruit growing, particularly in the many valleys of the Aïr.

Agriculture in the Agadez region is intended for cash cropping or market gardening. However, the region is not agriculturally homogeneous and can be subdivided into i) an area of rainfed crops and flood recession cereals and peri-urban market gardening around the town of Agadez, ii) irrigated crops, the majority of which are grown in the south and centre of the Aïr (Tabelot, Dabaga, Timia, Tchirozérine), with a predominance of onions and local specialisations for other crops (garlic, potatoes, tomatoes, etc.), including fruit crops (citrus fruits, dates, vines, mandarin trees), iii) cereals, the majority of which are grown in the north of the region (Tabelot).) including arboriculture (citrus, dates, vines, mandarin), iii) cereals, which are in the majority in the northern part of the Aïr (Iférouane) with a tendency towards a decrease in production and an increase in irrigated crops, and iv) basin or oasis crops in the rest of the region.

According to the results of the evaluation of the 2020 agricultural season and the 2020/2021 Food Outlook, the areas, yields and production of certain crops in the Agadez region are given in Table 39 below.

Table 39 Area, production and yield of crops

VARIABLES	SPECULATION						
	MIL	SORGHUM	BUT	COWPEAS	OKRA	ONION	TOMATO
Area	97	159	705	127	5	2 902	414
Performance	636	753	1042	361	20 875	30272	21 874
Production	62	120	734	46	104	87 850	9 056

Source: MA/EL, 2020

Despite the above findings, the Agadez region has tens of thousands of hectares of undeveloped fertile land in the Irhazer, Talak, Tamesna, Tadress plains and in the mouths and oases of the Ténéré desert (DR INS Agadez, 2017).

In the project area, only market gardening is practised by the population in the valleys along the koris. During the study, the estimated area under cultivation was 7.29 ha. The main crops are vegetables, lettuce, peppers, cabbage, carrots, watermelons, etc. The agricultural production is partly consumed locally and the rest sold at the markets of Arlit, Tchirozérine and Agadez.

It provides substantial income to local communities, enabling them to improve their incomes. Photo 11 below shows a farm developed at the Elagozan kori. This activity has been carried out in a rudimentary manner due to lack of resources and therefore requires support, including supervision, in order to modernise the sector and thus enable optimal development of the farms.

Photo 11 Market gardening in the Elagozan valley

2.4.2.3. Trade

Tourism and handicrafts are two sectors of activity that make a significant contribution to the socio-economic life of the Agadez region. Their dynamism is reflected, among other things, in the volume of activities, the diversity of products and services offered, the jobs provided and the wealth created.

The handicraft sector employs several thousand people of both sexes, young people and adults, spread throughout the region. This activity concerns leather goods, vanilla, weaving, pottery, blacksmithing, etc. Thus, the Aïr is extremely well known in this sector, through the blacksmiths who essentially work with silver and leather: a collection of 21 crosses, symbols of Nigerien cities (towns), of which the best known and most celebrated is the cross of Agadez.

There are several tourist sites in the region, including: the city of Agadez with its famous mosque, the Aïr massif, the Timia Oasis, Assodé, the former capital of the Aïr, the Adrar Bous mountain, the Temet Dunes, the Ténéré, known as the desert of the Paris-Dakar

Rally, a vast expanse of sand, and Fachi, a city that hosts the Taghlamt (salt caravan) once a year. In addition to these sites, there are also: the Bilma oasis, the Djado plateau, the Bianou, the Aïr festival, the Cure Salée, etc. (INS, 2016).

2.4.2.4. Tourism and crafts

Trade in the Agadez region is characterised by the predominance of the informal sector in which a multitude of retailers and a few semi-wholesalers operate. The towns of Agadez and Arlit are the two main commercial centres of the region, through which there are about ten rural markets where the rural populations buy supplies. The growing importance of the market gardening sector (notably onions) necessitated the creation in 2003 of two important rural markets in Dabaga and Tabelot in the Aïr oasis zone (INS, 2016).

In the permit area, commercial activities are mainly based on small-scale trade, in particular the sale of livestock products, market gardening and woodcutting (wood cutting, charcoal making, etc.) and basic necessities. There are two main markets in the main towns of the communes (Dannet and Tchirozérine) as well as many others in the villages of the area such as Tindawene, Azzel, etc. in the commune of Tchirozérine.

2.4.2.5. Archaeolgical heritage

2.4.2.5.1. Heritage potential of the region

Niger has an immensely rich heritage in terms of both its diversity and its originality and authenticity in all regions, including Agadez.

A pre-Saharan land, the Agadez region was green and humid millions of years ago, as shown by the presence of crocodile skulls, silicified tree trunks and a dinosaur cemetery.

In fact, human presence has been attested for several millennia. Thus, prehistoric man has left us images on the rocks, through drawings and engravings which allow us to retrace the history of ancient settlements.

In Niger from independence to the present day, few inventories have been carried out by the Ministry of Culture in the field of cultural heritage. The most important are those carried out in 1979-1980 and 1989-1990.

Thus, the 1979-80 inventory focused on the safeguarding of the archaeological cultural heritage and the 1989-90 inventory on sites, historical monuments, movable objects, sacred and cult places, mystical tombs, traditional festivals and sports.

In the Agadez region, Paleolithic industry is mentioned in several areas, notably in Kawar and Djado between 30,000 and 17,000 years ago.

Regarding the Neolithic, a 10,000-year-old Neolithic site was discovered on Mount Bagazan, which is one of the earliest examples of the domestication of nature by man.

During this Neolithic period, the lithic industry reached its peak, particularly in the perfection of the tools produced in the countless workshops in the desert areas. It was during this period that rock engravings and paintings made their appearance.

The mastery of metallurgy in the region is of great importance and one of the great moments of human civilisation.

The results of the research carried out have made it possible to attest to the presence of a 4,000 year old copper metallurgy (Afunfun, Tiguidit cliff). To the east of the Tiguidit valley, the presence of bronze metallurgy was noted.

The considerable achievements of the ancient populations who had lived in the desert in terms of metallurgy, Neolithic, lithic industries, rock art and painting show how important a focus of civilisation this area really was.

The main areas of archaeological research have been palaeontology, prehistory, post Neolithic, early metal age and contemporary.

In all these areas, research and discoveries were carried out under the administrative guidance and/or scientific and technical collaboration of the Institute for Research in Human Sciences (IRSH).

Among these discoveries we can note:

- deposits of dinosaurians and crocodilians among the most important in the world dating from 150 million to 100 million years ago in the south of the Air Massif, in particular at Gadafoua to the south-east of Agadez, by Philippe TAQUET of the Paris Museum of Natural History from 1965 to 1975, by Neumann in 1983 and by Paul SERENO from 1993;
- environmental and climatic pale deposits in the Air and Téneré, Tafassasset, Kawar and Djado massifs by researchers from ORSTOM, CNRS;
- Paleolithic Aterian deposits in the Adrar Bous and especially in the Kawar and Djado;
- Paleolithic Acheulean deposits dating from 34 thousand to 60 thousand years ago;
- prehistoric research in the Ténéré, the eastern edges of the Massif de l'Air on the paleoclimate, Acheulean, Neolithic, rock art and the beginnings of iron metallurgy;
- rock art stations of the Air and Djado Massif by Christian DEPUIS of CRNS;

2.4.2.5.2. Description of the cultural and archaeological potential identified in the permit area

Interviews with local communities around the Adrar Emoles 3 exploration licence, coupled with site visits, have helped to highlight the existence of cultural and archaeological heritage in some villages in the area, as shown in Table 40 below. The description of these sites is given in the appendix in the report on cultural and archaeological heritage.

Table 40 Cultural and archaeological sites in the project area

NAME OF THE VILLAGE	NAME OF THE SITE	TYPE OF SITE	GEOGRAPHICAL COORDINATES
Tagaza	Gani (Mouloud)	Cultural space	N : 17°43.88' E : 07°33.53'
	Engravings (Ali Gourane)	Prehistoric	N : 17°43.76' E : 07°37.30'
	Old Cemetery	Cultural	N : 17°45.40' E : 07°38.75'

NAME OF THE VILLAGE	NAME OF THE SITE	TYPE OF SITE	GEOGRAPHICAL COORDINATES
	Dinosaur tracks	Paleontological	N : 17°47.85' E : 07°36.36'
	Old well site with trough supports (the stone blocks)	History	N : 17, 77217° E : 07,68478°
Eghatrak	Rock engravings	Prehistoric	N : 17°49.71' E : 07°37.32'
	Old mosque (ruins)	Cultural	N : 17°48.60' E : 07°35.88'
	Dinosaur tracks	Paleontological	N : 17°42.85' E : 07°35.81'
Temilt -Dabous	Rock engravings (Dabous Giraffes)	Prehistoric	N : 17°53.23' E : 07°37.70'
Gados	Rock engravings (Giraffes)	Prehistoric	N : 17°52.15' E : 07°44.10'
	Rock engravings (Tifinagh)	Prehistoric	
	Old cemetery	Cultural	N : 17°52.45' E : 07°43.62'

2.4.2.5.3. General considerations and status in relation to the operating permit

Of all the cultural and archaeological sites identified in the project area, only that of the great giraffes of Dabous is known worldwide as it attracts visits from tourists and schoolchildren. It is also managed by the community and has a warden guide. The other sites are known by the communities but are not visited and have no management mechanism except for the Gani (Mouloud) cultural space. They have a public status as they belong to the whole community. The state of conservation of these sites is acceptable despite some natural (erosion, wind) and human threats of denaturation.

Regarding the location of the mining permit, none of the cultural and archaeological sites are located there. The following sites: the ancient cemetery of Tagaza, the site of the ancient mosque of Eghatrak, are located within 7 km of the centre of the deposit. Finally, apart from Gani (Mouloud) of Tagaza, all the other sites are located within 15 km of the centre of the deposit (see Figure 19 below).

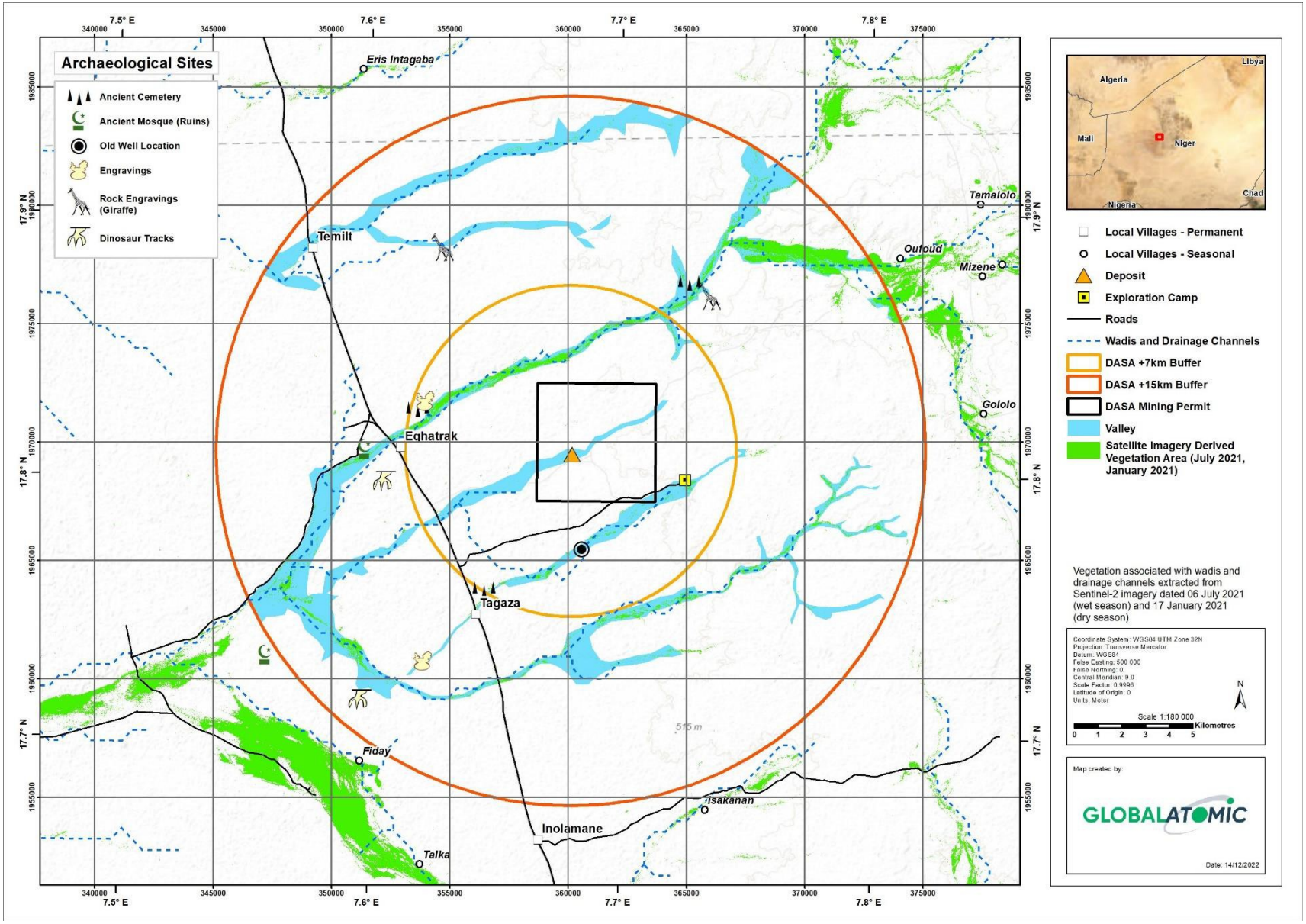

Figure 19 Location of archaeological sites in relation to the mining licence

2.4.2.5.4. Procedures for incidental findings

Given the richness and diversity of the project area's heritage and the activities to be carried out, chance discoveries could be made during the works and operations. To this end, the provisions of law n°97-22 of 30 June 1997 relating to the protection, conservation and enhancement of the national cultural heritage and its implementing decree n°97-407/PRN/MCC/MERST/A of 1 November 1997 are activated. Thus, the procedure includes the following stages:

- ***Suspension of works:*** In accordance with the provisions of Article 51 of law n°97-002 of 30 June 1997, when, as a result of the work or any other event, monuments, ruins, substructions, mosaics, elements of ancient piping, remains of ancient dwellings or burials, inscriptions or generally objects that may be of interest to paleontology, prehistory history, art, archaeology or numismatics, are uncovered, the company in charge of the work must immediately stop the said work, inform the supervisor of the work who reports directly to the head of the site who must immediately inform the administrative authorities who will immediately notify the Directorate of Cultural Heritage and the Directorate of Research.
- ***Delimitation of the discovery site:*** The company is obliged to delimit and secure a perimeter around the discovered property. It will limit access within this perimeter, and work may only be resumed after authorisation from the Directorate of Cultural Heritage.
- ***Securing the site to prevent damage or loss of removable objects:*** In the event of the discovery of removable antiquities or sensitive remains, a night watchman must be present until the responsible local authorities and the Ministry of Culture take over. The costs of securing the site of the find are charged to the contract.
- ***Incidental finding report:*** The company is required to prepare an incidental finding report providing information on the date and time of the discovery, the location of the discovery, the estimated weight and dimensions of the item discovered, and the temporary protection measures put in place. This report must be submitted to the supervisor of the works, the head of the site, the Directorate of Cultural Heritage, the Ministry in charge of research, the Prefect and the Governor of the region.

The Research and Culture administrations must visit the place where the discovery was made and prescribe any useful measure in accordance with the provisions of the last paragraph of Article 51 of the above-mentioned law.

- ***Arrival of the cultural services and action taken:*** The Cultural Heritage Directorate will arrange to send a representative to the site of the discovery within a reasonable time of notification and determine the action to be taken, which may include
    - ✓ Removal of physical cultural property deemed important and further work on the discovery site;
    - ✓ Continued work within a specified radius of the discovery site;
    - ✓ Enlargement or reduction of the area delimited by the company in charge of the works;

Decisions on how to deal with the finding should be taken by the responsible authorities in the Ministry of Culture. This could include conservation, preservation, restoration or recovery.

The implementation of the decision concerning the management of the finding must be communicated in writing by the Ministry in charge of Culture.

If the cultural services do not send a representative within a reasonable period of time, the Works Engineer, together with the Head of the site, will request the company to take mitigating measures in accordance with the provisions of the specifications and resume work while preserving or avoiding the discovered property.

2.4.3. Basic social services

2.4.3.1. Access to water and sanitation

Access to water for the population plays an important role in improving their living conditions. Thus, to improve access to this resource as well as the monitoring of related indicators, the government has developed and implemented programmes and projects, the latest of which is the Water, Sanitation and Hygiene Sector Programme (PROSEHA) developed since 2016 and covering the period 2016-2030. Under this programme, the notion of Household Served (HD) is developed as the main unit for planning the needs for new drinking water supply facilities. Thus, a HD is characterised by 10 persons as the number of users with a specific consumption of 20 L per person per day in rural areas and 75 L per person per day in urban areas (MH/A, 2019).

For the Agadez region, the rates of household access to the various water services in 2018 compared to the national average are shown in Figure 20 below.

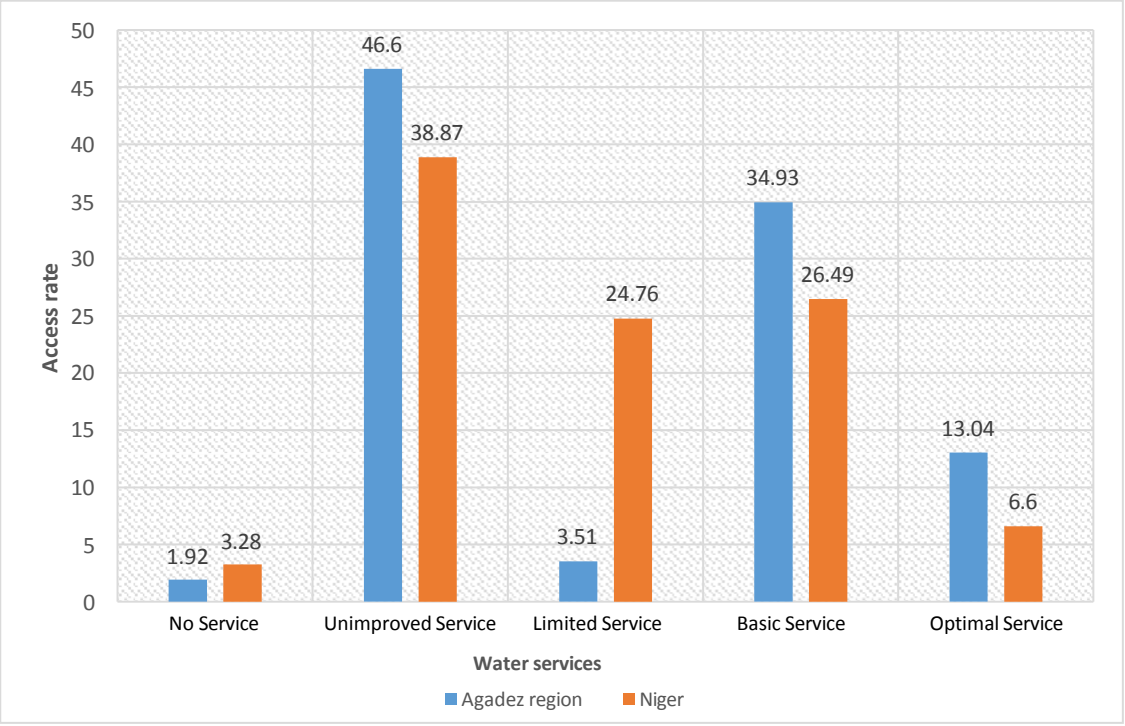

Figure 20 Households' access rate to different water services in 2018 (NSI, 2019)

The investments made have enabled an increase in the Theoretical Access Rate (TAR) to drinking water in rural areas, from 44.85% in 2018 to 46.09% in 2019. These rates are lower than the national averages which were 46.31% and 46.85% in 2018 and 2019 respectively.

The Geographical Coverage Rate (GCR) for drinking water increased from 55.05% in 2018 to 56.44% in 2019, an increase of 0.17%. These rates are higher than the national average of 1.39 percentage points (NSI, 2020).

In terms of infrastructure, 142 and 145 boreholes equipped with Human Powered Pumps (HPP) were recorded in 2018 and 2019 respectively. The number of cemented wells increased from 667 in 2018 to 673 in 2019.

In the permit area, more than 150 water points of all categories were identified in the commune of Tchirozérine and 83 modern water point equivalents (PC, PME, Mini AEP and SPP) in Dannet.

In terms of sanitation, the rate of household access to different services in 2018 compared to the national average is illustrated in Figure 21 below.

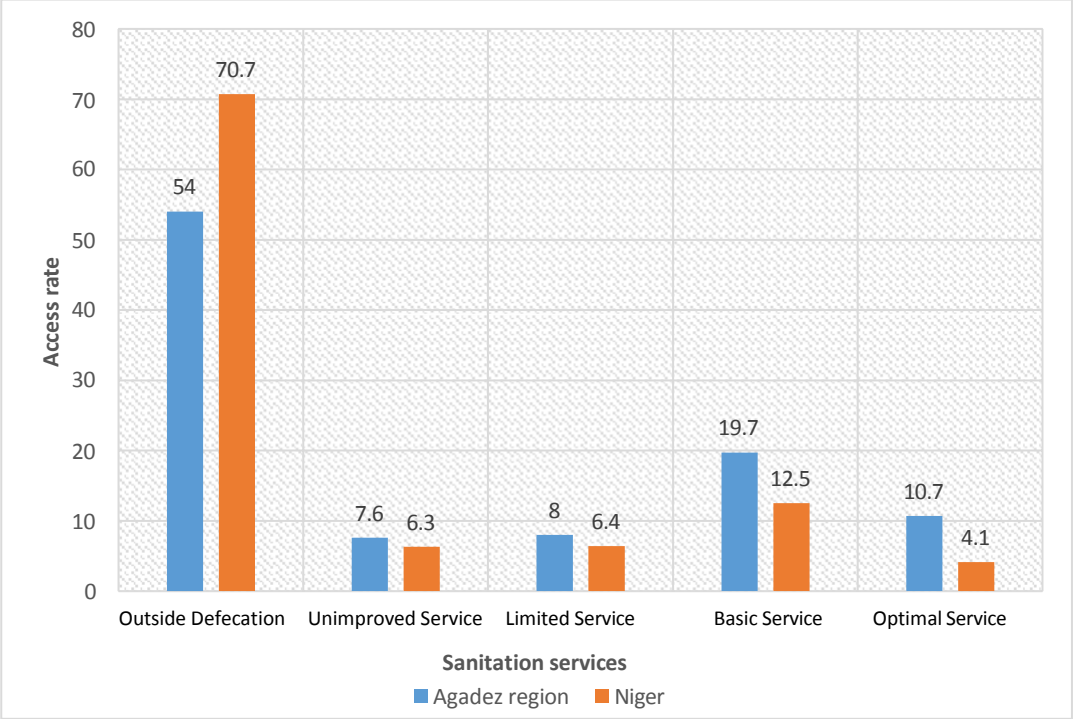

Figure 21 Household access rate to sanitation services in 2018 (MH/A, 2019)

At the regional level, analysis of the figure above shows that the rate of household access to the optimum sanitation service in 2018 is 10.7%, well above the national average of 4.1%. The basic service (19.7%) is also above the national average of 12.5%. The rate of open defecation is 54%, lower than the national rate of 70.7%. Finally, the rate of access to unimproved services is 7.6%, above the national average of 6.3%.

2.4.3.2. Access to health services

In the field of health, the State's objective is to improve health coverage and the quality of care through the construction of infrastructures and the strengthening of personnel.

Thus, in the project area, the health coverage rate in PMA (Minimum Activity Package) in 2018 is 68.35%. It was the same in 2017 (INS, 2020).

In terms of health infrastructure, in 2017, the region has: 1 Regional Hospital, 2 District Hospitals, 49 Integrated Health Centres I, 25 Integrated Health Centre II, 133 Health Centres.

The health staff in 2018 is composed of 22 doctors, 49 qualified midwives, 85 state-qualified nurses, 84 certified nurses, 1 registered nurse, 4 social assistants, 2 hygiene officers, 5 hygiene and sanitation technicians (INS,2020).

In the permit area, the health infrastructure identified in the commune of Tchirozérine includes: 1 Tchirozérine health district based in Agadez, 1 SONICHAR hospital, 1 functional CSI, 13 functional health huts, 1 public pharmacy, 1 private pharmaceutical depot. In the rural commune of Dannet, these infrastructures consist of 1 IHC, 12 health huts.

The types of recurrent diseases at the Tchirozerin IHC and the RTA (Dannet) IHC are measles, respiratory infections (coughs, colds, pneumonia, tuberculosis), vomiting, dermatitis, chickenpox, and vector-borne diseases such as malaria and yellow fever, and food- and water-borne diseases such as cholera, diarrhoea and gastroenteritis.

The ratio of doctors to population in 2019 is 1/14419 in the region (the WHO standard is 1/10000). As for the ratio of nurses to population, it is 1/1529 in the same year (the WHO standard is 1/5000). Finally, the number of women of childbearing age per midwife was 1/6729 (NSI, 2020).

2.4.3.3. Education

Like the national level, the education system in the Agadez region is characterised by a pyramid structure comprising pre-school, primary education, secondary education, vocational and technical education and higher education.

To ensure the development of this sector, Niger has developed several documents, notably the Ten-Year Education Development Programme (PDDE) 2003-2013 and the Education and Training Sector Programme (PSEF) 2014-2024.

The implementation of these programmes has led to significant results in the various educational sectors.

At the level of primary education, during the 2016-2017 school year, the region had 674 schools (public, private and community), 3124 classrooms including 3,006 public, 12 community and 106 private for a total of 96,570 pupils. The Gross Enrolment Rate (GER) was 97.4% during the same period (INS, 2018).

As regards traditional lower secondary education (CEG), during the 2016-2017 school year, the region had 52 public and private establishments, 736 classes (public and private) for a total of 22 622 pupils, 18 813 of whom were public and 3 809 private. At the level of traditional upper secondary education (Lycée), there were 29 public and public schools, 134 classes and 5,090 pupils (INS, 2018).

In 2016-2017, vocational and technical education totalled 3 health schools (with 22 classes and 290 students) and 33 technical training institutions (with 76 classes and 2,724 students).

Finally, at the level of higher education, the University of Agadez has 396 students, including 369 boys and 27 girls in the 2017-2018 academic year.

In the project area, the commune of Tchirozérine has one secondary school complex (CES) and three secondary schools with 1,071 pupils. At the primary level, there are 91 primary schools, including 67 "traditional" schools, 6 "community" schools and 2 "bilingual" schools (French-Tamasheq), 15 Franco-Arabic schools and one public school. These schools have a total of 7,801 pupils, including 3,502 girls (45% of the total) and 4,299 boys. In addition, this commune has 34 functional literacy centres for a total of 850 learners. These centres operate thanks to the support of certain partners such as UNICEF, AFRICAIRE, etc. Finally, the rural commune of Dannet has 6 General Education Colleges (CEG) and 30 primary schools for a total of 984 primary school pupils, including 536 boys and 448 girls.

2.4.4. Gender-based violence assessment

Gender-based violence refers to any act directed against a man or a woman as a result of unequal social relations governing the community and disadvantaging a group.

Gender-based violence is a generic term for any harmful/harmful act perpetrated against the will of others, and which is based on socially prescribed differences between men and women/girls and boys.

The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) defines it as "any act of gender-based violence that results in, or is likely to result in, physical or psychological harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or in private life."

Thus, following the interview with stakeholders as part of the update of the Environmental and Social Impact Assessment of the Adrar Emoles 3 research permit, the types of GBV identified in the Agadez region are Child labor on gold panning sites through pounding, sifting and washing, sexual abuse, rape, sexual assault, unwanted pregnancies, physical violence, marital violence, child marriage, psychological violence and economic violence.

According to the results of the data collection, the types of GBV that could be encountered at the site of the "Adrar Emoles 3" research permit are sexual abuse, physical violence, exploitation, child marriage, sexual assault and psychological violence.

In order to take them into account, "GBV clauses" developed and annexed to this report will be integrated into the specifications of the companies.

3. OUTLINE OF THE POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1. Policy framework

The policy framework for the implementation of the Adrar Emoles 3 Exploration Licence is as follows

- **National Policy on Environment and Sustainable Development** adopted by Decree N°2016-522/PRN/ME/DD of 28 September 2016. It covers all the key dimensions of development relating to technical, institutional and organisational aspects, capacity building and resource mobilisation, particularly domestic. It is structured around four (4) strategic areas of intervention, namely: sector governance, sustainable land and water management, sustainable environmental management and biodiversity management.
- **National Environment Plan for Sustainable Development (PNEDD)**, elaborated in 1998, which serves as Agenda 21 for Niger. The PNEDD establishes the objectives of Niger's policy on environmental protection and sustainable development. Its aim is to implement the three (3) post-Rio Conventions by putting in place conditions favourable to the long-term improvement of the living conditions of the population and the economic development of the country.
- **Sustainable Development and Inclusive Growth Strategy (SDDCI Niger 2035): the** objective of this strategy is to build a modern, democratic and united country, well governed and peaceful, open to the world, as well as an emerging economy, based on a balanced sharing of the fruits of progress. It is based on six (06) strategic axes, namely territorial security, the development of a dynamic private sector, the control of fertility and infant mortality, the dynamisation and modernisation of the rural world, the development of human capital and the transformation of the administration.
- **Economic and Social Development Plan (PDES) 2022-2026**: this development instrument allows Niger to truly return to the exercise of economic planning after several decades of weakening the planning function. Based on the profound ambitions of the Niger Renaissance Programme, of which it is the main instrument for implementation in the short and medium term, the PDES is based on the Prime Minister's General Policy Declaration, from which it draws its substance, its main orientations and its strategic axes.
- **National Spatial Planning Policy:** the National Spatial Planning Policy (PNAT) was adopted by decree n°2014-319/PRN/MPAT/DC of 02 May 2014. Its general objective is to promote balanced and sustainable spatial development that reduces inter- and intra-regional disparities based on the country's natural potential, the creation of regional development poles, the reduction of social deficits, the preservation of the environment and the dynamics of regional integration. The PNAT's orientations and areas of intervention are: (i) National and regional integration; (ii) Territorial and institutional efficiency; (iii) Social development; (vi) Promotion of regional development poles and areas of activity; (v) Sustainable management of natural resources; (iv) Risk and disaster reduction.
- **Framework document of the National Occupational Safety and Health**

Policy adopted by Decree No. 2017-540/PRN/MET/PS of 30 June 2017. Its purpose is to prevent accidents and damage to health at work or the conditions in which it is performed. Thus, the general objective is to protect and ensure the safety and health of workers through the prevention of occupational accidents and diseases in all sectors.

- **National Mining Policy (PMN 2020-2029):** adopted on 3 July 2020, this policy is based on the reference frameworks at the international (ODD), continental (AU Agenda 2063), regional and sub-regional (ECOWAS Vision 2020, ECOWAS Mining Directive and Policy, WAEMU Community Mining Policy) and national levels (Constitution of 25 November 2010, the DPG, PDES 2017- 2021, etc.) It also takes into account other commitments specific to the mining sector to which Niger has subscribed as well as good practice benchmarks in the mining industry.

3.2. Legal framework

3.2.1. International legal framework

The international legal framework is made up of the international texts signed and ratified by Niger and which can be activated within the framework of the activities of the Adrar Emoles 3 Exploration Permit. Table 41 below provides a summary of these texts.

Table 41 International legal framework

TITLE OF THE AGREEMENT	SIGNATURE DATES /ENTRY INTO FORCE	DATE OF SIGNATURE/ RATIFICATION BY NIGER	CONTEXTUAL REFERENCES
Convention on the World Cultural and Natural Heritage	16 November 1972	23 November 1974	**Article 4**: "*Each State Party to this Convention recognises the duty to ensure the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural [...], scientific and technical heritage*".
Convention on Biological Diversity	Signed on 11 June 1992 in Rio de Janeiro, Brazil, and entered into force on 24 March 1994	Signed by Niger on 11/06/92 and ratified on 25/07/95	**Article 14**(a) and (b) of the Convention provides that each Contracting Party to the Convention shall, as far as possible (a) adopt procedures to require environmental impact assessment of its proposed projects that are likely to have significant adverse effects on biological diversity with a view to avoiding and minimizing such effects, and, where appropriate, allow for public participation in such procedures; and (b) take steps to ensure that due account is taken of the environmental effects of its programmes and policies that are likely to have significant adverse effects on biological diversity.
International Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification	Adopted in Paris on 14 October 1994 and entered into force on 19 January 1996	Signed by Niger on 14 October 1994 and ratified on 19 January 1996	*Article 5 of the Convention obliges drought-affected countries to commit themselves to giving due priority to combating desertification and mitigating drought, and to allocating adequate resources commensurate with their situation and capabilities.*
United Nations Framework Convention on Climate Change	Signed on 11 June 1992 in Rio de Janeiro, Brazil, and entered into force on 24 March 1994	Signed by Niger on 11/06/92 and ratified on 25/07/95	*"The use of EIA (Article 41t) to minimise the adverse effects of climate change on health, the economy, etc."*
Stockholm Convention on the Protection of Human Health and the Environment from Persistent Organic Pollutants (POPs)	Adopted in Stockholm on 22 May 2001, entered into force on 17 May 2004	Niger joined on 12 April 2006	It aims to protect human health and the environment against Persistent Organic Pollutants.

TITLE OF THE AGREEMENT	SIGNATURE DATES /ENTRY INTO FORCE	DATE OF SIGNATURE/ RATIFICATION BY NIGER	CONTEXTUAL REFERENCES
Bamako Convention on the Ban of the Import into Africa of Hazardous Wastes and on the Control of Transboundary Movement and Management of Hazardous Wastes products in Africa.	30 January 1991 in Bamako and entered into force on 20 March 1996	30 June 1991 27 July 1996	The convention aims to improve and ensure the environmentally sound management of hazardous waste, as well as the cooperation of the African states involved. Article 4: "General obligations *3. Ban on the import of hazardous waste [...]* *4. Prohibition of dumping of hazardous waste in the sea, inland waters and waterways [...].* *Waste generation in Africa ... "...*
The Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, Rotterdam	10/09/1998, entered into force 24/02/2004	Accession by Niger: 16/02/2006	Promote shared responsibility and cooperation to protect human health and the environment from harm and to contribute to their use in an environmentally sound manner.
Work Environment (Air Pollution, Noise and Vibration) Convention No. 148	International Labour Organisation (ILO) 20 June 1977	28 July 1979	Article 6: *"Employers shall be liable for responsible for the implementation of the prescribed measures. Whenever two or more employers are simultaneously engaged in activities at the same workplace, they shall have a duty to co-operate with a view to applying the prescribed measures, without prejudice to the responsibility of each employer for the health and safety of the workers employed by him. In appropriate cases, the competent authority shall prescribe the general procedures by which such collaboration shall take place.* Article 11, paragraph 1*: "The state of health of workers exposed or likely to be exposed to occupational risks due to air pollution, noise or vibration at the workplace shall be subject to surveillance at appropriate intervals in the circumstances and in accordance with the procedures laid down by the competent authority...*

TITLE OF THE AGREEMENT	SIGNATURE DATES /ENTRY INTO FORCE	DATE OF SIGNATURE/ RATIFICATION BY NIGER	CONTEXTUAL REFERENCES
Convention No. 155 on Occupational Safety and Health	22 June 1981	Ratified by Niger and entered into force 11 August 1983.	Article 16 (paragraph 1, 2 and 3)*: "Employers shall be required to ensure that, so far as is reasonable and practicable, workplaces, machinery, equipment and work processes under their control do not present a risk to the safety and health of workers. Chemical, physical and biological substances and agents under their control shall not present a risk to health where appropriate protection is provided. Employers shall be required to provide, where necessary, appropriate protective clothing and equipment to prevent..., the risk of accidents or adverse health effects".* Article 18: *"Employers shall be required to provide, where necessary, measures to deal with emergencies and accidents, including adequate facilities for the administration of first aid".*
Convention No. 161 on occupational health services	25 June 1985 by the ILO	Ratified by Niger and entered into force on 17 February 1988	Article 12: *"Work-related health surveillance must not entail any loss of earnings for workers; it must be free of charge and take place as far as possible during working hours".* Article 13: *"all workers must be informed of the health risks inherent in their work".* Article 15: *"Occupational health services shall be informed of cases of illness among workers and of absences from work for health reasons. Staff providing occupational health services shall not be required by employers to verify the validity of the reasons for absence from work".*
Convention No. 187 on the Promotional Framework for Safety and Health at Work.	15 June 2006 by the ILO	Ratified by Niger and entered into force on 20 February 2009	Article 2 (paragraphs 1, 2 and 3) states that*: "1. Each Member ... shall promote the continuous improvement of occupational safety and health in*

TITLE OF THE AGREEMENT	SIGNATURE DATES /ENTRY INTO FORCE	DATE OF SIGNATURE/ RATIFICATION BY NIGER	CONTEXTUAL REFERENCES
			order to prevent work-related injuries, illnesses and deaths ..... Each Member shall take active steps towards the progressive achievement of a safe and healthy working environment Each Member shall, in consultation with the most representative employers' and workers' organizations, periodically consider what steps could be taken to ratify the relevant ILO Conventions on occupational safety and health.
Equal Remuneration Convention No. 100	Adoption: Geneva, 34ème ILC session (29 June 1951) / Entry into force: 23 May 1953	9 August 1966 / entry into force 9 August 1968	Article 1: "For the *purposes of this Agreement :* *(a) the term remuneration includes the ordinary, basic or minimum wage or salary and any other benefits, paid directly or indirectly, in cash or in kind, by the employer to the worker by reason of the latter's employment;* *(b) the term equal pay for male and female workers for work of equal value refers to rates of pay set without discrimination on the grounds of sex.*
Convention No. 102 concerning Minimum Standards of Social Security	Geneva, 35ème ILC session (28 June 1952) / Entry into force: 27 Apr 1955	9 August 1966 /9 August 1968	*Article 32: "The contingencies covered shall include the following when caused by prescribed occupational injuries or diseases:* *a) morbid condition ;* *(b) incapacity for work resulting from a morbid condition and leading to the suspension of earnings as defined by national legislation;* *(c) total loss of earning capacity or partial loss of earning capacity above a prescribed degree, where it is likely that such total or partial loss will be*

TITLE OF THE AGREEMENT	SIGNATURE DATES /ENTRY INTO FORCE	DATE OF SIGNATURE/ RATIFICATION BY NIGER	CONTEXTUAL REFERENCES
			permanent, or corresponding diminution of physical integrity; *(d) loss of livelihood suffered by the widow or children as a result of the death of the breadwinner; in the case of the widow, entitlement to the benefit may be subject to the presumption, in accordance with national legislation, that she is incapable of supporting herself.*
Convention 138 on the minimum age for employment	Adoption: Geneva, 58ème ILC session (26 June 1973) / Entry into force: 19 June 1976	4 December 1978/entered into force 4 December 1980	Article 3: "*The minimum age for admission to any type of employment or work which, by its nature or the conditions in which it is carried out, is likely to jeopardise the health, safety or morals of adolescents shall not be less than eighteen years.* *2. The types of employment or work referred to in paragraph 1 above shall be determined by national laws or regulations or the competent authority, after consultation with the employers' and workers' organisations concerned, if any.* *3. Notwithstanding the provisions of paragraph 1 above, national laws or regulations or the competent authority may, after consultation with the employers' and workers' organisations concerned, if any, authorise the employment or work of young persons from the age of sixteen years, provided that their health, safety and morals are fully guaranteed and that they have received adequate specific instruction or vocational training in the relevant branch of activity.*

TITLE OF THE AGREEMENT	SIGNATURE DATES /ENTRY INTO FORCE	DATE OF SIGNATURE/ RATIFICATION BY NIGER	CONTEXTUAL REFERENCES
Worst Forms of Child Labour Convention No. 182	Adoption: Geneva, 87ème ILC session (17 June 1999) / Entry into force: 19 Nov. 2000	23 October 2000/entered into force 23 October 2001	Article 3: "For *the purposes of this Convention, the term 'worst forms of child labour' includes* *(a) all forms of slavery or practices similar to slavery, such as the sale and trafficking of children, debt bondage and serfdom and forced or compulsory labour, including forced or compulsory recruitment of children for use in armed conflict;* *(b) the use, procuring or offering of a child for prostitution, for the production of pornography or for pornographic performances;* *(c) the use, procuring or offering of a child for illicit activities, including for the production and trafficking of drugs, as defined in the relevant international conventions;* *(d) work which, by its nature or the conditions in which it is carried out, is likely to harm the health, safety or morals of the child.*

3.2.2. IFC Environmental and Social Sustainability Performance Standards

IFC's Environmental and Social Sustainability Performance Standards (PS) are an integral part of its Sustainability Framework and outline its strategic commitment to promoting sustainable development. They are intended to provide guidance to clients in identifying risks and impacts and are designed to help them avoid, mitigate and manage risks and impacts in order to operate in a sustainable manner. In this regard, they also cover the clients' obligations to collaborate with stakeholders and communicate information about project-level activities.

Of these eight (8) standards, all are applicable to the project. The objectives and the context of their application are given in Table 42 below.

Table 42 Applicability of the IFC Performance Standards to the project

PERFORMANCE STANDARDS	OBJECTIVES	APPLICABILITY TO THE PROJECT
PS 1: Assessment and management of environmental and social risks and impacts	- Identify and assess the environmental and social risks and impacts of the project: - Adopt a hierarchy of mitigation measures so as to anticipate and avoid impacts, or where this is not possible, to mitigate as much as possible, and where residual impacts remain, to compensate for the risks and impacts faced by workers, affected communities and the environment; - Promote better environmental and social performance of clients through effective use of management systems; - Ensure that grievances from affected communities and external communications from other stakeholders are responded to and managed appropriately; - Promote and provide the means for meaningful dialogue with affected communities throughout the project cycle to cover issues that may affect them and ensure that relevant environmental and social information is disclosed and disseminated.	In order to comply with the provisions of this standard, this environmental and social impact study has been carried out and has made it possible to identify and assess the risks and impacts associated with the implementation of the project. Measures have also been proposed to avoid, mitigate and, if necessary, compensate for them. This will ensure a better environmental and social performance of the project. Consultation with local communities has been taking place since 2008 for close to 15 years and these communities have been fully informed about the project and the nature of activities to be carried out. Broad Community Support (BCS) has been demonstrated at the Village and Regional levels. In addition, a Stakeholder Engagement Plan and associated Grievance Management Mechanism has been developed and allows any stakeholder who feels aggrieved by the implementation of the project to lodge a complaint so that it can be appropriately addressed.
PS 2: Workforce and working conditions	- Promote fair treatment, non-discrimination and equal opportunities for workers; - Establish, maintain and improve relations between workers and management; - Promoting compliance with national labour and employment law ; - Protect workers, including vulnerable categories of workers such as children, migrant workers, third party workers and workers in the client's supply chain; - Promote safe and healthy working conditions and protect workers' health;	The measures planned as part of the environmental and social impact assessment in accordance with PS1 include those relating to working conditions (health and safety, and specifically measures around occupational exposure to radioactive materials). More importantly, at the end of this study, labour management (human resources) procedures have been developed that will address the risks associated with the workforce and proportionate management measures.

PERFORMANCE STANDARDS	OBJECTIVES	APPLICABILITY TO THE PROJECT
	- Avoid the use of forced labour.	
PS 3: Resource efficiency and pollution prevention	- Avoid or reduce negative impacts on human health and the environment by avoiding or reducing pollution generated by project activities; - Promote more sustainable use of resources, including energy and water; - Reduce project-related GHG emissions.	This Environmental and Social Impact Assessment has proposed measures that will allow for the rational use of resources and the prevention of deterioration of air quality, ground and surface water quality and use, and waste management. A number of measures have been integrated into project design to reduce water use and GHG emissions. A Climate Change Risk Assessment will be carried out ahead of the start of construction.
PS 4: Health, safety and security of communities	- Anticipate and avoid, during the life of the project, negative impacts on the health and safety of affected communities that may result from ordinary or non-ordinary circumstances, - Ensure that the protection of personnel and property is carried out in accordance with applicable human rights principles and in a manner that avoids or minimises risk to affected communities.	With regard to local communities, the planned measures take into account their concerns, including health and safety issues. A Human Rights Risk Assessment will be carried out ahead of construction.
PS 5: Land acquisition and involuntary resettlement	- Avoid, and wherever possible limit, involuntary resettlement by considering alternative designs for projects; - Anticipate and avoid, or where avoidance is not possible, limit negative social and economic impacts resulting from land acquisition or restrictions on land use by : o providing compensation for the loss of assets at replacement cost and by o ensuring that resettlement activities are accompanied by appropriate provision of information, informed consultation and participation of those affected; - To improve or at least restore the livelihoods and living conditions of displaced people;	The project to exploit the deposits of the Adrar Emoles 3 research permit will not result in the physical displacement of populations.

PERFORMANCE STANDARDS	OBJECTIVES	APPLICABILITY TO THE PROJECT
	- Improve the living conditions of physically displaced people through the provision of adequate housing with security of tenure in resettlement sites.	
PS 6: Conservation of biodiversity and sustainable management of living natural resources	- Protecting and conserving biodiversity; - Maintaining the benefits of ecosystem services ; - Promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.	This Environmental and Social Impact Assessment has provided a baseline of the biodiversity and living natural and modified resources (koris) in the area, and habitat mapping. A Critical Habitat screening process has been completed and no critical species identified. An ecosystem services baseline assessment has been completed, to include biodiversity risks and impacts of the project and proposed measures to address them as described under PS1. This will enable the project to comply with the provisions of this performance standard.
PS 7: Indigenous Peoples	- Avoidance of adverse impacts, consultation and informed participation - Impacts on Traditional or Customary Lands under Use, including relocation, impacts to or use of critical cultural heritage, requiring FPIC - Provision of fair and equitable sharing of benefits with IPs	Consultation and informed participation of local predominantly Tuareg communities has been taking place since 2008 for close to 15 years, and more recently, Broad Community Support has been demonstrated both at the local village level and the highest levels of the regional administration. As no adverse impacts, relocation, or impacts to or use of natural or critical cultural heritage will take place, the requirement for FPIC is not triggered. Benefits to local communities will accrue through education and training and associated local procurement and hiring, enhancement of water provision (refurbishment and maintenance of wells and consideration of the provision of additional fresh water

PERFORMANCE STANDARDS	OBJECTIVES	APPLICABILITY TO THE PROJECT
		from the mining operation (dewatering), improved agricultural opportunities and practices and the enhancement of health care. These initiatives are in addition to the benefits that will accrue to the local and regional population from the payment by GAC of mining royalties and tax revenue, a portion of which will be returned to local and regional authorities.
PS 8: Cultural heritage	- To protect cultural heritage from the negative impacts of project activities and support its preservation and to promote the equitable distribution of benefits from the use of cultural heritage.	To comply with the provisions of this performance standard, the initial baseline of the cultural and archaeological heritage of the area has been established. The risks and impacts that the project is likely to generate have been identified and assessed, and appropriate measures will be undertaken under PS1.

3.2.3. Good Industry Practice/Standards

3.2.3.1. International Finance Corporation Performance Standard 6

IFC PS6 and its accompanying Guidance Note (GN6) present the standards that an IFC compliant project must meet regarding the conservation of biodiversity and the sustainable management of living natural resources. The performance standard is recognised as the global benchmark for best practice in biodiversity assessment and management.

IFC PS6 requires the identification and assessment of three classes of area based on habitat condition. Land areas may be defined as “Modified” or “Natural Habitat” and either of these classes may also be identified as “Critical Habitat” if they support certain high biodiversity values.

Definitions of the three classes of habitat are outlined below.

Natural Habitat is defined as: ‘areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area’s primary ecological functions and species composition’. Natural Habitat is not restricted to pristine habitats. It is assumed that the majority of habitats designated as natural will have undergone some degree of historic anthropogenic impact.

Modified Habitat is defined as: ‘areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area’s primary ecological functions and species composition’. For example, areas managed intensively for agriculture, forest plantations, settlements and urban areas. Definitions of what might constitute a modified or degraded area vary, are location specific and may be influenced by the broader landscape context.

Critical Habitat is defined as ‘areas of Natural and/or Modified Habitat that support high biodiversity value’ based on the presence of one or more of the following:

- Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species;
- Criterion 2: Endemic and/or restricted-range species;
- Criterion 3: Globally significant concentrations of migratory and/or congregatory species;
- Criterion 4: Highly threatened and/or unique ecosystems; and/or
- Criterion 5: Areas associated with key evolutionary processes.

The presence of any one of these types of biodiversity features in the landscape may “trigger” a determination of Critical Habitat, based on their extent or abundance within an Ecologically Appropriate Area of Analysis (EAAA) defined for each feature. For Criteria 1 to 3, presence of CH is confirmed by assessment against quantitative thresholds. Expert judgement is needed to determine presence of CH for Criteria 4 and 5. Legally Protected Areas and Internationally Recognised Areas may also qualify an area as CH depending on the reasons for designation.

Implementation of the mitigation hierarchy is required for compliance with IFC PS6. This is typically described as:

- Avoid Impacts, and
- Minimize impacts, and
- Restore conditions (abate, rectify, repair), and
- Where residual impacts remain, Offset impacts

Operations are required to achieve a Net Gain outcome for Critical Habitat (Paragraphs 17-19 of IFC (2012) and IFC, 2019).

In impacted areas of Natural Habitat, mitigation measures are to be designed, adopting the mitigation hierarchy where feasible, to achieve a No Net Loss outcome for biodiversity (paragraph 15 of IFC (2012).

To align with IFC PS6 general requirements include:

Demonstrate an absence of alternatives that would avoid damage to Natural and Critical Habitat. This will be considered as part of the Biodiversity Impact Assessment.

Apply the mitigation hierarchy with a view to achieving “No Net Loss” or a Net Gain of biodiversity in areas of Natural and Critical Habitat respectively. The Project-related direct and indirect impacts will not jeopardize the long-term persistence of the biodiversity value for which Critical Habitat was designated. This will be outlined in a Biodiversity Action Plan (BAP).

Undertake robust habitat mapping to determine areas of Critical and Natural Habitat and underpin appropriate application of the mitigation hierarchy such as identifying requirements for strict avoidance or minimisation of footprint. Habitat mapping is currently being completed and will be applied in the BAP.

Design and implementation of a Biodiversity Monitoring and Evaluation Program (BMEP).

3.2.3.2. International Finance Corporation Standard Performance Standard 7

In addition to the text in Table 42 above, the following provides further detail on the applicability of PS7 without triggering the requirement for FPIC.

Paragraph 14 relates to ‘adverse impacts’, in this case limited to the prevention of grazing in the fenced 2 km^2 portion of the 40 km^2 buffer zone, represents approximately 2ha. This is not considered significant in relation to the extensive areas of vegetation elsewhere, with water sources, that are available to the largely sedentary local population. There are no cultural sites of significance or other natural resources present within the buffer zone, so it is considered that there are no adverse impacts on local communities.

Paragraph 15 relates to the relocation of indigenous people from lands and natural resources; this will not be carried out by the Dasa project. Communities will remain as they are, and traditional herding routes unaffected. The project has committed to the following: Water wells will be refurbished and maintained, and additional water may be made available to local communities as a result of dewatering (pumping out groundwater to allow mining access). Market gardening and the growth of fodder crops

to increase areas under cultivation and yields and improve the seasonal availability of grazing and fodder will be developed by the project proponent in consultation with the communities and the participation of local agricultural experts. Other community development aspirations will be discussed with communities on an ongoing basis.

Paragraph 16 & 17 relate to critical cultural heritage, which has not been identified in the project area, so these are not applicable.

In terms of other PS7 paragraphs, these will be addressed in the following ways:

- Consultation and informed participation of local predominantly Tuareg communities has been taking place since 2008, and more recently, Broad Community Support has been demonstrated both at local village level and the highest levels of regional administration. A Stakeholder Engagement Plan and associated Grievance Mechanism has been developed and is being implemented in the local area.
- Benefits to local communities will accrue through education and training programmes and associated local procurement and hiring, enhancement of water provision (refurbishment and maintenance of wells and consideration of the provision of additional fresh water from the mining operation (dewatering), improved agricultural opportunities and practices, and the enhancement of health care. This is in addition to the benefits that will accrue from the payment of tax revenue, a portion of which will be returned to the local authority.

3.2.4. Equator Principles

The Equator Principles are intended to provide a common basis and framework for financial institutions to identify, assess and manage environmental and social risks in project finance. There are ten (10) principles that apply globally and across all business sectors. The titles of these principles, their objectives and applicability to the project are given in Table 43 below.

Table 43 Applicability of the Equator Principles to the project

PRINCIPLES	OBJECTIVES	APPLICABILITY TO THE PROJECT
EP1: Review and Categorisation	Categorise the project (A, B, or C) according to the magnitude of the risks and potential environmental and social impacts	As this project has major potential impacts, it is therefore classified as category A in accordance with this principle and national texts, in particular law n°2018-28 of 14 May 2018 and its implementing decree n°2019-027/PRN/MESU/DD of 11 January 2019.
EP2: Environmental and Social Assessment	Conduct an Assessment process to analyse the extent of environmental and social impacts and risks associated with the proposed project and propose measures to minimise, mitigate and, where residual impacts remain, compensate/remediate the risks and	In order to comply with the provisions of this principle, the present environmental and social impact study has been carried out and has made it possible to assess the environmental and social risks and impacts associated with the project and to propose measures. Also, specialised studies have been carried out, notably in terms of

PRINCIPLES	OBJECTIVES	APPLICABILITY TO THE PROJECT
	impacts on Workers, affected Communities and the environment, in a manner that is relevant and appropriate to the nature and scale of the proposed project.	biodiversity, cultural heritage, air quality, etc. Finally, within the framework of the study, issues related to climate change, impacts on human rights (e.g. GBV issues) were addressed.
EP3: Applicable environmental and social standards	Assess compliance with the necessary laws, regulations and permits relating to environmental and social issues in the host country concerned and the applicable provisions of the principles.	The environmental and social impact study, which is the subject of this report, was carried out in accordance with the national texts in force on the subject and the provisions of the Equator Principles.
EP4: Environmental and Social Management System (ESMS) and Equator Principles Action Plan (EP Action Plan)	Establish and maintain an environmental and social management system and an Environmental and Social Management Plan to address the issues raised in the Assessment process and to incorporate the measures required to meet the applicable standards.	In order to comply with the provisions of this principle, an Environmental and Social Management Plan (ESMP) has been developed as a result of this environmental and social impact assessment. It includes measures to manage the environmental and social risks and impacts that will be associated with the implementation of the project.
EP5: Stakeholder participation	Ensure effective stakeholder participation through a continuous and structured process adapted to the local culture of the affected communities, workers and, where appropriate, other stakeholders	As part of the environmental and social impact study, which is the subject of this report, a stakeholder consultation process was carried out (administrative, communal and customary authorities, local populations, etc.) and enabled their opinions, concerns and recommendations to be taken into account in relation to the implementation of the project. In addition, a Stakeholder Engagement Plan was drawn up.
EP6	Establish a grievance mechanism to receive and facilitate the resolution of concerns and grievances related to the environmental and social performance of the project	In order to bring the project into line with this principle, a Complaints Mechanism has been developed which will allow anyone who feels aggrieved by the implementation of the project to register their complaint so that it can be dealt with in a fair and equitable manner
EP7: Independent review	Provide independent review of the assessment process, including the ESMP, ESMS and Stakeholder Participation process documents to assist EPFI in conducting its due	The project to exploit the deposits of the Adrar Emoles research permit will be subject to this obligation in order to comply with the provisions of these principles

PRINCIPLES	OBJECTIVES	APPLICABILITY TO THE PROJECT
	diligence and assessing compliance with the Equator Principles	
EP8: Covenants	The client will covenant in the financing documentation to comply with all relevant host country environmental and social laws, regulations and permits. For all Category A and B Projects, the client will covenant in the financial documentation: to comply with the ESMPs and EPAP (where applicable) during the construction and operation of the Project; and to provide periodic reports in a format agreed with the EPFI, at least annually or as agreed, prepared by in-house staff or third party experts, that document compliance with the ESMPs and EPAP and compliance with relevant local, state and host country environmental and social laws, regulations and permits; and to decommission the facilities, where applicable and appropriate, in accordance with an agreed decommissioning plan.	An ESAP or EPAP will be agreed between the financing parties and the company and implemented over the course of the construction and operation of the project, and audits will be carried out by an Independent Environment and Social Consultant (IESC) appointed by the project Lenders.
EP9: Independent Monitoring and Reporting	Ensure independent monitoring and reporting by an independent Environmental and Social Consultant to assess the project's compliance with the Equator Principles after financial close and during the life of the loan.	The Niger Government through the National Environmental Assessment Office will carry out periodic evaluations (every six (6) months) of the implementation of the ESMP. In addition, the IESC appointedd by the Project Lenders will conduct periodic evaluations during the tenure of their Loans.
EP10: Reporting and Transparency	• Ensure that, as a minimum, a summary of the ESIA is accessible and available online and that it includes a summary of human rights and climate change risks and impacts, where relevant	The project that has undergone an environmental and social impact assessment in accordance with the provisions of PS 1 will take all necessary steps to comply with the provisions of this principle.

PRINCIPLES	OBJECTIVES	APPLICABILITY TO THE PROJECT
	• Make public, once a year, the GHG emission levels (Type 1 and Type 2 emissions combined and, if applicable, the GHG efficiency factor 12) during the operational phase of projects emitting more than 100,000 tonnes of CO2 equivalent per year. • Make non-commercially sensitive project-specific biodiversity data available to the Global Biodiversity Information Facility (GBIF) and relevant national and global databases, in formats and under conditions that allow access to and re-use of these data in future research and decision-making	

3.2.5. International Atomic Energy Agency standards

Niger is a member state of the International Atomic Energy Agency ("IAEA") which establishes safety standards and measures for protection against ionizing radiation. The following references are applicable for strategies and protocols for the location, design, construction, operation and closure of facilities necessary to protect the workforce, the public and the environment from the impacts of radioactive waste resulting from mining and crushing of ores (including tailings, waste rock, mineralized waste rock, process water, leach solutions, precipitation, seepage from stockpiles, and uranium mill areas):

- Basic Safety Principles for the Protection of People and the Environment (IAEA, 2006);
- International Basic Standards (IAEA, 2014);
- The Safety Guide (IAEA, 2002).

In addition, the IAEA (2012) establishes the Regulations for the Safe Transport of Radioactive Material, which includes the requirement to establish a radiation protection programme for the transport of radioactive material to ensure safety and to protect persons, property and the environment from the effects of radioactivity in the transport of radioactive material.

The requirements of these documents will be implemented through site specific occupational health and safety procedures and associated monitoring of workplaces.

3.2.6. National legal framework

At the national level, the Adrar Emoles 3 Exploration Permit project falls within the framework of the national texts summarised in Table 44 below.

Table 44 National legal framework of the project

TITLE OF THE TEXT	ADOPTION DATES	AREA OF APPLICATION	CONTEXTUAL REFERENCES
Constitution of the 7ème Republic of Niger	25 November 2010	Citizens' rights and duties	Article 28: *"Everyone has the right to property. No one shall be deprived of his property except in the public interest, subject to fair and prior compensation*. Article 35: "*The State has the obligation to protect the environment in the interest of present and future generations. Everyone is obliged to contribute to the safeguarding and improvement of the environment in which he or she lives [...] The State shall ensure the assessment and control of the impact of any development project and programme on the environment*." Article 37: *"National and international companies have the obligation to respect the legislation in force in environmental matters. They are obliged to protect human health and to contribute to the safeguarding and improvement of the environment".*
Law N°61-37 regulating expropriation for public utility and temporary occupation as amended and completed by Law N°2008-037 of 10 July 2008	24 November 1961	Expropriation in the public interest	Article 1 (new): "*Expropriation is the procedure by which the State may, in the public interest and subject to fair and prior compensation, compel any person to surrender to it the ownership of real property".* According to Article 13/bis (4) (Article 2 of the amending law): *"affected persons shall be compensated at replacement cost without depreciation, prior to taking ownership of land or property".*
Law N°66-33 on dangerous, unhealthy and inconvenient establishments	24 March 1966	Dangerous, Unhealthy or Unsuitable Establishments	*This law, in its articles 1 and 2, places under the supervision of the administrative authority, workshops, factories, shops, building sites and all industrial or commercial establishments which present dangers or inconveniences, either for the safety, health or convenience of the neighbourhood, public health or for agriculture.*
Law No. 97-002 on the protection, conservation and enhancement of the national cultural heritage	30 June 1997	National cultural heritage	Article 57: "*The Ministry in charge of cultural heritage has the prerogative to assume, among others, the following functions [...] To organise the control of archaeological excavations, to ensure the*

TITLE OF THE TEXT	ADOPTION DATES	AREA OF APPLICATION	CONTEXTUAL REFERENCES
			conservation "in situ" of certain cultural property and to protect certain areas reserved for future archaeological research [...]".
Law No. 98-56 on the framework law for environmental management	29 December 1998	Environmental management	Article 31: "*Activities, projects and development programmes which, due to their size or impact on the natural and human environment, may affect the latter, are subject to prior authorisation by the Minister in charge of the environment.* *This authorisation is granted on the basis of an assessment of the consequences of the activities, project or programme updated by an environmental impact study drawn up by the promoter and approved by the ministry responsible for the environment.* Article 58, paragraph 1 and 2: *"The holders of mining or quarrying titles have the obligation, under the control of the competent administration, to restore the exploited sites.* *However, the holders of these titles may choose to pay the financial cost of the restoration operations carried out by the competent administration.*
Law n°2001-32 on the orientation of the Territorial Development Policy	31 December 2001	Spatial planning	Article 34: *"The State shall ensure that the environmental dimension is taken into account in the formulation of programmes and projects, in particular by including environmental impact studies that integrate ecological, socio-economic and cultural aspects.* *It also ensures that all development actors respect international conventions in this area.*
Law n° 2004-040 on the forestry regime in Niger	8 June 2004	Forestry regime	Article 37: "*Any clearing of a portion of forest larger than a given area, fixed by regulation, is subject to prior authorisation by the Minister in charge of forests, after consulting the local authorities concerned. It must be preceded by an environmental impact assessment carried out in accordance with the legislation in force.*

TITLE OF THE TEXT	ADOPTION DATES	AREA OF APPLICATION	CONTEXTUAL REFERENCES
Law N°2006-26 modifying Ordinance n°93-16 of 2 March 1993 on the Mining Law, completed by Ordinance n°99-48 of 5 November 1999	9 August 2006	Mining Code	Article 99 (new): "*Mining or quarrying operations are considered as commercial acts.* *They must be conducted in such a way as to ensure the rational exploitation of national resources and the protection of the environment in accordance with the laws and regulations in force.* *To this end, companies must carry out their work using proven mining industry techniques and take the necessary measures to preserve the environment, treat waste and preserve the forest heritage and water resources. [...]. "*
Law n°2012-45 on the Labour Code in the Republic of Niger	25 September 2012	Labour regulations	Article 2: *"For the purposes of this Code, a worker shall be [...]. In determining the status of worker, no account shall be taken of the legal status of the employer or of the employee. However, persons appointed to a permanent post in a public administration are not subject to the provisions of this Code.* Article 136: *"To protect the life and health of employees, the employer is required to take all useful measures that are appropriate to the operating conditions of the enterprise. In particular, he shall arrange the installations and organise the work in such a way as to protect employees as far as possible from accidents and illnesses. Where sufficient protection against the risk of accident or damage to health cannot be provided by other means, the employer shall provide and maintain such personal protective equipment and protective clothing as may reasonably be required to enable employees to perform their work safely.* *Articles 145 and 146 are also mentioned and can be taken into account in the context of employment contracts.* Article 155: *"Stress, smoking, alcoholism, drug addiction and HIV/AIDS are the emerging health risks in the world of work. Every employer shall be obliged to inform and raise the awareness of his*

TITLE OF THE TEXT	ADOPTION DATES	AREA OF APPLICATION	CONTEXTUAL REFERENCES
			workers about emerging risks and to provide psychosocial assistance." Article 156: *"Under no circumstances may an employer require a job seeker to undergo an HIV-AIDS or sickle cell test on the occasion of recruitment.*
Law No. 2014-63 prohibiting the production, import, marketing, use and storage of bags and packaging made of low-density flexible plastic	5 November 2014	Flexible low density plastic bags and packaging	Article 1: "*It is forbidden to produce, import, market, use and store, throughout the territory of the Republic of Niger, bags and packaging made of low density flexible plastic. However, for scientific, sanitary or experimental reasons, a special authorisation may be granted for the production, import, use and storage of bags and packaging made of low density flexible plastic*.
Law n°2018-28 determining the fundamental principles of Environmental Assessment in Niger	14 May 2018	Environmental assessment	Article 3: "*Policies, strategies, plans, programmes, projects or any other activities, which, due to the importance of their dimensions or their repercussions on the biophysical and human environments, may affect the latter, are subject to prior authorisation by the Minister in charge of the environment*".
Ordinance No. 93-13 establishing the Public Health Code	2 March 1993	Hygiene code	Article 4: "*Any person who produces or holds waste under conditions likely to create harmful effects on the soil, flora and fauna, to degrade the landscape, to pollute the air or water, to generate noise and odours and, in general, to harm human health and the environment, shall be required to ensure or have ensured the elimination of such waste in accordance with the provisions of this Ordinance under conditions likely to avoid the aforementioned effects [...]*. Hygiene protection for establishments is provided for in Articles 80, 81, 82, 84 and 86. Thus, it is clear from the terms of Article 80 that "every establishment must be provided with a waste disposal system". Articles 83 to 85 prohibit the mixing of industrial waste and other toxic or dangerous products with household waste.

TITLE OF THE TEXT	ADOPTION DATES	AREA OF APPLICATION	CONTEXTUAL REFERENCES
			Articles 88 and 90 state that it is forbidden to discharge waste water into the environment without prior treatment or to burn combustible waste in the open air that may cause a nuisance.
Ordinance n°2010-09 on the water code in Niger	1er April 2010	Water Code	Article 6: "*This Ordinance recognises that water is an ecological, social and economic asset, the preservation of which is of general interest and the use of which in any form whatsoever requires that everyone contribute to the efforts of the community and/or the State to ensure its conservation and protection*. Article 12: "*Those who by virtue of their activities use water resources must contribute to the financing of water management, according to their use, by virtue of the "polluter pays" principle, notwithstanding the right to water of every citizen set out in Article 4 of this Ordinance*. Article 13: "*when the activity of natural or legal persons is likely to cause or aggravate water pollution or the degradation of the aquatic environment, the promoters of this activity shall bear and/or contribute to the financing of the measures that the State and the local authorities must take against this pollution, with a view to compensating for the effects, and to ensure the conservation of water resources in accordance with the "polluter-pays" principle.*
Decree No. 76-129 /PCMS/MMH, on the implementation of Law No. 66-033 of 24 March 1966 on the ÉDII	31 July 1976	Dangerous, Unhealthy or Unsuitable Establishments	This decree specifies the application of the principles laid down by the law for all establishments that present dangers or inconveniences either for the safety, health or convenience of the neighbourhood and public health. Article 28 provides that, in application of law n°61-32 of 19 July 1961 (article 10), a tax for services rendered called "tax for the control of dangerous, unhealthy or inconvenient establishments (EDII) is instituted and is payable by the companies subject to control". [...] ".

TITLE OF THE TEXT	ADOPTION DATES	AREA OF APPLICATION	CONTEXTUAL REFERENCES
Decree N°2006-265/PRN/MME, setting out the modalities for the application of the mining law	18 August 2006	Mines	Article 57: *"Any holder of a quarry is obliged to rehabilitate the exploited sites as they progress. [...]. "* Article 60, paragraph 2: *"The holder of an authorisation to open and exploit a permanent or temporary quarry is obliged to fence off the perimeter allocated to him/her with sufficiently rigid fencing or ropes".*
Decree 2009- 229 PRN/MU/H, setting the modalities of application of the specific provisions of law n°61-37 of 24 November 1961 regulating expropriation for public utility and temporary occupation as amended and completed by law n°2008-37 of 10 July 2008, relating to involuntary displacement and resettlement of populations	12 August 2009	Expropriation in the public interest	Article 14 states that the Resettlement Plan is the design and planning of the displacement and involuntary resettlement of populations after consultation and with the participation of the populations. Accordingly, the RP includes measures to minimise the negative impacts associated with the expropriation and displacement of affected populations and maximise the benefits to them. It also sets out the content and methods of compensation considering the losses suffered by the affected people.
Decree n°2011-404/PRN/MH/E determining the nomenclature of developments, installations, works and activities subject to declaration, authorisation and concession for water use	31 August 2011	Water resource development	Article 1: *"This decree determines the nomenclature of developments, installations, works and activities subject to declaration, authorisation and water use concessions, as shown in the annex.* *Annex: "Developments, installations, works and activities subject to declaration, authorisation and concession concern all permanent or temporary water uses, in particular* - *human food;* - *agriculture and livestock;* - *aquaculture, fisheries and fish farming;* - *forestry and logging;* - *energy, industry and mining;* - *the craft industry;*

TITLE OF THE TEXT	ADOPTION DATES	AREA OF APPLICATION	CONTEXTUAL REFERENCES
			- *navigation;* - *transport and communications;* - *tourism and leisure;* - *public works and civil engineering (dams, roads, bridges, etc.)*
Decree n°2011-405/PRN/MH/E setting the modalities and procedures for declaration, authorisation and concession of water use	31 August 2011	Methods and procedures for obtaining authorisations for the construction and/or operation of hydraulic works.	Article 1: "*Developments, installations, works and activities subject to declaration or authorisation and operations subject to water use concession are those set out in Decree No. 2011-404/PRN/MH/E of 31 August 2011, determining the nomenclature of developments, installations, works and activities subject to declaration, authorisation and water use concession*."
Decree n°2012-358 /PRN /MFPT setting the minimum wages by professional category of workers governed by the interprofessional collective agreement	17 August 2012	Minimum wage	Article 1 of this decree sets the minimum wages for workers governed by the Interprofessional Collective Agreement.
Decree n°2015-321/PRN/MESU/DD determining the modalities of application of law n°2014-63 of 5 November 2014, banning the production, import, marketing, use and storage of bags and packaging made of low density flexible plastic	25 June 2015	Flexible low density plastic bags and packaging	Article 3: *"The types of flexible low density plastic bags and packaging that may be produced, imported, marketed, used or stored within the meaning of Article 1 paragraph 3 of Law No. 2014-63 of 5 November 2014 are:* - *bags and flexible plastic packaging certified as biodegradable or oxo-degradable (materials that disintegrate under the action of light, heat or another oxidant) by the competent services recognised by the State, in accordance with the standards in force;* - *medium and high density plastic bags and packaging certified as compliant by the relevant state-recognised authorities;*

TITLE OF THE TEXT	ADOPTION DATES	AREA OF APPLICATION	CONTEXTUAL REFERENCES
			- *plastic bags and packaging thicker than 15 microns for industrial use for plastic film for handling and transporting manufactured products from the producer or consumer, for agricultural use for the production, storage, packaging and transport of agricultural products and for sanitary use for the collection and transport of waste.*
Decree 2015-541/PRN/MET/PS of 15 December 2015 amending and supplementing Decree No. 65-117/PRN/MFP/T of 18 August 1965 determining the rules for the management of the scheme for the compensation and prevention of occupational accidents and diseases by the CNSSS	15 December 2015	Management of the compensation and prevention scheme for accidents at work and occupational diseases	Article 117 determines the list of diseases considered as occupational as well as the time limits for coverage by the National Social Security Fund (CNSS).
Decree n°2015-541/PRN/MET/SS/MEF amending and supplementing decree n°65-117/PRN/MFP/T of 18 August 165, determining the rules for the management of the scheme for the compensation and prevention of accidents at work and occupational diseases by the National Social Security Fund	15 December 2018	Compensation and prevention of accidents at work and occupational diseases	Article 117 (new): *"The list of diseases considered to be occupational as well as the time limits for coverage by the National Social Security Fund (CNSS) and the indicative list of the main jobs likely to cause them are set out in Annex IV to this decree*.
Decree n°2017-682/PRN/MET/PS on the regulatory part of the Labour Code	10 August 2017	Labour Regulations	Article 212: "*The employer is required to take all necessary measures to ensure the safety and protect the life and health of the workers he employs, as well as of all workers present in his undertaking. These measures include actions to prevent occupational risks, information and training, as well as the establishment of an organisation and appropriate means. He shall ensure that these measures are adapted to take account of changing circumstances and aim to improve existing situations*. Article 216: "*The general assessment of the risks to which workers are exposed must include an identification of the risks, a quantitative*

TITLE OF THE TEXT	ADOPTION DATES	AREA OF APPLICATION	CONTEXTUAL REFERENCES
			assessment and a draft of prevention measures. The prevention programme shall comprise a set of precise coherent actions, with realistic and achievable objectives, well-defined strategies and well-determined means. In order to ensure continuous and adequate prevention of health risks, the employer must update the general assessment of health risks and the programme to combat them every two (2) years.
Decree n°2018-191/PRN/ME/DD determining the modalities of application of law n°2004-040 of 8 June 2004, on the forest regime in Niger	16 March 2018	Forestry regime	*Article 2 of this decree defines the felling tax as the tax collected on the occasion of the issuance of the felling permit.* Article 113: " *The rate of the felling tax for timber or service wood with a diameter greater than 20 cm, with the exception of that of the rônier and the doum palm, is set out in Annex II of this decree.* *For planted trees, the felling tax is set by order of the Minister in charge of forests.*
Decree No. 2019-027 MESUDD on the modalities of application of Law No. 2008-28 determining the fundamental principles of Environmental Assessment in Niger	11 January 2019	Environmental Assessment	This decree determines the modalities of application of the Law n°2018-28 of 14 May 2018 determining the fundamental principles of the Environmental Assessment in Niger. It determines the environmental and social impact assessment procedure through Articles 14 to 24.
Interprofessional collective agreement	15 December 1972	Labour law	This agreement regulates relations between employers and employees as defined in paragraphs 2 and 5 of article 1er of the Labour Code in all companies operating on the territory of the Republic of Niger and falling within the following professional branches (without being exhaustive): auxiliary transport, banks, building and public works, trade, all types of industries, general mechanics, road transport.

TITLE OF THE TEXT	ADOPTION DATES	AREA OF APPLICATION	CONTEXTUAL REFERENCES
Order n°00037/MMH regulating the inspection and surveillance of dangerous, unhealthy or unsafe establishments	8 October 1979	Regulations on the inspection and monitoring of dangerous, unhealthy or unsafe establishments	This decree establishes and specifies the modalities for the inspection and monitoring of dangerous, unhealthy or inconvenient establishments (EDII). Article 3 specifies that controlled establishments must be inspected whenever necessary and at least once every six months.
Order n°0099/ME/SU/DD/SG/BEEEI/DL on the organisation and functioning of the National Environmental Assessment Office, its National Directorates and determining the powers of their managers	28 June 2019	Organisation and functioning of the NESO	Article 2: "*The National Environmental Assessment Office (BNEE) is a decision-making body whose mission is to promote and implement Environmental Assessment in Niger. It has competence at the national level, on all policies, strategies, plans, programmes, projects and all activities, for which an Environmental Assessment is compulsory or necessary, in accordance with the provisions of the law n°2018-28 of 14 May 2008, determining the founding principles of the Environmental Assessment in Niger.* Articles 9, 10 and 11 specify the powers of the Director General of the National Environmental Assessment Office and the National Directors.
Order n°00342/MSP/SG/DGSP/DHP/ES on the approval of standards of potability of water intended for human consumption in Niger.	29 March 2021	Potability of water	Article 3: *"To be considered as drinking water, the water:* - *Must not be harmful to the health of the consumer;* - *Must have acceptable organoleptic properties;* - *Must comply with current standards.* Article 6: Drinking *water must not contain any pathogenic germs transmissible to humans. It must be colourless, odourless and tasteless.* Article 7 defines the microbiological quality standards that water intended for human consumption must meet. Article 10 defines the physico-chemical quality standards.

TITLE OF THE TEXT	ADOPTION DATES	AREA OF APPLICATION	CONTEXTUAL REFERENCES
Order n°00343/MSP/SG/DGSP/DHP/ES setting the standards for waste discharge into the natural environment	30 March 2021	Waste management	*In Section I (Chapter II), the general characteristics of the discharge standards for liquid effluents are defined.* Article 5 (section II) *states: "It is forbidden to discharge into the natural environment without prior treatment as defined by the regulations, wastewater from:* - *Industrial, craft or commercial units* *Chapter IV deals with discharge standards and conditions for the disposal of solid waste.*

3.3. Institutional framework

3.3.1. Ministry of Environment and Combating Desertification

According to article 29 of decree n°2021-319/PRN of 11 May 2021, specifying the attributions of the members of the Government, the Minister of Environment and Combat against Desertification, is in charge, in relation with the other concerned Ministers, of the conception, elaboration, implementation, follow-up and evaluation of the national policy in terms of environment and combat against desertification, in accordance with the orientations defined by the Government. In this respect, it exercises, among others, the following attributions

- the definition and implementation of policies and strategies in the fields of environmental restoration and preservation, combating desertification, climate change, biodiversity, biosafety, natural resources and wetlands management;
- the definition and application of environmental and sustainable development standards;
- Validation of environmental assessment reports for development programmes and projects, issuing environmental compliance certificates, carrying out environmental and ecological monitoring, audits and environmental reviews;

To do so, and in accordance with the provisions of Decree n°2021-351/PRN/ME/LCD of 27 May 2021, on the organisation of the Ministry of the Environment and the Fight against Desertification (ME/LCD), the said Ministry has general and technical directorates and attached services, including the National Environmental Assessment Office (NEAO), a structure in charge of ensuring the respect of the national environmental assessment procedure in Niger The BNEE is created by article 24 of law n°2018-28 of 14 May 2018 determining the fundamental principles of Environmental Assessment in Niger, and according to order n°0099/MESUDD/SG/BNEE/DL of 28 June 2019 on the organisation and functioning of the BNEE, its missions include examining and framing the terms of reference of environmental assessments, analysing the admissibility and conformity of environmental assessment reports, monitoring and controlling the implementation of the environmental and social specifications to be fulfilled by promoters, etc.

Thus, as part of the implementation of the ESMP for the Adrar Emoles 3 exploration permit, the NEB will be responsible for carrying out environmental monitoring and capacity building.

In addition, within the ME/LCD, there is a General Directorate of Water and Forests (DGEF) which includes National Technical Directorates, and which ensures, among other things, that forest legislation is respected through the deconcentrated services. Consequently, the deconcentrated services (Regional and Departmental Directorates of the Environment) will have to intervene for the inventory and the determination of tree felling tax rates as well as for the supervision and monitoring-evaluation of the compensation plantations that will be carried out in the framework of the project.

Finally, within the framework of the project, the Directorate General for Sustainable Development (DGSD) will also have responsibilities, particularly with regard to the management of waste that will be generated during the entire project cycle.

3.3.2. Ministry of Employment, Labour and Social Protection

According to Article 30 of Decree No. 2021-319/PRN of 11 May 2021, specifying the powers of members of the Government, the Minister of Employment, Labour and Social Protection is responsible, in relation to the other Ministries concerned, for the design, development, implementation, monitoring and evaluation of national policies and strategies in the area of employment and social protection, in accordance with the guidelines defined by the Government. It ensures compliance with the legal provisions (legislative and regulatory) in these areas. In addition, it exercises, among others, the following attributions

- the design, development, implementation, monitoring and evaluation of social protection policy for public officials and workers;
- managing relations with professional organisations of employers and workers in the public and Para public sectors;
- contributing to the definition, implementation and management of the institutional and legal framework for the management of industrial relations, social dialogue and collective bargaining.

To this end, this Ministry has been structured into general and national technical directorates, including the Directorate General of Labour (DGT), which has within it the Directorate of Occupational Safety and Health (DSST). Thus, the latter, through the deconcentrated services and the National Social Security Fund (CNSS), will be the lead agency in the process of recruiting the labour required for the project. The deconcentrated services must also ensure the working conditions of the personnel. Finally, they must participate in the monitoring and control missions for the implementation of the ESMP to ensure compliance with health and safety aspects at work.

3.3.3. Ministry of Public Health, Population and Social Affairs

According to article 8 of decree n°2021-319/PRN of 11 May 2021, specifying the attributions of the members of the Government, "the Ministry of Public Health, Population and Social Affairs is in charge, in relation with the Ministries concerned, of the conception, elaboration, implementation, follow-up and evaluation of national policies in the field of Public Health, notably in terms of improving health coverage, prevention and the fight against endemic diseases in accordance with the orientations defined by the Government". In this respect, it has, among others, the following attributions

- the design and implementation of public health programmes and projects;
- the definition of public health and hygiene standards and criteria, as well as the control and inspection of health services throughout the country;
- developing, implementing and monitoring the application of legislation and regulations governing the public health, population and social affairs sector.

As part of the implementation of this project, the Ministry will intervene through its relevant technical services, notably the National Directorate of Public Hygiene and Health Education (DNHPES) and the Tahoua Regional Directorate of Public Health.

3.3.4. Ministry of Mines

The Minister of Mines is responsible, in relation with the other Ministers concerned, for the design, development, implementation, monitoring and evaluation of national mining policy in accordance with the guidelines defined by the Government (Article 9 of Decree No. 2021-319/PRN of 11 May 2021, specifying the powers of the members of the Government)

In this capacity, it has the following responsibilities

- the initiation of studies for the development of rational exploitation of mineral resources, including in particular the carrying out of fundamental geological studies;
- the establishment of the basic geoscientific infrastructure of the national territory in relation with the relevant research institutions;
- the control, monitoring and evaluation of mineral exploration and exploitation activities;
- the effective implementation of environmental protection and restoration guidelines in the mining sector.

In accordance with the provisions of decree n°2021-326/326/PRN/MM of 13 May 2021, this ministry is organised into a central administration, deconcentrated and decentralised services as well as public programmes and projects. Thus, within the framework of the implementation of this project, the Directorate of Mines and Quarries and the Directorate of the Mining Environment and Classified Establishments (DEMEC) will be involved in the monitoring and environmental control of the implementation of the measures provided for in the Environmental and Social Management Plan (ESMP).

3.3.5. Ministry of Water and Sanitation

According to the provisions of article 3 (point 26) of decree n°2021-289/PRN of 04 May 2021 on the organisation of the government and fixing the attributions of the Ministers of State, Ministers and Ministers Delegate, the Minister of Water and Sanitation is in charge, in relation with the other Ministers concerned, of the conception, elaboration, implementation, follow-up and evaluation of the national policy in the field of Water and Sanitation in accordance with the attributions defined by the Government.

In this capacity, it designs, develops, implements and evaluates development strategies, programmes and projects in the fields of water, sanitation and hygiene.

Through the Directorate of Water Resources, this Ministry will be involved in environmental monitoring and control in order to assess the implementation of measures within its area of competence.

3.3.6. Ministry of the Interior and Decentralisation

According to Article 5 of Decree No. 2021-319/PRN of 11 May 2021, specifying the powers of members of the Government, the Minister of the Interior and Decentralisation, in relation with the other Ministers concerned, oversees the design, development, implementation, monitoring and evaluation of national policies in the area of territorial administration, public security, decentralisation, and deconcentration in accordance with the guidelines defined by the Government. In this respect, it exercises, among others, the following attributions

In the field of territorial administration:

- the organisation and administration of administrative districts;
- the management of national borders;
- the drafting and application of regulations on the movement of persons, public freedoms and the regime of associations;
- the organisation of the traditional chieftaincy and the management of its relations with the administration.

In the area of decentralisation and deconcentration:

- the general supervision and organisation of support for local and regional authorities;
- the operationalisation of the deconcentration-decentralisation process, mainly with regard to the transfer of competences and resources to local authorities;

In customary and religious affairs:

- the organisation of the traditional chieftaincy and the management of its relations with the administration;
- the promotion of local customs and traditions;
- the supervision and control of places and the exercise of worship;

This ministry supervises local authorities. Thus, created by law n°2008-42 completed by ordinances n°2010-54 of 17 September 2010 and ordinance n°2010-76 of 9 December 2010, the communes have legal personality and financial autonomy. They are equipped with technical services for the environment, agriculture, livestock, and a communal land commission, which are responsible for environmental and land issues (waste management, reforestation actions, environmental education and communication, etc.).

To this end, in accordance with Ordinance No. 2010-76 of 9 December 2010 amending and supplementing Ordinance No. 2010-54 of 17 September 2010, on the General Code of Local Authorities, the communes:

- ensure the preservation and protection of the environment;
- ensure the sustainable management of natural resources with the effective participation of all stakeholders;
- draw up, in accordance with the development options, local action plans and schemes for the environment and the management of natural resources;
- give their opinion on all infrastructure projects;
- intervene as members of expropriation commissions.

Within the framework of this project, the municipalities concerned will be involved, with a view to playing their roles in accordance with the texts in force.

3.3.7. Niger's High Atomic Energy Authority (HANEA)

According to article 2 of decree n°2019-085/PRN of 1st February 2019 amending decree n°2013-490/PRN, on the creation, attributions, organisation and functioning of

the Nigerien High Authority for Atomic Energy, "The Nigerien High Authority for Atomic Energy has as its main missions: the supervision, coordination and promotion of all peaceful applications including electronuclear and ionising radiations in relation with all the ministries and other institutions concerned.

In this capacity, it is responsible for:

- directing and/or managing the peaceful applications of nuclear science and technology;
- initiate and/or participate in the development and implementation of policies and strategies for the peaceful application of science and technology, in accordance with national guidelines and priorities;
- initiate and/or participate in the elaboration of policies and strategies in the field of nuclear security; define and implement nuclear security plans, in accordance with national guidelines and priorities;
- initiate and/or participate in the development of national policies and strategies for the development of nuclear energy resources;
- to initiate and/or participate in the elaboration and implementation of policies and strategies for human resource development, research and capacity building in the field of peaceful applications of nuclear science and technology and ionising radiation;
- to undertake, encourage and promote research and training in the peaceful applications of nuclear science and technology and ionising radiation;
- support nuclear research or training institutes and centres;
- develop and implement policies, strategies and communication plans for the promotion of peaceful applications of nuclear science and technology, as well as nuclear safety culture;
- coordinate, direct, monitor and harmonise nuclear security activities at national level;
- To be borne by the applicant or beneficiary:
  - the analysis and radiological control of consumer products throughout the country;
  - quality control of radiodiagnostic and nuclear medicine equipment;
  - radiological environmental monitoring ;
  - dosimetric monitoring of personnel and the environment in public and private organisations using ionising radiation;
- decide on all matters referred to it by the President of the Republic, the Government or the structures concerned.

Within the framework of the implementation of the project of exploitation of the deposits of the Adrar Emoles 3 research permit, this structure will have roles to play in accordance with its missions defined above.

3.3.8. Nuclear Safety and Regulation Authority (ARSN)

Created by Law No. 2016-45 of 06 December 2016, the ARSN is competent for the

regulation and control of nuclear and radiological activities to guarantee safety, security and environmental protection against the effects of ionising radiation throughout the national territory.

The ARSN's mission is to regulate activities and practices related to the use of nuclear or radioactive substances and materials, as well as those related to ionising radiation sources.

In this capacity, it is responsible for, among other things

- to establish and publish technical standards for Radiation Protection, Safety, Security and Safeguards;
- ensuring compliance with nuclear safety and security regulations and safeguards;
- take enforcement action in the event of violations of laws and regulations or in the event of an unsafe or potentially unsafe situation at any location where licensed activities are conducted;
- inform, educate and consult the public and all other stakeholders on the regulatory process and the safety, security, health and environmental aspects of these practical activities, including incidents, accidents and abnormal events;
- cooperate with all relevant structures to develop and maintain a plan for the preparedness and conduct of emergency response involving nuclear or other radioactive materials, in accordance with the national emergency plan;
- participate in the definition of the baseline threat for the application of security measures.

In accordance with its mission to regulate and control nuclear and radiological activities throughout the country, this structure will play an important role in the implementation of the project.

3.3.9. National Environment Council for Sustainable Development

Created by decree n°96-004/PM of 9 January 1996, modified and completed by decree 2000-272/PRN/PM of 4 August 2000, the CNEDD is a deliberative body whose mission is to elaborate, implement, monitor and evaluate the implementation of the PNEDD. It is especially responsible for ensuring that the environmental dimension is considered in Niger's socio-economic development policies and programmes. It is attached to the Prime Minister's office and the Director of the Cabinet chairs it. To ensure its functions as a national coordination body, the CNEDD has an Executive Secretariat which is supported at the central level by sectoral technical commissions created by Prime Ministerial Decree and at the regional level by regional environmental councils for sustainable development.

Within the framework of this project, the CNEDD will be invited to evaluate the environmental and social impact study report to ensure that the provisions of the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity and the Convention to Combat Desertification are taken into account in countries seriously affected by drought, particularly in Africa.

3.3.10. Civil Society Organisations

The Civil Society Organisations (CSOs) that can be involved in the implementation of

this project to exploit the deposits of the Adrar Emoles 3 research permit include:

- Association Nigérienne des Professionnels en Études d'Impact Environnemental (ANPÉIE): Authorised to carry out its activities in Niger by decree n°117/MI/AT/DAPJ/SA of 29 April 1999, ANPÉIE is a non-political, non- profit organisation which aims mainly to promote the inclusion of environmental concerns in development policies, plans, strategies, programmes and projects. It intervenes in the field of training and sensitisation of the staff of design offices and projects, companies and local populations in the field of EA, monitoring and environmental follow-up of the implementation of environmental impact limitation plans in the framework of development projects.
- Groupe de Réflexion et d'Action sur les Industries Extractives: GREN is a network of Nigerien civil society organisations. It works in the field of extractive industries to promote good governance and environmental protection. It is also involved in informing and raising the awareness of stakeholders on the issue of extractive industries. Finally, it promotes and defends the rights of the sector throughout the country. Thus, GREN will have a key role to play in the framework of this project, particularly in terms of raising awareness among local populations about the issues related to its implementation.
- Réseau des Organisations pour la Transparence et l'Analyse Budgétaire (ROTAB, Publish What You Pay Niger): ROTAB is a collective of several associations, NGOs and trade unions in Niger that have decided to pool their knowledge and experience in order to actively participate in the global Publish What You Pay campaign to contribute to transparency in the extractive industry. Within the framework of the project, this network will have a watchdog role to play, particularly with regard to the transparent management of revenues generated by exploitation for the benefit of local populations.
- Association des Femmes du Secteur des Industries Extractives du Niger (AFSIEN): Created in October 2014, the main objective of this association is to promote women in the extractive industries sector while placing its actions within the framework of improving the living and working conditions of women working in the extractive industries or living on the sites of the activities concerned. In accordance with its remit, this association will play a key role in the implementation of the project.

4. ASSESSMENTS OF LIKELY CHANGES

The general approach used to identify the impacts on the environment is based on an approach structured around the three (3) phases below:

- the description of the project, which identifies the sources of impacts based on the characteristics and types of activities to be carried out during the different phases;
- the general description of the environment, which provides an understanding of the environmental and social context in which the project is to be implemented, and the consultations with stakeholders, which identify the concerns associated with the project's implementation;
- the interrelationship between the impact-causing activities and the components (biophysical and human) of the environment likely to be affected by the project activities.

4.1. Activities causing impacts

Impact-causing activities are defined as all activities planned within the framework of a project that are likely to modify positively or negatively the components of the biophysical and human environment of its insertion zone.

Thus, within the framework of the Adrar Emoles 3 Exploration Permit, the activities that are likely to cause impacts are shown in Table 45 below.

Table 45 Impact-causing activities by project phase

PROJECT PHASES	ACTIVITIES CAUSING IMPACTS
Construction preparation (Development)	Construction/development of access roads/tracks
	Site preparation for temporary equipment
	Installation of temporary infrastructure and equipment
	Borrowing and quarrying (sand, gravel, laterite, etc.)
	Movement of construction equipment and the supply of construction materials and equipment to the site
	Preparation of the rights of way for the permanent project facilities
	Construction/installation of surface works and equipment
	Underground mine construction and support services
	Maintenance of fixed and mobile equipment on site
	Fuel storage and supply
	Recruitment of labour and operation of the base camp
Operation	Recruitment and presence of the workforce on site (operation of project bases and subcontractors)
	Extraction of ore from the underground mine (drilling, blasting, transport of ore to the primary crusher, conveying to daylight through a conveyor belt)
	Truck movements for input supply

PROJECT PHASES	ACTIVITIES CAUSING IMPACTS
	Storage of inputs (chemicals including sulphur, hydrocarbon products, etc.)
	Operation of the workshops (maintenance of machinery and equipment, reconditioning of machinery, manufacture of spare parts, etc.) and the contact workshop
	Ore storage, crushing and conveying to the plant
	Ore processing at the plant
	Storage of tailings from ore processing
	Storage of effluent in ponds
	Construction of the new ponds
	Borrow pits for the site's laterite and gravel needs
	Loading and shipping of uranate
	Periodic maintenance of the plant
	Movement of project and subcontractor equipment
Closure	Dismantling of facilities
	Site clean-up
	Site redevelopment/restoration
	Movement of machinery
	Presence of the hand in the work

4.2. Impact assessment methodology

The methodology for assessing impacts is based on the parameters of the nature of the impact, its intensity, extent and duration. This allows them to be aggregated to give the significance/importance of the impacts.

Furthermore, impact assessment is inevitably a value judgment.

4.2.1. Evaluation parameters

- ✓ ***Nature***

The nature of an impact refers to the positive or negative nature of the effects of an activity on a given component of the environment, whether biophysical or human.

- ✓ ***Intensity***

The intensity of an impact expresses the relative importance of the environmental consequences of altering a component, taking into account its environmental value and the degree of disturbance (extent of structural and functional modifications). Thus, the greater the value of a component due to its special character, the greater the risk that its alteration will have a severe impact on the environment.

Intensity is therefore a major dimension of impact whose relative importance is weighted by the duration and extent of its effects.

✓ Value of an environmental component

It expresses the relative importance of an environmental component in the environmental and social context of the area concerned. Its evaluation is based, on the one hand, on the appreciation of its intrinsic value, as defined by its function, representativeness, frequency of use, diversity and rarity or uniqueness and, on the other hand, on its social value, which demonstrates its popular and political interest. The social value assesses the popular or political will to preserve the integrity or the particular character of an environmental component. It is expressed through popular appreciation or through laws and regulations.

Thus, actions to conserve or enhance the original character of a component will contribute to enhancing its environmental value.

- **Function:** This parameter assesses, from a biological point of view, the degree of usefulness or essentiality of an environmental component;
- **Representativeness**: Representativeness expresses the typical character of a component that should be protected because of its biological, social or heritage value;
- **Frequency:** This parameter determines the intensity and frequency of human use of an environmental component. It can be expressed in terms of density (variable proportion of a population) or frequency of occupation;
- **Diversity**: Diversity expresses the character of a component that has several aspects (e.g. different uses) simultaneously or successively. The diversity parameter will indicate the interest or quality of a component or environment;
- **Rarity or uniqueness:** The rarity parameter, which is a major discriminating index of the interest of an element, refers to the exceptional or extraordinary character of an environmental component;
- **Social value**: The elements that the different stakeholders, particularly the local populations and the project promoter, could be concerned about from the point of view of social value are **the creation of jobs, safety and health during the operation of the centre.**

✓ Degree of disturbance

It expresses the extent of the modifications that affect the structural and functional characteristics of an environmental component. It implies the notion of vulnerability of the affected component, which is essentially expressed in terms of the adaptive capacity (tolerance) of the communities and their biotope and the minimum functional area below which a system is unable to function adequately and thus loses its integrity. It can be low, medium or high.

- ***Low:*** when the impact only slightly modifies the quality of the component, not noticeably affecting its integrity or use;
- ***Medium:*** where the impact reduces the quality of the component somewhat, thus slightly affecting its integrity and use;
- ***High:*** when the impact results in the loss or modification of all the characteristics of the environmental component, thus strongly altering its quality and jeopardising its integrity.

The impact intensity value classes, which range from very high to low, are the products of the interaction of the environmental value of the component and its degree of disturbance. Table 46 below presents the impact intensity assessment grid.

Table 46 Impact intensity assessment grid

DEGREES OF DISTURBANCE	ENVIRONMENTAL VALUE		
	HIGH	AVERAGE	LOW
High	Strong	Average	Low
Medium	Strong	Average	Low
Low	Average	Low	Low

✓ ***Scope***

The extent of an impact corresponds to the scope or spatial extent of the effects generated by an intervention on the environment. The extent can be described as point, local or regional.

- Specific when the impact is limited to the immediate vicinity of the activity.
- Local where the impact is felt throughout the study area.
- Regional when the impact is felt outside the study area, e.g. throughout the country.

✓ ***Duration***

This is the time during which changes to a component will be felt. It is important to note that an intervention that takes place over a few weeks could have repercussions on certain components of the environment over several years. Therefore, the duration of an impact should refer to the recovery or adaptation period of the affected components. Impacts are categorized as long, medium and short term.

4.2.2. Significance of the impacts

Significance is determined by means of a summary indicator that allows an overall assessment of the impact that a component of the environment could suffer. Thus, the significance of an impact is assessed by combining the Intensity parameter, which links the environmental value of a component and its degree of disturbance, with two indicators characterising the impact itself, namely its extent and duration.

The correlation established between each of the indicators (Intensity, Extent and Duration), as presented in Table 49 below, allows the significance level of an impact to be determined.

The scale of significance of the impacts corresponds to three levels: Major, Medium and Minor.

An impact is considered major when it profoundly alters the nature and use of a highly vulnerable or very intolerant environmental component that is also highly valued. The lower the vulnerability and value of the affected component, the less significant the impact (medium and minor).

Impact significance is determined according to different possible combinations of criterion indices by applying one of two considerations:

- If the indices of two criteria have the same level of severity, the importance rating corresponding to this level is given, independently of the index given to the other criterion. For example, an impact of long duration and regional extent will have a major importance, regardless of the index of the intensity criterion.
- If, on the other hand, the indices of the three criteria are all at different levels, the importance rating is given to the median level, i.e. medium. For example, an impact of long duration, local extent and low intensity will be given a medium importance rating.

Once the significance of an impact has been determined for a given activity and environmental component, the result is entered into an impact assessment grid.

Table 47 Impact assessment grid (Fecteau, 1997)

INTENSITY	SCOPE	DURATION	ABSOLUTE SIGNIFICANCE OF THE IMPACT		
			MAJOR	AVERAGE	MINOR
Strong	Regional	Long			
		Average			
		Short			
	Local	Long			
		Average			
		Short			
	One-off	Long			
		Average			
		Short			
Average	Regional	Long			
		Average			
		Short			
	Local	Long			
		Average			
		Short			
	One-off	Long			
		Average			
		Short			
Low	Regional	Long			
		Average			
		Short			
	Local	Long			
		Average			
		Short			
	One-off	Long			
		Average			
		Short			

4.3. Interrelationship grid

In order to understand the interactions between the elements of the environment likely to be impacted and the activities causing the impacts, a matrix of interrelationships represented in Table 48 below was developed.

Table 48 Interrelationship matrix

PROJECT PHASES	ACTIVITIES CAUSING IMPACTS	COMPONENTS THAT WILL BE AFFECTED											
		BIOPHYSICAL ENVIRONMENT					HUMAN ENVIRONMENT						
		SOIL	AIR	WATER	WILDLIFE	FLORA	LANDSCAPE	SECURITY/ HEALTH	EMPLOYMENT / INCOME/ECO	SOUND AND VIBRATION	PASTORAL ACTIVITIES	USES AND CUSTOMS	HERITAGE
Development (Preparation and construction)	Construction/development of access roads/tracks	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(+)	(-)	(-)	(0)	(-)
	Site preparation for temporary equipment	(-)	(-)	(0)	(-)	(-)	(-)	(-)	(+)	(-)	(-)	(0)	(-)
	Installation of temporary infrastructure and equipment	(-)	(0)	(-)	(-)	(-)	(-)	(-)	(+)	(-)		(0)	(0)
	Borrowing and quarrying (sand, gravel, laterite, etc.)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(+)	(-)	(-)	(0)	(-)
	Movement of construction equipment and the supply of construction materials and equipment to the site	(-)	(-)	(0)	(-)	(-)	(-)	(-)	(+)	(-)	(-)	(0)	(0)
	Preparation of the rights of way for the permanent project facilities	(-)	(-)	(0)	(-)	(-)	(-)	(-)	(+)	(-)	(-)	(0)	(-)
	Construction/installation of surface works and equipment	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(+)	(-)	(0)	(0)	(0)
	Underground mine construction and support services	(-)	(-)	(-)	(0)	(0)	(0)	(-)	(+)	(0)	(0)	(0)	(0)
	Maintenance of fixed and mobile equipment on site		(0)	(-)	(0)	(0)	(0)	(-)		(0)	(0)	(0)	(0)
	Fuel storage and supply		(0)	(-)	(0)	(0)	(0)	(-)	(0)	(0)	(0)	(0)	(0)
	Recruitment of labour and operation of the base camp	(-)	(0)	(-)	(-)	(0)	(-)	(-)	(+)	(0)	(0)	(-)	(-)
Operation	Recruitment of labour and operation of project bases and subcontractors	(-)	(0)	(-)	(-)	(0)	(-)	(-)	(+)	(0)	(0)	(-)	(-)
	Extraction of ore from the underground mine (drilling, blasting, transport of ore to the primary crusher)	(-)	(-)	(-)	(0)	(0)	(0)	(-)	(+)	(-)	(0)	(0)	(0)

PROJECT PHASES	ACTIVITIES CAUSING IMPACTS	COMPONENTS THAT WILL BE AFFECTED											
		BIOPHYSICAL ENVIRONMENT					HUMAN ENVIRONMENT						
		SOIL	AIR	WATER	WILDLIFE	FLORA	LANDSCAPE	SECURITY/ HEALTH	EMPLOYMENT / INCOME/ECO	SOUND AND VIBRATION	PASTORAL ACTIVITIES	USES AND CUSTOMS	HERITAGE
	Truck movements for input supply	(-)	(-)	(-)	(-)	(-)	(0)	(-)	(+)	(-)	(-)	(0)	(0)
	Storage of inputs (chemicals including sulphur, hydrocarbon products, etc.)	(-)	(-)	(-)	(0)	(0)	(-)	(-)	(0)	(0)	(0)	(0)	(0)
	Operation of the workshops (maintenance of machinery and equipment, reconditioning of machinery, manufacture of spare parts, etc.) and the contact workshop	(-)	(-)	(-)	(0)	(0)	(-)	(-)	(+)	(-)	(0)	(0)	(0)
	Ore storage, crushing and conveying to the plant	(-)	(-)	(-)	(0)	(0)	(-)	(-)	(0)	(0)	(-)	(0)	(0)
	Ore processing at the plant	(-)	(-)	(-)	(0)	(-)	(0)	(-)	(+)	(-)	(-)	(0)	(0)
	Storage of tailings from ore processing	(-)	(-)	(-)	(-)	(0)	(-)	(-)	(0)	(0)	(-)	(0)	(0)
	Storage of effluent in ponds		(0)	(-)	(-)	(0)	(-)	(-)	(0)	(0)	(-)	(0)	(0)
	Construction of the new pools		(0)	(0)	(-)	(-)	(-)	(-)	(0)	(0)	(-)	(0)	(-)
	Borrowing for the site's laterite and gravel needs		(0)	(0)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(0)	
	Loading and shipping of uranate	(-)	(-)	(-)	(0)	(0)	(-)	(-)	(+)	(-)	(0)	(0)	(0)
	Periodic maintenance of the plant	(-)	(0)	(-)	(0)	(0)	(-)	(-)	(+)	(+)	(0)	(0)	(0)
	Movement of project and subcontractor equipment	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(0)	(-)	(-)	(0)	(-)
Closure	Dismantling of facilities	(-)	(-)	(-)	(0)	(0)	(+)	(-)	(-)	(-)	(+)	(0)	(0)
	Site clean-up	(+)	(0)	(0)	(0)	(0)	(0)	(-)	(0)	(-)		(0)	(0)
	Site redevelopment/restoration	(+)	(-)	(-)	(+)	(+)	(+)	(-)	(-)	(-)	(+)	(0)	(0)
	Movement of machinery	(-)	(-)	(-)	(-)	(0)	(0)	(-)	(0)	(-)	(0)	(0)	(0)

(-) Low interactions
(+) High interactions
(0) Minor interactions

4.4. Mitigation of impacts

This initial assessment of impacts illustrates the worst-case scenario should impacts not be mitigated. Throughout the development and design of the project, opportunities to apply the mitigation hierarchy have been explored. This means that as far as possible, impacts have been anticipated and avoided, minimised or reduced. The impacts remaining when these principles have been applied are the residual impacts, and these are managed, compensated or offset. Alternatives are considered in Chapter 5 of this document, and Mitigation measures in Chapter 6. Residual impacts are also considered in Chapter 6 and an illustration provided of how the impact ratings have been reduced.

4.5. Analysis and assessment of risks and impacts of the project

4.5.1. Impacts during the preparation and construction phase

4.5.1.1. On the biophysical environment

- ✓ *On the soil*

The Adrar Emoles 3 Exploration Permit Project will have negative impacts on the soil during the preparation/construction phase (development phase). These impacts are the disruption of its structure at the sites concerned, the modification of the topography, the risks of exposure to wind and water erosion and its pollution/contamination by the solid and liquid waste that will be generated.

Disturbance of the soil structure and modification of the topography of the land will be associated with the construction/development of access roads/tracks, site preparation (stripping or removal of overburden) for the construction of temporary facilities, the exploitation of borrow pits and quarries (sand, gravel, laterite, etc.), the preparation of the rights-of-way for the permanent project facilities, etc.

In addition, the movement of machinery (vehicles, trucks, etc.) for the transport of labour and the supply of materials and equipment to the site will cause the soil to settle and consequently modify its structure. This will further expose it to the risks of water and wind erosion.

This impact will be of medium intensity, limited in extent to the project footprint and short in duration. It will therefore be of minor overall significance.

The risks of soil contamination during this phase will be related to the solid and liquid wastes that will be generated during the above-mentioned activities, to which must be added the installation of infrastructure and equipment, the construction/installation of surface structures and equipment, the construction of the mine, the maintenance of mobile and fixed site machinery, etc.

Thus, the solid and liquid waste that will be generated includes used oil from the emptying of mobile and fixed machinery (trucks, vehicles, excavators, generators, etc.), used oil or diesel filters, waste soiled with hydrocarbons, oily wastewater, plastics, ferrous metal scraps, paint, glue and varnish residues, mechanical soot, various packaging, etc.

In addition, the workforce that will be mobilised for the work will generate various types of waste (empty mineral water bottles, cans, plastics, food packaging, food scraps, waste water, etc.) that may pollute the soil on the site.

Finally, the storage of hydrocarbons and oils, their possible leakage from fixed and mobile machinery and their accidental spillage can also constitute potential sources of soil pollution/contamination.

In conclusion, the unmitigated impact of the project on the soil in terms of pollution/contamination will be of medium intensity, local extent and short duration. Its overall significance will therefore be medium.

- ✓ *On the air*

During the preparation and construction phase, the project will result in changes to the ambient air quality. This will result from dust generated during construction/access road/track development, site preparation (stripping or removal of overburden) for the construction of temporary facilities, quarrying (sand, gravel, laterite, etc.), preparation of permanent project facility rights-of-way, and construction/installation of surface structures and equipment.

In addition, the movement/circulation of machinery to transport labour and to supply the site with materials, equipment, etc., will generate dust and exhaust gases (combustion gases) that may contain carbon monoxide (CO), sulphur monoxide (SO), nitrogen monoxide (NOx) and hydrocarbon vapours, which will contribute to the modification of the ambient air quality. Finally, the operation of the generators during the works will be a source of polluting emissions that will alter the quality of the ambient air.

The unmitigated impact of the project on the air will be of medium intensitý, local extent and short duration. It will therefore be of medium overall significance.

- ✓ *On the water*

The project will have potential negative impacts on resources during the preparation and construction phase. These impacts include water consumption which could affect the available potential, modification of the natural drainage system and the risk of contamination/pollution from solid and liquid waste that will be generated.

Thus, in relation to water consumption, the main source activities are the construction/development of access roads/tracks which will require watering, consumption by staff in the operation of the base camp, civil works for the construction/installation of surface structures and equipment (workshop platforms, administrative and technical buildings, etc.), construction of the underground mine and downhole support services, etc.

The modification of the natural water drainage system will be linked to the construction of access tracks and the opening and operation of quarries and borrow pits.

Finally, the contamination/pollution of water during this phase will be associated with the solid and liquid wastes that will be generated during the activities, the maintenance of the fixed and mobile machines of the construction site and by the operation of the life base. Also, the storage of hydrocarbons and oils, their accidental spills and their leaks from the machines will generate water pollution by the phenomenon of runoff or infiltration.

Overall, the impact of the project on water resources will be medium in intensity, local in extent and short in duration. Its overall significance will therefore be medium.

- ✓ *On wildlife*

The potential negative impacts of the project on wildlife are the destruction of habitats,

noise disturbance, vehicle movements and the risk of poaching.

The activities that result in the destruction of soil and vegetation habitats are the construction/development of access roads/tracks, the preparation of sites (stripping or removal of overburden) for the construction of temporary facilities, the installation of temporary infrastructure and equipment that will contribute to the construction of the project (living quarters for the staff of construction companies, equipment base, etc.), the exploitation of borrow pits and quarries (sand, gravel, laterite, etc.), the preparation of the right-of-way for the permanent project facilities and the construction/installation of surface works and equipment, in particular the construction of the road network.), the exploitation of borrow pits and quarries (sand, gravel, laterite, etc.), the preparation of the right-of-way for the permanent project installations and the construction/installation of surface works and equipment, particularly civil engineering works.

Disturbance to fauna will be linked to the presence of the construction site in general, to the exploitation of the borrow pits and quarries and to the movements of machinery (vehicles, trucks) in the construction zone. This could lead to their migration to quieter habitats. There is also a risk of poaching due to the presence of personnel on the work sites.

This negative impact will be of medium intensity, punctual extent and medium duration. Its overall significance will therefore be medium.

- ✓ *On flora*

The potential negative impacts of the project on flora during this phase are the clearance/disturbance of vegetation for works to take place and the disruption of photosynthesis due to dust.

Thus, the activities that will destroy vegetation are the construction/development of access roads/tracks, the preparation of sites (stripping or removal of overburden) for the construction of temporary facilities, the installation of temporary infrastructure and equipment, the exploitation of borrow pits and quarries (sand, gravel, laterite, etc.), the preparation of the right-of-way for the permanent project facilities, and the construction/installation of surface structures and equipment. Finally, the movement of construction machinery and the supply of construction materials and equipment to the site will result in the destruction of vegetation.

The disturbance of plant photosynthesis will be associated with the dust that will be generated during the above-mentioned works and with the exhaust fumes of the fixed and mobile construction machinery.

This potential negative impact of the project on flora will be of high intensity, punctual extent and medium duration. Its overall significance will therefore be medium.

4.5.1.2. On the human environment

- ✓ *On the landscape*

On the landscape, the project will result in the modification of its visual quality. The main source activities are the construction/development of access roads/tracks, the preparation of sites for temporary infrastructure and equipment and their installation, the exploitation of borrow pits and quarries (sand, gravel, laterite, etc.), the movement of construction machinery and the supply of construction materials and equipment to the site, the preparation of the rights-of-way for the permanent project installations and

the construction/installation of surface structures and equipment.

The transitory storage of waste (construction waste and waste from the operation of the base camp) prior to disposal and poor organisation of the construction site can also affect the visual quality of the landscape.

This negative impact will be of medium intensitý, punctual in extent and of short duration. Its overall importance will therefore be minor

- ✓ *On safety and health*

The potential risks and negative impacts of the Adrar Emoles 3 Exploration Permit on the safety and health of workers and surrounding populations are: risks of accidents and physical injuries, respiratory diseases, sexually transmitted diseases, biological contamination, exposure to hot environments, risks of fire or explosion, risks of illnesses linked to changes in the sound environment, low back pain, risks of tension/conflict between local populations and workers, etc.

With regard to the risks of accidents and injuries, they will be associated with the following activities that will be carried out: the construction/development of access roads/tracks, the preparation of sites (stripping or removal of overburden) for the construction of temporary equipment, the installation of temporary infrastructure and equipment that will contribute to the construction of the project (living quarters for the personnel of the construction companies, equipment base, etc.), the exploitation of borrow pits and quarries (sand, gravel, laterite, etc.), the movement of construction machinery and the supply of construction materials and equipment to the site, the preparation of the right-of-way for the construction of the project, and the construction of the site.), the exploitation of borrow pits and quarries (sand, gravel, laterite, etc.), the movement of construction machinery and the supply of construction materials and equipment to the site, the preparation of the right-of-way for the project's permanent installations, the construction of the underground mine and underground support services, and the maintenance of the site's fixed and mobile machinery. Finally, the construction/installation of surface works and equipment are sources of accidents and injuries, particularly in the ore processing plant component which requires work at height. Finally, related activities such as welding, grinding, etc. that will be carried out as part of the installation of equipment will be a source of injury risks.

The risks of respiratory diseases will be linked to the modification of the ambient air quality by the dust that will be generated during the works. In addition, the exhaust gases (combustion gases) from the fixed and mobile machinery, which may contain carbon monoxide (CO), carbon dioxide (CO2), nitrogen oxides (NOx), sulphur oxides (SOx), etc., will contribute to the modification of air quality and consequently be a source of respiratory diseases, particularly for the workers. Depending on weather conditions such as winds, people in the surrounding villages may also be exposed. Also, fine particles from cement during civil works can cause respiratory diseases.

Sexually transmitted diseases such as STIs/HIV/AIDS could be encouraged by mixing with the local population, especially as the activities to be implemented may generate an influx of labour from various backgrounds. However, the workers will largely be drawn from the surrounding villages and towns and bussed in daily or on shift rotations and be housed at the mine camp.

The risks of biological contamination for workers will be associated with the non-respect of hygiene conditions in the use of common areas such as restaurants and toilets at the living bases. There is also a risk of COVID-19 contamination, especially

in the event of non-compliance with barrier measures.

The risks of exposure to thermal environments (cold or heat) will depend on the period or season during which the construction of the project takes place.

Explosion and fire risks will be associated with the storage and handling of hydrocarbons.

Noise generated on the construction site can have a health impact on workers. These include auditory effects (hearing fatigue, hearing loss), "extra-auditory" effects (sleep disturbance, stress, increased heart rate, increased blood pressure) which may, in the long term, lead to illness, depression, chronic fatigue, etc.

Low back pain in the context of the work will be linked to postural constraints, particularly for work that requires high demands on the limbs.

Finally, if local communities feel that they are being treated unfairly or insufficiently, especially in the recruitment of labour, this can lead to tensions and conflicts between them and project workers.

The unmitigated impact of the project on the safety and health of workers and surrounding populations will be of high intensitý, local in extent and short in duration. Its overall significance will therefore be medium.

- ✓ *On jobs/income and the economy*

During the preparation and construction phase, the project will have positive impacts on employment and income in the area. For example, during the works, a large skilled and unskilled workforce will be recruited. During this recruitment, priority will be given to local people. This will be a real opportunity for the young people of the localities concerned, particularly in terms of reducing unemployment and improving their income.

This phase will also have positive impacts on the local market with the purchase of locally available goods and services. This constitutes a real business opportunity for businesses and providers. Through the latter, several jobs will be created and will contribute to the improvement of incomes.

As part of the implementation of the project activities, subcontracting with local companies will be encouraged. This will contribute to the creation of indirect jobs and the improvement of the incomes of the people concerned as well as the turnover of these companies.

Furthermore, the exploitation of borrow pits and quarries will improve the tax revenues of the communes concerned and of the national treasury through the payment of the extraction tax and the surface royalty respectively, in accordance with the texts in force on the subject.

The positive impact of the project on employment and income will be of high intensity, regional scope and medium duration. It will therefore be of major positive overall importance.

- ✓ *On noise and vibration*

The impact of the project on the noise environment during the preparation and construction phase will concern their modification, which will constitute a nuisance for the workers and the populations surrounding the sites. This modification will be associated with the noise that will be generated during the works

(construction/development of access roads/tracks, preparation of sites for temporary and permanent infrastructures and equipment, exploitation of borrow pits and quarries (sand, gravel, laterite, etc.), installation works of infrastructures and equipment as well as by the movements of machinery.

This unmitigated impact will be of medium intensitý, arising from point sources and line sources and short in duration. It will therefore be of medium overall significance.

- ✓ *On pastoral activities*

The implementation of the project will have potential negative impacts on pastoral activities in the area. These impacts will firstly concern the limitation of access to forage resources within the 2ha fenced area inside the buffer zone. In addition, the activities that will be implemented during this phase as well as the movement of machinery will result in the destruction and reduction of forage potential.

In addition, soil contamination from the solid and liquid waste that will be generated or from oil or hydrocarbon leaks from machinery and their accidental spills will have potential direct negative impacts on the forage, which is its contamination.

The unmitigated impact of the project on pastoral activities will be of medium intensity, punctual extent and long duration. It will therefore be of medium overall significance.

- ✓ *On traditions and customs*

During the preparation and construction phase, the project will require the mobilisation of a large number of specialised and non-specialised local and foreign workers. Thus, the presence of the latter on the construction sites will favour interactions with the local populations. This will constitute a source of potential risks of degradation of local traditions and customs.

However, the impact of the project on customs and practices will be low in intensity, one-off and of short duration. It will therefore be of minor overall significance.

- ✓ *On cultural and archaeological heritage*

During the course of the study, sites of cultural and archaeological significance were identified in the project area. However, none of these sites are located within the mining permit.

However, there is a risk of total or partial destruction or degradation of these sites during the works, particularly due to the movements of machinery. Also, given the particularity of the area, it is possible that there will be chance discoveries during the various activities that will be carried out as part of the project development. This could pose the risk of workers collecting valuables in the event of such discoveries, in defiance of the legal provisions in force in this area.

The impact of the project on this component will be of low intensity, punctual extent and medium duration. It will therefore be of minor overall significance.

4.5.2. Impacts on the operational phase

4.5.2.1. On the biophysical environment

- ✓ *On the soil*

The implementation of the project will result in potential negative impacts on the soil, which are the modification of its structure and its pollution/contamination (modification

of its quality).

The modification/degradation of the soil structure will be associated with the construction of ponds during operation (effluent ponds, storm water ponds, etc.), machinery movements, etc. This structural modification of the soil will expose it more to wind and water erosion.

Concerning the risks of soil contamination/pollution, it will be associated with use of processing chemicals, fuels and lubricants and the solid and liquid waste that will be generated during the project activities, in particular: the operation of the base camp, the extraction of the ore, the operation of the workshops (maintenance of the machinery and equipment, reconditioning of the machinery, manufacture of spare parts, etc.), the processing of the ore (operation of the plant), the periodic maintenance of the plant, etc. Furthermore, inadequate storage of inputs (chemicals including sulphur, hydrocarbon products, etc.) used in the operation of the project could be a source of soil contamination. Finally, accidental hydrocarbon spills and other emissions of toxic pollutants, storage of effluents, production juices, ore processing residues may lead to soil pollution/contamination.

The deposition of dust from ore crushing, movement of machinery, tailings storage facilities, etc. may constitute a potential source of radiological pollution/contamination of the soil. Finally, the storage of effluents, production juices and processing residues can lead to soil pollution/contamination.

This unmitigated negative impact will be of average intensity, local extent and long duration. It will therefore be of medium overall significance.

- ✓ *On air quality*

The potential negative impact of the Adrar Emoles 3 Exploration Permit on the air will be the modification of its quality at the site and even beyond depending on the ambient meteorological conditions. This modification will be associated with the different types of pollutants generated during the activities associated with the extraction, transport and processing of ore. Thus, it will be associated with mobile, fixed and fugitive sources.

Mobile sources include machinery used in ore extraction operations, transport of ore to the crushing plant, cars transporting company and contractor staff to the mine site, trucks supplying the site with raw materials and those shipping the finished product, etc. The level of pollutant emissions from these sources depends on the fuel and operating condition of the equipment. They may include carbon dioxide, carbon monoxide, methane, nitrous oxide, sulphur dioxide, volatile organic compounds, etc. Mobile sources include power generation facilities, the contact workshop for the production of sulphuric acid, etc. To these must be added fugitive emissions whose sources include: ore storage and handling, storage of certain inputs such as sulphur, crushing, ore processing, storage of tailings from ore processing, etc.

This unmitigated impact will be of medium intensity, local extent and long duration. It will therefore be of medium significance.

- ✓ *On the water*

During the operational phase, the project will have potential negative impacts on water resources. These will include the lowering of groundwater levels associated with the continuous pumping (dewatering) of groundwater from the drifts to facilitate ore extraction. If dewatering occurs in aquifers that are exploited by local people through

boreholes or wells, it could lead to depletion of these waterworks. Water management at the site could therefore have a significant influence on the local hydrological and hydrogeological regimes of the site. In addition, the use of water for industrial purposes (ore processing, dust suppression, etc.) and for domestic purposes, particularly for the needs of the base camp (drinking water, showers, toilets, etc.), may lead to a lowering of the levels of the exploited water tables.

Finally, the presence of the mine may lead to an influx of people into the area in search of possible employment. This sudden increase in population may also lead to an increase in water consumption and thus pressure on the resource.

This unmitigated impact will be of medium intensity, local extent and long duration. It will therefore be of medium significance.

Water pollution/contamination will be caused by the reagents used in the ore processing chain. In addition, the presence of the effluent ponds are the main sources of radiological or chemical water pollution/contamination. In addition, acid rock drainage (ARD) (caused by oxidation of sulphide minerals including FeS2 pyrites and chalcopyrites) with a high potential for contamination constitutes a risk of groundwater contamination in the context of this project. These risks of acidic drainage may o occur in waste rock these storage areas.

Another potential source of water pollution/contamination during the operation of the project might be the discharge of untreated wastewater from the base camp into the environment. The latter may infiltrate and alter the quality of groundwater in the vicinity of drinking water wells.

This impact will be of average intensity, local extent and long duration. It will therefore be of medium significance.

- ✓ *On wildlife*

The operation phase of the project will have negative impacts on wildlife. These include the destruction of fauna habitats (soil and vegetation), disturbance and risks of poaching, risks of falling into the ponds and mortality.

The activities that cause the destruction of fauna and its habitats are: the construction of new ponds as the ore is extracted (effluent ponds, storm water ponds, etc.) and the use of borrow pits for maintenance work on the ponds, the construction of dams, the movement of machinery, etc.

The disturbance of wildlife will be associated with the noise that will be generated by the operation of the installations, the movements of the project machinery and subcontractors, etc. This noise is likely to cause animals to flee to quieter remote areas. The risk of poaching will be linked to the presence of personnel on the site and potential project induced migration to local villages. Finally, there are also risks of falls, intoxication and wildlife mortality due to the presence of ponds and other sunken storage areas.

Overall, certain groups of animals such as birds, small mammals (hares, rats) and reptiles could be considered as populations at higher risk of exposure to potential negative impacts of the project in the area.

This impact will be of medium intensity, punctual in extent and of long duration. It will therefore be of medium overall significance.

- ✓ *On flora*

During the operational phase, the project will have potential negative impacts on flora. These include the destruction of vegetation cover and the disruption of photosynthesis.

The destruction of the plant cover will be linked to the construction of new ponds as the project is operated (effluent ponds, storm water ponds, etc.) and to the operation of the borrow pits. The disruption of photosynthesis will be caused by polluting emissions from the project activities, including the movements of machinery and dust generation. These emissions will be deposited on the leaves of the plants and will disrupt the photosynthesis process.

The impact of the project on flora will be of medium intensity, local extent and long duration. It will therefore be of medium overall significance.

In terms of PS6, it is unlikely that Critical Habitat will be triggered by the five species of conservation concern which have been observed in the local area. Habitat mapping is likely to demonstrate the presence of Natural Habitat, which means that the project will demonstrate No Net Loss of biodiversity it it's progressive restoration plans and closure plan.

4.5.2.2. On the human environment

- ✓ *On the landscape*

The potential negative impact of the project on the landscape during this phase will be the degradation of its quality by the presence of surface infrastructure in a previously unoccupied environment, the presence of large equipment and vehicles, the deposition of tailings and waste rock from ore processing, the presence and construction of new ponds as mining proceeds (effluent ponds, storm water ponds, etc.), the exploitation of borrow pits etc. Facilities may be illuminated at night to permit safe vehicle movements and operation of the plant.

Finally, the temporary storage of solid waste (wood, rubber, scrap metal, glassware, plastics, etc.) in bunkers will disturb the visual quality of the landscape.

This impact will be of medium intensity, local extent and long duration. It will therefore be of medium overall significance.

- ✓ *On safety and health*

The potential negative impacts of the project on the safety and health of workers and the surrounding population are the risk of accidents and injuries, the risk of respiratory diseases, radiological contamination, the risk of poisoning, the risk of biological contamination, the risk of drowning, the risk of spreading sexually transmitted diseases, back pain, etc.

Indeed, mining projects are potential sources of several types of accident, both for workers and for neighbouring populations. For example, accidents related to: the movement of heavy machinery, explosives, the handling of machinery and the flammability of products, fire or explosion of pressurised equipment, explosions or burns during chemical reactions, falls from heights, electrocutions, asphyxiation, etc., could be feared.

Risks of respiratory diseases will be related to changes in air quality as a result of pollutant emissions (dust, gases, etc.). The main sources of emissions (gas, smoke, dust) which are likely to affect the quality of the ambient air are generally related to stacks, ore conveying, tailings deposition, movements of mining machinery, etc.

Heavy metals and toxic substances contained in the emissions (fluorine, cadmium, lead, silica and radioactive minerals such as uranium and its derivatives) will alter the air quality potentially resulting in respiratory diseases.

The risks of radiological contamination and its consequences are linked to exposure to radon in the mine (at the bottom) and to dust which may contain radioactive elements. Also, the contamination of soil and water by radioactive elements has an impact on the health safety of workers and people living near the site.

Concerning poisoning, it could be linked to gas leaks during the operation of the installations (e.g. H2S during the manufacture of sulphuric acid in the contact workshop) or other emissions linked to the use of toxic chemicals.

The risks of biological contamination and drowning will be linked respectively to the use of common areas (toilets, restaurants, etc.) and to the presence of the various ponds (effluent ponds, production juice ponds, hot water ponds, etc.). In addition to biological contamination, there are risks of COVID-19 contamination linked to the

The risks of the spread of sexually transmitted diseases will be linked to the potential influx of labour in search of work, which will give rise to interactions with local populations, the development of indirect activities, etc.

Finally, the risks of hearing impairment with loss of hearing in workers, linked in particular to the modification of the sound environment in the context of the project activities, should be noted. Finally, the risks of low back pain will be associated with poor posture, work involving high demands on the limbs, etc.

The unmitigated impact of the project on the safety and health of workers and surrounding populations will be medium intensity, local in scope and long lasting. It will therefore be of medium significance.

- ✓ *On employment/income and the economy*

The operation of the project will have significant positive impacts on employment, income and the economy at local, regional and national level.

With regard to employment and income, this implementation phase will require the mobilisation of a large skilled and unskilled labour force. In the context of this recruitment (especially for unskilled labour), priority will be given to local populations in order to allow them to benefit from certain advantages linked to the presence of the project in the area. This will therefore create jobs, reduce unemployment and improve the income and living conditions of the people concerned. The income generated and injected into the local circuit will provide a positive dynamic in terms of improving the income and well-being of the whole community, especially as it can indirectly promote the development of other small commercial activities.

Within the framework of the project activities, subcontracting with local companies and businesses will create jobs with positive effects on income, living conditions and well-being.

Furthermore, the purchase of locally available goods and services will contribute to the increased success of local businesses.

Also, in view of the enthusiasm shown by some local communities for market gardening activities, this phase of the project could trigger the development of this activity by supporting producers and purchasing their produce.

Concerning the economy in general, the exploitation phase of the project will be

characterised by significant positive impacts at the local, regional and national level through the payment of various taxes and royalties in accordance with the provisions of the texts in force. Indeed, the State, through law n°2006-26 of 9 August 2006 on the mining code, has taken measures to support local development for the benefit of the communities concerned. This law stipulates that: "*mining revenues made up of mining royalties, surface royalties, fixed fees, the product of the artisanal exploitation tax and the product of the sale of mining artisanal cards, less the rebates granted to agents of the Ministry of Mines, are distributed as follows: 84% for the national budget; 16% for the budget of the communes of the region concerned for the financing of local development".*

Finally, during the operational phase, there could be a development of small-scale trade in favour of the local economy.

The project's impact on employment/income and the economy will be high intensity, regional in scope and long lasting. Its overall significance will therefore be major.

- ✓ *On noise and vibration*

The potential negative impacts of the project during the operational phase will be the modification of the noise environment and vibrations. The main sources of noise are the extraction of ore associated with the movement of machinery (heavy and light), the operation of installations such as crushers, compressors, the ventilation system, the workshops, etc.

During the day, the operation of the installations will also be a source of noise that may affect the sound environment. These include the plant (crushers, mills, compressors, fans, etc.) and its associated facilities such as the workshops, garage, contact for the production of sulphuric acid, emergency generators in case of use, etc.

Finally, the movement of machinery (trucks, vehicles, shovels) for the transport of personnel and the supply of inputs and shipment of uranate will alter the noise environment. This will be a nuisance for workers and the surrounding population.

The unmitigated impact of the project on the noise environment will be of medium intensity, local extent and long duration. It will therefore be of medium overall significance.

- ✓ *On pastoral activities*

The exploitation phase of the project is likely to generate negative impacts on pastoral activities in the area. Indeed, livestock farming may be impacted through the occupation of space by the infrastructures that will be built, the destruction of forage potential by the movements of machinery, the accidental discharge of effluents into the environment that may contaminate the pasture, the risks of contamination/intoxication of animals, falling into effluent basins, traffic accidents involving machinery and vehicles that may impact the animals, etc. However, no significant additional areas will be added during operations as the facilities will be built, areas cleared, and fences installed during the construction phase. Therefore, limited additional impacts will occur during operations.

This unmitigated impact will be of low intensity, local extent and long duration. It will therefore be of medium significance.

- ✓ *On local traditions and customs*

The project may have potential negative impacts on the traditions and customs of local

people.

Indeed, the development of a mining project of this scale may be accompanied by induced migration of people from different backgrounds (search for jobs, associated commercial activities). Thus, people with totally different cultural diversities, beliefs, traditions, traditions and customs may find themselves living together with strong interactions with the local populations. This may result in the modification of the practices and traditions of the local populations.

This unmitigated impact will be of medium intensity, local extent and long duration. It will therefore be of medium significance.

- ✓ *On cultural and archaeological heritage*

The potential negative impacts of the project on cultural and archaeological heritage during this phase will be the risk of degradation or destruction of the said heritage as a result of the movement of machinery in the area and the collection of objects in the event of accidental discovery. However, it is unlikely that additional operational areas will be disturbed following the construction phase.

This unmitigated impact will be of low intensity, local extent and long duration. It will therefore be of medium overall significance.

4.5.3. Impacts during the closure phase

4.5.3.1. On the biophysical environment

- ✓ *On the soil*

During the closure phase, the Adrar Emoles 3 exploration permit project will have both negative and positive impacts on the land.

The negative impacts will concern the modification of its structure by the dismantling activities of the installations and the movements of the machines and its pollution by the solid and liquid waste that will be generated, including by the workers on the site. In addition, oil and hydrocarbon leaks from the machinery or accidental spills from the latter will be a source of soil contamination. Finally, the deposit of certain equipment or materials from the dismantling process may lead to radiological contamination of the soil.

This unmitigated impact will be of low intensity, one-off extent and short duration. It will therefore be of minor overall significance.

However, this phase will also have positive impacts on the soil, especially since after the dismantling works, the clean-up and redevelopment/reclamation of the sites will allow the soil to be stabilised.

This positive impact will be of high intensity, one-off extent and long duration. It will therefore be of major overall significance.

- ✓ *On the air*

During the closure phase, the project will result in changes to the ambient air quality. The main sources of this change will be dust and particles of various sizes as well as combustion gases, in particular nitrogen oxides, sulphur dioxide, carbon monoxide and volatile organic compounds. These pollutants will be emitted during the dismantling of infrastructure, the movement of mobile machinery, the operation of fixed machinery

and site rehabilitation work.

This negative impact will be of medium intensity, local extent and duration. It will therefore be of medium overall significance.

Once the closure activities are completed and the closure plan implemented, the sources of dust, particles and gases will be eliminated, so that impacts will no longer be evidenced.

This positive impact will be of medium intensity, local extent and long duration. It will therefore be of medium significance.

- ✓ *On the water*

During the closure phase, the dismantling of infrastructure and site rehabilitation activities will present a risk of water contamination. Indeed, accidental spills and/or leaks of hydrocarbon products from fixed and mobile machinery will be the main sources of this contamination. Also, inappropriate management of solid and liquid waste generated during the works will lead to water pollution.

In addition, as in the operational phase, water resources could be exposed to the release of radionuclides and other heavy metals in the waste rock and tailings disposal areas. However, testing indicates tailings and waste rock are non-acid generating and have low potential for leaching. Thus, after the cessation of operations, the quality of water resources is unlikely to deteriorate due to the risk of increased levels of radionuclides and metals through percolation of meteoric water and infiltration into the water table.

The unmitigated impact of the project on water during this phase will therefore be negative, medium in intensity, local in extent and short in duration. It is therefore of medium overall significance.

- ✓ *On the fauna*

During the dismantling of project infrastructure, the movement of machinery and the presence of personnel could constitute sources of disturbance for fauna during the works.

This impact will be negative, of low intensity, punctual extent and short duration. It will therefore be of minor overall significance.

Following site closure, the redevelopment/restoration of the sites will allow the stabilisation of the soil and the reconstitution of the vegetation cover which represent the habitats of the fauna and will consequently favour its return to the area.

The impact will be positive, medium in intensity, local in extent and long in duration. The relative importance of the impact will therefore be medium.

- ✓ *On flora*

The closure phase of the project will have significant positive impacts on flora. Indeed, the work related to the closure of the mine aims at the final restoration of the site. To this end, the infrastructures will be dismantled, freeing up spaces that will be redeveloped/restored. This will encourage the return of vegetation.

This impact will be positive, of high intensity, local extent and long duration. It will therefore be of major overall significance.

4.5.3.2. On the human environment

✓ *On the landscape*

The implementation of the Adrar Emoles 3 exploration permit project will lead to a change in the visual quality of the landscape in the permit area.

The closure phase, which will be characterised by the dismantling of the infrastructures put in place, will have positive impacts on this component. Indeed, the redevelopment/reclamation and site restoration work that will be carried out will allow the partial restoration of the initial (pre-project) visual quality of the landscape.

This positive impact will be of low intensity, local extent and long duration. It will therefore be of medium significance.

✓ *On safety and health*

During the closure phase, the project may have negative impacts on the safety and health of workers. These impacts are risks of accidents and injuries, risks of respiratory diseases, risks of radiological and biological contamination.

The activities that lead to accidents and injuries are the dismantling of facilities, site clean-up, redevelopment/reclamation and restoration of sites, movement of machinery that will be deployed, activities related to dismantling, etc.

The risk of respiratory diseases will be due to the dust that will be generated during the above-mentioned activities and to the exhaust fumes of the machinery.

Radiological contamination will be linked to inadequate or negligent protection during the work, given the environment in which it will take place. Finally, biological contamination, in particular with COVID-19, will be due to the failure to respect barrier measures.

The unmitigated impact on safety and health during this phase will be of medium intensity, local extent and short duration. It will therefore be of medium overall significance.

✓ *On employment, income and the economy*

The closure phase of the project will have potential negative impacts on employment, income and the economy in the area.

Indeed, the loss of jobs associated with the cessation of mining operations could have significant repercussions on the income of workers and, consequently, on the quality of life and social conditions of their households. This phase will also mark the loss of fiscal revenues (loss of taxes and royalties related to the operation of the mine) for the area concerned as well as the national treasury. It also represents a loss of opportunities for local businesses and companies hired as subcontractors for the operation of the project.

This unmitigated impact will be of high intensity, regional extent and long duration. It will therefore be of major significance.

However, for the subcontractors who will be recruited as part of the redevelopment of the sites, this represents a real opportunity in terms of improved turnover. In addition, through them, jobs will be created at local level.

This impact will be positive, of medium intensity, one-off and of short duration. It will therefore be of minor overall significance.

✓ *On noise and vibration*

The noise and vibration environment will be modified during this phase of the project due to the noise that will be generated by the following activities that will require the mobilisation of machinery. These are: dismantling of installations, site clean-up, redevelopment/reclamation and machinery movements.

Also, certain works such as welding, cutting of certain installations, etc. associated with the dismantling will modify the noise environment at the sites. This will be a particular nuisance for workers

The unmitigated impact of the project on the noise environment will be low, local in extent and of short duration. It will therefore be of minor significance.

Following the completion of closure activities, there will no longer be any significant sources of noise at the site.

The positive impact of the closed project on the noise environment will be low, local in extent and of long duration. It will therefore be of medium significance.

✓ *On pastoral activities*

The closure of the project will have positive impacts on pastoral activities in the area. Indeed, after the dismantling of the installations, the redevelopment/reclamation works that will be carried out will allow a return of the grass cover on the project sites. This will help to improve the availability of fodder in the area.

This positive impact will be of low intensity, specific extent and long duration. It will therefore be of minor overall significance.

✓ *On traditions and customs*

During this phase, additional teams dedicated to dismantling, cleaning, redeveloping and restoring the sites will be deployed. They may develop interactions with the communities, with the risk of not respecting local customs and traditions.

However, this impact will be of low intensity, one-off extent and short duration. It will therefore be of minor overall significance.

✓ *On cultural and archaeological heritage*

The main potential negative impact of the project on heritage during this phase is the risk of collecting archaeological or cultural remains, particularly in the event of accidental discovery. This will be linked to the presence of the workforce on the sites.

This impact will be of low intensity, one-off extent and short duration. It will therefore be of minor overall significance.

4.5.4. Human rights risks of the project

The constitution of the 7ème Republic of Niger gives every citizen the right to a healthy environment and the duty to contribute to its protection and improvement. Indeed, Article 35 stipulates: "*The State has the obligation to protect the environment in the interest of present and future generations. Everyone is obliged to contribute to the safeguarding and improvement of the environment in which he or she lives [...] The State shall ensure the assessment and control of the impact of all development projects and programmes on the environment*.

Despite being a real opportunity for the local populations, the project to exploit the

deposits of the Adrar Emoles 3 research permit may have negative environmental and social impacts in terms of respect for human rights. On the environmental level, these include the consumption of water and the disruption of the local hydrological balance, the alteration of water quality, the modification of ambient air quality, the destruction of vegetation, the disruption of the tranquillity of the fauna that provide services to the local communities, etc.

On the social level, this project will generate health risks, including radiological contamination for workers and local populations, the reduction of available forage potential, the risk of destruction of cultural and archaeological sites of importance to local communities, the degradation of the visual quality of the landscape, the risk of gender-based violence, etc.

In its activities, the project must ensure that the basic rights of workers and local communities are respected.

To this end, the implementation of the measures planned at the end of this study, coupled with the actions that fall within the framework of social and societal responsibility, will make it possible to achieve this objective and improve the ecological viability and social acceptability of the project.

4.5.5. Vulnerability to climate change

Climate change is significantly affecting the frequency, incidence and duration of extreme events such as droughts, floods, high winds, etc., which have negative impacts on development infrastructure.

In Niger, six (6) categories of extreme weather events are considered. These include: droughts, heavy rains/floods, sand and/or dust storms, high temperatures, locust invasions and bushfires/fires which have direct or indirect negative consequences on the various development sectors (agriculture, livestock, fisheries, health, environment, industry including mining, etc.).

In the context of the "ADRAR EMOLES 3" research permit uranium mining project, the infrastructure to be built (water management infrastructure, tailings management facilities, waste rock disposal facilities, transport infrastructure such as roads and access tracks, telecommunications infrastructure, etc.) could be affected by climate change, particularly during the mining and post-mining phases. These include degradation, failure or destruction due to temperature variations, heavy rainfall and high winds. In addition, the high humidity associated with climate change could also affect the structural and functional performance of infrastructure and structures. However, it should be noted that the infrastructure that will be built as part of the mine rehabilitation will be more vulnerable to climate change because of its permanent nature (it will be in operation for many years after mine closure) compared to the usual infrastructure that will be dismantled at the end of its useful life.

Thus, the planning, design of structures (including during site restoration) and management of mining activities must take into account not only historical weather data but also, and especially, climate change induced variability. This has been incorporated into the project design in the Feasibility Study, in the selection of return periods and the calculation of flood lines. This has influenced the siting of infrastructure (for example the TSF) and the design of infrastructure.

GHG Emissions Reductions

The options available to SOMIDA for the Dasa Mine include the combination of the following power sources:

i. Coal-fired power plant operated by SONICHAR supplying to the grid
ii. On-site diesel power generation
iii. On-site solar power generation and battery storage

Based on the work completed to-date it is estimated that 84,096 MWh of electricity are needed when the Dasa mine and process plant are in full operation. Based on information provided by the United States Energy Information Administration (Frequently Asked Questions (FAQs) - U.S. Energy Information Administration (EIA)), on average each kWh of electricity produced by coal results in 2.2 pounds (1 kilogram) of CO_2. Power produced by diesel generators produces an equivalent volume of CO_2 per kWh. Therefore if 100% of the electricity for Dasa was derived from the coal -fired SONICHAR power plant base-case operations-phase GHG emissions are estimated to be 65,395 tonnes per annum (tpa) which includes 12,477 tpa scope 1 emissions and 52,919 tpa scope 2 emissions. There is an optimized plan to install solar photovoltaic (PV) panels linked to battery storage and back-up diesel, with the intent of providing approximately 20% of the Project's total requirement as renewable energy. This would reduce the total estimated GHG emissions to 52,871 tpa to include 21,275 tpa scope 1 emissions and 31,596 tpa scope 2 emissions. Furthermore, there is a conceptual plan to reduce the mine site power demand from 12 megawatts (MW) to 9 MW which, coupled with solar PV and battery storage, and back-up diesel, would target a reduction in GHG emissions to 43,000 tpa; a 34% reduction from the base case scenario to include 18,691 tpa scope 1 emissions and 24,422 tpa scope 2 emissions. Scope 1 and 2 GHG emissions as a minimum will be tracked and reported in line with IFC PS requirements. A Resource Efficiency plan, which will include the collection and reporting of GHG monitoring data, will be developed ahead of production.

5. POSSIBLE ALTERNATIVES TO THE PROJECT

The analysis of possible alternatives to the project is enshrined in current environmental management legislation. It allows the selection of the technically, economically, environmentally and socially advantageous alternative.

Thus, in the context of the implementation of the Adrar Emoles 3 exploration permit project, the analysis first concerned the project options, i.e. the "option with project" and the "option without project", and then the alternatives linked to the exploitation of the deposits.

5.1. Analysis of options

The two options "with project" and "without project" have been analysed in terms of technical, economic, environmental and social advantages and disadvantages as shown in Table 49 below.

Table 49 Advantages and disadvantages of project options

OPTIONS	BENEFITS	DISADVANTAGES
With project	The benefits that will be associated with the implementation of the project are - Contribution to the development of the national mining potential - Direct and indirect job creation, fight against unemployment and improvement of the income of the people concerned - Improved tax revenues at local, regional and national level through the payment of taxes and fees, etc. - Contribution to local socio-economic development through increased purchases from local businesses and suppliers, - Improved access rates to basic social infrastructure (water, health, education) through investments to be made in the framework of social and societal responsibility and mining royalties to be collected	The disadvantages that will be associated with the implementation of the project are: destruction of vegetation prior to overburden removal as part of the construction of the infrastructure, destruction of fauna and its habitat and disturbance of its tranquillity, degradation of ambient air quality as a result of pollutant emissions, health and safety risks associated with the exploitation of the deposits, risks of lowering the water table as a result of pumping, risks of contamination of the water table, etc.
No project	The option without will have the advantage of allowing normal development to take place while avoiding potential negative impacts on the biophysical and human environment (destruction of vegetation, destruction of soil and its contamination, modification of ambient air quality, lowering of the water table and contamination by solid and liquid waste, health and safety risks, etc.).	The main disadvantage of the non-project option will be the compromise of the objectives of its development with the project (see project option).

As a result of the above comparative analysis, the "with project" option was chosen, in particular because of the multiple advantages it offers.

5.2. Alternatives related to the method of operation

The analysis of alternatives related to the exploitation of the deposits concerned open pit mining and underground mining. It should be noted that in the context of mining projects, the type of exploitation depends on several factors, in particular geological conditions such as the depth of the mineralisation, the geotechnical conditions of the surrounding rocks, the strength of the mineralisation and its spatial layout.

Thus, as part of this analysis, the advantages, and disadvantages of each of these alternatives have been considered as shown in Table 50 below.

Table 50 Analysis and disadvantages of alternative ways of exploiting the deposits

ALTERNATIVES	BENEFITS	DISADVANTAGES
Open-pit mining	- Method used in the area by SOMAIR with good results - Possibility of upgrading the low-grade ore contained in the various pits. - Economic exploitation method. - Less risk of chemical contamination of underlying aquifers	- Destruction of native vegetation prior to overburden removal as part of pit operations - Lower safety risks than underground mining - Significant reclamation of the surface as the operation progresses and/or at the end of the operation. - Waste rock management (waste rock storage areas, slope stability, potential for ARD). - Mine water management - Dust emissions from mining activity (machine traffic, crushing, blasting) in meteorological conditions (wind). - Significant landscape impact, particularly from the exploitation of the pits and the deposit of tailings and waste rock
Underground mining	- Methodology implemented by COMINAK in the area with good results - Provides the conditions for good selectivity - Little overburden removal as access to the deposits is via tunnels: less environmentally destructive method - Less landscape impact than an OLS because no waste rock dumping	- Significant dewatering of the water table with risks of resource depletion. - Requires more technicality - High operating costs - More radiation protection needed - Higher safety risks than open pit mining - Risk of destabilisation of the mechanical strength of the land.

Following the analysis, underground mining was chosen due to the multiple advantages it offers during the different phases of the project implementation. In addition, this alternative was considered because of the geological conditions and

the location of the deposit, particularly its spatial position and dimensions in terms of depth and power. It will allow for selective extraction of the ore, but also for the production of less waste rock and waste products, a significant reduction in the costs of transporting and processing the ore, and a reduction in the environmental impact due to a smaller tailings facility and waste rock piles.

In addition, the following aspects were considered during engineering studies:

- ore processing method;
- power supply;
- mine water supply;
- staff accommodation and services;
- management of waste rock and mine tailings;
- management of non-mining waste;
- wastewater treatment;
- stormwater management;
- redevelopment, rehabilitation, and management of the site post closure.

5.2.1. Alternative for the ore processing method

Many other options have been studied by Global as an alternative method of processing the ore.

The process circuit and treatment parameters are similar to those already applied in the uranium mines of the French group ORANO, which operates in Niger.

Thus, the main stages of the treatment plant include: ore crushing and grinding operations; attack, impregnation, maturation and disintegration; ore filtration and washing; extraction and re-extraction; and finishing and removal of the uranate.

As far as the treatment circuit is concerned, this involves the following aspects:

- ***Radiometric sorting of ore***: is a process used to reduce the amount of feed returning to the leaching circuit while losing only a small percentage of the uranium present in the feed. The implementation of a radiometric ore sorting system can reduce the size of several components of the treatment circuit (thus reducing CAPEX capital expenditures), reduce the amount of reagents required, reduce the size of pumps, etc. The process can be used to reduce the amount of feed returning to the leaching circuit while losing only a small percentage of the uranium present in the feed stream. (thereby reducing OPEX) and reduce the overall environmental footprint. Radiometric ore sorting tests indicated that, based on a synthetic feed mix of available stockpiled samples, approximately 45% of the feed material in an ore sorter could be released with a loss of <10% of the contained uranium.
- ***Ablation***: Ablation offers a low-cost method of concentrating uranium by applying a physical grain size separation procedure to the ore slurry without the addition of chemicals. Ablation Technologies conducted tests on Project samples focusing on optimizing the fragmentation stage of the treatment circuit, adding an ablation stage to reduce the amount of feed material requiring acid

leaching, increasing the uranium content and reducing the carbon content. Approximately 63% of the material subjected to the ablation process could be rejected with a loss of <10% of the uranium content. A key advantage of including radiometric ore sorting and ablation systems in the processing circuit is that approximately 80% of the ore feed material is removed from the procedure without the use of chemicals and prior to the acid leaching procedure.

The table below gives the approach as well as the inputs, outputs and wastes of the treatment operation.

Table 51 ***Process, inputs, outputs and waste from the treatment operation***

Steps in the operation of the treatment		Inputs (materials raw materials, water and energy)	Outputs (products intermediaries and products)	Waste (emissions, effluents and solid waste)
Preparation of the all- round feed	Crushing	100% of everything from P80 250 mm ore	100% of everything coming from 20 Ŕ 300 mm	Dust in the environment
	Radiometric sorting of the ore	100 % all-round 20 mm Ŕ 300 mm	55% of all coming	Low quantity of uranium waste in the tailings storage facility Dust in the environment
	Ablation	55% of all coming	20% of everything coming, 149 µm	Small amount of uranium waste in the tailings storage facility
Leaching circuit	Two-stage tank leaching	20 % of total 149 µm	Uranium	Gaseous emissions into the environment
Uranium recovery circuit	Removal of impurities	Metal-laden solution	Uranium- charged solution	Iron- and silica-rich waste to the tailings storage facility Gaseous emissions into the environment
	Uranium stripping	Uranium- charged solution	Uranium precipitation circuit	Filled solution for the start of the solvent extraction circuit Gaseous emissions into the environment

Source: Preliminary Economic Assessment 2020

The best option for Global is the treatment process described in the table above, as it is economically and environmentally suitable for the uranium industry.

5.2.2. Alternative energy source

Energy is a key factor in the development of major mining projects. Discussions with the State and local authorities are essential. It is obvious that Global Atomic Fuels Corporation can only develop the exploitation of its deposit within a development plan integrating the already existing infrastructures. Any use of non-fossil energy should be encouraged in view of the problems of climate change.

In Niger, the mining projects will seek energy supply solutions to operate according to public grid connection schemes, or alternatively develop their own energy source.

Global Atomic Fuels Corporation conducted a power supply study to evaluate the costs and benefits of alternative power draw options to SONICHAR, which is 100% coal fired, and therefore maximises greenhouse gas emissions. One alternative is to use diesel generators for power supply backup, which also ensure continuity of supply to the mine and mill. This will result in exhaust emissions and, consequently, air quality and noise problems, although these can be minimised and emit less CO2 per unit of energy than coal.

In addition to diesel back up, a solar photovoltaic farm and battery back-up will be installed at the project to further reduce reliance on fossil fuels and overall GHG emissions.

5.2.3. Alternative mine water supply

The water for the treatment plant will come from underground catchment operations that may be sufficient to meet water needs. This is mainly the Teloua and Tarat aquifers.

Pumping tests were carried out on the Teloua aquifer (15 and 25 $^{m3/h}$), the Guézouman aquifer (2 to 3 ^{m3} /h) and the Tarat with a flow rate of over $_{30}$ $^{m3/h}$.

Also, to meet the estimated needs of 55 $^{m3/h,}$ it is sufficient to drill two or three boreholes to capture the Teloua water table or to drill a large-diameter borehole to capture the Tarat water table, which can give a flow rate of 50m3/hour. As far as aquifer recharge is concerned, it should be remembered that these aquifers are classified as fossil aquifers that recharge very little or not at all.

The water consumption for the treatment facilities is estimated at 55 m3/hour. The boreholes will supply the water and the underground drainage pumps will direct it to the treatment plant via pipelines. Water not used by the treatment plant will be stored. The hydrogeological programmes carried out on the permit have also highlighted the possibility of exploiting other aquifers such as the Guézouman and Tarat. Several alternative locations and sources for water supply boreholes have been considered, the location of the boreholes and the aquifer have been chosen to ensure minimal impact on the aquifers which have been selected to ensure minimal drawdown. Also, water will be recycled and reused wherever possible to minimise withdrawals from aquifers.

This alternative is the most appropriate both economically and socially, avoiding potential conflicts of use with local communities.

5.2.4. Alternative accommodation for staff and services

During construction, a temporary camp (including canteens and leisure facilities) will be built on the project area to house staff. Finally, a base camp will be built for staff and management. This camp will replace the existing Global Atomic Fuels Corporation Camp, which will be relocated. The decision to relocate the current camp is motivated by the fact that it is located approximately 7 km from the deposit, therefore, within the direct area of influence of the mining operations. The standards for the installation of mining camps will be used as a guide. The buildings will be constructed with thermally insulated panels previously wired for electric current.

In addition to the employees' private quarters, the camp will include the following community buildings: administration and communications building; kitchen/refectory; complex/refrigerated/freezer rooms; first aid centre with cover for the ambulance; recreation centre; toilets.

5.2.5. Alternatives for tailings and waste rock management

The management of mine tailings and waste rock containing high concentrations of radionuclides is a significant health and safety issue. Waste rock, soil and rubble will be reused as far as possible as backfill material, or stored, during construction. Where appropriate, storage facilities will be covered with protective layers and soil containment techniques. Permanent and regular monitoring is necessary to ensure that the protective and containment layers play their role properly. The possibility of reclaiming these tailings and waste rock will be considered in order to integrate them into the environment in a permanent and sustainable manner, while limiting contamination.

As part of this project, the tailings storage facility will be designed according to current good practice. Dry stack tailings (dewatered before disposal) will be used which minimises water losses and the stability of the tailings will be maximized.

The tailings storage facility will be constructed with a clay liner to minimise migration of process water into the underlying layers and will be rehabilitated progressively with low uranium material released from the treatment circuit. Several alternative locations for the tailings storage facility have been considered. The selected location strategy is designed to mitigate the impact of the tailings storage facility on the environment. The Tailings Storage Facility is located as close as possible to the processing plant, minimizing the impact of the conveyor, while still ensuring a low permeability base layer.

The tailings cells will be developed and built one after the other as they fill, and the initial stripping and overburden will form the initial material.

The location and design of the waste rock piles will conform to internationally recognized standards in the uranium industry, such as the location of surrounding watercourses; the geochemical properties of the ore, waste rock and tailings produced by the project for example.

5.2.6. Alternative for the management of non-mining waste

Inert waste rock, soil, subsoil and rubble will be used as far as possible as backfill, or piled up, during construction. Other waste streams such as industrial waste (e.g. used oil, filters, aerosol cans and gas bottles) and plastic packaging, wood and crates and organic kitchen waste will be separated at source. Appropriate authorized sites for recycling or disposal in Niger will be identified as far as possible for each waste stream.

As regards household waste, the removal and disposal of household waste to local authority landfills will be entrusted to service providers approved by the Ministry of the Environment.

5.2.7. Alternative for the treatment of wastewater

Sewage collection and treatment facilities (including permanent water treatment and mobile toilets) will be available at the plant, in the camps and in the administrative buildings.

Global will use a proven technology for the treatment of domestic wastewater, i.e. the maceration process, bacterial decomposition and then destruction by chlorination of the effluent before final discharge into an organic matter holding tank. This treatment method was chosen because it is a proven approach in the West African region.

Other options that have been examined include:

- using wastewater pits that allow water to infiltrate into the groundwater. These pits are unhealthy and dangerous for the environment. Therefore, this option has not been taken into account;
- discharging wastewater directly into the tailings pond. This method is not appropriate because dry stack disposal methods will be used. The bacterial population in the wastewater is still "alive" and therefore capable of affecting and/or contaminating humans and animals that come into contact with it. This option has also been ruled out.

These two options have been discarded because of their inherent shortcomings.

5.2.8. Alternative for stormwater management

For stormwater management, a drainage system that will lead to sedimentation basins will be developed at key points in the stormwater circuit to mitigate the sediment load on the environment.

5.2.9. Alternatives for redevelopment, conversion and post-mining management

The goal is to ensure a safe and environmentally sustainable closure at the end of operations. It aims to comply with the regulations in force in Niger, as well as to integrate international best practices in this area. The plan focuses on the potential environmental risks associated with mine closure and the identification of specific measures to avoid or otherwise mitigate them. Its implementation aims to protect the general health and safety of the public, to minimise negative environmental impacts by reducing or preventing biophysical degradation of the environment, to restore the mine-affected area to a state that is compatible with stakeholder expectations and

technical and economic feasibility, and to ensure regulatory compliance of the site, in particular by obtaining the required closure certificate (quitus environnemental) from the Nigerien State.

5.2.10. Alternative for the redevelopment of underground operations

The equipment and associated surface area buildings will be dismantled at closure and the buildings demolished through the following operations:

- decontamination of buildings, equipment and surrounding soil;
- recovery of material for reuse/recycling/disposal;
- removal of any infrastructure including pipes and electrical conduits;
- destruction of walls and foundations from floor to ceiling ;
- transportation of demolition debris to underground facilities, and
- cleaning of cleared areas and revegetation where possible.

It is often necessary to keep a section accessible for inspecting and/or visiting the ramp and gallery entrances (water level surveys, geotechnical inspection, gas vents, monitoring of protected species, etc.). Thus it is often not useful to reclaim these structures completely. However, the areas around these points are cleaned and can be revegetated so that they can be optimally integrated into the restored site.

5.2.11. Alternative for the dismantling of infrastructures in the dismantling phase, good practice consists of:

- study all the possibilities for recycling excavated material and old equipment from dismantled infrastructures (museums, local industries, etc.);
- consider integrated deconstruction (allowing the recycling of a large part of the materials);
- labelling and evacuating the waste in the appropriate local channels.

The advantage of this option is that the assets will continue to have value for and benefit the community. The infrastructure assets that could be transferred are electricity, water, roads, accommodation units/villages, offices and workshops. Infrastructure that are likely to be withdrawn because of salvage value and safety concerns for the community are treatment facilities, treatment ponds, water reservoirs and tailings infrastructure. They will be dismantled in accordance with the closure activities listed below:

- decontamination of buildings, equipment and surrounding soil;
- removal of equipment and recovery of material for disposal;
- demolition of buildings;
- removal of any infrastructure including pipes and electrical conduits;
- destruction of walls and foundations;

- removal of access roads and reopening or recycling where appropriate;
- removal of safety barriers and recycling where appropriate;
- transport of non-hazardous demolition debris to underground shafts;
- placing a cover and/or growth support material if necessary.

5.2.12. Alternative for post-mining management

During the post-closure phase, Global Atomic Fuels Corporation will seek a follow-up/monitoring protocol with the relevant authorities that will determine the conditions for projection over time, in terms of:

- nature, duration and periodicity;
- costs;
- technical and financial responsibility.

6. IMPACT MITIGATION AND/OR COMPENSATION MEASURES

6.1. Measures in the preparation and construction phase

6.1.1. Measures on the biophysical environment

✓ *On the soil*

To mitigate the degradation of the soil structure and its pollution/contamination by solid and liquid wastes during the preparation and construction phase of the Adrar Emoles 3 exploration permit project, the following measures will be implemented

- Respecting the rights of way of the works to limit the disturbance of the soil structure;
- Removal of soils from project infrastructure footprint and stockpiling of soils for future re-use
- Restoration of all disturbed sites at the end of the works (borrow pits, base camp, plant etc.);
- Raising awareness of drivers on the strict respect of traffic lanes;
- Establish an emergency plan to prevent and/or deal with accidental spills and oil leaks;
- Establishment of a waste management system for the waste that will be generated during the works;
- Set up watertight platforms to ensure the storage and distribution of hydrocarbons as well as the maintenance of machinery. This platform must be equipped with a low wall to contain any oil and hydrocarbon leaks.

The residual impact to soils during construction will be of low intensity, local extent and medium duration. It will therefore be of medium significance.

✓ *On the air*

The project is located in an area where existing dust levels are very high due to the Harmattan winds and the desert environment. To mitigate the impacts of the project on ambient air quality, including its impairment, the measures to be implemented include:

- Suspension of the work in case of strong winds; this will reduce dust entrainment;
- Dust suppression by watering the site whenever necessary;
- Covering of trucks transporting construction materials ;
- Maintain fixed and mobile equipment in good working order to reduce air pollution emissions;
- Limiting the speed of the machines; this will reduce dust emissions.

The residual impact to air quality during construction will be of low intensity, local extent and medium duration. It will therefore be of medium significance.

✓ *On the water*

To mitigate or avoid the risk of water contamination and alteration of the drainage/flow system, the following measures will be implemented:

- Respecting the topography of the land during the works and restoring disturbed sites to avoid the risk of altering the drainage system
- Installing storm water management structures that are designed to manage the probable maximum flood and to allow sufficient retention time to allow suspended solids to settle out.
- Design site water management systems to separate clean from contact water and install appropriate treatment facilities
- Establish an emergency plan that will prevent and/or deal with accidental spills and leaks of oil and hydrocarbons;
- Installation of watertight platforms to ensure the storage and distribution of hydrocarbons. This platform must be equipped with a low wall to contain any oil and hydrocarbon leaks;
- Establishment of a watertight platform for the storage of used oils before their removal from the works site; this is an element of the management plan for the liquid waste that will be generated;
- Establishment of an effective management system for the solid and liquid waste that will be generated.

In order to ensure rational water management in the context of the works and to reduce the waste of the resource, the measure that will be implemented will consist of raising the awareness of workers in this area.

The residual impact to water quality during construction will be of low intensity, local extent and medium duration. It will therefore be of medium significance.

✓ *On wildlife*

During the preparation and construction phase of the Adrar Emoles 3 exploration permit, the measures that will be implemented to mitigate the destruction of wildlife habitats, the disturbance of its tranquility and the risks of poaching are

- Raising awareness of the importance of wildlife among workers;
- Respect for wildlife habitats during the works;
- Prohibition of all forms of poaching;
- Restoration of sites disturbed during the works.

The residual impact to wildlife during construction will be of low intensity, local extent and medium duration. It will therefore be of medium significance.

✓ *On flora*

To mitigate the impacts of the project on flora, the following measures will be implemented:

- Inventory of trees that will be cut on the sites during the works;
- Strict adherence to the work area in order to limit the destruction of vegetation;

- Raising awareness among workers on the need to conserve plant species considered "rare", protected, vulnerable or threatened;
- Planting and compensatory seeding at sites to be selected in collaboration with the relevant departments.

The residual impact to vegetation during construction will be of low intensity, specific extent and medium duration. It will therefore be of minor significance.

6.1.2. Measures on the human environment

✓ *On the landscape*

To mitigate the disturbance to the visual quality of the landscape during the works, the measures that will be implemented are:

- Restoration of any disturbed sites after the works;
- Directing lights away from communities and access routes as far as possible
- Setting up a good organisation of the construction site in order to reduce the disturbance of the visual quality of the landscape;
- Planting tree screens around some facilities, to reduce visibility
- Establishment of a management system for the solid and liquid waste that will be generated.

The residual impact to landscape during construction will be of low intensity, specific extent and medium duration. It will therefore be of minor significance.

✓ *On safety and health*

To mitigate the impacts of the project on the safety and health of workers and the surrounding population, the following measures will be implemented:

- Training of all workers in health and safety and safe working practices;
- Implementation of working practices and procedures in line with IAEA good practice guidance, including occupational health monitoring;
- Providing workers with appropriate Personal Protective Equipment (PPE);
- Provision of collective protective equipment (CPE) to sites;
- Establishment of an infirmary at the base;
- Setting up of first aid boxes on site;
- Organisation of a safety minute at each workstation before the start of the work;
- Putting up signs and safety instructions and posters at the work sites;
- Establishment of an Occupational Health and Safety Committee and its training to make it operational;
- Raising awareness of the risks associated with respiratory diseases;
- Watering regularly and wherever necessary to reduce dust;
- Raising awareness of STI/HIV/AIDS risks among workers and local communities;

- Staffing of workers with appropriate clothing according to the season;
- Setting up an Internal Operations Plan (IOP);
- Use of mechanical handling aids (hand truck, trolley, etc.) wherever necessary to reduce ergonomic risks;
- Creation of good working conditions in the offices, including adapted chairs;
- Provision of sufficient and appropriate toilets for employees and awareness raising on hygiene and sanitation;
- Establishment of a COVID-19 protocol and awareness-raising of workers and local communities on this disease;
- Setting up a consultation framework for the project

The residual impact to occupational health and safety during construction will be of low intensity, local extent and medium duration. It will therefore be of medium significance.

✓ *On employment and income and the economy*

The measures that will be implemented to enhance employment and income impacts are:

- Prioritisation of local labour in recruitment;
- Prioritisation of local companies in subcontracting;
- Regular payment of the extraction tax on loans to the municipalities concerned and of the surface fee to the State.

The residual positive impact to health and safety during construction will be of high intensity, regional extent and medium duration. It will therefore be of major positive significance.

✓ *On noise and vibration*

To mitigate the change in the noise environment during the project preparation and construction phase, the measures that will be implemented are:

- Maintaining equipment in good working order;
- Using noise screens around temporary stationary equipment if necessary;
- Prohibition of work at night and during rest hours.

The communities are located at considerable distance from the working areas, which provides considerable attenuation of noise levels. Therefore, residual impacts to noise during construction will be of low intensity, point source and medium duration. It will therefore be of minor significance.

✓ *On pastoral activities*

To mitigate the very limited negative impacts of the project on pastoral activities, the measures that will be implemented are:

- Carrying out the CES/DRS actions accompanied by the seeding of herbaceous plants. This will compensate for any losses due to the destruction of vegetation. This will be delivered through the Global Atomicsupport for agriculture programme already in development and will result in more opportunities to grow fodder crops.

- Support to pastoralists through the provision of Cattle Feed Banks;
- Refurbishment and maintenance of watering points.

The residual positive impact to grazing during construction will be of average intensity, local extent and medium duration. It will therefore be of medium positive significance.

✓ *On traditions and customs*

To mitigate the impacts of the project on the traditions and customs of the local populations, the measure that will be implemented is to raise awareness among the company's workers and subcontractors about respecting the traditional practices, customs and traditions of the local populations. Workers will be drawn from the local communities and bussed in and out or brought to the mine camp from nearby towns for shift patterns. Camp residents will be discouraged from entering local communities for recreational purposes. Workers will be required to adhere to a Code of Conduct.

The residual impact to traditions and customs during construction will be of low intensity, specific extent and medium duration. It will therefore be of minor significance.

✓ *On cultural and archaeological heritage*

The measures that will be implemented to mitigate the impacts of the project on cultural and archaeological heritage are:

- Training and awareness-raising of the company's workers and employees on the respect and preservation of the identified heritage;
- Strict prohibition on the collection of archaeological objects on the project sites during the works;
- Immediately inform the administration and/or the competent authorities of any archaeological finds in accordance with the GAC chance finds procedure

There are no known sites of cultural heritage within the mine footprint. The residual impact to cultural heritage during construction will be of low intensity, specific extent and medium duration. It will therefore be of minor significance.

6.2. Measures in the operational phase

6.2.1. On the biophysical environment

✓ *On the soil*

The measures that will be implemented to mitigate the impacts on the soil are:

- Development of a site redevelopment plan;
- Progressive rehabilitation of sites, particularly of borrow pits;
- Careful storage of topsoil from cleared areas, in mounds not exceeding 3 – 4m;
- Regular inspection of stored topsoil to ensure it does not deteriorate (erosion, weed growth, loss of structure and soil fauna etc
- Establishment of a solid and liquid waste management system through the SMP to be developed for this purpose;
- Implementation of spill management procedures;
- Establish preventive maintenance programmes to ensure that all machinery and

equipment that use or contain hazardous materials (including fuel, oil, etc.) are regularly maintained in good condition;

- Regular inspection and maintenance of ponds;
- Monitoring of soil physicochemical parameters.

The residual impact to soils during operations will be of low intensity, local extent and medium duration. It will therefore be of medium significance.

✓ *On the air*

In order to avoid or mitigate the deterioration of the ambient air quality, the measures that will be implemented are:

- Implementation of speed limit guidelines to reduce dust (coarse and fine);
- Development of dust mapping and a Dust Management Plan (including all abatement options and protective measures);
- Watering of haul roads, materials transfer points and other dusty areas;
- Restriction of machinery traffic to appropriate areas;
- Use of equipment meeting emission standards ;
- Periodic maintenance of equipment;
- Air quality monitoring.

The residual impact to air quality during operations will be of average intensity, local extent and medium duration. It will therefore be of medium significance.

✓ *On the water*

The potential negative impacts of the project on water will be mitigated through the following measures:

- Raising awareness on water efficiency to reduce water waste;
- Implementation of water saving measures, such as the use of dry stack tailings;
- Set up a wastewater treatment system and monitor it through bacteriological and other analyses;
- Monitoring the stability of structures such as ponds to detect possible failures and avoid water contamination;
- Monitor water sources such as wells and springs (levels, yields) and correlate results with dynamic water balance modelling;
- Carry out regular periodic quality monitoring in monitoring wells around the site, and at wells and springs in the local area, and correlate results with baseline qualities;
- Installation of HDPE at the bottom of the effluent storage basins and their securing to avoid the risks of soil and water pollution and animal incursion respectively;
- Monitoring of water quality in and around the project area.

The residual impact to water quality and quantity during operations will be of average intensity, local extent and medium duration. It will therefore be of medium significance.

✓ *On wildlife*

To mitigate the impacts of the project on wildlife during the operational phase, the measures that will be implemented are:

- Raising awareness of the importance of wildlife among workers;
- Carrying out CES/DRS actions together with seeding to improve wildlife habitat; sites will be selected in collaboration with the relevant technical services;
- Strict ban on poaching;
- Development and implementation of a waste and hazardous materials management plan.
- Progressive rehabilitation of areas no longer used, with local species which will stablise surfaces, attract wildlife and enhance biodiversity values.

The residual impact to biodiversity during operations will be of low intensity, local extent and medium duration. It will therefore be of medium significance.

✓ *On flora*

To mitigate the impacts on flora, the measures that will be implemented are:

- Raising awareness among the wider workforce and local communities about environmental protection and the conservation of certain plant species considered "rare", protected, vulnerable or threatened;
- Continue to implement an invasive species management plan and remove and destroy plants that threaten local habitats;
- Census of trees to be felled and payment of the felling fee;
- Respect for the rights of way of the works, particularly in the context of the construction of new ponds;
- Carrying out land restoration actions at sites in the area to be selected in agreement with the technical services concerned;
- Regular watering of sites to reduce dust generation.

The residual impact to flora during operations will be of low intensity, local extent and medium duration. It will therefore be of medium significance.

6.2.2. On the human environment

✓ *On the landscape*

To mitigate the alteration of the visual quality of the landscape, the measures that will be implemented during this phase are

- Rehabilitation of disturbed sites ;
- Angling lighting away from communities and transit routes;
- If appropriate, planting tree or bush screens around some buildings;
- Selecting colours for buildings that blend with the landscape;
- Adequate management of the solid waste that will be generated in order to avoid its dispersion in the environment of the area.

The residual impact to landscape during operations will be of low intensity, local extent and medium duration. It will therefore be of medium significance.

✓ *On safety and health*

To mitigate the impacts of the project on the safety and health of workers and the surrounding population, the following measures will be implemented:

- Equipping workers with the appropriate Personal Protective Equipment (PPE) and sites with the necessary Collective Protective Equipment;
- Training and awareness raising of workers (company and subcontractor workers) on work-related health and safety risks;
- Elaboration of an Occupational Safety and Health Management Plan (safety and health of workers and neighbouring populations) which will include the necessary measures to be implemented to ensure the safety of workers and neighbouring populations. These measures must take into account the health monitoring of workers;
- Implementation of an Internal Operation Plan (IOP) at the site;
- Establishment of a chemical management procedure (the measures to be proposed will concern the following aspects: transport, storage, use, packaging management, management of obsolete chemicals, etc.);
- Regular watering to limit dust;
- Covering of the conveyor belt to reduce dust;
- Air-conditioning of machine cabs in order to keep them closed during work and thus avoid exposure of drivers to dust;
- Monitoring the food chain ;
- Health monitoring of workers through annual medical check-ups;
- Monitoring of workplaces for NORMs;
- Adherence to IAEA guidance documents on the Monitoring and surveillance of residues from the mining and milling of Uranium and thorium, and Occupational radiation protection in the Uranium mining and processing industry;

- Dosimetric monitoring of workers exposed to radioactive environments.

The residual impact to occupational health and safety during operations will be of average intensity, specific extent and medium duration. It will therefore be of medium significance.

✓ *On employment and income and the economy*

To enhance the positive impacts on employment, income and the economy, the measures to be implemented are:

- Prioritisation of local labour in recruitment, particularly for unskilled positions;
- Prioritisation of local companies and firms in the context of sub-contracting;
- Enhancement of local procurement opportunities for the providers of local goods and services;
- Regular payment of taxes and fees.

The residual positive impact to employment, income and the economy, both directly and indirectly, during operations will be of high intensity, regional extent and medium duration. It will therefore be of major positive significance.

✓ *On noise and vibration*

The impacts of the project on the noise and vibration environment will be mitigated by the following measures that will be implemented:

- Careful blast design during portal and ramp development to reduce noise and blast impacts;
- Noise monitoring;
- Monitoring of the sound environment at sensitive receptors;
- Installation of silencers at the level of machinery exhausts;
- Maintenance of equipment in accordance with manufacturers' recommendations.

The residual impact to noise and vibration during operations will be of low intensity, local extent and medium duration. It will therefore be of medium significance.

✓ *On pastoral activities*

During the exploitation phase, the impacts of the project on pastoral activities will be limited to the exclusion of grazing animals from the fenced areas around key installations (mine camp, plant, mine portal and waste management areas). An area of 2 ha has been used to estimate maximum effects to grazing access, within which areas proximal to surface infrastructure will be fenced. These effects will be mitigated through, the construction of pastoral works for the benefit of local communities in terms of improved irrigation and access to water, to increase the amount of fodder crops that can be grown to support the grazing herds and compensate for reduced access. In addition, a Livestock Food Bank (LFB) will be set up to benefit local communities. Also, the following measures will be implemented:

- Proper management of the waste (mine waste, hazardous waste and general waste) that will be generated;
- Setting up a monitoring system of leading and lagging indicators;

- Ongoing education and awareness around the exclusion zone;
- Training in agricultural techniques to maximise fodder crop yields and ways of harvesting and storing fodder;
- Raising drivers' awareness of the need to comply with the provisions of the highway code.

The residual impact to grazing during operations will be of low intensity, local extent and medium duration. It will therefore be of medium significance.

✓ *On traditions and customs*

In order to avoid the degradation of the traditions and customs of the local populations, the measure that will be implemented will consist of raising the awareness of workers, including those of subcontractors, about respecting the traditions and practices of the local communities. Support to cultural activities may also be considered by the mine.

The residual impact to traditions and customs during operations will be of low intensity, local extent and medium duration. It will therefore be of medium significance.

✓ *On cultural and archaeological heritage*

To mitigate impacts on cultural and archaeological heritage, the following measures will be implemented:

- Awareness raising on the respect of cultural and archaeological heritage in the project area;
- Establish an incidental findings procedure and train staff on how to recognise, deal with and respond to incidental findings.

The residual impact to cultural heritage and archaeology during operations will be of low intensity, specific extent and medium duration. It will therefore be of minor significance.

6.3. Measures during the closure phase

6.3.1. On the biophysical environment

✓ *On the soil*

On closure, soils that have been stockpiled will be spread on reclaimed areas as infrastructure is removed or made safe (tailings and waste rock storage). This should result in a minor positive impact as the soils are vegetated and support improved soil fauna, increase biodiversity and act as a carbon sink. To mitigate the risks of loss of soils and degradation of the soil structure and its pollution by the solid and liquid waste that will be generated, the following measures will be implemented:

- Soil handling techniques implemented to minimise damage during site restoration;
- Rapid revegetation of placed soils to reduce erosion;
- Integration of suitable slope design and drainage features in the closure design to minimise runoff and erosion;
- Implementation of the closure plan and associated aftercare;

- Limitation of work to rights of way;
- Appropriate management of the waste that will be generated and maintenance of machinery in good condition to avoid oil and hydrocarbon leaks.

The positive residual impact to soils during closure will be of low intensity, local extent and medium duration. It will therefore be of medium positive significance.

✓ *On the air*

Once operations have ceased and the site has been restored, there should be limited ongoing sources of air pollution and these will be limited to dust and particulate matter. There will be no ongoing sources of gaseous emissions unless the site is repurposed for other industrial uses. In order to mitigate the deterioration of ambient air quality during the dismantling of the installations and the restoration of the sites, the following measures will be implemented:

- Watering of roads and sites during demolition;
- Careful stockpiling of materials for disposal and/or recycling;
- Implementing speed limit guidelines to reduce dusting;
- Use of equipment that meets the required emission standards and regular maintenance;
- Implementation of closure plan to include rapid vegetation or covering of areas prone to dust entrainment (such as materials transfer points, TSF etc).

The positive residual impact to air quality during closure will be of low intensity, local extent and medium duration. It will therefore be of medium positive significance.

✓ *On the water*

At closure, dewatering pumping will cease and the groundwater level in the affected deep aquifers will gradually rebound. These are hydraulically separate from the shallow aquifer which is used by the local population, and there is no surface expression of these deep aquifers. Therefore, impacts of aquifer rebound will be very limited. Cessation of dewatering will mean that additional water (for communities and agriculture) might no longer be available, unless alternative pumping arrangements are made (for example, installing and equipping a deep well for ongoing use). The measures that will be carried out to mitigate the impacts of the works on water resources are:

- Maintain equipment in good working order to avoid oil and hydrocarbon leaks;
- Completion of the redevelopment works in accordance with the standards to avoid the risk of water contamination
- Establish post closure monitoring of water levels, yields and qualities at key locations.

The residual impact to groundwater during and after closure is expected to be of low intensity, local extent and long duration. It will therefore be of medium significance.

✓ *On wildlife*

During closure activities, the measures that will be implemented to mitigate the impacts on wildlife are listed below. Once closure is complete, it is anticipated that, in the absence of increased hunting pressures from local communities, populations of fauna may increase in the area as there will be an increase in the area of seminatural habitat (revegetation). On the other hand, reduced water availability (on cessation of pumping) might counteract this.

- Raising awareness of workers, including drivers, on the importance of wildlife protection;
- Strict ban on poaching.

The residual impact to wildlife during and after closure is expected to be of low intensity, local extent and long duration. It will therefore be of medium significance.

✓ *On flora*

During the closure phase, the Closure Plan will be implemented which will involved the clearance of the site, reinstatement of soils and seeding or planting with local, self sustaining species which will help to stabilize soils and slopes and provide additional habitat for local fauna. Measures that will continue to be implemented are

- Raising awareness among the wider workforce and local communities about environmental protection and the conservation of certain plant species considered "rare", protected, vulnerable or threatened;
- Continue to implement an invasive species management plan and remove and destroy plants that threaten local habitats;

The residual positive impact to flora during closure will be of low intensity, specific extent and long duration. It will therefore be of minor positive significance.

6.3.2. On the human environment

✓ *On the landscape*

At closure, the visual quality of the landscape will be affected by the implementation of the closure plan, which will aim to integrate elements of the mine infrastructure which remain into the surrounding landscape and its features. The measures that will be implemented during this phase are:

- Rehabilitation of disturbed sites;
- If appropriate, planting tree or bush screens around some features;
- Adequate management of the solid waste that will be generated in order to avoid its erosion, including battering slopes to echo landscape features.

The residual impact to landscape during closure will be of low intensity, specific extent and long duration. It will therefore be of minor significance.

✓ *On safety and health*

During closure activities, the risks of exposure to dangerous conditions and hazardous materials will be elevated due to non routine activities taking place. To mitigate the impacts on the safety and health of workers and the surrounding population, the following measures will be implemented:

- Providing workers with adequate PPE and making it mandatory to wear it;

- Raising awareness of the main risks on the site;
- Staffing of medical clinic;
- Implementation of safety instructions;
- Daily organisation of the safety minute before the start of the work;
- Proper management of the waste that will be generated;
- Watering of the site to reduce dust;
- Dosimetric monitoring of workers.

Once closure is complete, the residual impacts to health and safety are expected to be of low intensity, local extent and long duration. It will therefore be of medium significance.

✓ *On employment and income and the economy*

To mitigate the loss of jobs and income associated with the closure, the measure that will be implemented is a study on the retraining of workers in other occupations. This may be expected to identify a range of transferrable skills that workers have that could increase their chances of employment in other industries, or in setting up their own businesses. A programme of demobilization, identifying and delivering training requirements, is likely to be implemented. The Closure Plan, which will be reviewed and updated regularly during operations (at least every 5 years and 3 years before planned closure) will include consideration of the social aspects of closure, both in terms of direct workers, indirect livelihoods and associated communities (those with a high proportion of workers or suppliers of goods and services) to ensure that the impacts of closure are mitigated as far as possible.

The residual impact to employment, income and the economy during and after closure is expected to be of medium intensity, regional extent and medium duration. It will therefore be of medium significance.

✓ *On noise and vibration*

In order to mitigate the change in the noise and vibration environment during the dismantling of the installations, the measures that will be implemented is the use of machinery in good working order and monitoring of the noise environment. On completion of closure, there will be no ongoing sources of noise or vibration, so in the absence of new industrial development close by, the baseline conditions will be achieved once more.

The residual impacts to noise after closure is expected to be of low intensity, specific extent and long duration. It will therefore be of minor significance.

✓ *On pastoral activities*

During the closure phase, the impacts of the project on pastoral activities will continue to be limited to the exclusion of grazing animals from any remaining fenced areas around key installations. The mitigation measures put in place during operations to mitigate the effects of exclusion should continue into closure, as far as possible. This might mean maintaining irrigation and access to water, to maintain the amount of fodder crops that can be grown to support the grazing herds. The Livestock Food Bank (LFB) should be designed to be self supporting so that it can continue into closure to benefit local communities.

The residual impact to grazing during closure will be of low intensity, local extent and medium duration. It will therefore be of medium significance.

✓ *On traditions and customs*

In order to avoid the degradation of traditions and customs, the measures that will be implemented is the sensitisation of workers to respect the practices and customs of local communities. Cultural aspects will be considered in the Closure Plan, which will be developed in conjunction with the local communities. Once closure has been implemented, there will be no ongoing impacts to traditions and customs.

The residual impact to traditions and customs after closure is expected to be of low intensity, specific extent and long duration. It will therefore be of minor significance.

✓ *On cultural and archaeological heritage*

The impact on cultural and archaeological heritage during this phase is the collection of objects by workers or community members in case of chance finds. To avoid this impact, the measure that will be implemented is to raise awareness of the importance of heritage and to apply the provisions of the procedures in the event of chance finds.

On closure, there will be no ongoing impacts.

6.3.3. Summary of impacts and measures

Table 52 below summarizes pre and post mitigation impact ratings. Note the Impact Assessment Grid (Table 49) above does not allow for low ratings for anything other than short duration, low intensity, one off impacts. Therefore, elimination of an impact through mitigation measures (or on closure) will still rank as medium. This means that even with mitigation measures, applied, the impact rating does not often change.

Table 52 Summary of Impacts through Project Phases

Valued environmental and social component	Construction		Operation		Closure	
	Unmitigated	Mitigated	Unmitigated	Mitigated	Unmitigated	Mitigated
Physical elements						
Soil	Medium	Medium	Medium	Medium	Minor	Medium +
Air	Medium	Medium	Medium	Medium	Medium	Medium +
Water	Medium	Medium	Medium	Medium	Medium	Medium
Wildlife	Medium	Medium	Medium	Medium	Medium +	Medium+
Flora	Medium	Minor	Medium	Medium	Major +	Major +
Human elements						
Landscape	Minor	Minor	Medium	Medium	Medium +	Medium +
Health & Safety	Medium	Medium	Medium	Medium	Medium	Medium
Economy	Major +	Major +	Major +	Major +	Major	Medium
Noise & vibration	Medium	Minor	Medium	Medium	Medium +	Medium +
Pastoral	Medium	Medium	Medium	Medium	Minor +	Minor +
Traditions	Minor	Minor	Medium	Medium	Minor	Minor
Archaeology	Minor	Minor	Medium	Minor	Minor	None

Table 53 below provides a summary of the impacts and mitigation and/or enhancement measures for the Adrar Emoles 3 exploration license.

Table 53 Summary of impacts and mitigation and/or enhancement measures

PROJECT PHASES	COMPONENTS IMPACTS	IMPACTS	IMPACT MITIGATION AND/OR ENHANCEMENT MEASURES
Preparation and construction	Soil	Disturbance of its soil structure, change of topography and exposure to erosion	Respecting the rights of way of the works
			Restoration of all disturbed sites at the end of the works
			Raising awareness of drivers on the strict respect of traffic lanes
		Pollution/contamination from solid and liquid waste and from leaking oil and hydrocarbons from machinery	Implementation of an emergency plan for oil spills and leaks
			Establishment of a management system for the waste that will be generated during the works
			Installation of watertight platforms to ensure the storage and distribution of hydrocarbons and the maintenance of equipment
	Air	Changes in ambient air quality due to pollutant emissions	Suspension of work in case of strong winds
			Dust suppression by spraying the site whenever necessary
			Covering of trucks transporting construction materials
			Maintenance of fixed and mobile equipment in good working order
			Limiting the speed of machinery
	Water (surface and groundwater)	Water consumption and declining potential	Raising awareness of water efficiency among workers
		Modification of the natural drainage system	Respecting the topography of the land during the works and restoring disturbed sites to avoid the risk of altering the drainage system
		Risks of contamination/pollution from the solid and liquid waste that will be generated and from oil and hydrocarbon leaks from machinery	Establishment of an effective management system for the solid and liquid waste that will be generated
			Implementation of an emergency plan (PU) for oil and hydrocarbon spills and leaks
			Installation of watertight platforms to ensure the storage and distribution of hydrocarbons
			Establishment of a watertight platform for the storage of used oils before their evacuation from the work site
	Wildlife	Destruction of habitats and disturbance of wildlife tranquillity	Raising awareness of the importance of wildlife among workers
			Respect for wildlife habitats during construction
			Restoration of sites disturbed during the works

PROJECT PHASES	COMPONENTS IMPACTS	IMPACTS	IMPACT MITIGATION AND/OR ENHANCEMENT MEASURES
		Risk of poaching (harvesting).	Prohibition of all forms of poaching
	Flora	Destruction of vegetation and disruption of photosynthesis	Inventory of trees that will be cut on the sites during the works
			Payment of the slaughter tax
			Strict adherence to the work area in order to limit the destruction of vegetation
			Raising awareness among workers on the need to conserve plant species considered 'rare', protected, vulnerable or threatened
			Planting and compensatory seeding
	Landscape	Changes in the visual quality of the landscape	Restoration of any disturbed sites after the works
			Setting up a good organisation of the site
			Establishment of a solid and liquid waste management system
	Safety and health	Risk of accidents and physical injury	Providing workers with appropriate Personal Protective Equipment (PPE)
			Provision of collective protective equipment (CPE) to sites
			Establishment of an infirmary at the life base
			Setting up first-aid boxes on the construction site
			Organisation of a safety minute at each workstation before the start of the work
			Putting up signs and safety instructions and posters at the work sites
			Establishment of an Occupational Health and Safety Committee and its training to make it operational
		Risks of respiratory diseases	Raising awareness of the risks associated with respiratory diseases
			Regular watering where necessary to reduce dust generation
		Risks of sexually transmitted diseases	Awareness of STI/HIV/AIDS risks among workers extended to local communities
		Risks of exposure to thermal environments	Staffing of workers with appropriate seasonal clothing
		Explosion and fire hazards	Setting up an Internal Operation Plan (IOP)
		Risks of noise-related diseases	Equipping workers with anti-noise kits

PROJECT PHASES	COMPONENTS IMPACTS	IMPACTS	IMPACT MITIGATION AND/OR ENHANCEMENT MEASURES
		Risks of low back pain	Use of mechanical handling aids (hand truck, trolley, etc.) wherever necessary to reduce ergonomic risks
			Creation of good working conditions in the offices, including adapted chairs
		Risks of biological contamination	Provision of sufficient and appropriate toilets for employees and their awareness of hygiene and sanitation
		Risk of COVID-19 contamination	Establishment of a COVID-19 protocol and awareness-raising among workers and local communities about this disease
		Risk of tension/conflict between local people and workers	Setting up a consultation framework for the project
	Employment, income and the economy	Job creation, income improvement	Prioritisation of local labour in recruitment
			Prioritisation of local companies in subcontracting
		Improving local and national tax revenues and developing the local, regional and national economy	Regular payment of the extraction tax on loans to the communes concerned and of the surface fee to the State
	Sound and vibration	Changes in the sound environment and vibrations	Maintaining equipment in good working order
			Prohibition of work at night and during rest hours
	Pastoral activities	• Limiting access to fodder resources • Destruction and reduction of forage potential • Fodder contamination from waste and leaking oils and hydrocarbons	Carrying out the CES/DRS actions accompanied by the seeding of herbaceous plants. This will allow to compensate the possible losses linked to the destruction of the vegetation
			Support to pastoralists through the provision of Livestock Feed Banks
			Construction of hydraulic structures
	Uses and customs	Potential risks of degradation of local traditions and customs	Raising awareness of the company's workers and subcontractors about respecting the traditional practices, customs and traditions of local populations.
	Cultural and archaeological heritage	Risks of total or partial destruction or damage	Training and awareness-raising of the company's workers and employees on the respect and preservation of the identified heritage
			Immediately inform the administration and/or the competent authorities of any archaeological finds

PROJECT PHASES	COMPONENTS IMPACTS	IMPACTS	IMPACT MITIGATION AND/OR ENHANCEMENT MEASURES
		Collection of objects (especially in the case of chance finds) in disregard of the legal provisions in force in this Area	Strict prohibition on the collection of archaeological objects on the project sites during the works
Operation	Soil	Changes in soil structure and exposure to wind and water erosion	Development of a site redevelopment plan
			Rehabilitation of sites, particularly of mined loans
		o Pollution/contamination from solid and liquid waste that will be generated, oil and hydrocarbon leaks from machinery, inadequate storage of inputs o Risks of radiological contamination	Establishment of a solid and liquid waste management system through the SMP to be developed for this purpose
			Implementation of spill management procedures
			Establish preventive maintenance programmes to regularly maintain all machinery and equipment that use or contain hazardous materials (including fuel, oil, etc.) in good condition
			Regular inspection and maintenance of ponds
			Monitoring of soil physicochemical parameters
	Air	Changes in ambient air quality	Implementation of speed limit guidelines to reduce dust (coarse and fine)
			Development of dust mapping and a Dust Management Plan (including all abatement options and protective measures)
			Watering of runways and other dusty areas
			Restriction of machinery traffic to appropriate areas
			Use of equipment that meets emission standards
			Periodic maintenance of machinery
			Air quality monitoring
	Water (surface and groundwater)	Risk of lowering of groundwater levels	Raising awareness on water efficiency to reduce water waste
		Water pollution/contamination	Set up a wastewater treatment system and monitor it through bacteriological analyses
			Monitoring the stability of structures such as ponds to detect possible failures and avoid water contamination

PROJECT PHASES	COMPONENTS IMPACTS	IMPACTS	IMPACT MITIGATION AND/OR ENHANCEMENT MEASURES
			Installation of HDPE at the bottom of the effluent storage ponds and securing them to avoid the risks of soil and water pollution and animal incursion respectively
			Monitoring of water quality in and around the project area
	Wildlife	Destruction of fauna and its habitats (soil and vegetation) and disturbance of its tranquility	Raising awareness of the importance of wildlife among workers
			Carrying out CES/DRS actions with seeding to improve wildlife habitat
		Risk of poaching	Strict ban on poaching
		Risks of falling into ponds and mortality	Setting up a passive and active monitoring system for ponds
		Risk of wildlife poisoning from the waste that will be generated	Development and implementation of a waste and hazardous materials management plan
	Flora	Destruction of vegetation	Survey of trees to be felled and payment of the felling fee
			Raising awareness among the wider workforce and local communities about environmental protection and the conservation of certain plant species considered "rare", protected, vulnerable or threatened
			Respecting the rights of way of the works, particularly in the context of the construction of new ponds
			Implementation of land restoration actions
		Disruption of photosynthesis	Regular watering of sites to reduce dust generation
	Landscape	Changes in the visual quality of the landscape	Rehabilitation of disturbed sites
			Adequate management of solid waste that will be generated in order to avoid its dispersion in the environment of the area
	Safety and health	Risk of accidents and injuries	Staffing of workers with PPE and EPC sites
			Establishment of an Internal Operation Plan (IOP) at the site
			Establishment of a chemical management procedure
		Risks of illness (respiratory, STI/HIV/AIDS, biological contamination, radiological contamination, poisoning, low back pain, etc.) and drowning	Awareness raising of workers on the risks associated with the project including the various diseases
			Regular watering to limit dust generation
			Covering of the conveyor belt to reduce dust

PROJECT PHASES	COMPONENTS IMPACTS	IMPACTS	IMPACT MITIGATION AND/OR ENHANCEMENT MEASURES
			Air-conditioning of machine cabs in order to keep them closed during work and thus avoid exposure of drivers to dust
			Health monitoring of workers through annual medical check-ups
			Dosimetric monitoring of workers exposed to radioactive environments
	Employment, income and the economy	Job creation, income improvement	Prioritisation of local labour in recruitment, particularly for unskilled positions
			Prioritisation of local companies and businesses in the context of subcontracting
		Improvement of tax revenues through the payment of various taxes and fees and the development of small-scale trade in favour of the local economy	Regular payment of taxes and fees
	Sound and vibration	Change in noise and vibration	Development of noise mapping
			Monitoring of the sound environment
			Installation of mufflers on machinery exhausts
			Maintenance of equipment in accordance with manufacturers' recommendations
	Pastoral activities	Destruction and reduction of forage potential	Implementation of environmental restoration actions
			Construction of pastoral works for local communities
			Endowment of the Livestock Feed Bank (LFB).
		Risks of contamination/intoxication of animals	Proper management of the waste that will be generated
		Risk of falling into effluent ponds and animal mortality	Setting up a passive and active monitoring system
		Risks of traffic accidents involving machinery and vehicles that may impact animals	Raising drivers' awareness of compliance with the provisions of the highway code
	Uses and customs	Risks of degradation of the traditions and customs of local populations	Raising awareness of workers, including those of subcontractors, about respecting the customs and practices of local communities
	Cultural and archaeological heritage	Risk of damage or destruction of heritage and collection of objects in case of accidental discovery	Awareness raising on the respect of cultural and archaeological heritage in the project area

PROJECT PHASES	COMPONENTS IMPACTS	IMPACTS	IMPACT MITIGATION AND/OR ENHANCEMENT MEASURES
			Establish an incidental findings procedure and train staff on how to recognise, deal with and respond to incidental findings
Closing	Soil	Changes in soil structure	Site restoration
			Limitation of work to rights of way
		Risks of soil contamination from the solid and liquid waste that will be generated	Appropriate management of the waste that will be generated and maintenance of machinery in good condition to avoid oil and hydrocarbon leaks
		Risks of radiological contamination	Soil quality monitoring
	Air	Alteration of ambient air quality	Watering of roads and sites during construction
			Implementing speed limit guidelines to reduce dusting
			Use of equipment that meets the required emission standards and regular maintenance
	Water (surface and groundwater)	Risk of water contamination	Maintain equipment in good working order to avoid oil and hydrocarbon leaks
			Redevelopment work carried out in accordance with standards to avoid the risk of water contamination
	Wildlife	Risk of disturbance to wildlife and its habitat	Raising awareness of workers, including drivers, on the importance of wildlife protection
			Strict ban on poaching
	Safety and health	o Risk of accidents and injuries o Risks of respiratory diseases o Risks of radiological contamination o Risk of biological contamination	Providing workers with adequate PPE and making it mandatory to wear it
			Raising workers' awareness of the main risks on the site
			Staffing of medicine chest sites
			Implementation of safety instructions
			Daily organisation of minute security before the start of the work
			Proper management of the waste that will be generated
			Watering of the site to reduce dust generation
			Dosimetric monitoring of workers
	Employment, income and the economy	Loss of jobs and income	Study on the retraining of workers in other occupations

PROJECT PHASES	COMPONENTS IMPACTS	IMPACTS	IMPACT MITIGATION AND/OR ENHANCEMENT MEASURES
	Sound and vibration	Changes in the sound environment and vibrations	Use of machinery in good working order and monitoring of the noise environment
	Uses and customs	Risks of not respecting the traditions and customs of local communities	Raising workers' awareness of the need to respect the practices and customs of local communities.
	Cultural and archaeological heritage	Risk of collection of objects in case of accidental discovery	Raising awareness of the importance of heritage and the application of the provisions of the procedures in case of accidental discoveries.

6.3.4. Cumulative Impacts

This section details the cumulative impacts identified for the Dasa Project. It considers "*cumulative impacts of the project in combination with impacts from other relevant past, present and reasonably foreseeable developments as well as unplanned but predictable activities enabled by the project that may occur later or at a different location."*

Many environmental and social management challenges arise as a result of cumulative impacts from several activities, either project related, other projects, or by third parties. Individually, these impacts are typically insignificant however, cumulatively they can have regional or even global repercussions[5].

Cumulative impacts can be both positive and negative and can vary in intensity as well as spatial and temporal extent. The section identifies projects and activities potentially leading to cumulative impacts, and then assesses the magnitude of the impact on identified receptors.

The Cumulative Impact Assessment (CIA) has drawn on the baseline data and impact assessment undertaken for all environmental and social disciplines as well as data gathered during site visits and consultations undertaken. Other projects that are active, planned or proposed have been considered and their operations assessed to determine the potential shared environmental and social receptors with the Dasa Project. Environmental and Social Receptors used in this CIA, includes the following:

- Physical features, habitats, wildlife populations;
- Ecosystem services;
- Natural processes;
- Social conditions; and
- Cultural aspects.

The study areas and project affected areas identified in this ESIA for different environmental and social topics were used to define the limits for cumulative impacts. Existing baseline conditions, as described in this document, were used to inform the CIA.

An assessment has been undertaken to evaluate whether the Project would interact with other planned developments that would lead to cumulative impacts. For this CIA, the assessment considers the residual impacts arising from the Project, according to section 6.2 – 6.4, which could contribute to cumulative effects.

Other active Projects in the region have been identified and shared environmental and social receptors reviewed, see Table below.

[5] IFC Good Practice Handbook on Cumulative Impact Assessment: http://www.ifc.org/wps/wcm/connect/3aebf50041c11f8383ba8700caa2aa08/IFC_GoodPracticeHandbook_CumulativeImpactAssessment.pdf?MOD=AJPERES

Table 54 Summary of Neighboring Projects

Project	Description	Environmental and Social Receptors
Cominak Mine	Underground uranium mine located close to the town of Arlit, approximately 110km north of Dasa. The mine is currently owned by Orano, who closed the mine on 31 Mar 2021. The underground mine had operated since 1978 and is now in the closure phase, which focuses on technical issues, employees and affected communities. Closure is expected to occur over 11 years, with a 5 year environmental monitoring phase to follow.	Economically active population and job seekers in Niger, supply chain.
Somair Uranium Mine	Open pit uranium mine, owned by Orano, also near Arlit, around 110km from Dasa. Began operating in 1971 and predicted to continue producing until at least 2035.	Economically active population, local suppliers of goods and services.
Imouaren project	Located about 50 miles south of Arlit and about 100 miles north of Agadez, this deposit, discovered in 1966, contains one of the largest reserves in the world. Following a feasibility study completed at the end of 2007, Orano was awarded an operating permit to mine the deposit in early 2009. However, since 2015, the work to bring the site into production has been suspended and the site has been put "under wraps", pending more favourable market conditions. Annual production capacity of 5,000 tons and lifespan of 35 years.	Economically active population, surrounding environment, supply chain providers
Madouela project	Owned by Goviex, the Project is situated in the Agadez region in the northern part of the Republic of Niger around 10km south-east of Arlit. Feasibility Study released in September 2022, for a mine with a life of 19 years. An open pit will be followed by two separate underground operations.	Economically active population and job seekers in Niger, surrounding environment, supply chain

Project	Description	Environmental and Social Receptors
	Molybdenum may be produced as a by-product.	
Sonichar coal mine and power station	Located around 80km to the south of Dasa, the open pit coal mine is around 2km from the power station. The principal consumers have been the Cominak and Somair mines in Arlit. The mine, in operation since 1980, uses borehole water from 30km away for cooling. Water is also reticulated to Tchirozerine but not surrounding villages. Water from the mine and plant are discharged to the environment without treatment; effluents show very high levels of sulphates, aluminium, iron, manganese, nickel and selenium. It is not known if the power plant has any pollution control measures on stack emissions.	Economically active population, surrounding environment, supply chain

Cumulative Impacts are shown in the Table below with receptors identified and the spatial and temporal extend of the impact shown. These are further described in the following sections.

Table 55 Summary of impacts, Receptors, Spatial & Temporal Extent

Impact	**Receptors and Spatial Extent**	**Temporal Extent**
Environmental pollution (air quality, noise)	Local and regional area, key communities (Arlit, Tchirozerine)	Mid-term (construction and operational phase)
Impacts to water resources	No permanent surface water courses in the area but should all projects come on stream at the same time, there may be regional effects on groundwater flow. These are thought to be influenced by the Aïr Massif to the east of all the projects. All mines are located in the Niger river catchment.	Mid-long term (Construction, operation, closure and post-closure)
Impacts to Biodiversity	While impacts on vegetation is localised, some of the animal species of conservation concern identified as being present in the Dasa areas have huge ranges which could also include the other mines. Further assessment to the nearby protected area, namely the Aïr massif, may be required.	Long term (construction, operation, closure and post-closure)
Greenhouse Gas Emissions and Climate Change	National and Global reaches.	Long term
Socioeconomics and Employment	Local, regional and national levels of receptors. The extent of these impacts could cover Agadez region as well as more widely in Niger.	Long term
Accommodation	Arlit region, particularly for workers moving to the area to find jobs.	Mid-long term (construction, operation)
Tourism Industry	Potential rejuvenation of tourism to the cultural heritage sites (e.g. the Dabbous giraffe) and Aïr mountains	Long term

Impact	Receptors and Spatial Extent	Temporal Extent
Community Health, Safety and Human Rights	Vulnerable groups, key community members and existing residents located in surrounding villages and towns.	Mid-long term (construction, operation)
Road Traffic Network	Main route RN24 from Arlit to Agadez, particularly the northern stretch. Increased risk of RTAs, noise and air pollution.	Mid-term (construction and operation)
Ecosystem services	Increased population pressures on habitats, water resources, soils and grazing. Habitats might become degraded or destroyed in order to graze more animals or grow more crops.	Mid-long term (construction, operation)
Social structures	Increased economic activity might result in induced migration, where job seekers from elsewhere in Niger or neighbouring countries travel to find work and find lodgings in local communities. Alternatively, young people might move away from rural areas to the nearby towns to find work and better living conditions.	Mid-long term (construction, operation)

6.3.5. Management and Mitigation of cumulative impacts

The Dasa Project is relatively remote with limited industry in the region. As such, the cumulative impacts associated with the Project are not expected to significantly hinder either the development of the Project itself or other planned or ongoing Projects in the region.

Supply chain development and local procurement is an aspect supported by Global Atomic, who have committed to working with local businesses and services to strengthen their offering in the region. Again, this would have beneficial impacts to other industries and operations in the area.

Management and mitigation for cumulative impacts will be covered in topic specific management plans and the Environmental and Social Management System (ESMS). Specific requirements regarding cumulative impacts will be considered within the Biodiversity Management Plan (BMP), Water Management Plan and the Conceptual Mine Closure Plan. The BMP is a live document and will be monitored and updated annually. Should additional impacts be identified that require offsets, these will need to be considered within the BMP.

The Conceptual mine closure plan considers the retrenchment of employees; as part of this a capacity building and training programme is considered. This will provide not only benefits to employees themselves but all to other developments and industries in the region.

The Stakeholder Engagement Plan includes for consultation with local, regional and national authourites. As part of this ongoing consultation GAC personnel will need to consider proposed and planned future projects that may arise during the life of the mine. Both the impact of these Projects on the Dasa Project, as well as any potential obstacles the Dasa Project might pose to future operations will need consideration. GAC will work with legal institutions to ensure a mutually beneficial future for both the Dasa Project and the local area.

6.4. Community Engagement & Support

Global Atomic has been engaging with local communities since their arrival in the area in 2007. Initiatives generally consist of informal engagement with village elders and is ongoing.

Formal consultation engagement undertaken as part of the 2020 ESIA took the form of a series of meetings in the communities around the project area, including Tagaza, *Agatara*, Issakanan, *Sikiret/Tadant*, Oufound, *Mizeine*, *Ghalab*, the *Kelezeret Tribe* and Inolamane.

Environmental concerns noted included potential effects of uranium mining, contamination of the food chain, human and animal health risks; occupation and loss of pastoral areas and crop lands, destruction of vegetation and loss of wildlife habitat; impacts to water resources, management of waste from the mining operations and restoration and rehabilitation of the mine.

Social concerns included population displacement, marginalization of local communities, the security of cultural and tourist sites, employment opportunities for young people from the local communities and management of labour risks.

Community development concerns included youth training and jobs for young people (8 villages each), a water well (7 villages), sanitation (6 villages), construction of a health post (4 villages), market gardening (3 villages), business opportunities and a food bank (2 villages each) and support for animal health and protection of the koris (1 village each).

The consultations assisted GAC in selecting initial priority projects that will be monitored on a regular basis as the project moves into the construction and operations phases (See section below)

Additional consultation took place around the 2022 ESIA, focussing on the villages of Issakanan, Inolamane, Tagaza, *Temil Daabous*, *Eghatrak, Galelo*, Oufoud and *Gados*. Village names in *italics* were consulted in either 2020 or 2022, not both. (Village names in normal font were consulted twice). The 2022 engagement also include the Governorate, the Regional Council, the Regional Director of Mines, the Regional Directorate for the Environment and the Fight against Desertification, the Regional Directorate for the Advancement of Women and Child Protection, the Regional Directorate of Hydraulics and Sanitation, the Regional Labour Inspectorate, and the Regional Directorate of Livestock.

At Departmental level, the Town Hall and the Prefecture as well as the villages listed above were consulted. These consultations resulted in a list of concerns regarding the project, many of which are addressed by the impact assessment and associated mitigation measures and Management Plans, and a list of development goals for their areas of jurisdiction. In many cases, these are basic infrastructure needs that are more commonly provided by the state, such as electricity, health care and access to water. All villages consulted in 2022 requested a health centre and local recruitment. Four villages requested water supply or reticulation, and three villages requested a livestock feedbank, mobile phone coverage and **'**classes in final materials'. Two villages asked for a vaccination programme, electricity supply, the avoidance of the use of toxic materials at the mine site, and one village asked for local procurement and one for 'care of students'. These issues are similar to those identified by different villages in 2020 (summarised above).

The comments received have been reviewed and, along with the previous and ongoing consultations, have been used to develop current community support programs which cover the following areas:

- Food security
- Medical support
- Infrastructure
- Local business support/procurement
- Regional and national procurement

The sectors which have received support since 2007 are detailed in Table 56 below. To date, education and training has been limited to employees of the project and annual contributions to the Ministry of Mines for the training of Ministry employees.

Additional future development support will be delivered in partnership with NGOs currently active in country and will provide targeted benefits to women including enhanced irrigation, training and support of existing market gardening initiatives, support for development of goods and services related to workers apparel and PPE and associated education, training, and mentoring programs.

Table 56 also indicates anticipated increased levels of support and new programs during the construction and underground development phases in the period 2022-2024.

As the project ramps up into commercial operations, the Corporate Social Responsibility contributions will be reviewed with reference to the success of projects to date and priorities identified in consultation with communities, including those referenced above and summarised in the Stakeholder Engagement Plan (Appendix 8, Sect 4.4 Summary Of The Results Of The Public Consultations).

Table 56 Summary of CSR / ESG Engagement since 2008

Global Atomic Corp - CSR / ESG	Exploration														Construction		Ops
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Food																	
millet			x					x						x	x	x	x
sugar	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
rice			x					x						x	x	x	x
Medical																	
ambulance												x					
supplies												x		x	x	x	x
food												x		x	x	x	x
covid													x	x			
Infrastructures																	
roads					x									x	x	x	x
water well - local / nomadic herding			x											x		x	x
water well - Camps / community use					x	x					x		x		x	x	x
water well - farming support													x		x	x	x
Environment																	
EIS and baseline studies / inventory		x	x										x	x	x	x	x
project area inventory													x	x	x	x	x
re-vegetation initiatives														x	x	x	x
mitigation programs																x	x
Education / Training																	
education - exploration			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
training - exploration			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Mining – training / apprenticeship															x	x	x
Environment – training														x	x	x	x
Agriculture – training / support																x	x
Local Business Support / Procurement																	
agriculture														x	x	x	x
food services														x	x	x	x
micro business - community			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
camp supply				x	x	x	x	x	x	x	x	x	x	x	x	x	x
Regional / National procurement																	
exploration drilling			x	x	x	x	x	x			x		x	x	x		x
road work					x									x	x	x	x
camp site development					x	x	x	x	x	x	x	x	x	x	x	x	x
Food services			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
water wells install / maintain					x	x	x	x	x	x	x	x	x	x	x	x	x
camp security - regional / federal					x	x	x	x	x	x	x	x	x	x	x	x	x
ppp - solar farm																	x

7. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The Environmental and Social Management Plan (ESMP) is a management tool that defines the operational arrangements for implementing the proposed measures. It describes the measures required to prevent, minimise, mitigate or compensate for negative environmental and social impacts or to enhance positive impacts.

Thus, this ESMP, developed within the framework of the Adrar Emoles 3 exploration permit, is structured around the:

- impact mitigation and/or enhancement programme;
- environmental monitoring programme;
- environmental inspection programme;
- capacity building programme for stakeholders.

7.1. Impact mitigation and/or enhancement programme

This programme sets out all the measures to be implemented to mitigate and/or enhance, as appropriate, the impacts of the project. It describes the following elements:

- the elements of the environment that may be affected;
- potential impacts of the project;
- impact mitigation and enhancement measures;
- those responsible for implementing the measures;
- implementation indicators;
- the costs of implementing the measures.

The following table 57 constitutes the mitigation and/or enhancement programme for the project. This is the version which has been agreed with the Government in December 2020 and represents the minimum in terms of environmental management practices, monitoring and inspections.

Table 57 Impact mitigation and/or enhancement programme

Activities/Impact Sources	Components of the affected environment	Potential impacts	Mitigation and/or bonus measures	Execution manager	Implementation indicator	Cost in FCFA
• Preparation, stripping, earthmoving and site clean-up work, • The extraction of building materials • Traffic of machinery and trucks; • The use of machinery and machinery, • Degradation of pastoral paths, • Consumption energy	Air	Altered air quality by dust and gas particles	Putting in place speed limits; Watering the tracks and areas of dusty work; Limiting the movement of vehicles and machinery to the tracks and right-of-way works Use of standard-meet equipment; Equipment and vehicle checks Implementation of an Air Quality Management Plan; Stopping all construction equipment when they are not in service.	**Global Atomic Fuels corporation**	Traffic regulations published Work schedule available Maintenance sheet for vehicles and vehicles Level of Dust Fallout Level suspended particles (PM10, PM2.5, TSP...) NO2 and SO2 level in the air Suspended particle level (PM10, PM2.5, TSP...)	*Environmental and Social Clauses*
		Contributing to change Climate	Conduct an awareness campaign among the project's workforce regarding energy management		Level of reduction in electricity consumption	*Environmental and Social Clauses*
• Cutting down trees and shrubs • Use of heavy machinery	Ground	Changing the structure and texture,	Restricting deforestation and stripping activities to necessary right-of-way;		Site Rehabilitation Report or Minutes	*Environmental and Social Clauses*

• Machinery and vehicle traffic • Use of petroleum products, • Production and management of site waste		Soil compaction; Erosion, contamination and/or pollution	Simultaneous rehabilitation of temporary structures and right-of-way areas used; Restricting vehicle traffic; Preventive maintenance of vehicles and machinery; Establishing an appropriate waste management system; Setting up a watertight platform for storing petroleum, chemical and construction waste Implementation of an emergency plan and clean-up equipment		Waterproof areas for washing/maintenance and for petroleum product depots; Operational waste collection and management system; Traffic procedure available for vehicles and construction equipment Visual observation made on the site during visits by competent service officers or rehabilitated area Waste Management Report Waste Tracking Sheet Availability of decontamination kits; Erosion control procedures.	
• Clearing and clearing of land, • Production and management of solid and liquid construction waste), • Accidental releases of oils from machines	Water	Disruption of hydrological regime Risk of contamination and water pollution Lower level of tablecloths	Waterproofing of washing and/or maintenance areas and depots of petroleum products equipped with retention bowls with drainage system; Preventive maintenance of equipment; Collection and orientation by embankments and/or channels of		Waterproof areas for washing/maintenance and for petroleum product depots; Waterproof tank Operational waste collection and management system Results of analysis	*Environmental and Social Clauses*

• Water consumption			sediment-laden runoff to dedicated control infrastructure; Establishing an appropriate system for managing site waste; Removal of solids deposited in natural drainage channels; Preventive maintenance of vehicles and construction equipment; Implementation of emergency accidental spill management procedures Monitoring the level and quality of groundwater; Installing independent wastewater treatment stations in the camps; Appropriate choice for the location of tailings pours taking into account the hydrology of the area		groundwater Maintenance sheet for vehicles and vehicles Operational Accidental Spill Management Emergency Procedure	
Site preparation work Exploitation of loan and quarry sites Traffic of trucks and construction equipment	Vegetation	Loss of vegetation Disruption of photosynthesis by dust deposit on vegetation	Pre-marking of trees to be felled to limit abusive felling; Awareness of vegetation protection among site staff.		Number of feet felled; Number of feet spared; Number of awareness sessions held;	PM

			Paying the cull tax		Payment release	PM
			CES/DRS works Application of dust-control measures		Area recovered and seeded	25 000 000
Clearing, clearing, stripping and earthmoving of land, How construction equipment works, Presence of staff	Fauna	Destruction of refuge and habitat areas, Destruction of individuals, temporary disturbance and, dislodgement.	Prohibition of killing and/or capture of any species of wildlife on construction sites Information and awareness of construction workers and communities about wildlife and habitat protection; Conducting an ecological study on wildlife; Regular monitoring of the impact of the work on wildlife.		Number of individuals killed and/or captured Operational Information and Outreach Program Number of awareness sessions held Ecological wildlife study available Wildlife Follow-up Report	12 000 000
Stocks of embankments and clearings fromclearing, clearing, stripping and earthmoving, Presence of construction equipment and equipment	Landscape	Visual modification of the local landscape	Restricting stripping and deforestation operations to land needed for surface infrastructure; Limiting the thickness and heights of plant land stocks over limited thicknesses; Gradual rehabilitation of disturbed land; Construction of alveoli for the storage of bulky waste;		Regulations on the conduct of work Rate of rehabilitation of disturbed sites Available bulky waste storage alveoli Disturbed Area Inspection Report	*Environmental and Social Clauses*

Waste production and management			Inspection of disturbed areas and reclaimed land			
Use of equipment (compressors, generators, cement mixers, trucks and machinery, dump trucks, bulldozers, diggers, vibrating compactors, etc.	Soundscape	Increased soundscape and vibration	Equipment of installations with silencers and soundproofing devices; Compliance with IFC HSE environmental standards across all facilities; Use of low-noise reversing alarms; Use of equipment that complies with the manufacturer's instructions; Information from local communities about the site's general activities, including working hours; Maintenance of machinery and construction vehicles; Stopping or putting the machines used between two work sessions into minimum operating mode; Stopping all static installations except generators, pumps and electrical installations when they are not in use; Developing mapping of sensitive sources and targets Regular monitoring of noise levels		Mapping sensitive sources and targets available Sound level recorded at the different receivers Number of complaints about Noise	*Environmental and Social Clauses*

Labor, labour, Local purchase of goods and services	Employment and income	Job creation and increased income tax revenues	Priority of coastal populations when recruiting unskilled local labour.		Proportion of space in the workforce Recruitment contract	*Environmental and Social Clauses*
Purchases of goods and materials, Quarrying and borrowing	Economy	Improving the local economy	Developing and implementing a policy to maximize the purchase of goods and services and the recruitment of labour at the local, regional and national level; Consultation with local employment agencies and training centres; Prioritizing contracts to local, regional and national contractors where possible; Establishing programs or training activities for the local workforce, Established an economic impact monitoring committee; Implementation of a stakeholder engagement and internal complaints management program.		Report on local providers developed Number of services and service contracts awarded to premises Consultation frameworks created Number of people trained Number of young people trained and getting jobs in the mine	15 000 000
Construction work and the movement of machinery and vehicles, Work in dusty areas, Presence of foreign labour	Safety and health	Accident risks for labour and coastal populations Respiratory infections,	Developing a workplace health and safety policy; Developing a single risk management document and risk prevention plan Employment health and safety program;		Occupational health and safety policy is available; Unique risk management document and risk prevention plan is available Operational Health and Safety Program	*Environmental and Social Clauses*

		Increased risk of STI/HIV/AIDS and Covid 19 infection in the area Interactions between staff Biological risks	Workers' training on occupational health and safety; Endowment and obligation to carry PPE Installing appropriate road signs and fencing around construction sites with the greatest risk of accidents; Limiting traffic and speed limits on the site		Number of awareness sessions held Type and quantity of IPEs provided Signage installed Operational traffic procedure	
			Setting up an awareness programme on STI/HIV AIDS Covid 19 in communities Road safety awareness		Number of awareness sessions held Number of accidents recorded	8 000 000
			Support for infrastructure and basic social services in communities		Types of support for communities	30 000 000
Free-of-the-way	Pastoral lands	Reducing grazing areas Degradation of pastoral routes	Setting up spaces for pasture production		Areas embalmed for forage production	20 000 000
			Strengthening the capacity of the local local conflict management authority		Nature of assistance	
			Support for improving animal health;		Type and amount of support provided	15 000 000

			Support for the livestock feed supplement.			
			Improvements to existing hydraulic structures		Number of hydraulic structures rehabilitated	25 000 000
Stripping and earthmoving work	Archaeological and cultural heritage	Destruction of cultural heritage, including cemeteries	Developing a Heritage Resource Management Plan to ensure signage; Involvement of traditional authorities in monitoring identified sites; Relocation of sacred sites (cemeteries and sacred forests); Implementation of a discovery procedure during; Information on the administration of any archaeological discovery.		Heritage Resource Management Plan Developed Number of cemeteries relocated How to discover operational archaeological and cultural heritage	10 000 000
Massive arrival of foreign people	Population and community change	Pressure on basic social infrastructure Disruption of communities (IST-HIV/AIDS and Covid 19; alcohol abuse, theft, violence, conflict, inflation)	Conducting awareness campaigns on health and safety in communities; Cooperation with United Nations agencies (UNHCR) for reconciliation and appeasement of local communities.		Number of health and safety awareness campaigns in communities organized Operational framework for consultation with United Nations agencies (UNHCR)	PM

		Improving the local socio-economic framework	Conducting a study on local activities and the implementation of a validated database of local suppliers; Putting in place a local economic participation plan; Promoting the purchase of local goods and services; Support for the development of community infrastructure and services.		Validated database on local suppliers available Number of services and service contracts awarded to premises Operational local economic participation plan Types and amount of support for basic social services	15 000 000
TOTAL						**175 000 000**

Table 58 Mitigation and Impact Improvement Program for the Operating Phase

Activities/Impact Sources	Components of the affected environment	Potential impacts	Mitigation and/or bonus measures	Execution manager	Implementation indicator	Implementation cost
Traffic of machinery and trucks; Use of machinery and machinery, Extraction of ore; Mechanical and chemical processing of ore, Wind erosion of waste rock and tailings stocks, Consumption energy	Air	Altered air quality	Putting in place speed limit guidelines, Watering tracks and dusty work areas Limiting the movement of vehicles and machinery to the right-of-way of the access road and work areas Use of standard-meet equipment Periodic checks of equipment and vehicles and, construction equipment Monitoring air quality Putting in place a waste rock management plan Coverage and/or seeding of completed stocks as soon as possible to stabilize surfaces; Establishing a radiological monitoring program.	Global Atomic Fuels corporation	Traffic regulations published Level of dust fallout Level of suspended particles (PM10, PM2.5, TSP ...) Level of NO2 and SO2 in the air Suspended particle level (PM10, PM2.5, TSP...) in the air Maintenance sheet for vehicles and vehicles Radioelement rates in target environments Waste management pan available Functional radiological monitoring program	*Environmental and Social Clauses*

		Contributing to change Climate	Conduct an awareness campaign among the project's workforce regarding energy management		Level ofreduction in consumption energy	*Environmental and Social Clauses*
Ore extraction and transport, Use of machinery and machinery, Wind and water erosion of waste rock and tailingsstocks, Waste production and management	Ground	Disruption of biological, and physicochemical properties of soils Soil erosion Soil contamination and pollution	Coordinated site rehabilitation; Sanitation of disturbed land; Inspection of disturbed areas and rehabilitated areas; Dust removal Operational Spill Containment and Treatment Procedures Training in Spill Cleaning Technique; Operational traffic procedures; Vehicle maintenance, inspection; Maintenance of storage areas; Setting up a watertight platform for storing petroleum, chemical and construction waste Cleaning and maintenance of transportation routes, conveyor routes, access roads, drains and stormwater storage facilities; Setting up a soil management awareness program		Site rehabilitation rate Procedure of available driving Operational waste management system; Storage of petroleum products on waterproof holding bowls Collection and storage of site waste; Containment and operational spill treatment procedures available; Availability of decontamination kits; Erosion control procedures; Vehicle maintenance sheet Physicochemical soil parameters	*Environmental and Social Clauses*

			Soil analysis.			
Mine fire, ore felling, ore loading and unloading, crushing, screening and grinding of ore, Operating compressors, ventilation system, various workshops and circulation of machinery including heavy machinery	Soundscape and vibrations	Increased soundscape and vibration	Equipment of installations with silencers and soundproofing devices; Compliance with IFC HSE environmental standards across all facilities; Use of low-noise reversing alarms; Use of equipment that complies with the manufacturer's instructions; Information from local communities about the site's general activities, including working hours; Maintenance of machinery and construction vehicles; Stopping or putting machines into minimum operating mode used between two working sessions Stopping all static installations except generators, pumps and electrical installations when they are not in use; Optimal management of shooting procedures Developing a map of sources and targets		Sound level recorded at the different receivers Number of complaints about Noise Existence of noise source mapping	*Environmental and Social Clauses*

• Deposit of waste rock and tailings, • Presence of infrastructure (buildings, processing units, etc.) • Waste production and management	Landscape	Changing the visual quality of the landscape	Mitigation measures for the impacts associated with the tailings park, waste rock storage; Installing plant screens; Gradual rehabilitation of disturbed land; Inspection of disturbed areas; Construction of alveoli for the storage of bulky waste.		Waste and waste park storage system Success rate of peri-central plantations Regulations on the conduct of work Rate of rehabilitation of disturbed sites Presence of alveoli for the storage of large waste; Disturbed Area Inspection Report	*Environmental and Social Clauses*
Pumping water and blasting, Ore extraction (formation of acid mine drainage) Mining denothing Waste and treatment waste deposits Production and management of site waste, Movement of vehicles and heavy machinery	Water	Changing geochemical and hydrogeological parameters Lower water table levels; Water contamination and pollution; Changes in the hydrological regime.	Development of a hydrogeological model for groundwater flow use and monitoring; Saving water use at the mine; Setting up a committee of water users; Developing a waste rock and tailings management plan; Control of waste and tailings areas; Control of pumps, pipes and tailings pond dykes; Developing and implementing a stormwater management plan;		Tablecloth level Number of piezometers installed Operational water use-saving procedure available Committee of Operational Water Users Number of usage-related conflicts recorded Operational waste and tailings management plan	*Environmental and Social Clauses*

			Developing and implementing a waste management plan; Preventive maintenance of equipment. Installing piezometers around tailings ponds and waste rock stocks; Compacting the surfaces of the waste rock for the installation of a sewage treatment plant; Putting in place an emergency response plan for accidental spills; Putting in place a contaminated soil management plan; Tracking the level of the tablecloths. Appropriate site selection for the location of tailings and proper direction of the pour taking into account the hydrology of the area		Level of operation of waste and tailings areas; pumps, pipe and tailings pond dam Operational waste and stormwater management plans Physicochemical water parameters Vehicle Technical Tracking Sheet Liquid waste discharge standards Emergency Spill Response and Operational Contaminated Soil Management Procedures	
New deposits are being put into operation Traffic of trucks and construction equipment	Vegetation	Destruction of vegetation Disruption of photosynthesis by dust deposit on vegetation	Framing the cups Application of measures to control dust fly control;		Number of trees felled and/or avoided	PM
			Payment slaughter tax		Payment release	PM
			CES/DRS work with seeding of treated areas		Areas recovered and seeded	10 000 000

			Raising awareness among labour and communities about vegetation protection and conservation of certain plant species		Number of awareness sessions held	6 000 000
		Restoration of vegetation	Establishing protected natural areas on and off site; Settlement of *Leptadenia pyrotechnica* of Oufoud.		Areas of protected natural areas Area developed within the settlement of Oufoud	8 000 000
		Increased uranium bioaccumulation potential for plants	Ecotoxicologist analyses of vegetation		Rate of uranium bioaccumulation potential for plants	PM
Explosive fire, movements of machinery and trucks Poaching Clearing the right-of-way of new deposits Management of waste and treatment effluent (evaporation ponds)	Fauna	Disruption and relocation of wildlife Crushing and destruction Habitat loss Risk of wildlife poisoning	Creating protected areas or wildlife habitats; Raising awareness among workers and communities about the protection of wildlife and its habitat; Prohibition of hunting of mine employees and subcontractors.		Number of protected areas created Number of awareness sessions held Number of species killed Proportion of premises in the workforce Number of offices selected for recruitment management Number of trained Nigerian technicians	15 000 000

					Nature of contracts Proportion of premises within the workforce Number of offices selected for recruitment management Number of trained Nigerian technicians The nature of the contracts	
Labor Local subcontracting work, Local purchase of goods and services	Employment and income	Job creation Improved income	Prioritizing coastal populations when recruiting unskilled local labour; Recruitment management by local offices; Training of Nigerian technicians Integration of redundancy pay in the employment contract.		Proportion of space in the workforce Number of offices selected for recruitment management Number of trained Nigerian technicians The nature of the contracts	*Environmental and Social Clauses*
Acquisition of production-related dividends Payment of royalties, taxes and taxes Direct and indirect investments, Local purchase of goods and services	Economy	Improving the local economy; regional and national	Paying taxes to central authorities for affected communities; Support for agriculture and livestock Promoting local content.		State of tax liquidation; mining taxes and royalties Reporting financier Number of services and service contracts awarded to premises Number of producers supported	PM

Local purchase of goods and services						
Waste rock and tailings management, Work in ionizing environments Heavy vehicle and vehicle traffic, Handling machines and chemicals Interaction between resident populations and foreign and/or sex workers Interactions between site staff	Health and safety	Radiation exposure diseases either by radon inhalation, radionuclide ingestion, and exposure Risks of respiratory and cardiovascular diseases	Developing a workplace health and safety policy; Developing a single risk management document and risk prevention plan Developing a health and safety plan; Air conditioning system for machinery and cabins; Endowment and use of PPE; Compliance with HSE requirements for contractors and subcontractors; Training and awareness of staff, providers, subcontractors and suppliers about the risks associated with their work, their responsibilities to manage these risks		Occupational health and safety policy available Unique risk management document and risk prevention plan available Operational health and safety plan available Machinery and cabins equipped with air conditioning system on site; Types and nature of PPE Number of training and awareness sessions organized	PM
		Increased incidence of STIs/HIV/AIDS and Covid19 Risks of incidents and accidents	Awareness and education on the dangers of STIs/HIV/AIDS on Covid19; Raising awareness of road safety among affected users and affected communities.		Number of STI/HIV/AIDS awareness and education sessions held Number of IST/HIV AIDS cases and Covid19 recorded dangers associated with the use of puddles held	45 000 000

					Number of recorded traffic accidents	
Expansion of mining and other infrastructure	Archaeological and cultural heritage	Loss and/or disturbance of historical, archaeological and cultural heritage in attendance	Implementation of the Heritage Resource Management Plan Tracking identified sites and known cultural, historical and aesthetic resources; Implementation of the discovery procedure; Relocation of sacred sites (cemeteries and sacred forests).		Operational Heritage Resource Management Plan Operational discovery procedure Type and nature of archaeological and cultural heritage Number of sacred sites relocated	PM
Population influx in the area	Population and community change	Pressure on basic social infrastructure; Disruption of communities (IST-HIV/AIDS and Covid 19, alcohol abuse, theft, violence,	Strengthening the capacity of local suppliers of goods and services; Development of partnership between regional suppliers of financial products and training and local businesses; Support for local business start-up initiatives, promoting local sourcing; Promoting savings, safe investments and banking services; Accompanying women in AGR;		Number of services provided by local suppliers Number of local businesses operating	PM

		conflict, inflation); Potential destabilization on the internal community and local government dynamics.	Support for the development of basic social infrastructure; Cooperation with United Nations agencies (UNHCR) for reconciliation and appeasement of local communities.			
			Safety and health awareness in partnership with local health professionals and community representatives		Number of awareness sessions held Awareness report	30 000 000
TOTAL						**114 000 000**

Table 59 Closure Impact Mitigation and Enhancement Program

Activities/Impact Sources	Components of the affected environment	Potential impacts	Mitigation and/or bonus measures	Execution manager	Implementation indicator	Implementation cost
Dismantling work, heavy machinery and vehicle traffic, rehabilitation of galleries and temporary traffic lanes; Wind erosion of waste rock and tailings deposits	Air	Altered air quality	Watering the lanes of traffic machines and vehicles; Implementation of speed limit guidelines; Use of equipment that meets the required gas emission standards; Implementation of regular checks of equipment, vehicles and machinery; Stopping any equipment not in service; Monitoring and monitoring of waste rock deposits; and tailings to stabilize surfaces.	Promoter BNEE	Traffic regulations published Maintenance sheet for vehicles and vehicles Level of dust fallout Level of suspended particles (PM10, PM2.5, TSP ...) Level of NO2 and SO2 in the air Suspended particle level (PM10, PM2.5, TSP...)	*Environmental and Social Clauses*
Use of machinery and construction vehicles; Wind and water erosion of waste rock and	Ground	Contamination and/or pollution Soils	Delimitation of non-traffic zones to vehicles in land storage areas Inspection and maintenance of equipment, vehicles and construction equipment; Controlling erosion of waste rock and tailings deposits; Prohibition of off-piste driving for vehicles and equipment Ground	Promoter	Equipment and vehicle maintenance sheet Operational erosion control procedure Operational vehicle and vehicle traffic procedure	*Environmental and Social Clauses*

tailings deposits.			management awareness throughout the closure work.			
Work to fill, demolish and dismantle infrastructure; Moving gear	Soundscape and vibrations	Increased noise levels	Equipment with silencers and/or soundproofing devices of machinery and vehicles; Optimizing the movement of vehicles and construction equipment; Maintenance of machinery and vehicles		Silent and soundproofing devices available on vehicles and gear Operational vehicle and construction equipment traffic procedure Maintenance sheet for vehicles and vehicles	*Environmental and Social Clauses*
Use of machinery and machinery; Wind and water erosion of waste rock and tailings deposits; Restoration work on the site	Water	Groundwater and surface water contamination	Monitoring the quality of water resources even after the mine has closed; Putting in place measures to prevent and protect against accidental spills; Maintenance of machinery and construction vehicles; Introducing a hazardous materials management procedure;		Physicochemical water parameters Operational accidental spill prevention and protection procedures Vehicle and engine maintenance sheet Availability of decontamination kits;	PM

			Putting in place an emergency response plan for accidental spills. Putting in place a contaminated soil management plan			
CES/DRS work	Vegetation	Improved local vegetation cover	CES/DRS work Environmental monitoring of rehabilitated sites		Report of inventoriesforestiers Treated area Visual observation made on the site during visits by competent service officers or rehabilitated area	15 000 000
Dismantling infrastructure Restoration of the site	Fauna	New habitat formation Return of wildlife	Continued implementation of wildlife and habitat protection measures; Establishing a sustainable information and awareness program related to the management of created habitats.		Wildlife attendance rates Number of awareness campaigns organized Unfaunic inventory report	10 000 000
Dismantling infrastructure Restoration of the site	Landscape	Restoring the local landscape	Implementation of the final reclamation of the site		Report of the relevant services on the final condition of the site	PM

Stopping mining	Employment and income	Job loss Allocating workers' income	Training workers for retraining Development of facilities and activities promoting social interaction and positive behaviour for the community for the benefit of young people	Promoter	Number of trained workers Types and nature facilities and activities developed	PM
Loss of operating dividends, direct and indirect investments, royalties and taxes	Economy	Allocating the local, regional and/or national economy Reducing spending and livelihoods	Conducted a study of the socio-economic profile of the project shutdown of the zone; Developing and implementing a plan to support the diversification of the local economy and the consolidation of the promising sectors; Strengthening the socio-economic capacity of coastal communities; Participation in the Economic Development Plan for the communities of Tchirozérine and Dannet.		Results of the socio-economic profile report Social Investment Report	15 000 000
Stop supporting low-cost investment and other social services	Population and community change	Risk of declining quality of life and well-being; Change in the livelihoods and livelihoods of the Project	Conducted a societal study of the dependencies of riparian communities that takes into account water supply, health, energy supply; Livestock; market gardening; local economy	Promoter	Results of the societal study report	15 000 000
TOTAL						**55 000 000**

7.2. Environmental inspection and oversight programme

Environmental inspection or performance monitoring consists of ensuring that the project's environmental commitments are respected. It aims to ensure the effective implementation of the various measures proposed to mitigate or reinforce the impacts resulting from the project, in accordance with the legal provisions in force in Niger.

Table 60 below shows the environmental and social monitoring programme for the Adrar Emoles 3 exploration licence.

It is structured around the following points:

- the project phases;
- elements that may be impacted;
- potential impacts;
- mitigation and/or enhancement measures;
- the person responsible for monitoring the implementation of the measures;
- indicators to be filled in during environmental monitoring;
- costs related to monitoring.

Table 60 Environmental inspection and performance monitoring programme

Activities/Impact Sources	Components of the affected environment	Potential impacts	Mitigation and/or bonus measures	Supervisor	Implementation indicator	Frequency of surveillance	Cost of surveillance in FCFA
Preparation and construction phase							
Once a quarter in five (5) years	Air	Altered air quality by dust and gas particles	Putting in place speed limits; Watering the tracks and areas of dusty work; Limiting the movement of vehicles and machinery to the tracks and right-of-way works Use of standard-meet equipment; Equipment and vehicle checks Implementation of an Air Quality Management Plan; Stopping all construction equipment when they are not in service.	**BNEE**	Traffic regulations published Work schedule available Maintenance sheet for vehicles and vehicles Level of Dust Fallout Level suspended particles (PM10, PM2.5, TSP...) NO2 and SO2 level in the air Suspended particle level (PM10, PM2.5, TSP...)		

		Contributing to change Climate	Conduct an awareness campaign among the project's workforce regarding energy management		Level of reduction in electricity consumption		
	Ground	Changing the structure and texture, Soil compaction; Erosion, contamination and/or pollution	Restricting deforestation and stripping activities to necessary right-of-way; Simultaneous rehabilitation of temporary structures and right-of-way areas used; Restricting vehicle traffic; Preventive maintenance of vehicles and machinery; Establishing an appropriate waste management system; Setting up a watertight platform for storing petroleum, chemical and construction waste Implementation of an emergency plan and clean-up equipment		Site Rehabilitation Report or Minutes Waterproof areas for washing/maintenance and for petroleum product depots; Operational waste collection and management system; Traffic procedure available for vehicles and construction equipment Visual observation made on the site during visits by competent service officers or rehabilitated area Waste Management Report Waste Tracking Sheet		

					Availability of decontamination kits; Erosion control procedures.		
	Water	Disruption of hydrological regime Risk of contamination and water pollution Lower level of tablecloths	Waterproofing of washing and/or maintenance areas and depots of petroleum products equipped with retention bowls with drainage system; Preventive maintenance of equipment; Collection and orientation by embankments and/or channels of sediment-laden runoff to dedicated control infrastructure; Establishing an appropriate system for managing site waste; Removal of solids deposited in natural drainage channels; Preventive maintenance of vehicles and construction equipment;		Waterproof areas for washing/maintenance and for petroleum product depots; Waterproof tank Operational waste collection and management system Results of analysis groundwater Maintenance sheet for vehicles and vehicles Operational Accidental Spill Management Emergency Procedure		

			Implementation of emergency accidental spill management procedures Monitoring the level and quality of groundwater; Installing independent wastewater treatment stations in the camps; Appropriate choice for the location of tailings pours taking into account the hydrology of the area				
	Vegetation	Loss of vegetation Disruption of photosynthesis by dust deposit on vegetation	Pre-marking of trees to be felled to limit abusive felling; Awareness of vegetation protection among site staff.		Number of feet felled; Number of feet spared; Number of awareness sessions held;		
			Paying the cull tax		Payment release		
			CES/DRS works Application of dust-control measures		Area recovered and seeded		

	Fauna	Destruction of refuge and habitat areas, Destruction of individuals, temporary disturbance and, dislodgement.	Prohibition of killing and/or capture of any species of wildlife on construction sites Information and awareness of construction workers and communities about wildlife and habitat protection; Conducting an ecological study on wildlife; Regular monitoring of the impact of the work on wildlife.		Number of individuals killed and/or captured Operational Information and Outreach Program Number of awareness sessions held Ecological wildlife study available Wildlife Follow-up Report		
	Landscape	Visual modification of the local landscape	Restricting stripping and deforestation operations to land needed for surface infrastructure; Limiting the thickness and heights of plant land stocks over limited thicknesses; Gradual rehabilitation of disturbed land; Construction of alveoli for the storage of bulky waste; Inspection of disturbed areas and reclaimed land		Regulations on the conduct of work Rate of rehabilitation of disturbed sites Available bulky waste storage alveoli Disturbed Area Inspection Report		

	Sound scape	Increased soundscape and vibration	Equipment of installations with silencers and soundproofing devices; Compliance with IFC HSE environmental standards across all facilities; Use of low-noise reversing alarms; Use of equipment that complies with the manufacturer's instructions; Information from local communities about the site's general activities, including working hours; Maintenance of machinery and construction vehicles; Stopping or putting the machines used between two work sessions into minimum operating mode; Stopping all static installations except generators, pumps and electrical installations when they are not in use;		Mapping sensitive sources and targets available Sound level recorded at the different receivers Number of complaints about Noise		

			Developing mapping of sensitive sources and targets Regular monitoring of noise levels				
Labor, labour, Local purchase of goods and services	Employment and income	Job creation and increased income tax revenues	Priority of coastal populations when recruiting unskilled local labour.		Proportion of space in the workforce Recruitment contract		
Purchases of goods and materials, Quarrying and borrowing	Economy	Improving the local economy	Developing and implementing a policy to maximize the purchase of goods and services and the recruitment of labour at the local, regional and national level; Consultation with local employment agencies and training centres; Prioritizing contracts to local, regional and national contractors where possible; Establishing programs or training activities for the local workforce,		Report on local providers developed Number of services and service contracts awarded to premises Consultation frameworks created Number of people trained Number of young people trained and getting jobs in the mine		

					Established an economic impact monitoring committee; Implementation of a stakeholder engagement and internal complaints management program.				
Construction work and the movement of machinery and vehicles, Work in dusty areas, Presence of foreign labour	Safety and health	Accident risks for labour and coastal populations Respiratory infections, Increased risk of STI/HIV/AIDS and Covid 19 infection in the area Interactions between staff Biological risks	Developing a workplace health and safety policy; Developing a single risk management document and risk prevention plan Employment health and safety program; Workers' training on occupational health and safety; Endowment and obligation to carry PPE Installing appropriate road signs and fencing around construction sites with the greatest risk of accidents; Limiting traffic and speed limits on the site		Occupational health and safety policy is available; Unique risk management document and risk prevention plan is available Operational Health and Safety Program Number of awareness sessions held Type and quantity of IPEs provided Signage installed Operational traffic procedure			

			Setting up an awareness programme on STI/HIV AIDS Covid 19 in communities Road safety awareness		Number of awareness sessions held Number of accidents recorded		
			Support for infrastructure and basic social services in communities		Types of support for communities		
Free-of-the-way	Pastoral lands	Reducing grazing areas Degradation of pastoral routes	Setting up spaces for pasture production		Areas embalmed for forage production		
			Strengthening the capacity of the local local conflict management authority		Nature of assistance		
			Support for improving animal health; Support for the livestock feed supplement.		Type and amount of support provided		
			Improvements to existing hydraulic structures		Number of hydraulic structures rehabilitated		
Stripping and earthmoving work	Archaeological and cultural	Destruction of cultural heritage,	Developing a Heritage Resource Management Plan to ensure signage;		Heritage Resource Management Plan Developed		

	heritage	including cemeteries	Involvement of traditional authorities in monitoring identified sites; Relocation of sacred sites (cemeteries and sacred forests); Implementation of a discovery procedure during; Information on the administration of any archaeological discovery.		Number of cemeteries relocated How to discover operational archaeological and cultural heritage		
Massive arrival of foreign people	Population and community change	Pressure on basic social infrastructure Disruption of communities (IST-HIV/AIDS and Covid 19; alcohol abuse, theft, violence, conflict, inflation)	Conducting awareness campaigns on health and safety in communities; Cooperation with United Nations agencies (UNHCR) for reconciliation and appeasement of local communities.		Number of health and safety awareness campaigns in communities organized Operational framework for consultation with United Nations agencies (UNHCR)		
		Improving the local socio-	Conducting a study on local activities and the implementation of a		Validated database on local suppliers available Number of services and service		

		economic framework	validated database of local suppliers; Putting in place a local economic participation plan; Promoting the purchase of local goods and services; Support for the development of community infrastructure and services.		contracts awarded to premises Operational local economic participation plan Types and amount of support for basic social services		
Exploitation and processing							
Traffic of machinery and trucks; Use of machinery and machinery, Extraction of ore; Mechanical and chemical processing of ore, Wind erosion of	Air	Altered air quality	Putting in place speed limit guidelines, Watering tracks and dusty work areas Limiting the movement of vehicles and machinery to the right-of-way of the access road and work areas Use of standard-meet equipment Periodic checks of equipment and vehicles and, construction equipment Monitoring air quality		Traffic regulations published Level of dust fallout Level of suspended particles (PM10, PM2.5, TSP ...) Level of NO2 and SO2 in the air Suspended particle level (PM10, PM2.5, TSP...) in the air Maintenance sheet for vehicles and vehicles Radioelement rates in target environments		

waste rock and tailings stocks, Consumption energy			Putting in place a waste rock management plan Coverage and/or seeding of completed stocks as soon as possible to stabilize surfaces; Establishing a radiological monitoring program.		Waste management pan available Functional radiological monitoring program		
		Contributing to change Climate	Conduct an awareness campaign among the project's workforce regarding energy management		Level ofreduction in consumption energy		
Ore extraction and transport, Use of machinery and machinery, Wind and water erosion of waste rock and tailingsstocks, Waste production and management	Ground	Disruption of biological, and physicochemical properties of soils Soil erosion Soil contamination and pollution	Coordinated site rehabilitation; Sanitation of disturbed land; Inspection of disturbed areas and rehabilitated areas; Dust removal Operational Spill Containment and Treatment Procedures Training in Spill Cleaning Technique; Operational traffic procedures; Vehicle maintenance, inspection;		Site rehabilitation rate Procedure of available driving Operational waste management system; Storage of petroleum products on waterproof holding bowls Collection and storage of site waste; Containment and operational spill treatment procedures available;		

			Maintenance of storage areas; Setting up a watertight platform for storing petroleum, chemical and construction waste Cleaning and maintenance of transportation routes, conveyor routes, access roads, drains and stormwater storage facilities; Setting up a soil management awareness program Soil analysis.		Availability of decontamination kits; Erosion control procedures; Vehicle maintenance sheet Physicochemical soil parameters		
Mine fire, ore felling, ore loading and unloading, crushing, screening and grinding of ore, Operating compressors, ventilation	Sound scape and vibrations	Increased soundscape and vibration	Equipment of installations with silencers and soundproofing devices; Compliance with IFC HSE environmental standards across all facilities; Use of low-noise reversing alarms; Use of equipment that complies with the manufacturer's instructions;		Sound level recorded at the different receivers Number of complaints about Noise Existence of noise source mapping		

system, various workshops and circulation of machinery including heavy machinery			Information from local communities about the site's general activities, including working hours; Maintenance of machinery and construction vehicles; Stopping or putting machines into minimum operating mode used between two working sessions Stopping all static installations except generators, pumps and electrical installations when they are not in use; Optimal management of shooting procedures Developing a map of sources and targets				
Waste rock and tailings deposit Presence of infrastructure (buildings, processing units, etc.)	Landscape	Changing the visual quality of the landscape	Mitigation measures for the impacts associated with the tailings park, waste rock storage; Installing plant screens;		Waste and waste park storage system Success rate of peri-central plantations Regulations on the conduct of work		

Waste production and management			Gradual rehabilitation of disturbed land; Inspection of disturbed areas; Construction of alveoli for the storage of bulky waste.		Rate of rehabilitation of disturbed sites Presence of alveoli for the storage of large waste; Disturbed Area Inspection Report		
Pumping water and blasting, Ore extraction (formation of acid mine drainage) Mining denothing Waste and treatment waste deposits Production and management of site waste, Movement of vehicles and heavy machinery	Water	Changing geochemical and hydrogeological parameters Lower water table levels; Water contamination and pollution; Changes in the hydrological regime.	Development of a hydrogeological model for groundwater flow use and monitoring; Saving water use at the mine; Setting up a committee of water users; Developing a waste rock and tailings management plan; Control of waste and tailings areas; Control of pumps, pipes and tailings pond dykes; Developing and implementing a stormwater management plan; Developing and implementing a waste management plan;		Tablecloth level Number of piezometers installed Operational water use-saving procedure available Committee of Operational Water Users Number of usage-related conflicts recorded Operational waste and tailings management plan Level of operation of waste and tailings areas; pumps, pipe and tailings pond dam Operational waste and stormwater management plans Physicochemical water parameters		

			Preventive maintenance of equipment. Installing piezometers around tailings ponds and waste rock stocks; Compacting the surfaces of the waste rock for the installation of a sewage treatment plant; Putting in place an emergency response plan for accidental spills; Putting in place a contaminated soil management plan; Tracking the level of the tablecloths. Appropriate site selection for the location of tailings and proper direction of the pour taking into account the hydrology of the area		Vehicle Technical Tracking Sheet Liquid waste discharge standards Emergency Spill Response and Operational Contaminated Soil Management Procedures		
New deposits are being put into operation	Vegetation	Destruction of vegetation Disruption of photosynthesis by dust	Framing the cups Application of dust-control measures		Number of trees felled and/or avoided		

Traffic of trucks and construction equipment		deposit on vegetation					
			Payment slaughter tax		Payment release		
			CES/DRS work with seeding of treated areas		Areas recovered and seeded		
			Raising awareness among labour and communities about vegetation protection and conservation of certain plant species		Number of awareness sessions held		
		Restoration of vegetation	Establishing protected natural areas on and off site; Settlement of *Leptadenia pyrotechnica* of Oufoud.		Areas of protected natural areas Area developed within the settlement of Oufoud		
		Increased uranium bioaccumulation potential for plants	Ecotoxicologist analyses of vegetation		Rate of uranium bioaccumulation potential for plants		
Explosive fire, movements of	Fauna	Disruption and	Creating protected areas or wildlife habitats;		Number of protected areas created		

machinery and trucks Poaching Clearing the right-of-way of new deposits Management of waste and treatment effluent (evaporation ponds)		relocation of wildlife Crushing and destruction Habitat loss Risk of wildlife poisoning	Raising awareness among workers and communities about the protection of wildlife and its habitat; Prohibition of hunting of mine employees and subcontractors.		Number of awareness sessions held Number of species killed		
Labor Local subcontracting work, Local purchase of goods and services	Employment and income	Job creation Improved income	Prioritizing coastal populations when recruiting unskilled local labour; Recruitment management by local offices; Training of Nigerian technicians Integration of redundancy pay in the employment contract.		Proportion of space in the workforce Number of offices selected for recruitment management Number of trained Nigerian technicians The nature of the contracts		

Acquisition of production-related dividends Payment of royalties, taxes and taxes Direct and indirect investments, Local purchase of goods and services Local purchase of goods and services	Economy	Improving the local economy; regional and national	Paying taxes to central authorities for affected communities; Support for agriculture and livestock Promoting local content.		State of tax liquidation; mining taxes and royalties Reporting financier Number of services and service contracts awarded to premises Number of producers supported		
Waste rock and tailings management, Work in ionizing	Health and safety	Radiation exposure diseases either by radon inhalation, radionuclide ingestion, and exposure	Developing a workplace health and safety policy; Developing a single risk management document and risk prevention plan Developing a health and safety plan;		Occupational health and safety policy available Unique risk management document and risk prevention plan available Operational health and safety plan available		

environments Heavy vehicle and vehicle traffic, Handling machines and chemicals Interaction between resident populations and foreign and/or sex workers Interactions between site staff		Risks of respiratory and cardiovascular diseases	Air conditioning system for machinery and cabins; Endowment and use of PPE; Compliance with HSE requirements for contractors and subcontractors; Training and awareness of staff, providers, subcontractors and suppliers about the risks associated with their work, their responsibilities to manage these risks		Machinery and cabins equipped with air conditioning system on site; Types and nature of PPE Number of training and awareness sessions organized		
		Increased incidence of STIs/HIV/AIDS and Covid19	Awareness and education on the dangers of STIs/HIV/AIDS on Covid19; Raising awareness of road safety among affected users and affected communities.		Number of STI/HIV/AIDS awareness and education sessions held Number of IST/HIV AIDS cases and Covid19 recorded dangers associated with the use of puddles held		

		Risks of incidents and accidents			Number of recorded traffic accidents		
Expansion of mining and other infrastructure	Archaeological and cultural heritage	Loss and/or disturbance of historical, archaeological and cultural heritage in attendance	Implementation of the Heritage Resource Management Plan Tracking identified sites and known cultural, historical and aesthetic resources; Implementation of the discovery procedure; Relocation of sacred sites (cemeteries and sacred forests).		Operational Heritage Resource Management Plan Operational discovery procedure Type and nature of archaeological and cultural heritage Number of sacred sites relocated		
Population influx in the area	Population and community change	Pressure on basic social infrastructure; Disruption of communities (IST-HIV/AIDS and Covid 19, alcohol	Strengthening the capacity of local suppliers of goods and services; Development of partnership between regional suppliers of financial products and training and local businesses; Support for local business start-up initiatives, promoting local sourcing;		Number of services provided by local suppliers Number of local businesses operating		

		abuse, theft, violence, conflict, inflation); Potential destabilization on the internal community and local government dynamics.	Promoting savings, safe investments and banking services; Accompanying women in AGR; Support for the development of basic social infrastructure; Cooperation with United Nations agencies (UNHCR) for reconciliation and appeasement of local communities.				
			Safety and health awareness in partnership with local health professionals and community representatives		Number of awareness sessions held Awareness report		
Closing Phase							
Dismantling work, heavy machinery and vehicle traffic, rehabilitation of galleries and temporary	Air	Altered air quality	Watering the lanes of traffic machines and vehicles; Implementation of speed limit guidelines; Use of equipment that meets the required gas emission standards;		Traffic regulations published Maintenance sheet for vehicles and vehicles Level of dust fallout Level of suspended particles (PM10, PM2.5, TSP ...) Level of NO2 and SO2 in the air		

traffic lanes; Wind erosion of waste rock and tailings deposits			Implementation of regular checks of equipment, vehicles and machinery; Stopping any equipment not in service; Monitoring and monitoring of waste rock deposits; and tailings to stabilize surfaces.		Suspended particle level (PM10, PM2.5, TSP...)		
Use of machinery and construction vehicles; Wind and water erosion of waste rock and tailings deposits.	Ground	Contamination and/or pollution soils	Delimitation of non-traffic zones to vehicles in land storage areas Inspection and maintenance of equipment, vehicles and construction equipment; Controlling erosion of waste rock and tailings deposits; Prohibition of off-piste driving for vehicles and equipment Ground management awareness throughout the closure work.		Equipment and vehicle maintenance sheet Operational erosion control procedure Operational vehicle and vehicle traffic procedure		

CES/DRS work	Vegetation	Improved local vegetation cover	CES/DRS work Environmental monitoring of rehabilitated sites		Report of inventoriesforestiers Treated area Visual observation made on the site during visits by competent service officers or rehabilitated area		
Dismantling infrastructure Restoration of the site	Fauna	New habitat formation Return of wildlife	Continued implementation of wildlife and habitat protection measures; Establishing a sustainable information and awareness program related to the management of created habitats.		Wildlife attendance rates Number of awareness campaigns organized Unfaunic inventory report		
Dismantling infrastructure Restoration of the site	Landscape	Restoring the local landscape	Implementation of the final reclamation of the site		Report of the relevant services on the final condition of the site		

Stopping mining	Employment and income	Job loss Allocating workers' income	Training workers for retraining Development of facilities and activities promoting social interaction and positive behaviour for the community for the benefit of young people		Number of trained workers Types and nature facilities and activities developed		
Loss of operating dividends, direct and indirect investments, royalties and taxes	Economy	Allocating the local, regional and/or national economy Reducing spending and livelihoods	Conducted a study of the socio-economic profile of the project shutdown of the zone; Developing and implementing a plan to support the diversification of the local economy and the consolidation of the promising sectors; Strengthening the socio-economic capacity of coastal communities; Participation in the Economic Development Plan for the communities of Tchirozérine and Dannet.		Results of the socio-economic profile report Social Investment Report		
Stop supporting low-cost investment	Population and comm	Risk of declining quality of life	Conducted a societal study of the dependencies of riparian communities that takes into account water supply, health,		Results of the societal study report		

and other social services	unity change	and well-being; Change in the livelihoods and livelihoods of the Project	energy supply; Livestock; market gardening; local economy				

7.3. Environmental monitoring programme

Environmental monitoring makes it possible to verify, in the field, the accuracy of the assessment of certain impacts and the effectiveness of certain mitigation or compensation measures provided for by the ESMP and for which there is still uncertainty. The knowledge acquired through environmental monitoring will make it possible to correct the measures and possibly revise certain environmental protection standards.

The Monitoring Programme describes:

- the elements of the environment to be monitored;
- monitoring parameters;
- actions to be taken;
- monitoring indicators;
- implementation and monitoring responsibilities;
- the frequency of monitoring and
- the costs of the action to be carried out as well as the follow-up of its implementation.

The following table represents the environmental monitoring programme that will be implemented as part of the project.

Table 61 Environmental monitoring programme

Middle		Activities	Settings Followed	Frequency of Followed	Responsibility	
					Implementation	Monitoring the implementation of actions
Biophysical environment	Air	Measurements of dust fallout, suspended particles and gas emissions (CO2, CO, Nox, SO2) in sensitive areas Radiation tracking	Total dust fallout PM10 and PM2, 5 (24-hour measurement) NO2 and SO2 in concentrations over 24 hours; Short- and long-term gamma and radon measurements at the mine site and in nearby communities	Twice a year		BNEE

					Global Atomic corporation	
	Ground	Measuring the physical,chemical and biological quality of soils	Soil pollutant content	Once a year		
	Sound level and vibrations	Initial noise mapping at the beginning of operation; Measurements of noise level and vibration.		Periodic		BNEE
		Basic sound broadcasts of the new Equipment	dB	1 time at the beginning of its use		
		Vibrations generated by explosions (measured as a particle's peak velocity)	m/s	Daily during each shot		
	Surface Waters	Surface water quality analysis during the rainy season. Sampling points are selected from streams (upstream and downstream of activities) that flow from the permit site	pH and conductivity; Cyanide water content as well as organic pollution	Once a year during the rainy season		
	Underground Water	Establishing a network of sampling points and observations to Track potential changes in groundwater quantity and quality	Volume and flow of water pumped from the catchment field and underground operations (pump flows can be used); The rate and volume of water used and recycled at the mine site;			

		Analysis of the physical-chemical quality of exhaure waters; Regular water measurements of existing wells/drilling in riparian villages.	Groundwater levels in the village wells and boreholes in the drawdown cone; Groundwater quality at the mine site and in nearby communities for the following parameters: pH, Eh, MDT, alkalinity, T-, dissolved oxygen, nitrate, chloride, alpha and global beta activity, fluoride, sulphate, phosphate, Na, K, Ca, Mg, Al, Cr, Fe, Mn, B, Cu, Zn, As, Se, Mo, V and U	Periodic		
	Climate	Installing weather stations on site; Tracking weather parameters (rainfall, humidity, temperature, etc.)	Weather conditions at the site (wind, precipitation, temperatures)	Periodic		
	Radiation	Radiological analysis of the food chain (soil, air, water, vegetation, cheese)	Short- and long-term gamma and radon measurements at the mine site and in nearby communities	Quarterly		
	Vegetation	Evolution of vegetation cover by area unit Inventory of the main types of vegetation cover and their biodiversity	Vegetable cover rate Phytosociological and surficial monitoring of pilot plots	Annual		
	Fauna	Recordings of major wildlife sightings	Evolution of wildlife populations and avifauna; Biodiversity monitoring	Annual		
	Waste	Waste management system checks	Volume of different types of waste disposed of in waste dumps or disposed of in hazardous waste dumps;			

			Volume of different types of wasterecycleed or reused	Periodic		
Human environment	Employment and income	Source of employees (for the Customer and its operators) categorized by: ✓ Skill level ✓ If they are local, ✓ region, country, and/or foreigners ✓ ethnic group sex.	Percentage of employees in each category	Continues for the life of the Project		
	Local content	Origin of operators and suppliers (local, regional, country, and/or international)	Percentage	Once a year		
	Safety and Health	Health monitoring of workers and populations in the project area	Prevalence rate of communicable diseases: STIs, tuberculosis and respiratory tract infections; Malaria; Diarrhea	Twice a year for workers		
		Radiological monitoring of workers	Workers' radiological dose level	Periodic		
		Preventable accidents and incidents	Number and type of incidents	Twice a year for workers		
	Archaeology and cultural patrimony	Moving cemeteries/cultural sites impacted to the satisfaction of affected persons and regulators	Number and type of sites displaced	Twice a year for workers		
	Participation in the Local Economy	Creating Databases for Jobs and Business Opportunities Organizing workshops to identify and evaluate local businesses	Database	Once a year		

	population and community change	General social surveillance using secondary sources available with Household questionnaires to assess: ✓ The population ✓ The frequency of misdemeanors ✓ the frequency of social diseases (alcoholism, prostitution, drug addiction) ✓ access to social infrastructure, such as schools, health centres, credit facilities, religious centres, water supply and sanitation.	Access to basic social services	Once a year		

7.4. Stakeholder capacity building programme

7.4.1. Actors implementing the measures and monitoring control

The main actors for the implementation of the measures and environmental monitoring and control of the ESMP of the Adrar Emoles 3 exploration permit are:

- National Environmental Assessment Office (NEAO);
- Global Atomic Corporation;
- Niger's High Atomic Energy Authority (HANEA)
- Directorate General for Sustainable Development (DGSD);
- Directorate General of Water and Forests (DGE/F);
- Direction des Mines et des Carrières (DMC) of the Ministry of Mines;
- Direction de l'Environnement Minier et des Etablissements Classés (DEM/CE) of the Ministry of Mines;
- Occupational Health and Safety Directorate of the Ministry of Employment, Labour and Social Protection;
- Directorate of Public Hygiene and Health Education (DHPES) of the Ministry of Public Health, Population and Social Affairs;
- Regional Directorate for the Environment and the Fight against Desertification (DRE/LCD) of Agadez;
- Regional Mining Directorate of Agadez;
- Regional Directorate of Hydraulics and Sanitation;
- Regional Livestock Directorate;
- Regional Labour Inspection (IRT) of Agadez;
- Communes of Tchirozérine and Dannet;
- Service providers;
- Civil society organisations.

7.4.2. Roles of the actors

The roles of the actors in the implementation and environmental monitoring and control of the project's ESMP are defined in Table 62 below.

Table 62 Roles of actors in implementing and monitoring the ESMP

Actors	Roles in the implementation of the GSP
Global Atomic Fuels Corporation	• **Prepare with the execution structures, a program work** • **Liaison between the various institutions involved in the implementation of mitigation measures** • **Implementation of the measures in the GSP** • **Keep a consistent environmental watch for the success of the Environmental and Social Management Plan (GSP)**
National Environmental Assessment Office	• **Implementation of monitoring activities and follow-up of the project's Environmental and Social Management Plan (GSP)** • **Ensuring that contractual environmental commitments are met**
General Directorate of Mines and Careers	• **Participate in environmental monitoring and monitoring missions** • **Ensure respect and preservation of the environment as part of the project**
• The National Radiation Protection Center; • The Directorate General of Environment and Sustainable Development; • The General Directorate of Waters and Forests The Regional Directorate of Environment and Development Sustainable Agadez; • The Regional Directorate of Mines of Agadez; • The Regional Directorate of Hydraulics and the Sanitation of Agadez; • Agadez Regional Directorate of Public Health; • The Agadez Work Inspectorate; • The Municipalities of Tchirozerin and Dannet; • The customary chiefs of the area • socio-professional groups/organisations • Civil society organizations	**These structures will be involved in monitoring and monitoring the implementation of the project's Environmental and Social Management Plan (PGES)**

7.4.3. Capacity building needs of actors

In order to build the capacity of those involved in the implementation and monitoring of the Environmental and Social Management Plan (ESMP) for the Adrar Emoles 3

exploration permit project, training courses are planned at the end of this study. The topics and related costs are shown in Table 63 & 64 below.

Table 63 Training Themes and Targets of training courses

Training themes	Targets
• **Environmental and social issues of the project** • **Analysis of contract construction documents** • **Mastering the requirements of the Environmental and Social Clauses,**	• Global Atomic Fuels Corporation • Executives of the National Environmental Assessment Office • Executives of the General Directorate of Mines and Careers • Agadez Regional Council • Regional Directorate of Mines • Regional Environment Directorate • Representatives of the Municipalities of Tchirozerin and Dannet
• **Environmental monitoring of mining work,** • **Monitoring the implementation of the mining project PGES,** • **Development and use of tracking sheets,** • **Writing follow-up reports and monitoring**	• Global Atomic Fuels Corporation • Executives of the National Environmental Assessment Office • Executives of the General Directorate of Mines and Careers • National Radiation Protection Centre; • Representative of the Directorate General of Environment and Sustainable Development; • Representative of the General Directorate of Waters and Forests • Representative of the Agadez Regional Council • Representative of the Regional Directorate of Environment and Sustainable Development of Agadez • Representative of the Regional Directorate of Mines of Agadez; • Representative of the Regional Directorate of Hydraulics and Sanitation of Agadez • Representative of the Regional Directorate of Public Health of Agadez • Agadez Labour Inspectorate Representative • Elected from the Municipalities of Tchirozerin and Dannet; • Customary chiefs of the area; • Representative of the Opinion Leaders of the area • Representing socio-professional groups/organisations • Representing civil society organizations.
• raining in follow-up rehabilitation and closure plan	• Global Atomic Fuels Corporation • Executives of the National Environmental Assessment Office • Executives of the General Directorate of Mines and Careers • Representative of the National Radiation Protection Center • Representative of the Directorate General of Environment and Sustainable Development; • Representative of the General Directorate of Waters and Forests • Representative of the Agadez Regional Council • Representative of the Regional Directorate of Mines of Agadez; • Representative of the Regional Directorate of Environment and Sustainable Development of Agadez

	• Representative of the Regional Directorate of Water and Sanitation of Agadez • Representing Civil Society Organizations.
• Training on the dangers of ionizing radiation	• Global Atomic Fuels Corporation • Executives of the National Environmental Assessment Office • Executives of the General Directorate of Mines and Careers • Representative of the Regional Directorate of Mines of Agadez; • Representative of the Regional Directorate of Waters and Forests • Representative of the Agadez Regional Council • Representative of the National Radiation Protection Center

Table 64 Topics and costs of training courses

Topic	Cost in Frans CFA
Implementation of PGES **Analysis of contract construction documents** **Mastering the requirements of environmental and social clauses**	15 000 000
Environmental monitoring of mining work, **Monitoring the implementation of the mining project PGES,** **Development and use of tracking sheets,** **Writing follow-up reports and monitoring**	**25 000 000**
Training followed by closure and redevelopment plan	15 000 000
Training on the dangers of ionizing radiation	12 000 000
Logistics support (2 vehicles): BNEE and the Ministry of Mines	45 000 000
TOTAL	**112 000 000**

7.5. Summary of ESMP costs

The overall cost of the ESMP for the project is estimated at 456,000,000 FCFA as shown in table 65 below.

Table 65 Overall cost of the ESMP

Topic	Cost in CFA Francs
Program to implement mitigation measures and enhance impacts	344 000 000
Preliminary Capacity Building Program	112 000 000
TOTAL	**456 000 000**

7.6. Implementation of the ESMS within GAC

In order to implement the various elements of the ESIA and environmental management and monitoring commitments agreed with the National Environmental Assessment Office and the General Directorate of Mines and Quarries, a series of policies, management plans and some associated procedures have been developed. This is also in order to align with Good International Industry Practice (GIIP) and the requirements of the Equator Principles. These documents for part of the Environmental and Social Management System (ESMS) which will be developed at site.

A management system is a set of policies, tools, procedures, and internal capacity to manage the environmental and social risks of the Project. A management system aids in

assessing and controlling risks. A management system should be fit for purpose and designed to meet performance standards that are relevant to the Project and potential Project lenders or shareholders.

The ESMS is currently in development and will take into account the findings of the ESIA and the resulting requirements for implementation and management of mitigation and monitoring. Key elements are defined in this chapter. Continual improvement of the ESMS will be undertaken throughout construction and the life of mine. The implementation of the ESMS will aim to minimise and mitigate potential environmental and social effects whilst simultaneously promoting health, safety, social and environmental standards of the Niger regulatory agencies and associated international lending institutions.

The effectiveness and appropriateness of the ESMS will be regularly reviewed by GAC's HSE committee and reported on at quarterly meetings.

The planning phase of the ESMS includes:

- Periodic review of applicable laws, regulation, policies and guidelines;
- Identification of any existing environmental and social baseline conditions and anticipated impacts identified within the IA;
- Definition of required mitigation and management to limit significant impacts;
- Definition of ongoing monitoring requirements;
- Definition of internal performance criteria;
- Development of community development initiatives to beneficially contribute to the long-term sustainability of local communities;
- Establishment of health, safety, environment and community targets;
    - Establishment of monitoring programmes including data management systems and reporting;
    - Identification of internal and external resourcing needs, roles, responsibilities, and chains of command required to deliver the provisions of the ESMS;
    - Training programmes; and
    - Implementation schedule and budget.

The ESMS will require continual reviewing and updating as the final configuration of the operation is designed in detail.

7.7. ESG Policies

A number of corporate policies relating to Environmental, Social and Governance have been developed and implemented by Global Atomic. These policies are available on the Global Atomic website. The policies are as follows:

- Code of Business Conduct and Ethics
- Environmental and Social Policy
- Sustainability Policy

- Whistleblower Policy
- Majority Voting Policy

7.7.1. Environmental and Social Management Plan

7.7.1.1 Management Plans

A set of Management Plans covering environmental and social aspects have been developed for the Project, these cover the construction period in detail, and will be updated to cover the operational period in detail, once construction is nearing completion. Environmental and Social Management for closure is covered in high level in both the Conceptual Mine Closure Plan as well as in topic specific management Plans. Nearing the end of operations these plans will be updated to describe detailed closure requirements. The management plans developed for the Project are as follows:

Plan
Environment Social Management System ("ESMS") framework
Health and Safety including radiological protection of workers
Human Resources (including GBV in the workplace, forced labour, child labour etc)
Water Management Plan
Air quality and GHG
Noise and vibration
Hazardous materials (including NORM)
Waste Management
Mine Waste Management (geochemistry, waste rock and tailings)
Chance Find Procedure, archaeology and cultural heritage
Community Health, Safety and Security (including Human Rights, influx, VPHSR and a focus on IPs)
Stakeholder Engagement Plan and Grievance Mechanism
Biodiversity Management Plan
Contractor Environmental Management
Emergency Preparedness & Response Plan
Conceptual Closure Plan

GAC is responsible for ensuring that the implementation of the above management plans and monitoring strategies is effective across the life of the mine. Suitable staff, equipment, reporting mechanisms and financial resources will be necessary to implement the ESMS. The Management Plans will be incorporated into the ESMS. Many of the plans require activities to be carried out in a certain order, or a certain way, in order to achieve the impact elimination/reduction/mitigation.

These will be carefully reviewed and incorporated into the various construction contracts, as the activities will be carried out by third parties not GAC themselves. This will be

achieved through specific contract clauses, and in the case of key contracts, the requirement for contractors to have their own ESMS and/or develop site specific Environmental Management Plans. In the case of less experienced local contractors, GAC will provide support in developing these plans.

All management plans are “live” documents meaning they will be under continuous review to ensure items are implemented within the required time frame, and prior to certain activities occurring on site. All management plans will be reviewed no less than annually, or when any material changes to the Project or project related activities are realised.

7.7.2. Organizational Capacity and Commitment

A Health, Safety and Environment (HSE) Committee has been established at GAC to assist the Board in fulfilling its oversight responsibilities by reviewing and monitoring any matters relating to the management of workplace, community or environmental impacts, the management of stakeholder relationships (including relevant aspects of human resources), and permitting and relevant regulatory risks. It will provide scrutiny of and guidance to executive management on these issues.

The Implementation, management and monitoring of the ESMS will be the responsibility of the Health, Safety and Environmental Manager for the Dasa Project, who reports directly to the General Manager for the Project. The Environmental team on site comprises a Site Manager, HSE Manager and CSR Manager who have the day-to-day responsibility of ensuring that the actions of the ESMS are implemented. The social team is led by a Coordinator for Social Management and Human Resources Manager. The specific duties of the HSE team include:

- Compliance with legal and permitting requirements for the Project, in regard to environmental and social aspects;
- Compliance with international best practice requirements, including US International Development Finance Corporation (DFC) and Economic Development Canada (EDC) policies;
- Ensuring the implementation of the ESMS throughout the life of the Project;
- Development, Review and implementation of construction and operational management plans;
- Review, oversight and implementation of the ESIA;
- Ensuring that employees and contractors receive required training on the ESMS and specific ESMS aspects, as appropriate;
- Reporting to the Vice President ESG and the HSE Committee on E&S performance;
- Monitoring and Reporting on the ESMS activities;
- Operate within and promote GAC’s core values and ESG strategy;
- Be the main point of contact for ESG-related initiatives within the company; working and aligning closely with senior leadership (and participating in relevant ESG committee meetings) to develop and implement new ESG policies and action plans;

- Act as a catalyst for positive change on key ESG themes, including community relations, water issues, tailings management and transparency;
- Drive improvements in ESG and overall sustainability performance;
- Provide material and insights in support of developing external communications for Investor Relations and leadership engagements;
- Manage relationships on ESG issues with relevant external bodies;
- Drive the implementation of GAC's ESG strategy in coordination with senior leadership, relevant departments and third-party providers;
- Develop metrics and related KPIs/targets to monitor and improve ESG performance across the company;
- Collect and analyse ESG data at the asset and corporate levels;
- Develop with the Vice President ESG a strategy for the company's engagements with community, relevant international organisations and civil society;
- In coordination with the Vice President ESG, lead community and civil society engagement;
- Plan and oversee social investment and, working together with other managers, promote local hiring and procurement;
- Develop relationships with internal stakeholders to support the further integration of ESG in GAC's operations and strategic decision-making;
- Support communications and investor relations in developing relevant content, including for publishing on GAC's external communication channels (website, social media, etc.);
- In coordination with the Vice President ESG monitor ESG trends, standards and initiatives on an ongoing basis.

7.7.3. Monitoring and Reporting

7.7.3.1. Overview of Monitoring

Following the baseline monitoring period, environmental and social monitoring will be undertaken throughout all phases of the Project as follows:

- Construction: Routine monitoring including visual inspections and oversight of contractor activities;
- Operations: monitoring for environmental compliance, and occupational and community health and safety. Routine monitoring of operations and the conduct of personnel through visual inspections and oversight, monitoring of key environmental parameters such as air quality, water quality, noise and biodiversity aspects;
- Social Monitoring: Monitoring of grievances and feedback from project affected persons;
- Employment and Procurement Monitoring: Oversight and monitoring of the

implementation of the local procurement and employment strategies;

- Closure and post-closure monitoring: ambient and emissions monitoring during earth works and activities for closure/rehabilitation. Post-closure monitoring of the baseline conditions for contaminants and environmental condition (slope stability, soils, vegetation cover and resilience, water quality).

Monitoring programmes for each environmental discipline are defined in the relative management plans.

7.7.3.2. Reporting

Incident Reporting

An incident is defined as any event that impacts, or potentially impacts, on the environment, community, or health, safety and security of employees or community members, or any activity that results in regulatory non-compliance, in breach of company policies, standards or commitments.

The following events will constitute an incident:

- Community incidents and grievances;
- Accidental spills of chemicals or fuel outside of bunded or dedicated areas;
- Fires within operation areas;
- Injury or near miss hazards;
- Environmental incidents or activities prohibited as per permitting requirements, including:
    - Noise emissions;
    - Air Quality;
    - Biodiversity – unauthorised vegetation clearance, injury or impact to fauna species;
    - Waste management and Waters and groundwaters.

Incident reporting will be managed in accordance with the ESMS and SEP. Incidents will be logged, assessed and reported to the HSE Committee. All incidents will be publicly disclosed, in accordance with the Stakeholder Engagement Plan and Emergency Preparedness and Response Procedure.

Environmental and Social Reporting

Quarterly Environmental Social Governance reports will be produced alongside the stakeholder engagement reports. Quarterly reporting will summarise activities that have been undertaken and any incidents that have occurred. The reports will be provided to the HSE Committee.

Reporting to lenders or shareholders on ESG related aspects will be required. The schedule for this reporting will be determined as part of any deal process.

7.8. Management of Change

GAC will keep the ESMS under constant review. Detailed review will be undertaken no less than annually, when the Project is nearing the proceeding phase, when material changes to the Project design or activities are required, when an incident occurs or when a community grievance is received.

Management of change (MOC) is a systematic approach to organizational changes with the aim of ensuring the continued environmental, social and safety performance of the project throughout the process. These systematic processes ensures that the change is dealt with in a proactive fashion. While this section focuses on MOC related to the ESIA and ESMS, the company MOC process will ensure that Environmental, Social and Governance implications of significant changes are considered alongside technical, financial, safety and workforce aspects, and given appropriate weightings.

Changes in the Project may occur due to future project developments, for example the ESIA is being undertaken prior to detailed design stage. Adaptive changes may also occur during Project commissioning and operations. The Management of Change process will be initiated when a significant change (as defined above) to either project design elements or ways of working, other than those defined in the Feasibility Study, ESIA, national permits and detailed design, is identified. This might be things like a change in project footprint or road routing, or the use of a new chemical in significant quantities in the process plant. The Process for dealing with Project changes and uncertainty should recognise levels of change/ uncertainty as outlined below.

- Minor Significance – Level One, where the change or uncertainty is largely deemed to be immaterial to the ESIA findings and national permit conditions and does not affect the Project's ability to meet social performance requirements outlined in the ESMS. This level of change may require additional but limited environmental or social study or survey actions.
- Moderate Significance – Level two, where the change or uncertainty is thought to be material to the EIA findings, but is within the boundaries of the defined Project base-case covered by this ESIA. This level may require minor changes to the ESMS and additional surveys or environmental and social assessments.
- High Significance – Level three, where a future significant change or uncertainty leads to a departure from the base-case scenario, or a key aspect of it. An addendum to the ESIA, or a new ESIA and formal submission and approval process is required.

This process will ensure the Project is able to adapt to changes whilst meeting the relevant environmental and social performance requirements.

7.9. Emergency Preparedness and Response

An Emergency Preparedness and Response Plan (EPRP) has been developed for the Dasa Project. The plan describes the Emergency Preparedness and Response Process which will be implemented and supported by specific Response Plans during the construction, commissioning and operational phases of the Dasa Project. The EPRP has been developed to describe the standards and specific procedures that will be followed

by ADT and its contractors in the event of an emergency related to the Project.

A risk assessment for the Project was undertaken as part of the engineering studies, this will be reviewed during the detailed design phase, and then annually, or when any material changes to the Project Design or activities are made. The EPRP has been developed based on the existing risk assessment and will be updated with each iteration of the assessment. Currently, the EPRP covers the following types of emergency:

- an incident resulting in fatality;
- an incident resulting in major injuries;
- fire, bushfire and/or explosion;
- weather/climate;
- hazardous chemical/oil spill on water or land;
- rescue from height/depth or confined space;
- vehicle/equipment accident;
- Significant developments with management of the Tailings Storage Facility;
- Air quality monitoring;
- building evacuation;
- earthquake;
- haul road or public road; and
- river/watercourse incident.

The EPRP is triggered when an incident (i.e., accident, fire, spill, personal injury, etc.) occurs that is beyond the control of the personnel currently at the scene. Implementation of this plan is intended to mitigate or protect Project personnel, contractors, assets and the surrounding communities from injury; prevent contamination of surrounding surface and ground waters with hazardous materials; prevent damage to the environment and in particular fauna and flora; provide fire-fighting procedures and describe other emergency response procedures that may be required at the site.

Specific emergency response procedures are detailed in the EPRP. General measures include the following:

- Immediate reporting of the incident to the Emergency Response Control Room;
- Deployment of Emergency Response Team and Emergency Management Team;
- Determination of the emergency response level (Incident, emergency or crisis);
- Detecting incidents and raising the alarm;
- Evacuating personnel to predetermined points of safety and provision of emergency first aid treatment;
- Systematic and safe shut-down of operations during incidents;
- Designation of a central incident control location for major incidents;

- Containment / control of hazardous materials / situations;
- Search and rescue;
- The removal and/or protection of vital equipment, materials and documents;
- All clear and re-entry procedure;
- Contacts with the authorities, the media and, as appropriate, with the local community (e.g. provision of counselling or other support for any casualties and their families);
- Fire prevention; and
- Medical emergencies.

An inspection and audit program will be developed by GAC and contractors to ensure that emergency preparedness and response procedures are being followed. Regular EPRP monitoring and reporting will be undertaken via the monthly EHS Report that will be prepared and submitted to the General Manager. Reporting will include:

- A summary of activities undertaken during the reporting period;
- Any deviations or non-compliances to the EPRP;
- Planned activities during the next reporting period; and
- Any other issues of concern.

GAC will implement a community awareness programme to ensure that nearby communities are prepared for emergencies that may occur, through an Awareness and Preparedness for Emergencies at local Level (APELL) process (UNEP 2001), or similar. Through the Coordinator for Social Management and/or the Environmental and Social Manager, information will be provided to local communities and authorities on GAC Metal's strategy for emergency preparedness and response through the provision of information particularly in the areas of:

- Transport accidents;
- Natural disasters;
- Health and wellbeing; and
- Road safety and traffic awareness.

The APELL process is defined in the Emergency Preparedness and Response Plan and details a ten-step communication tool for external communications. This strategy is in place to manage incidents that have the potential to affect proximate stakeholders, including other industrial activity.

CONCLUSION

The project to mine the deposits of the Adrar Emoles 3 research permit is in line with the strategic development documents drawn up and implemented by the Government. These include the National Policy on the Environment and Sustainable Development, the National Environment Plan for Sustainable Development (PNEDD), the Sustainable Development and Inclusive Growth Strategy (SDDCI Niger 2035), the Economic and Social Development Plan (PDES 2022-2026), the National Mining Policy adopted in 2020 and covering the period 2020-2029, etc.

This project will have particularly important positive impacts, including: the creation of direct and indirect jobs, the improvement of incomes, the improvement of the turnover of companies and subcontractors, the improvement of tax revenues at local, regional and national level through the payment of taxes, fees, etc. It will improve the level of investment and consequently of infrastructure (health, water, schools, roads, etc.) in the area concerned. This is one of the objectives of its implementation.

Despite the above positive impacts, the project will have potential negative impacts on elements of the biophysical and human environment of the area.

Thus, on the elements of the biophysical environment, these impacts are the disruption of the soil structure and its pollution by solid and liquid waste, oil and hydrocarbon leaks from the machines, and radiological contamination, the modification of the quality of the ambient air, the drop in the level of the water table and the potential contamination of water (physicochemical, bacteriological and radiological contamination), the destruction of vegetation, the destruction of fauna habitats and the disruption of its tranquility, etc.

On the human environment, the negative impacts of the project are the modification of the visual quality of the landscape, the risk of accidents and injuries, the increased risk of environmental and transmissible diseases, the risk of exposure to thermal environments, the risk of radiological contamination, the modification of the noise and vibration environment, the disruption of pastoral activities, the disruption of local customs and traditions and the risk of damage to cultural and archaeological heritage.

To avoid, mitigate or manage the above impacts, measures have been proposed. As for the elements of the biophysical environment, the measures include the restoration of disturbed sites after the works, the implementation of a management system for solid and liquid waste that will be generated, the implementation of an emergency plan that will make it possible to avoid and/or deal with accidental spills and hydrocarbon leaks, the implementation of watertight platforms to ensure the storage and distribution of hydrocarbons as well as the maintenance of the machines, the suppression of dust through regular watering whenever necessary maintaining mobile and fixed machinery in good working order, carrying out CES/DRS actions, raising awareness and training workers in rational water management, raising workers' awareness of the importance of fauna and respect for its habitats during the works, monitoring air quality, monitoring water quality, monitoring soil quality, monitoring meteorological parameters, etc.

With regard to the human environment, the measures will concern the sensitisation of workers, extended to the local communities, on the risks linked to the project, the setting

up of an Internal Operations Plan (IOP), the health monitoring of workers through medical visits, the provision of workers with appropriate individual protection equipment and of the site with collective protection equipment, the setting up of an infirmary, the setting up of an Occupational Health and Safety Committee and its training with a view to making it operational, the monitoring of the noise environment, monitoring of the food chain, support to pastoralists by providing them with cattle food banks, construction of hydraulic works, sensitisation of the company's workers and subcontractors on the respect of traditional practices, customs and traditions of the local populations, sensitisation on the respect of the cultural and archaeological heritage in the project area, implementation of a procedure relating to fortuitous discoveries and training of the personnel so that they know how to recognise, deal with and react to these discoveries, etc.

To define the conditions for the operational implementation of the measures proposed in the study, an Environmental and Social Management Plan (ESMP) has been drawn up and is structured around the following programmes: Impact mitigation and/or improvement programmes, Environmental monitoring programme, Environmental follow-up programme and Stakeholder capacity building programme.

APPENDICES

Appendix 1: Bibliographical references

Appendix 2: Biodiversity report - dry season

Appendix 3: Biodiversity report - rainy season

Appendix 4: Biodiversity Management Plan

Appendix 5: Groundwater piezometric study

Appendix 6: Radiological survey

Appendix 7: Cultural & Archaeological Heritage Report, Chance Find Procedures

Appendix 8: Stakeholder Engagement Plan

Appendix 9: Gender-Based Violence Plan

Appendix 10: Workforce Management Procedures

Appendix 11: Health, Safety and Security Plan

Appendix 12: Emergency Management Plan

Appendix 13: Closure Plan