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AUGUST 2012
MINISTRY OF SUSTAINABLE DEVELOPMENT AND TOURISM OF MONTENEGRO
ENVIRONMENTAL PROTECTION AGENCY

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT OF NATIONAL HAZARDOUS WASTE DISPOSAL FACILITY

WORLD BANK ESIA AND SAFEGUARD STUDY FOR NATIONAL WASTE DISPOSAL FACILITY

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APPENDICES

1 Executive Summary and non-technical description

The Ministry of Sustainable Development and Tourism and the Environmental Protection Agency (EPA) of Montenegro are preparing the Industrial Waste Management and Clean-up Project (IWMCP) with the objective to reduce the environmental and health risks posed by selected industrial waste disposal sites and to strengthen the local institutional capacity for regulation and management of industrial and hazardous waste. The project implementation is expected to be funded with financial support from the World Bank (WB).

Component 2 of the IWMCP comprises establishment of a national hazardous waste disposal facility (HWF). The objective is to develop a facility for reception and safe disposal of hazardous waste material originating from contaminated sites and from ongoing industrial activities. A study for identification of sites suitable for establishment of the HWF is carried out by the consortium of the companies Ecorem and Hydroplan, hereafter just called Ecorem.

The present document is a generic framework ESIA prepared according to agreement with the EPA and the WB based on information available for the shortlisted sites in June 2012 at the stage of a very preliminary design of the facility. The ESIA was prepared following the WB guideline. During the next phase of the project implementation with more detailed design of the waste facility site, a more detailed EIA following the National legislation will be undertaken.

The differences between the WB guideline and national legislation are that the WB guideline requires two public consultations, whereas national legislation only requires one public consultation, social and economical issues are required by national legislation, but not to the same extent as by the WB guidelines. National legislation requires data on population and site development as part of chapter "Site description" and consideration of impacts to local inhabitants as part of chapter "Possible impacts", including possible migration for the above impact from the project. The ESIA which will be executed as part of the detail design will follow both the WB policies as well as the Montengrin Legislation.

The current situation in Montenegro regarding hazardous waste handling cannot be considered as being sustainable due to a high potential risk of spreading of

contaminants and the impact on the environment and on human health. The establishment of the hazardous waste facility is proposed to ensure a safe and environmental-friendly way of hazardous waste storage with significantly lower risk of exposure compared to the present situation.

In the current situation, a significant risk of human exposure to hazardous waste cannot be excluded due to uncontrolled storage. After establishing the hazardous waste disposal site, the waste will be disposed under controlled conditions and the risk of human exposure is considerably reduced. The overall environmental impact after establishing the solid hazardous waste facility are described below:

- Air. The facility will practically eliminate the risk for evaporation and spread of contamintants to the air with a significant positive impact from the HWF.

- Soil. The waste will be disposed under controlled conditions and the facility will practically eliminate the risk of soil contamination. The facility will have a significant positive impact.

- Groundwater. The waste is disposed under controlled conditions and the facility will practically eliminate the risk of groundwater contamination resulting in significant positive impact from the HWF.

- Surface water. The waste is disposed under controlled conditions and the facility will practically eliminate the risk for impact on surface water. The HWF will have a significant positive impact on the environment.

- Health and safety. The facility will practically eliminate the risk for humans and only trained people will handle the chemicals. The HWF will have a significant positive impact.

Ecorem has prepared a long list of potential sites for location of a hazardous waste facility site. The following 10 locations were included in the long list:

- Bar area - Mozura Site
- Podgorica area – Regional Sanitary Landfill Meadows
- Podgorica area – Aluminium Plant KAP
- Nikšić area – Nikšić Steel Plant Landfill
- Nikšić area – Bauxite Mine
- Nikšić area – Budos Site
- Pljevlja area – Sumane Site
- Pljevlja area - Maljevac Ash and Slag Landfill
- Pljevlja area - Borvica Surface Mine
- Pljevlja area - Repetitor Site

Based on the long list and further evaluation of technical and environmental parameters, Ecorem has prepared a shortlist with three sites as potential locations for the hazardous waste disposal facility based on investigations completed in June 2012. The sites were evaluated and given a score dependend on the setting, technical aspect, environmental impacts and social impacts. The shortlist includes

the KAP Aluminium Plant site, Nikšić Steel Plant Landfill site and Sumane Open Mine site.

By further evaluation, the Environmental Protection Agency has excluded the location in Pljevlja, due to site location in the far north of Montenegro and thus at great distance from the rest of the country and the producers of hazardous waste. This location would greatly increase the cost for use and transport. In addition, the site is sometimes very difficult accessible in wintertime because of snow and the site is situated in the direct vicinity of habitations and agricultural land. Hereafter, the Environmental Agency has limited the potential sites for hazardous waste facility to:

- Current landfill site of Steel Plant, Nikšić: score 77
- Brownfield site of KAP, Podgorica; score 75

The final selection for the location of the hazardous waste site has not yet been decided and additional evaluations of the potential sites will be carried out during the next phase of the project. The main advantages and disadvantages of the two sites are presented below.

Assessment of the location "Brownfield site at KAP"

Main advantages

- The site is centrally located in Montenegro and thus fairly closes to most producers of HW. It is very easily accessible by road and railroad and the land is partly privately and publicly owned.
- The available surface of 6 ha should be sufficient to accommodate the HW disposal facility. The land is also even and the stability of the subsoil is good.
- The site is a brownfield with very low aesthetic value and requires remediation and the remediation works and the construction of a HW disposal facility could be combined.
- The rather poor visibility from the closest settlements is an additional advantage.

Main disadvanges

- The site is close to agricultural land and is situated between water protection zones.

Nikšić Steel Plant Dumpsite

Main advantages

- The former waste disposal site of the steel plant at Nikšić is centrally located in Montenegro and thus fairly close to most producers of hazardous waste. It also very good accessibility by road and railroad. The available surface in the northern part of the disposal area is 3 ha, which should be sufficient for the construction of the HW disposal facility.

- The waste disposal from the steel plant is mainly composed of slag and present enough bearing capacity to construct a disposal facility on top.

- Because the waste disposal needs to be remediated, the de-pollution and stabilization measures, such as extensive profiling, appropriate surface treatment, or the reconstruction of one of the dumpsites can be combined with the construction of a hazardous waste disposal facility, potentially through a Public Private Partnership (PPP). This could have a positive impact on the total project costs. The closest habitations are at a fair distance to the site, and the site is hardly visible from the road or inhabitat areas.

Main disadvantage

- The land is privately owned.

- The southern part of the steel plant waste disposal is situated on a steep slope and is directly alongside the River Gračanica. Incorporation of this southern part for construction and operation of a HW disposal facility is not recommended.

The following alternatives are considered:

- 0-altenative is “doing nothing” which means no establishing of a hazardous waste facility. The consequence is that hazardous waste will continuing to be stored and deposited in uncontrolled ways with extensive risks to the environment and to human health

- Export of all hazardous waste is an alternative to establishing a hazardous waste storage facility in Montenegro albeit at much higher costs and not cost effective. Furthermore, a facility for collection/transport of hazardous waste will still be needed. The hazardous waste would be repacked at this facility and transported out of Montenegro. The exported waste shall then be disposed/treated at an approved and licensed facility outside Montenegro. The cost for establishing deposit for the hazardous waste would be limited if the waste is exported whereas the cost for transport and fee for disposal/treatment at facility outside Montenegro would increase. The advantage of the central facility is the possibility of capacity building which will ensure correct handling of hazardous waste. Without a central collection facility the risk of incorrect handling of the hazardous waste will increase.

- For the location of a central facility, based on vulnerability maps of Montenegro, ten possible suitable locations were evaluated, out of which the locations of KAP and Nikšić are the most suitable.

Mitigating measures construction phase

The present document contains assessment of impacts during the HWF construction phase and during the HWF operation phase for the two options of the facility location. The environmental and social impacts from the construction phase will mainly be related to dust during soil works, to working with contaminated soil and/or waste and to increased traffic during the construction period. The impacts during the HWF operation phase will be relatively limited, provided that the landfill is constructed and operated according to EU standards. The landfill will receive and dispose of solid hazardous waste and thus should pose lower risks than a facility that receives liquid hazardous waste.

The most important mitigation measures during the construction phase of the hazardous waste facility include inter alia:

- Material supply and transport: Using approved and licensed borrow pits or buying material from licensed companies for production of stone fractions and clay. Material shall be wet or the trucks shall be covered.
- Dust: Watering during dry periods as a dust prevention.
- Handling of oil and fuel used for Contractor's vehicles and machinery: No oil products or drums containing chemicals must be placed directly on the ground, and for KAP, oil and fuel must be stored with secondary containment. The KAP site is located on sensitive groundwater resource and between groundwater protection zones.
- Traffic and traffic management plan. The route net near KAP is well developed and heavy traffic in this area is common. In Nikšić, the traffic might pass thought the outskirt of Nikšić city. Transportation through urban areas during rush hours should be avoided or directed to the roads with less traffic. Also traffic passing through residential areas, particularly near schools and hospitals, should be avoided.
- Protection of soil groundwater and surface water: Storage areas for various materials shall be located away from surface water and, if necessary, the surface shall be covered to prevent leakage. Washing areas of concrete trucks and other equipment should not be placed on permeable soil and the water shall not be draining directly into the ground. Installation of a small temporary water treatment plant might be necessary
- Waste collectors: Nikšić : There are 30 to 50 waste collectors with usually 15 collectors each day. The waste collectors shall be compensated. There are no waste collectors at KAP.

Mitigation measures operational phase

The most important mitigation measures during the operation phase of the hazardous waste facility include inter alia

- Work safety with safety instructions and protective equipment (gloves, boots, working suits, masks).
- Accident at location: Provide a sufficient quantity of water against fire, and provide other fire extinguishing agents and prepare emergency response plan.
- Temporary storage of hazardous waste before final disposal with clear separation of various incoming waste. Any waste showing sign of leakage should be placed on separate section and all temporary stored waste shall be coved to prevent dust formation.
- Accident during transport of chemicals to the site: The most direct route to the site shall be taken and transport of hazardous waste shall only be done by licensed companies. The licensed companies shall develop a respond plan in case of accidents.
- Groundwater or river water: Leachate management system including leak detection system.
- Noise: The operation will include a limited munber of equipment including bulldozer, waste compactor, and vehicles for waste transport. Limiting operation hours on the landfill e.g. 07 – 20 h.

Mitigation measures during closure phase

The most important mitigation measures during the closure phase of the hazardous waste facility include inter alia:

- The operator shall prepare a closure plan based on the knowledge of stored chemicals
- A final cover system shall be installed for preventing leakage and erosion of the landfill cells.
- The permeability of the final cover must be less than the underlying liner system to prevent bath tube effect.
- Vegetation of the surface (not using plants with deep roots) to limit the percolation of rainwater.
- Access to the site should be prevented by a fence.
- Groundwater shall be monitored in downstram monitoring wells

Impact on groundwater, surface water and air will be monitored regularly during both the construction phase and the operation phase

2 Objective of the Project

The Ministry of Sustainable Development and Tourism and the Environmental Protection Agency (EPA) of Montenegro are preparing the Industrial Waste Management and Clean-up Project (IWMCP) with the objective to reduce the environmental and health risks posed by selected industrial waste disposal sites and to strengthen the local institutional capacity for regulation and management of industrial and hazardous waste. The project implementation is expected to be funded with involvement of the World Bank.

Component 1 of the IWMCP comprises investigation and subsequently remediation of 5 selected contaminated industrial sites. The following sites have been selected:

- Aluminium Plant Podgorica
- Steel Plan Nikšić
- Thermal Power Plan Pljevlja
- Adriatic Shipyard Bijela
- Gradac flotation tailings pond.

Component 2 of the IWMCP comprises establishment of a national hazardous waste disposal facility. The objective is to develop a facility for reception and disposal of hazardous waste material from contaminated sites and from ongoing industrial activities.

According to the World Bank Guidelines (OP 4.01) the remediation of contaminated sites and the establishment of hazardous waste facilities require an Environmental and Social Impact Assessment (ESIA), Environmental Management Plan (EMP) and at least two rounds of public consultations.

In accordance with the ToR COWI is supposed to carry out 2 rounds of public consultations and prepare the ESIA documents for 2 components of the WB project in Montenegro based on the technical input provided by CDM for Component 1 (remediation of 5 contaminated sites) and Ecorem for Component 2 (establishment of a national hazardous waste management facility, HWM facility).

This report is the ESIA of component 2 for the establishment of a national hazardous waste disposal facility. As agreed with the EPA and the WB, the basis for this ESIA is the two selected sites: current landfill site of Steel Plant, Nikšić and brownfield site of KAP, Podgorica for the facility based on a very preliminary conceptual design of the facility. A site specific EIA shall be prepared for the selected site at a later stage based on the design of the facility prepared for the specific site.

3 Legislation and guidelines

Montenegrin environmental legislation

The framework of the environmental legislation of Montenegro is laid down in the *"Environmental Law of Montenegro"(published in Official Gazette of Montenegro 12/96).* This Law declares that Montenegro is envisaged as an Ecological State and that the authorities' shall work to upgrade the quality of human environments, reduce all factors that have a negative impact on human life and health and prevent any harmful effects on the human. The law also prescribes the polluter and user pays principles.

The *"Regulation on Environmental Impact Assessment of Montenegro" (Official Gazette of the Republic of Montenegro 14/97 and 80/05)* defines the activities subject to EIA, preliminary assessment procedures, public participation in decision- making, the procedures for the evaluation and verification of the EIA and the criteria for assessment reports. The law is fully harmonized with the EU directives regulating this area. A national waste facility in Montenegron will be subject a an EIA according to the regulation.

(Official Gazette of Montenegro, 80/05) was adopted in 2005 and represents the legislative framework in the waste management sphere. In order to comply with the new European Union (EU) directive 2006/12/EC Waste Directive Montenegro introduced the *"Law on Amendments to the Law on Waste Management" (Official Gazette, number 73/08)* at the end of 2008. This law regulates waste management planning, classification of waste, defines the conditions for waste management, rights, obligations and legal responsibilities for waste operators, requirements and procedures for issuing permits, monitoring and other questions relevant for waste management.

In December 2011 a new "*Law on Waste Management in Montenegro"* was implemented. The law describe the waste management including prevention or reduce of the amount of waste, reuse of waste collection, transport, processing and disposal facilities, monitoring of these procedures and subsequent maintenance of the landfill. In article 2 it is defined that the law is not apply to land including contaminated sites. The section 4 describe the principles of the waste management including the polluters pay principle but also emphasizing the sustainable development and prevention actions. Section 6 describe the various type of waste and that the type shall be determined based on the hazardous properties and the

characterization is described in section 7. In addition, the law require manufactures to limit the amount of hazardous waste and specify the responsibility to the waste producer.

The document "Waste Management Plan in Montenegro for the period 2008-2012" describes the handling and management of waste in Montenegro. Although mainly focusing on household waste the plan also include reference to hazardous and industrial waste. Hazardous and industrial waste is defined in section 3.1.3. In section 3.2.2 the document specifically mention the importance of handling of waste generated for industries like the Aluminium Plant in Podgorica, Nikšić Steelwork and Pljevlja Thermal Power Plant. The current handling of hazardous and industrial waste is described in section 3.8.2 and it is concluded that" there is no storage or disposal of hazardous waste that is declared as a constant disposal of hazardous waste that meets the basic criteria of safe disposal, which would solve the problem of disposal of industrial hazardous waste in Montenegro. Based on available data, it is concluded in the waste management plan that "the fundamental problems in the area of industrial hazardous waste are the same as in the management of other hazardous waste, which means inter alia:

- There are no efficient and professional organization that comprehensively addresses the issues of hazardous waste management;
- There are no education of the population / industry / employees on hazardous waste, how treatment the waste, recycling commitment, so there are great risks to human health and the environment which raises legitimate public concern;
- There are no complete database to identify all manufacturer in accordance with EU regulations and directives;
- There are no approved hazardous waste landfill;

The estimated volume of hazardous waste is estimated in 6.2 and the handling of hazardous industrial waste is discussed in section 7.2.2. It is concluded, that "Hazardous industrial waste requiring special treatment".

Several rulebooks and decrees have been introduced as a complement to the Law on Waste Management in Montenegro. This includes the rulebook 084/2009 describing construction of landfills.

Other laws and regulations include:

"Law on Integrated Pollution Prevention Control, 2005" regulating environmental pollution prevention and control by issuing integrated permits for installations and activities that may have a negative impact on human health, the environment or material resources.

"Law *on Environmental Noise"* regulating noise emissions and their impact, and establishes measures to reduce the harmful effect of noise on human health.

"Solid Waste Strategic Plan of Montenegro" implemented in 2004 contains a strategy for hazardous waste. The purpose of this strategy is to identify a hazardous waste management which does not represent barriers to the best economic and environmental management of hazardous waste, and identifies potential initiatives

minimising these barriers. The strategic interim objective of the Plan is to establish a controlled system of production, treatment and intermediary storage of hazardous waste. Storage facilities will also serve initially as an intermediary storage for export of the hazardous waste to treatment facilities abroad. This shall diminish the hazardousness of the produced waste and establish storage of waste under controlled conditions.

The Plan also operates with the introduction of appropriate permitting, control and manifest system through legislative and enforcement measures. With respect to the industrial non-hazardous waste, implementation of the IPPC directive and introduction of 10 activities related to industrial implementation of cleaner production measures are defined as strategic interim objectives. It is also of importance to motivate industry to initiate the use of non-hazardous waste through appropriate methods. The plan describes the environmental situation at KAP and sets goal that states that technical and economical alternatives should be analysed including the possibility of moving the waste to an appropriate new landfill site or carrying out and in-situ upgrading of the dump-site. Hazardous and non-hazardous waste generated during the production process should be disposed of in the near future at a proper disposal site constructed according to Montenegrin legislation and oriented towards EU standards. It should be clarified where (within or outside KAP) and on which kind of management model (private/state) this landfill should be built and operated.

Montenegro aims to become a member of the EU in the near future. Therefore, one of the key activities for Montenegro is the harmonization of national legislation with EU legislative frameworks in all sectors. The Law on Waste Management in Montenegro is the framework which regulates waste management in accordance with the directives and standards applicable in EU member states. Montenegro has made a great progress in harmonization of laws with EU legislations on waste management by developing rulebooks and decrees over the last few years. However, there are no standards today that describe the acceptance criteria and procedures for waste disposal on landfills (leaching limit values) or control and monitoring procedures and programmes for landfill operation and after-care phases.

European Environmental Legislation

The most important EU directives regarding environmental impact assessment and waste management are:

- *"Directive 85/337/EEC on the Assessment of the effects of certain public and private projects on the environment".* The directive requires member states of the EU to carry out assessments of the environmental impact of certain public and private projects before they are allowed to operate. The aim of the EIA process is to ensure that projects which are likely to have a significant effect on the environment are assessed in advance so that people are aware of what those effects are likely to be.

- *"Directive 97/11/EC amending Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment"* The directive was adopted by the Council on 3 March, 1997. The new Directive extends the scope of Directive 85/337/EEC in terms of the

type of projects for which impact assessment is compulsory. It also widens the band of projects which are subject to individual review by the Member State. It further clarifies the information which developers must supply and provides for cooperation of Member States in the case of transboundary projects.

- *"ODPM Circular 2/99 Environmental Impact Assessment".* Important guidance on the interpretation of the EIA Regulations and on the procedure to be used.

- *"Directive 2006/12/EC of the European Parliament and of the Council of 5 April 2006 on Waste".* This directive is a framework directive on waste management in EU. It contains four annexes that list categories of waste, disposal and recovery operations, amendments to article 20 in the directive and correlation table.

- *"Council Directive 1999/31/EC of 26 April 1999 on the Landfill of Waste with Council decision of 19 December 2002"* This directive establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of Annex II to Directive 1999/31/EC. The main aim of this Directive is to sharpen operational and technical requirements on landfills, to provide for measures, procedures and guidance to prevent or reduce negative effects on the environment such as surface water, groundwater, soil and air, and on the global environment including the greenhouse effect as well as any resulting risk to human health. Annexes of the directive prescribe general requirements for all classes of landfills, waste acceptance criteria and procedures, control and monitoring procedures in operation and after-care phases.

- *"Council Directive 91/689/EEC of 12 December 1991 on hazardous waste"*. The object of this Directive is to approximate the laws on the controlled management of hazardous waste.

- *"Council Directive 94/31/EC of 27 June 1994 amending Directive 91/689/EEC on hazardous waste".*

- *"Council Directive 86/278/EEC of 12 June 1986"* The objective of this directive is the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture.

World Bank Guidelines for Environmental Impact Assessment

According to the Terms of Reference for this project, the ESIA should be prepared in compliance with the World Bank Guidelines for EIA as set out in the World Bank Operational Policies (OP) 4.01 of October 1991, and revised in 2004 and in compliance with Montenegrin legislation.

The Guidelines point out that the purpose of an ESIA is to improve the decision-making process and to ensure that the project options under consideration are environmentally sound and sustainable. An ESIA should identify the ways to improve the environmental aspects of a project, by introducing some measure to minimize, mitigate or compensate for any adverse impacts.

According to the World Bank Operational Policies 4.01, a project-specific EIA should normally include the following:

a) Executive summary, discussing the finding and recommended actions.

b) Policy, legal and administrative framework;

c) Project description;

d) Baseline data;

e) Environmental impact

f) Analyses of alternatives

g) Environmental management plan

h) Appendixes

List of EIA reports

- References, written materials published and unpublished

- Records of interagency and consultation meetings

- Tables presenting relevant data referred to or summarized in the main text

- List of associated reports.

According to the Guidelines, the level of the actual ESIA should be based on the expected environmental impacts. The classification of each proposed project depends on the type, location, sensitivity, and scale of the proposed project, as well as the nature and magnitude of its potential impacts.

Sanitary landfill and definitely hazardous waste disposal site projects are typically defined as Category "A" projects under the Guidelines. Such projects should be subject to a full environmental analysis through the planning and implementation phases.

Monitoring and implementation of EMP

In a later phase, the Ministry of Sustainable Development and Tourism/Montenegro Environmental Protection Agency will require all construction contractors to develop a detailed Construction Environmental Management Plan for their respective activities. The detailed CEMP shall include detailed method statements, environmental control procedures and environmental compliance monitoring to be carried out during the construction works. This section provides a summary of mitigation and monitoring requirements, which will be further detailed in the CEMP document and will be submitted for approval to the Ministry of Sustainable Development and Tourism/Montenegro Environmental Protection Agency prior to any works on site. The CEMP must be developed based

on the WB EMP presented in this document. The CEMP must at a minimum contain the mitigation measures stipulated in this EMP but depending on the detailed design of the landfill, additional mitigating measures can be added.

4 Description of the Project

Ecorem has prepared a study for development of a national hazardous waste disposal facility with the objective to develop a facility for reception and disposal of hazardous waste material from contaminated sites and from ongoing industrial activities.

The process for selection of the best location with less impact on the environment includes a series of steps as illustrated in Figure 1

Figure 1 The various steps for selecting the best location for a hazardous waste disposal site

Step 1		Step 2.1		Step 2.2		Step 3.1		Step 3.2
Developing of a Waste Disposal Demand Model for Montenegro		Based on the estimated need for hazardous waste disposal facility in step 1, the study carries out identification of four major areas for location of the hazardous waste facility in Montenegro		Based on the four major areas identified in step 2.1, a long list of suitable locations are prepared		From the long list in step 2.2 a further evaluation of the most suitable location results in a shortlist of sites with potential locations		Further selection of the selected sites by the Ministry of Sustainable Development and Tourism results in selection of two potential sites for location of a hazardous waste facility.
Determine the need and size for a hazardous waste disposal facility		Limit the potential area for a hazardous waste facility to major regions based on analyses of suitability		Within the four major area to further narrow down the potential sites for a hazardous waste facility		To limit the location further by including specific information on 10 potential sites		Focusing on the most suitable sites for location.

The principles used by Ecorem include the following:

1. Proposed solutions should lead to safer environment, reducing risks and impact from transport, collection and disposal;
2. Consequently, no actions should be foreseen inside or nearby protected areas, dwelling areas and areas valuable for agriculture;
3. Unpolluted areas should not be considered for landfilling of hazardous waste; as such, bulky industrial and mining wastes are considered to be treated onsite and not transported to new treatment / disposal facilities;
4. Solutions should also be socially acceptable (appropriate safety measures and creating other benefits like employment);
5. Innovation, Best Available Technology (BAT) and Best Available Technology Not Entailing Excessive Cost (BATNEC) should be applied where possible;
6. Solutions should be sustainable:
    a. Conceptual designs for mid- and long-term (time horizon put at 2033);
    b. Inclusion of EU visions;
    c. Maximum recycling of materials (waste considered as resource: secondary materials for regional infrastructure works…);
    d. Considering options for waste-to-energy (e.g. treated wood, etc.);
    e. Minimizing transport routes (roads); preference transport modes by boat or railway;
    f. Allowing for environmentally sound treatment outside of Montenegro;
7. Solutions should be technically but also legally-administrative feasible:
    a. Extension / revision of permits for regional sanitary municipal solid waste landfill sites with facilities for specific (small) hazardous waste streams;
    b. Export of specific hazardous waste streams for treatment outside of Montenegro
    c. Aiming at short EIA and permitting procedures

The final selection for the location of the hazardous waste site has not been taken and additional evaluations of the potential sites will be carried out during next phase of the project.

According to the World Bank Guidelines (OP 4.01), the remediation and the hazardous waste landfill project requires an Environmental and Social Impact Assessment (ESIA), Environmental Management Plan (EMP) and at least two public consultations. Since the final decision for the location of the hazardous waste disposal facility has not been taken the ESIA cannot be site-specific and the ESIA is developed as a framework generic document.

In a later stage of the project, an additional EIA following the Montenegrin guidelines will be carried out based on the detail design of the hazardous waste facility prepared for the specific location. The EIA following the national Montenegrin guideline and the World Bank EIA are nearly similar in context, however, the national EIA is carried out at the detail design phase whereas the World Bank ESIA is carried out in the feasibility/preliminary design phase of the project. In this preliminary phase of the project many mitigation measures in the Environmental Management Plan and monitoring in the Environmental Monitoring

Plan can only be described in broad terms. In the EIA based on the detail design, also the mitigating measures can be described in more detail.

World Bank guideline requires two public consultations, whereas the national legislation requires only one public consultation and the public consultation under national legislation shall be announced at least 10 days before the meeting whereas for the World Bank projects the meeting shall be announced 1 week before. Another difference between the World Bank procedure and national legislation is that project category B according to the World Bank requires EMP and public consultation but according to Montenegro legislation EMP and public consultation is not necessary. World Bank EIA reports shall be approved by the World Bank whereas National EIA reports shall be approved by a board of members selected by the Ministry. Finally, the social and economical issues are required by national legislation, but not to the same extent as by World Bank guideline. National legislation requires data on population and site development as part of chapter "Site description" and consideration of impacts to local inhabitants as part of chapter "Possible impacts", including possible migration for the above impact from the project.

4.1 Hazardous Waste Disposal Demand Model prepared by Ecorem

Ecorem has prepared a hazardous waste disposal demand model presented in the interim report “RFP #IWMCP-PPF-CS2, Site Selection and Preparation Study for a National Hazardous waste disposal Facility in Montenegro”. The study includes a description of previous and present waste generation in Montenegro. The waste generation is described for:

- Hazardous waste from large industries including dump sites for hazardous waste
- Hazardous waste from medium and small enterprises
- Hazardous waste from households

The description of waste stream and waste disposal sites from large industries based on the investigation by Ecorem is summarized in Appendix A.

Based on the study of waste stream, Ecorem has prepared a forecast of hazardous waste generation for various sectors. The forecast is shown in Table 1.

Table 1 Forecast of waste generation in the period 2013 - 2033

Sector	Accumulated amount of waste in the period 2013 – 2033
› Household	› 15,689 tons
› Small and medium enterprises	› 117,202 tons
› Heavy industry - Ship yards, Steel factory, Aluminium plant	› 248,400 tons

Based on the forecast, Ecorem made the following conclusions:

› Since the expected quantities of hazardous wastes are rather small, the proposed facility can be used for a long time

› By designing a cell-like structure for the new landfill facility, buffering can be foreseen to cover any uncertainties about collected volumes.

› Sustainability can be estimated using applicable gate fees and environmental taxes.

4.2 Criteria, procedures and findings for selecting a site for the Hazardous Waste Facility

Ecorem has prepared a long list of suitable locations for a Hazardous Waste Facility presented in the interim report. The criteria used for location of the possible site include the following:

› No landfill shall normally be constructed within at least 200 m distance from any lake or pond. Because of concerns regarding runoff of contaminated water, a surface water monitoring network shall be established;

› No landfill shall be constructed within a 100 m distance from a navigable river or stream;

› No landfill shall be constructed within a zone of 100-year flood in the river valley. A landfill may be built within the flood plains of secondary streams if an embankment is built along the streamside to avoid flooding of the area. However, landfills must not be built within the flood plains of major rivers, unless properly designed protection dams are constructed around the landfills;

› No landfill shall be constructed nearby any state or national highway;

- A landfill site shall be at least 500 m from a notified residential/dwelling area. A zone of 500 m around a landfill boundary should be declared a no-development buffer zone after the landfill location is finalized;
- No Landfill shall be constructed within 500 m distance from a public park, a recreation facility, etc.;
- No landfill shall be constructed within critical habitat areas including reserved forest areas. A critical habitat area is defined as an area in which one or more endangered species live. It is sometimes difficult to identify a critical habitat area;
- No landfill shall be constructed within wetlands. It is often difficult to identify a wetland area;
- No Landfill shall be constructed within a zone around airports as notified by the regulatory authority or the aviation authority;
- No landfill shall be constructed within 500 m of any water supply well;
- No landfill shall be sited in a coastal regulation zone;
- No landfill shall be located in areas where the groundwater table will be less than 2 m below the base of the landfill;
- Landfills located in seismic impact zones are designed so that overlay layer and the bottom of the landfill slopes, collection system of leachate and gas and the final overlay layer, provides the greatest resistance to the horizontal seismic effects;
- Other criteria may be decided by the planners in consultation with the authorities commensurate with specific local requirements such as presence of monuments, religious structures, etc.

Further, hazardous waste landfills should preferably be located in areas of low population density, low alternative land use value, low groundwater contamination potential and at sites with high clay content in the subsoil.

Based on these criteria, Ecorem has carried out an assessment of suitable locations for the hazardous waste facility using a GIS-tool with combining several spatial datasets and containing data layers with relevant suitability score. Using this method, Ecorem has identified the following four suitable areas for a hazardous waste facility: Bar area, Podgorica area, Nikšić area and Pljevlja area. In these four areas, Ecorem has used the following additional criteria to locate suitable locations for hazardous waste facility:'

- Major active industrial sites (landfills);

- Abandoned pits, quarries and mines, or similar exploitations with permits nearly expired;
- Existing unsanitary municipal dumping sites (to be remediated);
- Existing regional sanitary municipal solid waste landfills;
- Proposed and/or approved sites for future regional sanitary municipal solid waste landfills, to be extended with separate cells and territories for hazardous wastes;
- Contaminated sites, subject of remediation/ redevelopment (brown fields).

The following 10 locations were included in the long list:

- Bar area - Mozura Site
- Podgorica area – Regional Sanitary Landfill Meadows
- Podgorica area – Aluminium Plant KAP
- Nikšić area – Nikšić Steel Plant Landfill
- Nikšić area – Bauxite Mine
- Nikšić area – Budos Site
- Pljevlja area – Sumane Site
- Pljevlja area - Maljevac Ash and Slag Landfill
- Pljevlja area - Borvica Surface Mine
- Pljevlja area - Repetitor Site

The long list of 10 sites, as presented in the Ecorem Interim Report, was approved by the Client and the Technical Committee on 4 May 2012. The short list was presented in Ecorem's report approved on 9 May. The purpose of the Short List Report is to elaborate the environmental, geotechnical, social and legal properties of these three selected sites, including logistical issues. The pros and contras of each option are elaborated allowing for comparison of the sites and for undertaking the next steps in the spatial planning procedure. These planning processes include also the mandatory and other public debates.

The three shortlisted sites are 1. Current landfill site of Steel Plant, Nikšić 2. Brownfield site of KAP, Podgorica and 3. Closed Sumane site, Pljevlja.

Further evaluation by the Ministry and EPA has limited the shortlisted sites to:

- The current landfill site of Steel Plant, Nikšić
- The Brownfield site of KAP, Podgorica.

This generic ESIA will be focusing on these two sites.

4.3 Project description for the establishment of a HWF

It is proposed that the Hazardous Waste Facility is constructed with one closed landfill cell, two active landfill cells, a leachate wastewater treatment plant, a pre-treatment and storage area, a reserved area for extension of any of the activities mentioned above and an administrative building as shown in Figure 2 and Figure 3.

Figure 2 Outline of the hazardous waste facility

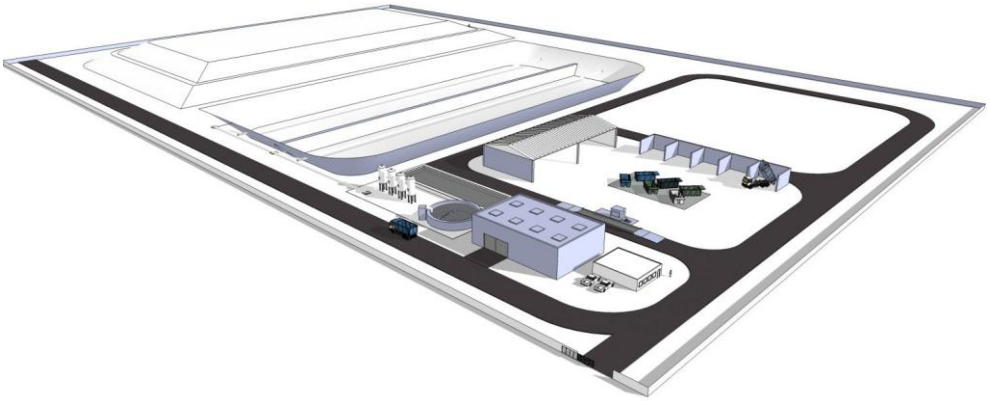
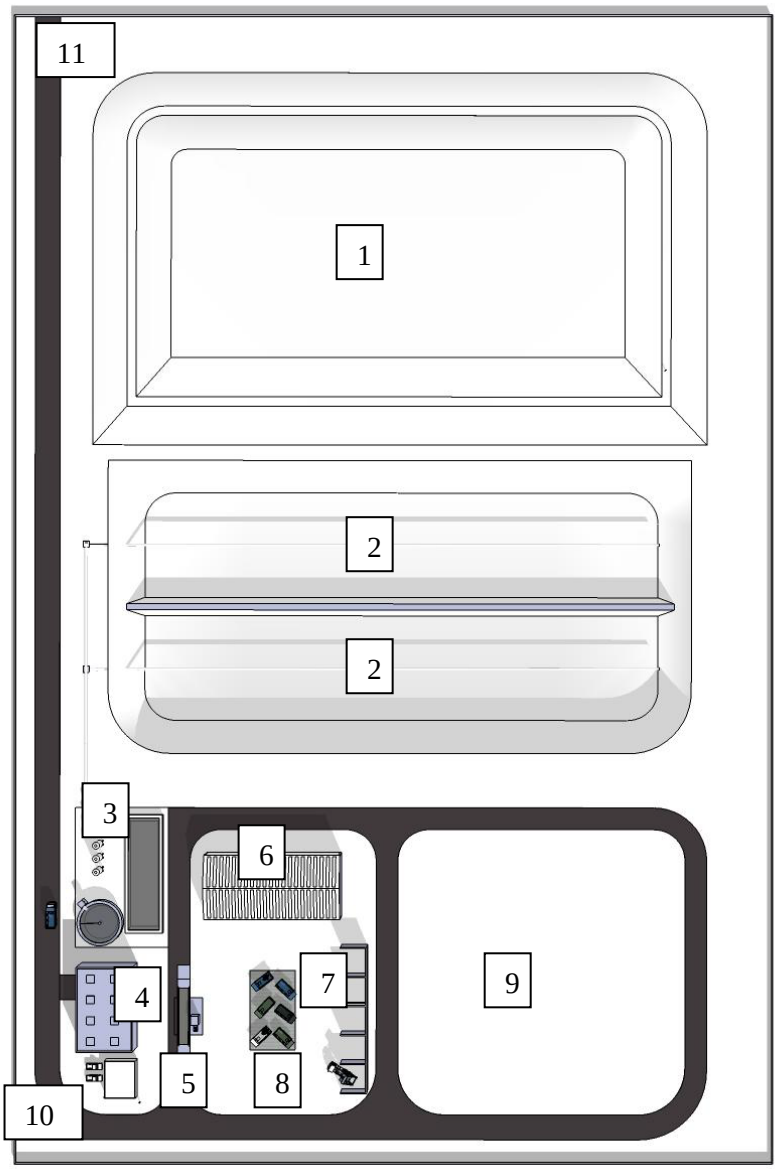


Figure 3 Outline of hazardous waste facility



1 Closed landfill cell
2 Active landfill cell
3 Leachate treatment plant
4 Administrative building
5 Weighing bridge and wheel wash
6 Pre-treatment and storage location hazardous waste (covered)
7 Storage location hazardous waste (open air)
8 Container park
9 Reserved area for landfill extension / extension of pre-treatment and storage area
10 Access gate
11 Fence
12 Service road

4.4 Description of the overall sustainability

The present handling of solid hazardous waste in Montenegro is not sustainable in the sense that most solid hazardous waste is disposed at uncontrolled sites and with a potential risk for significant negative impact on environment and health as described in the *"Waste Management Plan in Montenegro for the period 2008-2012"*. Hazardous waste from large industries has been stored at dumpsites without membrane, fence or any significant protection measures and hazardous waste from medium and small enterprises is not handled properly. Finally, there is no specific handling of hazardous waste fraction of waste generated by households. All this leads to a non-sustainable present situation in respect to hazardous solid waste handling with a large potential risk for spread of contaminants and impact on the environment and the human health.

The study by Ecorem has investigated the potential for establishing a cost-effective hazardous waste disposal facility in Montenegro and compared its establishment as a facility of a regional scale implicating that the solid hazardous waste should be exported from a region to a facility in the nearby region. The landfill is foreseen for dry inorganic hazardous waste. The establishment of the hazardous waste facility will ensure a safe and environmental-friendly way of hazardous waste storage with significantly lower risk of exposure compared to the present situation.

The assessments of the impacts after establishing of a waste disposal facility site are shown in Table 2.

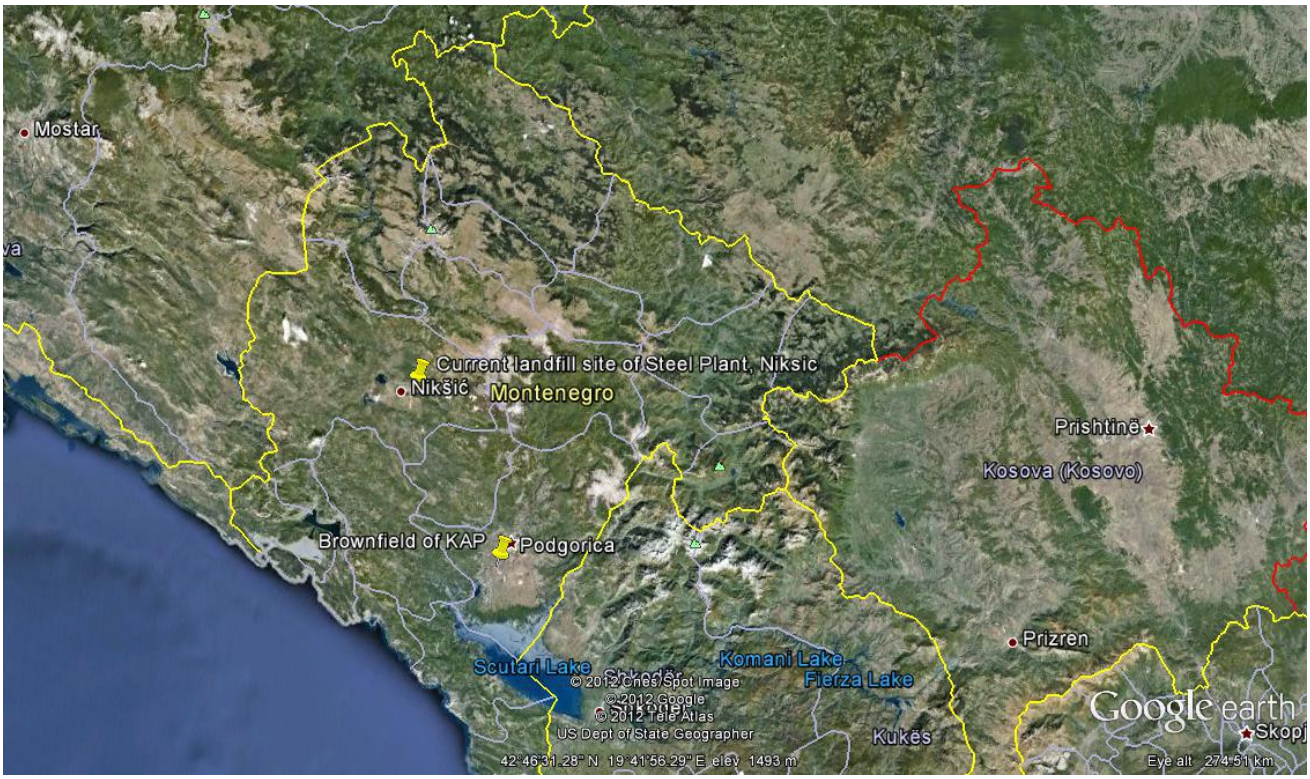
Table 2 Assessment of the impact after establishing of a hazardous waste disposal facility

Issue		Significant
Air	The facility will practically eliminate the risk for evaporation and spread to the air	Significant positive impact
Soil	The waste is disposed under controlled conditions and the facility will practically eliminate the risk for soil contamination	Significant positive impact
Groundwater	The waste is disposed under controlled conditions and the facility will practically eliminate the risk for groundwater contamination	Significant positive impact
Surface water	The waste is disposed under controlled conditions and the facility will practically eliminate the risk for spread of contaminants to surface water	Significant positive impact
Health and safety	The waste is disposed under controlled conditions and the facility will practically eliminate the risk for human contact	Significant positive impact

5 Baseline for shortlisted sites

The two shortlisted sites are located in different parts of Montenegro. The location of the brownfield site at KAP is at the outskirt of Podgorica in an area dominated by a mixture of industrial sites and farmland. The Nikšić site is located in an undeveloped location surrounded by mountains covered with forests with some farmland. The locations of the two shortlisted sites are shown (with yellow pins) in Figure 4.

Figure 4 Location of the shortlisted sites (Google map, 2012)



The environmental baselines for the two shortlisted sites are summarized in Table 3. An assessment of the sensitivity and quality is given for each parameter (except topography). The assessment of the sensitivity and quality is shown in italics. The sensitivity and quality is assessed by the consultant based on the background

material found in the reports from Ecorem and other reports. The quality of the landscape is presented as an expert opinion and might be more individual.

The social-economic baseline is summarized in Table 4. Whereas the Podgorica site is located in a relatively densely populated area close to the largest city of Montenegro, the current landfill site at Steel Plant in Nikšić is located in areas with low population density.

Ecorem has assessed advantages and disadvantages both from technical and environmental view points for using each of the sites for a hazardous waste facility. This assessment is summarized in Table 5.

Ecorem has calculated scores for suitability of the sites with the sites with the highest score rated as the most suitable. Ecorem has calculated the following scores for the sites being considered by EPA:

- Current dumpsite at Nikšić Steel Plant: 77
- Brownfield site of KAP, Podgorica: 75

The background table for the scores is attached as Appendix B.

5.1 Environmental Baseline

The environmental baselines for the two potential locations for a hazardous waste facility site are shown in Table 3.

Table 3 Summary of environmental parameters for the shortlisted sites revised from Ecorem

	Brownfield site of KAP, Podgorica	**Current dumpsite at Nikšić Steel Plant**
Landscape quality (aesthetic)	*Very low quality - no significant impact* The site area is a largely devastated brownfield with dominating industrial architecture.	*Low quality - no significant impact* Locally of very low quality due to the large amount of deposited slag.
Landscape quality (natural)	*In general very low no significant impact*. Locally, some relics of natural or semi-natural, mainly associated with the small hills, might hold a certain ecological value. Relics like these often form natural stepping stones in an otherwise urbanized or industrialized matrix and are therefore worth conserving; however, none of these relicts is located inside the KAP area and the ecological value are not significant	*Medium some impact near the site* Degraded quality on and in the vicinity of the site. Regionally, (semi) natural vegetations of small trees and marquis exhibit some ecological values.
Topography	Plain with distinct small hills in the vicinity	Small hills and sinkholes on the northern part (original terrain). Deposited material forms a plateau with irregular surface. Slope of the deposited material towards river on the southern part is over 50 % (see pictures). Approximated height of the southern part of the landfill (from the riverbed to the top of the landfill) is 40 m.
Soil and geology	The whole area of the Zeta valley is covered with glaciofluvial sediments, gravel and sand layers, at some locations loosely tied into conglomerates and minor occurrences of clay-sands and clays. The sediments of the Cemovsko field are characterized by very high	The top soil at Nikšić dumpsite is a thin and inconsistent layer of soil on top of the bedrock. The regional solid geology around Nikšić is part of the Dinaric geosyncline, predominantly comprising karstic limestones and dolomites. Recent drillings revealed under the industrial waste and slag deposits

	Brownfield site of KAP, Podgorica	**Current dumpsite at Nikšić Steel Plant**
	infiltration properties. Studies for determining the permeability of the rock have shown that practically the whole area is one aquifer of relatively uniform and very high infiltration capacity. Investigation by C1 component shows that the terra-rossa clay was only found in 2 of the 6 drillings and the terra-rossa was sandy with gravel which increase the permeability	(ca. 10 m), a 0.40 – 2.00 m thick layer of red earth and the mother rock, i.e. layered light-grey limestones (Lower Cretaceous). These limestones are karstified and tectonised, with a small amount of red earth in the caverns. A drilling under C1 in the river bed showed 17 m of grey sand and sandy gravel followed by rocky layer of light gray karstic limestone; no clay or groundwater was found. The drilling indicates high permeability in the area.
Climate	*Mediterranean climate – no impact* The climate can be described as Mediterranean with hot dry summers and cold winters. The climate in the area is also affected by the proximity of the Dinaric Alps. The long hot summers have maximum temperatures above 40°C, a temperature above 25°C 135 days per year and many sunshine hours with very low humidity and high evaporation.	*Mediterranean climate and Continental climate - no impact* Climate of the Nikšić area has the characteristics of both Mediterranean climate and Continental climate. Average temperature for January is 1.3 °C (34.3 °F), while average temperature in July is 21.1 °C (70.0 °F). Average humidity amounts to 68.6%. Nikšić receives 2.245 hours of sunshine per year, with hot and dry summer, and rainy winter. On average, there are 19 days per year with snowfall.
Hydrology	*Sensitive groundwater water resource – Potential impact and mitigation measures required* Located within a drinking water protection zone and obtains part of its water requirements from the fluvial-glacial aquifer via a field of nine groundwater wells located approximately 50-150m north-west of the smelting facility, close to the Morača river. Several nearby old wells were previously used for	*Low – medium sensitive water resources – no significant impact* River Gračanica flows along the southern border of the southern part of the landfill (irregularly, only during strong rain).

	Brownfield site of KAP, Podgorica	**Current dumpsite at Nikšić Steel Plant**
	private water but have now been abandoned due to poor water quality. Several rivers flow in the vicinity of the site.	
Present land use (on site)	*Non-sensitive land use – no significant impact* Landfill/dumpsite for industrial mixed waste (hazardous & non-hazardous). Hazardous waste since 2005 is land filled in concrete compartments.	*Non-sensitive land use – no significant impact* Dumpsite of slag's and dust from the steel factory.
Land use (site vicinity)	*Medium sensitive land use – no significant impact* Mainly agriculture and developments.	*Medium sensitive land use – no significant impact* Housing and small-scale agriculture 300 m from the landfill.
Presence of protected areas	*High sensitivity use – no significant impact but mitigation measured require due to limited distance to Lake Skadar* The northern border of the National park and Ramsar site Skadar lake is located some 4 km to the southwest; the lake itself is located at a distance of about 12 km. All water from the basin eventually drains to this lake.	*Low - Medium sensitivity- no significant impacts* Not in the immediate vicinity of the site. Some agricultural zones around Nikšić

Table 4 Sustainability assessment of social-economical parameters for the two shortlisted sites

	Brownfield site at KAP	**Nikšić Steel Plant Dumpsite**
Proximity of habitation	Surrounded by housing (mostly around 500 m). Settlements: Dajbabe, Zelenika, Botun, Velji Brijeg, Srpska, Cijevna, Balijače, Mojanovići, Mahala, Ljajkovići i Golubovci. The nearest residential dwelling is located 10 m from the plant boundary adjacent to the solid waste landfill.	Approximately 300 m from the southern part and 750 m from the northern part of the landfill.
Site visibility from habitation	Poor visibility from the habitations, but good visibility from the other parts due to the flat terrain.	Southern part of the landfill only (few houses).
Monuments or cultural assets in the vicinity	Not in the immediate vicinity of the site. The monastery Dajbabe ca. 2,800 m north of the site.	Not in close vicinity. Monument to the habitants of the village Dragovoljici killed in the 1st world war about 2 km east of the site, with no direct visibility.

Table 5 Summary of advantages and disadvantages for each shortlisted site (Ecorem)

	Brownfield site at KAP	**Nikšić Steel Plant Dumpsite**
Main advantages	The site is centrally located in Montenegro and thus fairly closes to most producers of HW. It is very good accessible by road and railroad. The land is partly privately and publicly owned. The available surface of 6 ha should be sufficient to accommodate the HW disposal facility. The land is also level and stability of the subsoil is good. The site is a brownfield with very low aesthetic value and requires remediation. The remediation works and the construction of a HW disposal facility could be combined. The rather poor visibility from the closest settlements is an additional advantage.	The former waste disposal of the steel plant at Nikšić is centrally located in Montenegro and thus fairly closes to most producers of hazardous waste. Very good accessibility by road and railroad. The available surface in the northern part of the disposal area is 3 ha, which should be sufficient for the construction of the HW disposal facility. The waste disposal from the steel plant is mainly composed out of slag and presents enough bearing capacity to construct a disposal facility on top. Because the waste disposal needs to be remediated, the de-pollution and stabilization measures, such as extensive profiling, appropriate surface treatment, or the reconstruction of one of the dumpsites (cf. Interim Report Hidroinzeniring – CDM, May 2012) can be combined with the construction of a hazardous waste disposal facility, potentially through a Public Private Partnership (PPP). This could have a positive impact on the total project costs. The closest habitations are at a fair distance, and the site is little visible.
Main disadvantage	The site is close to agricultural land and is situated between water protection zones.	The land is privately owned. The southern part of the steel plant waste disposal is situated on a steep slope and is directly alongside the River Gračanica. Incorporation of this southern part for construction and operation of a HW disposal

		facility is not recommended.
Concluding evaluation	Total score for suitability by Ecorem is 75	Total score for suitability by Ecorem is 77

Groundwater resources at the KAP site

The KAP site is currently not included in any water protection zone as defined by Law on waters (Off. gazette of the State, 27/07, dated on 27/05/2007) and Rule book on defining and maintaining zones of sanitary protection at water wells and limitations inside those zones (Off. gazette of the State, 66/09, dated on 02/10/2009).

The Law foresees protection zones only for existing or planned water wells. There are three zones of groundwater protection of public water wells: wide, medium and narrow zone. Groundwater protection zones for potential regional water wells are defined in Water Management Basis.

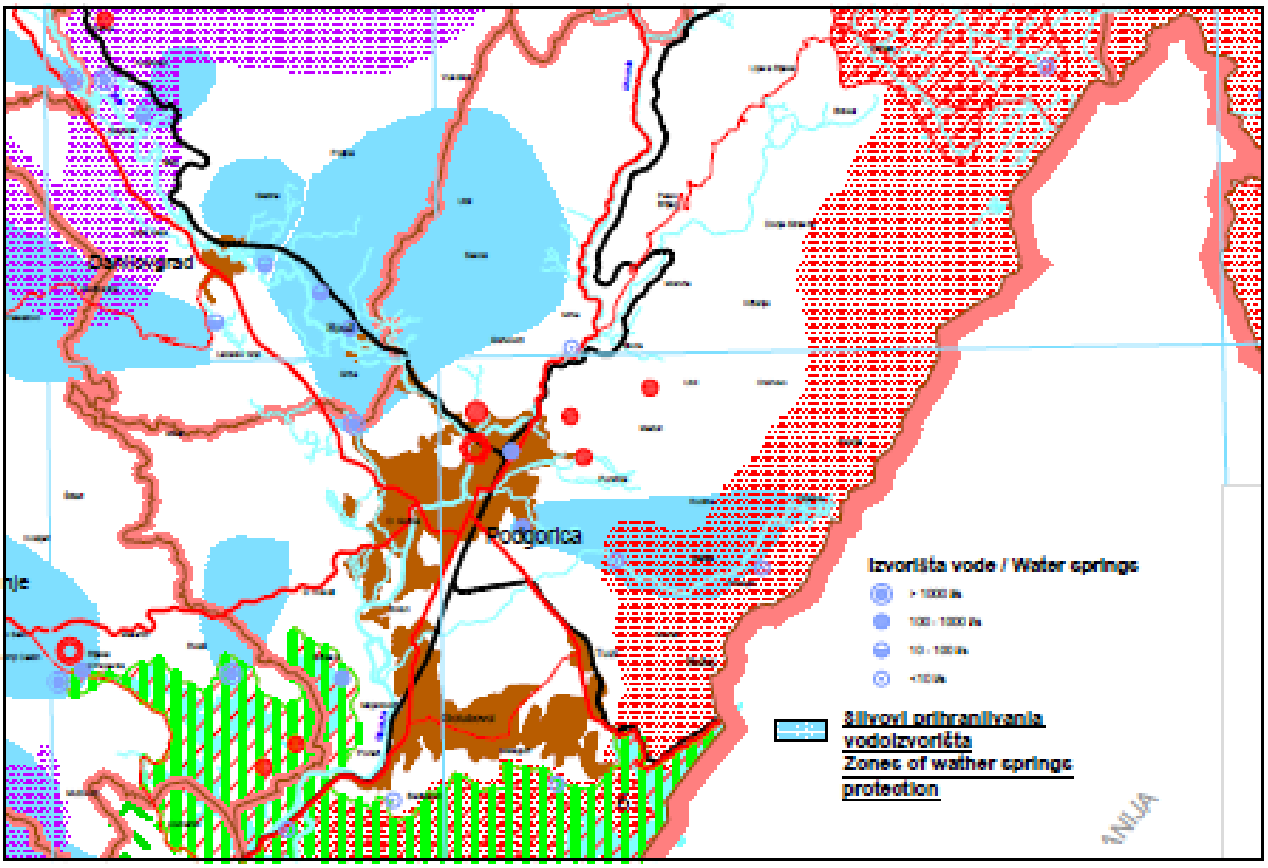
A plan showing the location of KAP and the nearest drinking water protection zones is shown in Figure 4. KAP obtains part of its water requirements from the fluvioglacial aquifer via a field of nine groundwater wells located approximately 50-150m north-west of the smelting facility, close to the Moraca river. There are several old wells previously used for private water supply in the vicinity of the site, which were abandoned due to poor water quality and were replaced by water supply provided by KAP

The fluvio-glacial deposits of the Zeta Plain cover an area of over 200 km^2 and provide the most significant groundwater resource in Montenegro. Where the gravels are thin, the underlying limestone unit is also likely to be used locally as a resource.

According to ECOREM shortlist report, KAP monitors the groundwater wells within the site and some of the abandoned private wells outside the site in nearby settlements. Based on the State Data for 2007 (issued in 2008 by the Ministry for Spatial Planning and Environment), the groundwater in the fluvio-glacial sediments is generally classified as quality A2, C, II (suitable as potable water supply after treatment). Lower groundwater quality (quality class A3) has been identified in more recent groundwater monitoring around the plant up to 2008 due to cyanides, phenols, COD and metals.

The fluvio-glacial aquifer is recharged from surface water infiltration from the Moraca and Cijevna rivers, groundwater infiltration from the karst bedrock underlying and surrounding the plain and rainfall infiltration. Discharge is via base flow direct to Skadar Lake and via a number of surface watercourses, which flow into Skadar Lake. The presence of the ‘terra-rossa’ clay layer in the area of the KAP site is likely to limit the downward groundwater flow into underlying bedrock; however, investigation by C1 component showns that the terra-rossa clay was only found in 2 of the 6 drillings and the terra-rossa was sandy with gravel which increase the permeability. The terra-rossa clay layer does not seemt to constitute a continues layer over the area. Groundwater flow direction is from the north to south, and the groundwater level below the KAP site is reported to be 12m to 15m below surface with a seasonal variation of approximately 3.5 m.

Figure 4 Drinking water wells near KAP



5.2 Social-economical baseline

Demographic

The Municipality of Nikšić has a total population of 72 824 inhabitants and Podgorica a total population of 187 085 inhabitants as shown in Table 6.

Table 6 Inhabitants in the municipalities of Nikšić and Podgorica.

	Total	Urban	Rural
Montenegro	625 266	401 462	223 804
Nikšić	72 824	57 278	15 546
Podgorica	187 085	156 169	30 916

Source: MONSTAT, Department of Demography and Population Census. First results 2011.

The area in the vicinity of the potential landfill in Nikšić is almost unpopulated or very sparsely populated. About 1 km from the site in factory direction, there are some suburban settlements. Also, on the southern edge of the dumpsite across the Gračanica River there are a few houses although it is not known whether they are permanently or temporarily populated, or even abandoned.

No people are permanently living at the potential locations of the hazardous waste facility; however, waste collectors have been observed at Nikšić dumpsite collecting scrap metal. The remediation of the dumpsite will include fencing and there will probably be no further access for waste collectors to the dumpsite.

Nikšić site

Locally around Nikšić dumpsite, only very few houses were observed or can be seen from air photo. The nearest houses are shown in Table 7.

Table 7 Houses nearby the dump site (based on Google map)

	Type	Approximate distance to border of the dumpsite
North	Farmhouse	350
East	Farmhouse	460
West	Farmhouse	130
South	Farmhouse (might be abandoned)	130

Social analyses of waste collectors

COWI has carried out a social analysis of the waste collecting at the Nikšić dumpsite.

The dumpsite is privately owned by the steel work. At present, the landfill management does not deny the waste collectors access to the dumpsite. However, the waste collectors are only allowed into the northern part as there are machines and trucks on the southern part of the landfill. There are 30 to 50 waste collectors with usually 15 collectors each day. The age of the waste collectors are between 20

to 60 years or older. The waste collectors include both men and women. They are mainly unemployed or retired with no other income.

Only metal parts are collected which originate from the steel work. However the amount collected has been steadily decreasing because of decreasing steel production and because the factory has started to separate metal parts before deposit at the dumpsite. The landfill manager estimated, that the daily income is around 5-10 Euro per person with 10 Euro being considered “a lucky day”.

Three waste collectors were willing to give information on the activity including an elderly couple around 60 years and an elderly woman.

The woman informed that waste collection was her only income and that she has been doing it for 20 years. Her family consists of 4 persons, however she was the only with regular income from waste collection. During hard times, other family members will participate in the waste collection. She explained that her daily income was around 10 Euro; however she also needs to pay for transport to the companies buying the metal. She did not collect waste from other sites.

She lived in the nearby village of Rubeza about 1 km away. Today, around 20 people in Rubeza regularly carry out waste collection. Previously, more people were involved in waste collection. The people in Rubeza can observe when the trucks are coming from the steel work with new loads, and she has observed that the number of trucks has decreased and sometimes there are no trucks for a whole day. She informed that there were around 10 collectors present on the day of the interview.

The elderly couple also lived in Rubeza. The husband was retired from the steel work whereas the woman had never been employed there. They explained that they could not survive without the income from the waste collection. They are a family of 10 people including children who still go to school. They have an additional income from a small farm - especially vegetables. They estimated their daily income to 5 – 7 Euro, although there were days with income as low as 3 Euro.

Podgorica site

The area north and east of the KAP site consist mainly of industrial activities. The nearest permanent residential area is found south of the site at a distance of approximately 200-500 metres. The residential area consists mainly of small housings.

Potential for employment

The potential for employment during the construction phase of the remediation may draw people to the area. On the positive side, there may be a temporary increase in economic activity and employment for the local community and local skills development.

The construction work related to the remediation can be tendered nationally or internationally according to the WB procurement procedure. It is expected that national procedures will result in more input from companies located in Montenegro whereas the exchange of knowhow will be less.

6 Environmental and Social Impacts

The potential impacts of a hazardous waste facility are anticipated for the following environmental components:

- Visual and landscape
- Air
- Noise
- Soil
- Surface water and groundwater
- Terrestrial ecology and birds
- Socio-economy.

The potential impact is assessed during the construction phase and the operational phase.

6.1 Construction phase

The key construction activities that are likely to have some environmental impacts include:

- Ground improvement, excavation and disposal/placement of excavated material
- Construction works including leachate collection system, leachate treatment plant, administrative building, fence, weighing bridge and wheel wash etc
- Construction traffic
- Local social-economical environment

The potential impact during the construction phase is summarized in Table 8.

Table 8 Impact from various activities during the construction phase.

Activity	Potential impact	**Brownfield site at KAP**	**Nikšić Steel Plant Dumpsite**
Ground improvement and construction work	Soil	Limited ground improvement work is expected. Handling of oil and chemical constitutes a risk of not being handled correctly.	Some ground improvement work is expected. Handling of oil and chemical constitutes a risk of not being handled correctly.
	Air	Dust generated during ground improvement will be limited	Some dust is expected during ground improvement. The impact might include formation of contaminted dust particles as the ground improvement might include handling of waste.
	Noise	Blasting is not expected and noise will be limited to the use of machineries. As these are located inside an industrial facility, the noise issue is considered insignificant.	Blasting is not expected and noise will be limited to the use of machines.
	Water	Handling of oil and chemical constitutes a risk of not being handled correctly. The water resources are sensitive as the soil has a high permeability and no continues cover of a protection layer. The terra-rossa clay layer is only found in some drillings in the area and the prevention of downwards movement of oil is therefore only found in parts of the area.	Handling of oil and chemical constitutes a risk of not being handled correctly.
Construction traffic	Air	The increase in traffic during the construction of the landfill will not be significant given that the general traffic in the area is already high.	Some increase in traffic from Nikšić to the landfill might be expected during the construction. Limited negative impact on the villages is expected.
	Noise	Not significant	Not significant
	Road safety	Not significant	Speed limit through the village must be ensured
Local social-economical environment	Employment	Not significant	The construction work might have a small positive impact if local people are employed during the construction phase

	Loss of business, income or houses	Not significant	Waste collectors have an income of approximately 10 Euro a day from collection of scrap metals. The construction of a new hazardous waste facility will have a negative impact on the people as they will be prevented from entering the site.
Transboundary impact		The site is located approximately 16 km from the Albanian border. Transboundary impact during the construction period is highly unlikely	The site is located approximately 33 km from border with Federation of Bosnia and Herzegovina. Transboundary impact during the construction period is highly unlikely
Risk of accident		Accidental spill of oil and chemicals used for construction might constitute a risk for especially groundwater. Based on the expected amount the risk is considered local although the groundwater is sensitive.	Accidental spill of oil and chemicals used for construction might constitute a potential risk.
Indirect impact		No indirect impacts are expected during the construction period	No indirect impacts are expected during the construction period
Cumulative impact		No cumulative impact are expected during the construction period	No cumulative impacts are expected during the construction period

6.2 Operation phase

The key operation activities that are likely to have some environmental impacts include:

- Pre-treatment of incoming solid hazardous waste
- Final storage of hazardous waste in landfill cells
- Leachate collection system and treatment plan
- Transport of hazardous waste
- Local social-economical environment

The general layout of the hazardous waste facility is shown in Figure 3 whereas the design is only described very preliminary. However, it is anticipated that the design will follow the requirements of EU and Montenegro including bottom liner, leachate collection system and treatment etc. Based on this assumption, impact from the hazardous waste facility is shown in Table 9.

Since the design of the hazardous waste facility basically will be the same for the two locations, most - but not all - impacts will be similar.

Both sites are located in region having a risk of earthquake. The risk of earthquake in Podgorica is VII-VIII according to the Mercali Scale. The risk of earthquake in Niksic is nearly the same.

Table 9 Impact from various activities during the operation period

Activity	**Potential impact**	**Brownfield site at KAP**	**Nikšić Steel Plant Dumpsite**
Pre-treatment of incoming waste	Soil and groundwater	Only solid waste is handled at the facility. The area will be covered thereby preventing that any liquid seeping from the solid waste will spread into the soil. Impact on soil and groundwater is insignificant. The water resources are sensitive at the site.	Only solid waste is handled at the facility. The area will be covered thereby preventing that any liquid seeping from the solid waste will spread into the soil. Impact on soil is insignificant
	Air	During handling some dust might occur from the hazardous solid waste. With proper management the spread of contaminated dust will be insignificant.	During handling some dust might occur from the hazardous solid waste. With proper management the spread of contaminated dust will be insignificant.
	Noise	No significant impact	No significant impact
Final storage of hazardous waste	Soil and groundwater	Only solid waste will be stored in landfill cells. The landfill cell will be constructed with bottom liner, leaches collection system and top layer. Correct design will prevent spread of hazardous material to the soil and groundwater. The design of the bottomliner shall take into account what the area has a medium risk of earthquake.	Only solid waste will be stored in landfill cells. The landfill cell will be constructed with bottom liner, leaches collection system and top layer. Correct design will prevent spread of hazardous material to the soil and groundwater. The design of the bottomliner shall take into account what the area has a medium risk of earthquake.
Transport of hazardous waste	Air	The site is located immediately west of the main E65/E80 highway to Petrovac and Bar. The distance from the potential hazardous waste producers is relatively small which will minimize exhaust from trucks	Some increase in traffic from Nikšić to the landfill might be expected during the operational phase. Limited negative impact on the villages is expected.
	Noise	Not significant	Not significant
	Road safety	Not significant	Speed limit through the village must be ensured
	Accident	The area around KAP is relatively densely populated and accidental spill during transport can potential have an impact on many residential areas. Only carriers with license should be allowed to transport solid hazardous waste.	Accidental spill during transport can potential have an impact on the residents around the location Although in general not as densely populated as the KAP-site. Only carriers with license should be allowed to transport solid hazardous waste.

Local social-economical environment	Employment	The operation of the hazardous waste facility will require permanent employment which is a positive impact	The operation of the hazardous waste facility will require permanent employment which is a positive impact
	Loss of business, income or houses	Not significant	Waste collectors have an income of approximately 10 Euro a day from collection of scrap metals. The construction of a new hazardous waste facility will have a negative impact on the people as they will be prevented from entering the site.
Transboundary impact		The site is located approximately 16 km from the Albanian border. The area of impact from the facility is limited. Transboundary impact during the operational period is highly unlikely.	The site is located approximately 33 km from border with Federation of Bosnia and Herzegovina. The area of impact from the facility is limited. Transboundary impact during the operational period is highly unlikely.
Risk of accident		Accidental spill of hazardous waste is a risk during the operation of the facility. The site is located relatively close to the potential hazardous waste producers limiting the risk for accident during transport. Only carriers with license should be allowed to transport solid hazardous waste.	Accidental spill of hazardous waste is a risk during the operation of the facility. The site is located relatively close to the potential hazardous waste producers limiting the risk for accident during transport. Only carriers with license should be allowed to transport solid hazardous waste.
Indirect impact		No indirect impacts are expected during the operational period	No indirect impacts are expected during the operational period
Cumulative impact		No cumulative impacts are expected during the operational period. However, the administrative unit of Golubovci has, in a letter dated 12.07.2012, informed that cumulative impact of production process in KAP, the asphalt plants, the grinding plants, etc. should be included in the evaluation of the site. The letter is attached in appendix D. The ESIA team has re-evaluated cumulative impact,	No cumulative impacts are expected during the operational period This is based on the assumption that the hazardous waste facility will be constructed using best available technology as described in the report from ECOREM. A hazardous waste facility design after best available technology is not expected to generate any significant emission to the surrounding environment. In addition, the waste facility is constructed at contaminated site and the cover of the site will itself limit the impact on

		and confirms the conclusion that no significant cumulative impacts are expected. This is based on the assumption that the hazardous waste facility will be constructed using best available technology as described in the report from ECOREM. A hazardous waste facility design after best available technology is not expected to generate any significant emission to the surrounding environment. This means that no significant cumulative impacts can be expected. The exact technical solution and technological processes of the hazardous waste facility has not been decided and only the general layout of the facility is known. Once the detailed design of facility is available, cumulative impacts may be assessed again. Although a waste water treatment plant will constructed near the hazardous waste storage facility according to the Detailed Urbanistic Plan „Industrial Zone – Aluminum Plant Podgorica"; no significant cumulative impact are foreseen based on the assumption that the waste water treatment plan will be constructed using modern technologies. A failure in the pipe system for the waste water treatment plant can potentially result in contamination of the groundwater. If the failure in the pipe is taken place in contaminted area this might lead to increased leaking of fluorides or heavy metals to the groundwater; however the risk is considered unlikely.	the environment. No other potential contaminating activities are located in the area close to the site.
Risk of flooding		The area of KAP is relatively low lying. Areas close to the Skadar lake are known to be flooded. However, the area at the KAP site has never been flooded (according to information from KAP during site visit 08/06/2012).	The area at Nikšić is relatively elevated and no flooding is expected

7 Mitigation measures and Monitoring and Environmental and Social Management Plan for shortlisted sites

The purpose of the Environmental Management Plan (EMP) for the construction phase of the hazardous waste facility is to ensure that all adverse environmental impacts are within the acceptable level. The EMP is meant to ensure that all aspects of the works comply with the relevant legislation, permit conditions and good practice, and that measures to mitigate the negative impacts identified in the ESIA are implemented. The EMP strives to implement appropriate environmental controls and monitoring procedures during construction.

At this stage of the project, no detail design of the waste facility is known and the final location for the hazardous waste facility is not selected. For this reason a generic environmental management plan and generic monitoring plans are prepared. It is assumed that the design of the hazardous waste disposal facility will be more or less the same independent of which site is selected. The generic Environmental Management Plan is shown in Table 10. Similarly, a generic Monitoring Plan is shown in Table 11.

Currently, the hazardous waste facility site is described preliminary and no estimate of the cost is available for the preparation of the ESIA. Issues like soil balance construction type etc will be defined in a later state and the cost estimated will be provided either by Ecorem in the next phase of the project or by the contractor/operator during the detail design. However, the cost for the mitigating measures has been estimated as a first rough figure based on experience from similar project. A key issue during the construction phase is that the contractor set up an environmental supervision management team employed by the contractor and responsible for control of environmental and health issues including material transport, dust water etc. The cost for an environmental supervisor is preliminary estimated to 4,000 Euro/Months during construction period.

A key issue during the operational phase is a similar environmental health and safety organization set up by the contractor. The cost for an EHS organization is preliminary estimated to 28,000 euro/year with a person employed at least half time. The cost estimates are preliminary rough figure because no detail design is available at the time of this report.

Table 10 *Environmental Management Plan*

			Cost		Institutional Responsibility		Comments
Phase	Issue	Mitigating Measures	Install	Operate	Install	Operate	
Construction phase	Material supply	Using approved and licensed borrow pits or buying material from licensed companies for production of stone fractions and clay	The work related to control of license and obtaining a copy for record is estimated to 800 eur. Must be included in the bid from the Contractor	N/A	Contractor	Ministry of Sustainable Development and Tourism/Environmental Agency shall appoint an independent consultant for supervision	The Ministry of Sustainable Development and Tourism/Environmental Agency shall signed a contract for supervisory of the construction work The specific requirements shall be specified in the bid documents and Special Specifications.
	Material transport	Material shall be wet or the trucks shall be covered	-	An environmental supervisor shall be responsible for controlling material transport Estimated cost 4000 Eur/Months during construction period Must be included in the bid from the Contractor	Contractor	Same as above	
	Dust	Watering during dry periods	Installation of water system for dust suppression. Rough estimate	An environmental supervisor shall be responsible for controlling dust.	Contractor	Same as above	

			Cost		Institutional Responsibility		Comments
Phase	Issue	Mitigating Measures	Install	Operate	Install	Operate	
			10,000 eur. Dust monitor pm_{10} approximately 300 eur.	Covered by the estimated 4000 Eur/month for an environmental supervisor Must be included in the bid from the Contractor			
	Handling of oil and fuel used for Contractor's vehicles and machinery	The KAP-site is located on sensitive groundwater resource. For KAP and Nikšić : No oil products or drums containing chemicals must be placed directly on ground. For KAP: Oil and fuel must be storage with secondary containment	Cost of secondary compartments for deposits of oil and chemicals are estimated to 3000 Eur. Storage facilities must be included in the bid from the Contractor	An environmental supervisor shall be responsible for controlling correct storage of oil and drums. Covered by the estimated 4000 Eur /month for an environmental supervisor Must be included in the bid from the Contractor	Contractor	Same as above	
	Traffic	Traffic management plan. The route net near	N/A Must be included in the bid from the	N/A Must be included in the bid from the	Contractor	Same as above	

			Cost		Institutional Responsibility		Comments
Phase	Issue	Mitigating Measures	Install	Operate	Install	Operate	
		KAP is well developed and heavy traffic in this area is common. In Nikšić the traffic might pass thought the outskirt of Nikšić city. Transportation through urban areas during rush hours should be avoided or directed to the roads with lighter traffic. Traffic passing through residential areas, particularly near schools and hospitals, should be avoided. When construction activities must disrupt traffic, i.e. conveyor road crossings, proper signs must be put up, as well as alternative route signs.	Contractor	Contractor			

			Cost		Institutional Responsibility		Comments
Phase	Issue	Mitigating Measures	Install	Operate	Install	Operate	
	Work in contaminated soil/waste	Use of Personal Protection Equipment Health and safety plan Staff training	Cost of personal protection equipment is estimated to 200 eur per person. With 10 persons working in contaminated environment the cost will be 2000 eur. Staff training 2000 eur. Must be included in the bid from the Contractor	An environmental supervisor shall be responsible for controlling correct work environment. Covered by the estimated 4000 eur /month for an environmental supervisor Must be included in the bid from the Contractor	Contractor	Same as above	
	Noise	The construction shall be limited to daylight working hours (not between 8 p.m. and 7 a.m.) equipment operating with noise mufflers; notification of work to local residents; appropriate equipment	Noise monitor approximately 300 eur + training in use 500 eur. Must be included in the bid from the Contractor	An environmental supervisor shall be responsible for controlling of noise level during construction. Covered by the estimated 4000 Eur/month for an environmental supervisor Must be included in the bid from the	Contractor	Same as above	

			Cost		Institutional Responsibility		Comments
Phase	Issue	Mitigating Measures	Install	Operate	Install	Operate	
		maintenance		Contractor			
	Work health and safety - occupational health	Appropriate lighting and well defined safety signs on the construction site Preparation of a Health and safety plan for the construction including personal working inside that area and nearby communities including requirements for monitoring during the construction period	Minimum Must be included in the bid from the Contractor	Minimum Must be included in the bid from the Contractor	Contractor	Same as above	
	Protection of soil groundwater and surface water	Storage areas for various materials shall be located away from surface water and, if necessary, be covered to prevent leakage. Washing areas of	Installation of a small temporary water treatment plant might be necessary Estimated cost for a small portable water treatment plan is estimated	N/A	Contractor	Same as above	

			Cost		Institutional Responsibility		Comments
Phase	Issue	Mitigating Measures	Install	Operate	Install	Operate	
		concrete trucks and other equipment should not be placed on permeable soil and the water shall not be draining directly into the ground	to 10,000 eur.				
	Waste collectors	Nikšić : There are 30 to 50 waste collectors with usually 15 collectors each day The waste collectors shall be compensation KAP: No waste collectors	To be decided	-	EPA/WB	EPA/WB	
Operation phase							
	Site management	Good operational procedure	N/A The cost will be estimated in detail the next phase of the project	The cost for an environmental health and safety organization is preliminary estimated to 28,000 eur/year The cost will be	Operator	Ministry of Sustainable Development and Tourism/Environmental Agency	The management of the hazardous waste site facility shall be in compliance with the rules set by the Law on Waste Management of Montenegro and

			Cost		Institutional Responsibility		Comments
Phase	Issue	Mitigating Measures	Install	Operate	Install	Operate	
				estimated in detail in the next phase of the project			EU directives 99/31/EC, and Directive 94/62/EEC
	Work safety	Safety instructions and protective equipment (gloves, boots, working suits, masks)	Yearly cost for personal safety equipment is estimated to 8,000 eur/year The cost will be estimated in detail in the next phase of the project	As above	Operator	Ministry of Sustainable Development and Tourism/Environmental Agency	
	Accident at location	Provide a sufficient quantity of water against fire and other fire extinguishing agents. Prepare emergency response plan	Minimum The cost will be estimated in the next phase of the project	As above	Operator	Ministry of Sustainable Development and Tourism/Environmental Agency	
	Temporary storage of hazardous waste before final disposal	Clear separation of various incoming waste. Any waste showing sign of leakage should be placed on separate section. All temporary stored waste shall be	Minimum The cost will be estimated in the next phase of the project	As above	Operator	Ministry of Sustainable Development and Tourism/Environmental Agency	

			Cost		Institutional Responsibility		Comments
Phase	Issue	Mitigating Measures	Install	Operate	Install	Operate	
		coved to prevent dust formation					
	Accident during transport of chemicals to the site	The most directly route to the site shall be taken Transport of hazardous waste shall only be done by licensed companies. The licensed companies shall develop a respond plan in case of accidents	N/A The cost will be estimated in the next phase of the project	As above	Operator	Ministry of Sustainable Development and Tourism/Environmental Agency	
	Groundwater or river water	Leachate management system including leak detection system	Installation of leak detection system is estimated by Ecorem to 20,000 eur. Installation of a permanent waste water treatment system is estimated by Ecorem to 450,000 eur.	As above	Operator	Ministry of Sustainable Development and Tourism/Environmental Agency	
	Noise	The operation will	Equipment - noise	As above	Operator	Ministry of	

			Cost		Institutional Responsibility		Comments
Phase	Issue	Mitigating Measures	Install	Operate	Install	Operate	
		include limited equipment including bulldozer, waste compactor, and vehicles for waste transport. Limiting operation hours of landfill e.g. 07 – 20 h.	monitor estimated 300 eur.			Sustainable Development and Tourism/Environmental Agency	
	Air	Inspection for smell and control of dust	Minimum	As above	Operator	Operator	
Closure phase							
	Closure plan	The operator shall prepare a closure plan based on the knowledge of stored chemicals	-	Expect 10,000 eur	Operator	Ministry of Sustainable Development and Tourism/Environmental Agency	
	Final cover	A final cover system shall be installed for preventing leakage and erosion of the landfill cells. The permeability of the final cover must be less than	Expected more than 1 million eur but highly dependend on the final design of the landfill	-	As above	As above	

			Cost		Institutional Responsibility		Comments
Phase	Issue	Mitigating Measures	Install	Operate	Install	Operate	
		the underlying liner system to prevent bath tube effect.					
	Revegitation	Vegetation of the surface (not using plants with deep roots)	Less that 50,000 eur		As above	As above	
	Access to the site	Existing fence shall be maintained and access prevented	Expected to be installed during the operational phase	Repair of fence if needed	As above	As above	
	Groundwater	Monitoring wells downstream the facility	Expected to be installed during the operational phase		As above	As above	

Table 11 *Monitoring Plan*

						Cost		Responsibility	
Phase	What	Where	How	When	Why	Install	Operate	Install	Operate
Construction phase									
Material supply	Official approval or operating license	Borrow pit	Inspection	Prior to work	-	The work related to control of license and obtaining a copy for record is estimated to 800 eur.	-	Contractor	Supervisor appointed by EPA
Material transport	Control of dust from transport	Along the route	Inspection	Daily visual inspection during transport	Prevention of dust	-	An environmental supervisor shall be responsible for control. Covered by the estimated 4000 eur/month for an environmental supervisor	Contractor	Supervisor appointed by EPA
Dust	Dust from construction works	Construction site	Inspection PM_{10} monitor	Daily inspection during active construction	Prevention of dust	Installation of water system for dust suppression rough estimate 10,000 eur. Dust monitor pm_{10}	As above	Contractor	Supervisor appointed by EPA

						approximately 300 eur.			
Handling of oil and fuel used for Contractor's vehicles and machinery	Oil and fuel from contractors machinery	Construction site / camp	Inspection and if necessary soil and groundwater sampling	In case spill is observed	Prevention of soil and groundwater contamination	Cost of secondary compartments for deposits of oil and chemicals are estimated to 3000 Eur.	As above	Contractor	Supervisor appointed by EPA
Traffic	Control of routes according to the traffic management plan	Main roads to the construction site	Inspection	Unannounced during active construction 2-4 times a Month	Prevent negative impact on residential areas	-	As above	Contractor	Supervisor appointed by EPA
Work in contaminated soil/waste	Control for use of personal protection equipment	Construction site	Inspection	Unannounced during active construction at least once a week	Prevention of human exposure to contaminant through direct contact or dust	Cost of personal protection equipment is estimated to 200 eur per person. With 10 persons working in contaminated environment the cost will be 2000 eur. Staff training 2000 eur.	As above	Contractor	Supervisor appointed by EPA
Noise	Noise from construction	Construction site	Inspection and monitoring with	Unannounced during active	Prevention of noise	Noise monitor approximately	As above	Contractor	Supervisor appointed by

	works		noise meter	construction		300 eur + training in use 500 eur. to be paid by the contractor			EPA
Work health and safety	Safe working environment	Construction site and along the transport roads	Inspection	Unannounced during active construction and transport least ones a week	Prevention of accidents	-	As above	Contractor	Supervisor appointed by EPA
Protection of soil and groundwater	Contamination of soil, groundwater and surface water	At or in the vicinity of the construction site	KAP: Groundwater sampling from minimum 3 monitoring wells Surface water 1 station upstream and 1 station downstream the HWF site	Groundwater monitoring once a month River water monitoring once a month	Prevention of negative impact on soil and water environment	-	KAP: Rough estimate 20.000 eur with monthly sampling and analyses of 3 groundwater samples and 2 river samples Nikšić : Rough estimates 10.000 eur for surface water sampling and analyses.	Contractor	Supervisor appointed by EPA
Waste collectors	Nikšić : There are 30 to 50 waste collectors with usually 15 collectors each day	People living nearby	Compensation	Prior to work	Compensation for lost income	-	-	Ministry of Sustainable Development and Tourism/Environmental Agency	-

Operation phase									
Site management	Site management Plan	Facility including transportation to and from	Covering handling of waste inside the facility as well as transport	Continuously from start of operation	Ensuring best practices	-	The cost for a environmental health and safety organization is preliminary estimated to 28,000 eur/year	Operator	Operator
Work safety	Risk of exposure to hazardous waste	Facility including transportation to and from	Health and safety plan	Continuously from start of operation least once a week	Prevention of work related accidents	Yearly cost for personal safety equipment is estimated to 8,000 eur/year	Same as above	Operator	Operator
Accident at location	Risk of exposure to hazardous waste	Facility	Emergency plan as part of the health and safety plan	Continuously from start of operation	Prevention of spread of chemicals	-	Same as above	Operator	Operator
Accident during transport of chemicals to the site	Risk of exposure to hazardous waste	Transportation to and from the site	Emergency plan as part of the health and safety plan	Continuously from start of operation	Prevention of spread of chemicals	-	Same as above	Operator	Operator
Groundwater or surface water	Impact on surrounding environment	In the vicinity of the site	Surface water 1 station upstream and 1 station downstream the HWF site Specific for KAP site: Groundwater	Continuously from start of operation with control ones a year	Ensuring optimal operation and controlling for unexpected spread from the site	Nikšić : No need for groundwater monitoring. KAP: Existing wells around the KAP site can be used for	KAP: Rough estimate 20.000 eur with monthly sampling and analyses of 3 groundwater samples and 2 river samples	Operator	Operator

			sampling from minimum 3 monitoring wells			monitoring; however it is expected that at least 3 new monitoring wells shall be installed. Estimated cost: 30,000 eur	Nikšić : Rough estimates 10.000 eur. for surface water sampling and analyses.		
Noise	Noise	Surrounding area and work environment at the site	Inspection and noise meter	Continuously from start of operation	Ensuring optimal operation	Noise monitor approximately 300 eur + training in use 500 eur. to be paid by the operator	As for site management	Operator	Operator
Air	Smell or spread of contaminants	Surrounding area and work environment at the site	Inspection and if necessary air sampling	Daily In case of indication of impact on air, air samples shall be taken Analyses for SO2, CO, NOx, and PM10	Ensuring optimal operation	Portable air sampler and monitor approximately 10,000 eur.	As above	Operator	Operator
Closure phase									
Control of access	Prevent public access to the site	At the site	Check of the fence and gates	Once a year	Prevent contact to hazardous waste	none	Yearly control approximately 1000 eur.	Operator	Operator
Control of vegetation	Prevent erosion	On closed landfill cells	Inspection	Once a year	Prevent leakage	none	As above	Operator	Operator

cover									
Control of groundwater or surface water	Impact on surrounding environment	In the vicinity of the site	Surface water 1 station upstream and 1 station downstream the HWF site Specific for KAP site: Groundwater sampling from minimum 3 monitoring wells	Continuously from start of operation with control ones a year	n and controlling ead from the site	Nikšić : No need for groundwater monitoring. KAP: Existing wells around the KAP site can be used for monitoring; however it is expected that at least 3 new monitoring wells shall be installed. Estimated cost: 30,000 eur	KAP: Rough estimate 20.000 eur with monthly sampling and analyses of 3 groundwater samples and 2 river samples Nikšić : Rough estimates 10.000 eur. for surface water sampling and analyses.	Operator	Operator

8 Analyses of alternatives

The analyses of the alternatives are shown in Table 12.

Table 12 Analyses of alternatives

Alternatives	Analyses
0-alternative	0-altenative is "doing nothing" which means no establishing of a hazardous waste facility. The consequence is that hazardous waste will continuing to be stored and deposited in uncontrolled ways with extensive risks to the environment and to human health
Export of hazardous waste	Export of all hazardous waste is an alternative to establishing a hazardous waste storage facility in Montenegro; however a facility for collection/transport of hazardous waste will still be needed. The hazardous waste will be repacked at this facility and transported out of Montenegro. The exported waste shall be disposed/treated at an approved facility outside Montenegro. The cost for establishing deposit for the hazardous waste will be limited if the waste is exported whereas the cost for transport and fee for disposal/treatment at facility outside Montenegro will increase. The advantage of the central facility is the possibility of capacity building which will ensure correct handling of hazardous waste. Without a central collection facility the risk of incorrect handling of the hazardous waste will increase.
Bar area - Mozura Site	The site was evaluated by Ecorem and was found to be not well suited as the location for a HW disposal facility in Montenegro The site is a greenfield and there is no space left for construction of the hazardous waste facility. Extension of the landfill to the south is a possibility but will require extensive re-profiling and will highly increase visibility from the coast, which could have a negative impact on tourist activities. In addition, the high altitude of the site makes it sensitive to strong winds, which typically occur on the Adriatic coast. The geologic subsoil (karsts limestone) and the high elevation are negative factors for spreading of potential groundwater pollution. Because the site is not centrally located in Montenegro it will strongly increase transport cost during exploitation of the HW disposal facility.
Podgorica area – Regional	The site was evaluated by Ecorem and was found to be not well suited as the

Sanitary Landfill Meadows	location for a HW disposal facility in Montenegro According to the zonal planning the entire site is destined for land filling of MSW and no space is available for the construction and operation of a hazardous waste facility. Extension of the site would be very difficult for several reasons: habitations are nearby, the site is situated alongside agricultural land, and it is situated in a drinking water protection zone and during the past occasional flooding of the terrain was reported.
Nikšić area – Bauxite Mine	The site was evaluated by Ecorem and was found to be not well suited as the location for a HW disposal facility in Montenegro The Bauxite mine is situated on a steep slope and the road access is very difficult. There are no utilities (water, electricity) available on site. Infrastructural costs for the construction of a HW disposal facility will thus be a negative factor. As the closest village, Zupa, extracts its water from the local aquifers a very strong opposition against the construction of a HW disposal facility could be expected.
Nikšić area – Budos Site	The site was evaluated by Ecorem and was found to be not well suited as the location for a HW disposal facility in Montenegro Although the terrain is under consideration for the construction of a regional MSW landfill, the site should be considered as a greenfield. Moreover it is situated on the slope of a hill with steep slopes towards Nikšić plain that lies to the north, towards the city. At the foot of the hill the landscape is characterized by agricultural lands and meadows with high aesthetic and moderate ecological value. Access to the Budos site is poor with a narrow road in a bad condition. Not suitable for transport of waste.
Pljevlja area - Maljevac Ash and Slag Landfill	The site was evaluated by Ecorem and was found to be not well suited as the location for a HW disposal facility in Montenegro The current power plant ash landfill has no available space left for the construction of a new waste disposal for hazardous waste facility. Constructing a disposal site on top of the ash disposal after closure is not advisable because of serious stability problems. At present the stability of the dam containing the ash sludge is already questionable. Because the ash is pumped to the landfill, no good roads for transport are available. Since the landfill is situated in the northern part of the country the weather conditions in winter and long distance from the rest of the country are major drawbacks. Houses are present on the eastern site close to the landfill and visibility is good. Because of the numerous landfills already in the area, a strong opposition of the local population is to be expected.
Pljevlja area - Borvica Surface Mine	The site was evaluated by Ecorem and was found to be not well suited as the location for a HW disposal facility in Montenegro The fact that the location is in the far north of the country represents a major

	drawback. The site is already remediated. The biggest part of the mine is filled by rainwater and forms a lake. It has a high aesthetic value in the landscape. Meadows around the lake are used for recreational activities. The mine is situated at a distance of 200m of dwelling areas. A HW disposal facility at this location would be very clearly visible. Strong opposition from the local population can be expected.
Pljevlja area - Repetitor Site	The site was evaluated by Ecorem and was found to be not well suited as the location for a HW disposal facility in Montenegro. The location is in fact a greenfield in a mountainous area. As for the other locations at Pljevlja, the northern location of the Repetitor site in Montenegro, combined with the weather conditions in wintertime presents a major disadvantage.
Sumane Site	The site was evaluated by Ecorem and was found to be not well suited as the location for a HW disposal facility in Montenegro. The site is located in the far north of Montenegro and is thus at great distance from the rest of the country and the producers of hazardous waste. This would greatly increase the cost for exploitation of a future HW disposal facility if constructed here. In wintertime the site is sometimes hardly accessible because of snow. The mine is situated in the direct vicinity of habitations and agricultural land. Because of the already high pressure of the activities of the power plant on the environment, strong opposition from the local population can be expected.

9 Public consultation

The first public consultation for the project was carried out in the period 09/04/2012 to 11/04/2012. The second public consultation on the possible hazardous waste facility at the KAP-site was conducted on 10/07/2012, 13:30 in the conference room at hotel "Ramada", Podgorica. The second public consultation on the possible hazardous waste facility at the landfill at Nikšić was conducted on 11/07/2012, 10:30 in the City Hall of Municipality Nikšić.

The minutes of meetings from the first public consultations are attached in Appendix C. The minutes of meetings form the second public consultation is attached in Appendix D. The original minutes of meetings are prepared in Montenegrin. The English version will reflect the wording of the participants.

Some of the main issues discussed during the public consultation of the KAP-location:

- The forecast of generated hazardous waste as shown in presentation and in ECOREM reports is incorrect. The waste from the Thermal Power Plant shall not be included as hazardous waste.

- The scoring table for the shortlisted sites Podgorica and Nikšić presented at the meeting was different from scoring provided in published report. The reason was that Ecorem after public announcement had received and reviewed new results from the investigation carried out by the company SWECO *(investigation of solid landfill at KAP)*, so the scoring had been changed.

- A participant claimed that the small settlement on south side of KAP consisted of illegally occupied huts, so it cannot be considered as permanent settlement, and it has less than 200 inhabitants, as quoted in Study, so scoring for that criteria should be changed.

Letter from Golubovci administrative unit with comments to the evaluation of the sites is attached in appendix D.

A mail was received from Company "Hemosan" Bar, claiming that the data for the company in Ecorem's Interim report are incorrect. The mail is attached in appendix D.

Some of the main issues discussed during the public consultation of the Nikšić-location:

- A participant said they had the impression that decision was taken in advance, and criteria were anticipated in such a way that Nikšić will be chosen. In his opinion, citizens should decide through a referendum. He warned about waters that flow towards Adriatic Sea this issue had to be solved and he asked if the quality of groundwaters had been investigated in detail.

- Several participants had the following comments to the scoring table: Accessibility by road. Citizens' opinion is that location in Podgorica has much better accessibility than location in Nikšić . In addition, road to location in Nikšić leads close to centre of town. Therefore, Podgorica should be given more points than Nikšić .

- EPA explained that this public consultation was only part of a preliminary phase, to allow the Government to apply for funds; once the project is approved, Design will follow in accordance with Montenegrin legislation, and it will include new public consultations.

Appendix A Waste stream (Ecorem 2012)

Izvor		Vrste opasnog otpada				Količina (tona/godišnje)								
		Naziv	Tečni/Čvrsti	EU class(1)	Opasni (O) / Neopasni (NO)	Niža vrijednost	Viša vrijednost	Opcije tretmana	Pretpostavke/izvor	Tačnost	Komentar i preporuke	Opasni otpad potencijalno predviđen za objekat opasnog otpada za deponovanje / privremeno skladištenje/ recikliranje (ton/god)	
Teška industrija	KAP	Crveni mulj	Čvrsti	01.03.03	NO	96039	160065	Deponija, lokacija blizu proizvođača otpada	Referentni podaci iz Al-industrije (1,5-2,5 t/t proizvedenog Al), količine otpada zasnovane na proizvodnji od 64.026 t Al/god. za 2009 gopd.	dobra	Crna Gora, lokacija blizu proizvođača otpada	0	
		Katodni otpad	Čvrsti	10.03.07	O	384,74		Neutralizacija, solidifikacija, ponovna upotreba u industriji keramike, cementa i opekač; ponovna upotreba kao gorivo; ponovna upotreba kao karburator u industriji čelika; deponija	Izvještaj o životnoj sredini, 2010	dobra	Crna Gora, centralna lokacija	384,74	
		Azbest	Čvrsti	17.06.01/17.06.05	O/NO	N/P		Deponija	Izvještaj o životnoj sredini, 2010	prilična	Crna Gora centralna lokacija	N/A, probably minor quantities	
		Aluminijumska prašina/šljaka	Čvrsti	10.03.04	O	843,89		Hemijski tretman, deponija	Izvještaj o životnoj sredini	dobra	Crna Gora centralna lokacija	843,89	
		Slani kolač prašina/šljaka	Čvrsti	10.03.08	O	351,69		Deponija	Izvještaj o životnoj sredini	dobra	Crna Gora centralna lokacija	351,69	
		Koksna prašina/šljaka	Čvrsti	10.03.12	NO	144,28		Deponija	Izvještaj o životnoj sredini	dobra	Crna Gora, lokacija blizu proizvođača otpada	0	
		Otpadno ulje (uklj. PCB)	Tečni	13	O	79,54		Spaljivanje	Izvještaj o životnoj sredini	dobra	Crna Gora, lokacija blizu proizvođača otpada	0	
		Natrijum-sulfidne kese	Čvrsti	06.02.99	O	2,09		Hemijski tretman	Izvještaj o životnoj sredini	dobra	Crna Gora, centralna lokacija	2,09	
	Željezara Nikšić	Laboratorijski otpad	Tečni	-	POTENCIJALNO OPASNI	N/P		Hemijski tretman	Željezara Nikšić plan procesa i podaci o proizvodnji	loša	Monte., location near the waste producer	0	
		PCB otpad	Čvrsti	10.02.99	O	N/P		Hemijska oksidacija, spaljivanje, izvoz	Željezara Nikšić plan procesa i podaci o proizvodnji	loša	Crna Gora, centralna lokacija	N/A, probably minor quantities	
		Otpadno ulje (PCB)	Tečni	13	O	N/P		Spaljivanje tj. cementna industrija	Željezara Nikšić plan procesa i podaci o proizvodnji	loša	Crna Gora, lokacija blizu proizvođača otpada	0	
		Šljaka	Čvrsti	10.02.02	NO	6000	11250	Deponija	Lična komunikacija, posjeta lokaciji 3. aprili	dobra	Crna Gora, lokacija blizu proizvođača otpada	0	
		Prašina	Čvrsti	10.02.07/10.02.08	POTENCIJALNO OPASNI	975	1350	Obnavljanje za neobojene metale , deponija	Lična komunikacija, posjeta lokaciji 3. aprili	dobra	Crna Gora, centralna lokacija	1350	
	Termoelektrane Pljevlja	Otpadno ulje	Tečni	13	O	N/P		Spaljivanje tj. cementna industrija	EPA	loša	Crna Gora, lokacija blizu proizvođača otpada	0	
		Lož ulje	Tečni	10.01.25	NO	N/P		Spaljivanje tj. cementna industrija	EPA	loša	Crna Gora, lokacija blizu proizvođača otpada	0	
		Otpadne boje	Tečni	08.01	POTENCIJALNO OPASNI	N/P		Spaljivanje	EPA	loša	Crna Gora, lokacija blizu proizvođača otpada	0	
		Azbest	Čvrsti	17.06.01/17.06.05	O/NO	N/P		Deponija	EPA	loša	Crna Gora, centralna lokacija		(2)
		Mulj iz elektrane	Mulj	10.01	POTENCIJALNO OPASNI	280000	Deponija	Deponija	EPA	prilična	Crna Gora, lokacija blizu proizvođača otpada	0	
	Brodogradilište Bijela	Grit (PAH i bakar)	Čvrsti	12.01.16	O	3500	4000	Recikliranje, deponija	Lična komunikacija, posjeta lokaciji 1/12/2011	dobra	Crna Gora, centralna lokacija	0	(3)
		Otpadno ulje	Tečni	13	O	N/P		Spaljivanje	EPA	loša	Crna Gora, lokacija blizu proizvođača otpada	0	
Mala i srednja preduzeća		Uljani filteri	Čvrsti	16.01.07	O	N/P		Recikliranje, deponija	Prognoza, stručni stav	prilična	Crna Gora, centralna lokacija	5850	
		Baterije	Čvrsti	16.06.00	O			Izvoz	Prognoza, stručni stav		Crna Gora, centralna lokacija		
	Auto-servisi;	Fluorescentne lampe	Čvrsti	16.02.11	O			Recikliranje	Prognoza, stručni stav		Crna Gora, centralna lokacija		
	Benzinske pumpe;	Fotohemijski otpad	Čvrsti	20.01.17	O			Hemijski tretman, recikliranje, spaljivanje	Prognoza, stručni stav		Crna Gora, centralna lokacija		
	Štamparije i fotografske radnje;	Mulj	Čvrsti	10.01.20	O			Hemijski tretman, deponija	Prognoza, stručni stav		Crna Gora, centralna lokacija		
	Kozmetički saloni;	Kiseline i alkali (bazni) otpad	Čvrsti	06.01 / 06.02	O			Hemijski tretman, deponija	Prognoza, stručni stav		Crna Gora, centralna lokacija		
	Zdravstvene ustanove;	Otpad od boje i mastila i njihove ambalaže	Liquid	08.01.00	O			Hemijski tretman, recikliranje, spaljivanje	Prognoza, stručni stav		Crna Gora, centralna lokacija		
	Laboratorije;	Agrohemijski otpad i njegova ambalaža	Tečni/Čvrsti	02.01.08	O			Hemijski tretman, spaljivanje	Prognoza, stručni stav		Crna Gora, centralna lokacija		
	Škole i univerzitetske jedinice;	Azbest	Čvrsti	17.06.05	O			Deponija	Prognoza, stručni stav		Crna Gora, centralna lokacija		
	Hoteli;	PCB i PCB kontaminirana oprema	Čvrsti	16.01.09	O			Hemijska oksidacija, spaljivanje, recikliranje, izvoz	Prognoza, stručni stav		Crna Gora, centralna lokacija		
	Hemijske čistione i perionice;	Kontaminirano zemljište	Čvrsti	17.05.03	O			Hemijski tretman, deponija	Prognoza, stručni stav		Crna Gora, centralna lokacija		
	Prerada drveta;	Kontaminirana iskopana zemlja	Čvrsti	17.05.05	O			Deponija	Prognoza, stručni stav		Crna Gora, centralna lokacija		
	Prerada papira;	Ostaci termičke obrade i pepeo	Čvrsti	10.00.00	O			Deponija, cementni aditiv	Prognoza, stručni stav		Crna Gora, centralna lokacija		
	Prehrambena industrija;	Otpadna elektronska i električna oprema	Čvrsti	16.02.00	O			Recikliranje	Prognoza, stručni stav		Crna Gora, centralna lokacija		
	Državne institucije.	Otpadna vozila	Čvrsti	16.01.04	O			Recikliranje	Prognoza, stručni stav		Crna Gora, centralna lokacija		
		Hemijski tretirano drvo	Čvrsti	17.02.04	O			Spaljivanje	Prognoza, stručni stav		Crna Gora, centralna lokacija		

Izvor	Vrste opasnog otpada				Količina (tona/godišnje)						Opasni otpad potencijalno predviđen za objekat opasnog otpada za deponovanje / privremeno skladištenje/ recikliranje (ton/god)
	Naziv	Tečni/Čvrsti	EU class(1)	Opasni (O) / Neopasni (NO)	Niža vrijednost	Viša vrijednost	Opcije tretmana	Pretpostavke/izvor	Tačnost	Komentar i preporuke	
	Laboratorijski otpad	Tečni	-	O			Hemijski tretman, izvoz	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Opšti hemijski otpad	Tečni	06 and 07	O			Hemijski tretman, izvoz	Prognoza, stručni stav		Crna Gora, centralna lokacija	
Domaćinstva	Baterije	Čvrsti	20.01.03	O			Recikliranje, izvoz	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Otpadna elektronska i električna oprema	Čvrsti	20.01.35	O			Recikliranje	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Otpadna vozila	Čvrsti	16.01.04	O			Recikliranje	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Azbest	Čvrsti	17.06.05	O			Deponija	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Ostaci boja i lakova	Tečni	20.01.27	O			Hemijski tretman, spaljivanje, reciklaža	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Alkali	Tečni	20.01.15	O			Termička obrada, spaljivanje	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Fungicidi, herbicidi, insekticidi	Tečni	20.01.19	O			Termička obrada, izvoz	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Aerosolne limene posude, kontaminirana ambalaža	Čvrsti	14.06.00	O	N/P		Recikliranje, spaljivanje	Prognoza, stručni stav	prilična	Crna Gora, centralna lokacija	780
	Tretirano drvo i sredstva za zaštitu drveta	Čvrsti	20.01.37	O			Spaljivanje	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Fluoroscentne tube	Čvrsti	20.01.21	O			Recikliranje	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Farmaceutski proizvodi	Tečni	20.01.31	O			Termička obrada, izvoz	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Prirodno ili sintetičko ulje	Tečni	20.01.26	O			Spaljivanje	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Fotohemikalije	Tečni	20.01.17	O			Hemijski tretman, spaljivanje, recikliranje	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Kiseline	Tečni	20.01.14	O			Spaljivanje	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Deterdženti sa opasnim supstancama	Tečni	20.01.29	O			Hemijski tretman	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Razređivači	Tečni	20.01.13	O			Recikliranje	Prognoza, stručni stav		Crna Gora, centralna lokacija	
	Kontaminirani građevinski šut	Čvrsti	17.01.06	O			Deponija	Prognoza, stručni stav		Crna Gora, centralna lokacija	

UKUPNO (tona /godišnje)	9762,41

Radi jedinstvene klasifikacije i poređenja preporučuje se korišćenje propisa EU klasifikacije otpada za sve buduće registracije tokova otpada.

(1) 1120 tona azbesta iz rashladnog tornja

(2) 56.000 tona trenutno prisutno na lokaciji

(3)

Appendix B Ecorem comparison of shortlisted sites

Shortlisted sites

Criterion		Scores KAP Aluminium Plant Site	Scores Niksic Steel Plant Landfill Site	Scores Sumane Surface Mine Site	Remarks KAP Aluminium Plant Site	Remarks Niksic Steel Plant Landfill Site	Remarks Sumane Surface Mine Site
Setting							
Accessibiltity	Road	5	5	4	Nearby main road	Local road from the steel plant to the settlements west from the landfill divides the landfill to north and south part	Main road Niksic-Pljevlja is located ca. 500 m from the site
	Rail	5	3	1	Railroad on site	2.5 km from the landfill	Nearest railroad is 30 km away
Topography		5	4	3			Valley between medium-height hills
Zonal plan		5	5	4		No	Yes, new plan in preparation
Total surface (ha or km^2)		4	4	5	Total surface: 4 km2, red mud basins: 45 ha, solid waste landfill: 12 ha	Ca. 9 ha	Ca. 100 ha
Available surface (ha or km^2)		5	2	5	Ca. 6 ha	Ca. 6 ha; part of territory may be needed for future controlled ash/slag deposit for which inclusion of nearby greenfield may be required	Ca. 100 ha
Regional setting		5	4	1	Close to major hazardous waste producers, incl. Bjela shipyards	Centralized location (relatively short distance to different hazardous waste producers)	Distant location (large distances to most hazardous waste producers)
Future activities		3	3	2	Land available: no specific activities planned, but some uncertainties re. future management	Potential synergy between site remediation and future landfill site for hazardous waste	Recently, land is also proposed for disposal of bulky waste from power plant
Technical Aspects							
Soil stability		5	4	5	Good	Fair, but slopes and covered cavities to be checked (surveys)	Good, surveys are recommended in particular for slopes showing risks for land sliding
On-site pollution (present-day)		1	2	5	Groundwater and soil already seriously polluted	Groundwater and soil already polluted	No groundwater or soil pollution
On-site waste piles		4	3	1	Volumes of hazardous waste already available on site for future landfilling	Volumes of hazardous waste for future landfilling already available on site or nearby site	Hazardous waste to be transported to site
Environmental Impacts							
Landscape quality (aesthetic)		4	4	2	Low quality because landscape is already impacted by plant	Low quality due to the large amount of deposited slag	Relatively high, cf. in the vicinity of the basins
Landscape quality (natural)		3	4	2	Variable agricultural land around the site	Low quality -- small trees and maquis.	Relatively high, cf. in the vicinity of the basins
Hydrology		2	2	4	Streams in vicinity of site	Streams in vicinity of site	No streams in the vicinity. Natural clay seal causes retention of the rainfall in the basins. Water is being pumped from both basins
Hydrogeology		1	2	3	Vulnerable aquifer (sand / gravel)	Vulnerable karstic aquifer underneath "terra rossa" and industrial waste deposits	Vulnerable karstic aquifer overlain by marls, etc.
Present land use (on site)		4	5	3	Industrial site, incl. landfill site (cf. Sweco rpt)	Industrial dumping site	Abandoned surface coal mine
Land use (site vicinity, e.g. 1 km radius)		2	3	1	Agriculture	Housing and small-scale agriculture at 300 m from the site, forest	Housing and small scale agriculture all around the site
Presence of protected areas (agriculture, nature, etc.)		3	5	5	Agriculture. National park Skadarsko lake is located ca. 12 km to the south	No	No
Social Impacts							
Proximity of habitation		2	4	1	At ca 100 m southeast of the site (approx. 200 pop.)	Ca. 300 m from the southern part and 750 m from the northern part of the landfill (approx. 200 pop.)	Houses around basins on the slopes of the valley (approx. 600 pop.)
Site visibility from habitation		2	4	1	Relatively well visible	Southern part of the landfill only (few houses)	Clearly visible
Monuments or cultural assets in the vicinity		5	5	5	Monastery Dajbabe ca. 2,8 km from site	Not applicable	Not applicable
Total Score		**75**	**77**	**63**			

Appendix C First public consultation

Appendix D Second public consultation

Minutes, second public consultation - Aluminium Plant (KAP), Podgorica, 10/07/2012, 13:30

Public consultation held in the conference room at hotel "Ramada", Podgorica. Total of 21 people attended the consultation, including representatives of EPA Montenegro and KAP, and 5 representatives from COWI and Ecorem/Hidroplan who conducted the consultation. Some of the participants, who had attended previous consultation about remediation, left the room after the presentation on NHWF.

Participants:

Name	Abbr.	Company	Contact data
Lars Bo Christensen	LBCH	COWI	
Dragan Milic	DMIL	COWI	
Vuko Strugar	VSTR	COWI	
Vladimir Filipovic	VLAF	Ecorem	
Denis Stjepan Vedrina	DENV	Hidroplan	
Birgitt Alger	BIAL	CDM Smith	
Vladan Dragutinović	VDRA	EPA Montenegro	vladan.dragutinovic@epa.org.me
Almina Bučan	VDRA	EPA Montenegro	almina.bucan@epa.org.me
Danilo Kujović	DKUJ	EPA Montenegro	danilo.kujovic@epa.org.me
Ivana Bubanja		EPA Montenegro	ivana.bubanja@epa.org.me
Danka Maksimović		EPA Montenegro	danka.maksimović@epa.org.me
Zoran Amidžić		EPA Montenegro	zoran.amidzic@epa.org.me
Dragan Asanović	DASA	EPA Montenegro	dragan.asanovic@epa.org.me
Boro Miljanić		Eko Centar d.o.o. Nikšić	069/541-137
S. Putnik			
Aleksandar Duborija	ADUB	Institute for technical research	067/528-258
Natasa Kovacevic	NKOV	NVO "Green Home"	natasa.kovacevic@greenhome.co.me
Jovana Janjušević	JJAN	NVO "Green Home"	jovana.janjusevic@greenhome.co.me
Marjana Kaluđerović	MAKA	KAP	marjana.kaludjerovic@kap.me
Dušan Laković	DULA	KAP	dusan.lakovic@kap.me

Vukosav Žulović		KAP	vuko.zulovic@kap.me
Tatjana Miranović		Municipality Podgorica	miranovic.tanja@gmail.com
Milka Šćepović		Municipality Podgorica	milkascepovic@t-com.me
Milanka Baljevic	MIBA	Local municipality Golubovci	milankab@t-com.me
Veselinka Vukčević		Municipality Podgorica	v.vukcevic@pggrad.co.me
Lazarela Kalezic	LKAL	Municipality Podgorica	lkalezic@pggrad.co.me

DMIL opened the public consultation, welcoming the participants and presented IWMCP (Industrial Waste Management and Clean-up Project), component B - construction of national hazardous waste facility.

During the presentation, DASA, ADUB and LKAL objected to the forecast of generated hazardous waste, shown in presentation.

DENV explained that data for Thermal power plant Pljevlja were wrong, since ash was not dangerous waste, and not all the quantities of generated hazardous waste will be disposed at NHWF.

ADUB asked if Ecorem's report, that was a basis for public consultation, had been approved or not.

DASA and DENV said it had not been approved, and it was in phase of final adjustments.

DMIL continued with presentation.

LKAL and NKOV objected that scoring table of shortlisted sites, Podgorica and Nikšić , was different from table provided in material after announcement, on 25. June.

DMIL and DASA explained that Ecorem in the meantime had received and reviewed new results from the investigation carried out by the company SWECO *(investigation of solid landfill at KAP),* so the scoring had been changed.
NKOV commented that it was not serious to change the data at such a short notice.
DMIL continued with presentation. After presentation, he invited participants for discussion.

LKAL asked about zero alternatives. She understood zero alternatives meant doing nothing, and she agreed it was not acceptable. However, zero alternatives could also mean finding a solution for hazardous waste without building NHWF; for example, exporting the waste. She asked if that option was considered, and what was the cost?

DASA said that waste management based only on export was not sustainable. He was aware of some countries, Ireland for example, where none of locations had been found suitable for NHWF. Similar case could happen in Montenegro, but

Government decided to take the risk, since export is always the most expensive solution.
LKAL asked if he wanted to say that option of exporting had not been considered at all.

DASA said it was responsibility of each generator of hazardous waste itself - they will have two possibilities: either to send it to NHWF, either to export it.

JJAN said that newspapers reported budget of 700 M EUR for exporting the waste, while Arhus Center reported budget of this project of 80.000 to 100.000 EUR; she asked for explanation of discrepancy.

DASA said that newspapers transmitted incorrect data: as one of alternatives for remediation of Gradac tailing pond, CDM considered export of the waste in Gradac, and it would alone cost 700 M EUR; the journalists have misunderstood the information.

LKAL asked how long time it took to review all 10 locations from the long list; what current owners of KAP and Steel Factory thought about the project; whether cumulative impacts in KAP had been considered; what was opinion of people who lived in vicinity of KAP; whether planning documents had been considered; what types of waste would be generated in NHWF; how was the scoring made, and why had it been changed two days prior to public consultation.

DENV replied to her questions: it took them 5 months for all 10 locations. He explained that they had done multi criteria analysis, which consisted of overlaying different maps of Montenegro, which gave zones where NHWF could not be built. After that, brownfields were chosen from remaining area, in order to decrease environmental impact. As for owners of KAP and Steel Factory, as far as he knew, they did not resist the idea, since it would help them solve their waste problem. No waste will be generated at NHWF, she misunderstood the Study – the table shows types and sources of generated waste, not waste generated at NHWF. As for cumulative impacts, they had been considered, but they might lead the project off course - once brownfields in Nikšić and Podgorica are remediated, their impact would be diminished; however, it was difficult to change perception of people on that issue.

MAKA said that a settlement on south side of KAP consisted of illegally occupied huts, so it cannot be considered as permanent settlement, and it has less than 200 inhabitants, as quoted in Study, so scoring for that criteria should be changed.
LKAL asked who would construct and finance NHWF.

DENV said scope of project was only site selection, not construction and operation.
DASA confirmed what DENV said. He added that ownership issues of KAP had not been cleared yet, and emphasized that Project was still in a preliminary phase; once project is underway, appropriate planning documentation will be made in accordance with Montenegrin legislation.

LKAL said that in her opinion, economic aspect was not considered enough.

VLAF explained that EU practice is to build HWF as extension of municipal waste landfills.
ADUB asked where the capacity of 130.000 tons, shown in presentation, came from. If it was based on forecast of hazardous waste generation, forecast had been inaccurate.

DENV said that capacity was decided on the basis of all available data.
ADUB asked which data.

DMIL explained that it was capacity of waste processing, not waste disposal.

DENV said that they considered the possibility to bring waste from other locations, for example Shipyard Bijela, and capacity of 130.000 tons was preliminary figure that may be increased because of historical waste.

ADUB asked if they had included scoring for possibility of extending of the facility in both locations.

VLAF and DENV confirmed that. Extension was limited by characteristics of brownfield.

ADUB concluded that public must wait for the final report to see exact details.
JJAN asked if 60% of waste would be exported.

DENV replied that export was a possibility, but exact quantity was unknown.

NKOV asked if those two quantities, for export and for NHWF, were clearly separated, since it could not be seen from the Study.

DENV explained that quantities would be the same, regardless of which location would be selected.

NKOV asked for the price of transportation.

DENV said it would not be of crucial importance.

NKOV asked why the location in Pljevlja had been excluded, if transportation price was not important.

DENV said there were other reasons: inaccessibility because of the snow during winter, planned extension of ash dumpsite, and absence of railways.

NKOV asked why the floods in KAP area had not been considered.

MAKA and MIBA said that KAP area had not been subject to floods.

MIBA asked why the proposal of NHWF did not included segments for various types of waste - hazardous waste, inert waste, etc.

DASA explained that intention was not to have classic landfill for waste disposal, but facility with bigger possibilities. It will be kind of center for waste, with several segments, including landfill.
MIBA asked what types of waste would be treated at NHWF. For example, it was known that KAP had PCB oils; would they be treated at NHWF.

DASA said that facility would receive only solid waste.

DENV said that there would be possibility to treat oil products, for example, to include incineration facility.

LKAL said that people who lived in vicinity of KAP were tired of remediation stories, so a campaign should be undertaken, to change their perception. She asked what would be further steps.

DASA explained that these Studies would be sent to WB for approval, so to get loan funds.

NKOV asked if there was a final version of any document. She stated it was not serious to organize public consultation on the basis of draft documents.

DMIL explained that purpose of public consultations was to collect suggestions from public, so to include them in final document.

NKOV asked why cost-benefit analysis had not been made, as asked in first public consultation.

DENV said that scope of project was only site selection, and such a project did not include cost-benefit analysis.

JJAN said that it would be useful to do analysis anyway, as it might have had an impact to scoring of two locations.

NKOV asked why scoring had been changed only for KAP and Nikšić , while Pljevlja kept the same points.

DENV said that there had not been new investigations in Pljevlja.

NKOV said that the scoring was a crucial part of Study, and it changed for about 10 points in one day; she asked how it was possible to make such a mistake.

DENV said it was not one day, but one month. Difference was caused by report from Company SWECO, which provided new data on quantities and composition of waste.

DMIL asked NKOV if she believed that old scoring table should have been discussed in consultation, and not new one.

NKOV said that surely a new table should been discussed, but they needed time to review it, so consultation should have been postponed. She asked why topography was not commented in scoring table.

VLAF said that detailed comments for topography were given in Short list Report. NKOV said that more maps should be given in the report, since geo mapping system had been used.

DENV said that preliminary report included more maps, but EPA Montenegro asked to decrease that content, as they considered it unnecessary.

NKOV said that soil around KAP was porous, thus making it unsuitable for NHWF. Locations with clayey soil should be found and considered for facility.

NKOV said that soil around KAP was porous, and present of clayey soil should have been included in the scoring found.

DENV said that entire Montenegro, except Pljevlja region, had porous soil. Location in Pljevlja was included in short list exactly because of the presence of clayey soil.

VLAF said that clay could be imported, or artificial liners used instead.

LKAL asked if infrastructure was included in the study for NHWF (transfer stations, collection stations, etc.)

DENV said that was not a scope of the project; it only gave some recommendations.

VLAF explained that first step should be selection of disposal site for waste; other steps would follow.

LKAL said that infrastructure was expensive. For example, small recycling center ("recycling yard") in Podgorica cost about 300.000 EUR, and smaller municipalities would not be able to afford it. NHWF is not worth if infrastructure is missing.

DENV agreed, but also said that infrastructure is not worth if facility is missing.

DASA said that it could be solved through PPP, private/public partnership. Since there were no more questions or comments, DMIL thanked to all participants, and closed the consultation.

Minutes, second public consultation – National Hazardous Waste Facility in location of landfill in Steel factory Nikšić , 11/07/2012, 10:30

Public consultation held in city hall of Municipality Nikšić.

Total of 22 people attended consultation, including representatives of EPA Montenegro and KAP, and 5 representatives of COWI and Ecorem/Hidroplan who conducted consultation. Some of participants who attended previous consultation, about remediation, left the room after presentation on NHWF.

Participants:

Name	Abbr.	Company	Contact data
Lars Bo Christensen	LBCH	COWI	
Dragan Milic	DMIL	COWI	
Vuko Strugar	VSTR	COWI	
Vladimir Filipovic	VLAF	Ecorem	
Denis Stjepan Vedrina	DENV	Hidroplan	
Birgitt Alger	BIAL	CDM Smith	
Vera Mirković	VMIR	Municipality Nikšić	mirkovicvera@yahoo.com
Sanela Ljuca		World Bank	sljuca@worldbank.org
Božidar Vučinić	BVUC	Eko Montenegro Nikšić	eko.montenegro@gmail.com
Zdravko Filipović		Neksan Nikšić	
Ivanka Nikolić - Mrkić		Neksan Nikšić	040.247-067
Nataša Bakić	NBAK	Municipality Nikšić	bakicnatasa@yahoo.com
Miodrag Karadžić		NGO "Association of young ecologists" Nikšić	ayen-ben@t-com.me
Dobrislav Bajović		Expert in environmental protection	bajone@t-com.me
Emilija Kovačina	EMIK	"Scena 083" Nikšić	069/348-846
Vladan Dragutinović	VDRA	EPA Montenegro	vladan.dragutinovic@epa.org.me
Danilo Kujović	DKUJ	EPA Montenegro	danilo.kujovic@epa.org.me
Dragan Asanović	DASA	EPA Montenegro	dragan.asanovic@epa.org.me

Boro Miljanić		Eko Centar d.o.o. Nikšić	069/541-137
S. Putnik			
Dragomir Vojinović	DVOJ		vojinovicd@t-com.me
Arsenije Lalatović	ALAL	Political party "PZP"	pzpnk@hotmail.com
Svetlana Mandić		Daily "Vijesti"	069/499-810
Anka Perović - Radović		Radio Montenegro	069/042-810
Ivana Jovović		Daily "Dnevne novine"	ivana.jovovic2006@gmail.com
Ratko Perošević		Daily "Pobjeda"	pobjedank@t-com.me
Natasa Kovacevic	NKOV	NVO "Green Home"	natasa.kovacevic@greenhome.co.me

DMIL opened the public consultation, greeted the participants and presented IWMCP (Industrial Waste Management and Clean-up Project), component B - construction of national hazardous waste facility.

After presentation, he invited participants for discussion.

BVUC asked if number of 10 locations had been defined in ToR, and if so, who decided to have 10 locations on wide list. Municipality of Nikšić is the biggest one in Montenegro, yet only 3 locations were chosen from this Municipality; he believed that more suitable locations could be found in Municipality. He read description for sanitary landfill Budos, where location was described as greenfield; however, if there was a sanitary landfill, it was not greenfield.

DENV explained that the 10 locations were selected using multicriterial analysis, which consisted of overlaying different maps of Montenegro, which gave zones where NHWF could not be built. After that, brownfields were chosen from remaining area, in order to decrease environmental impact. The number of 10 locations had been defined in ToR, but only number, not locations itself.

BVUC left the room after that reply.

ALAL said they had impression that decision was taken in advance, and criteria were anticipated in such a way to choose Nikšić . In his opinion, citizens should decide on referendum. He warned about waters, which flow towards Adriatic Sea, this issue had to be solved. He asked if quality of ground waters had been investigated in details.

DENV decisively denied his accusations. He said that Ecorem was independent body, and Client did not suggest which location to select at all.

ALAL said he was sure that the location in Nikšić would be selected one, and only citizens can prevent this decision. Citizens of Nikšić do not have positive experience with landfills.

DMIL said that project does not include landfill, as translation sometimes suggests, but facility.

VLAF explained that facility would receive only certain types of waste, and treat them in accordance with EU standards.

DENV explained that scoring had changed in the meantime, so it was not certain that location in Nikšić would be selected, since difference in points decreased. In addition, client requested to include extension for possible disposal of waste grit from Shipyard Bijela.

ALAL suggested that scoring might be camouflage only. He asked citizens to decide on location.

DENV said that usually people do not like such a facility in their city, so they can use institutional instruments to oppose the decision.

DMIL said that one of the criteria for selections was consensus of citizens, so their opinion would be taken into consideration.

EMIK said that only opinion of governing party was taken into consideration. Citizens were written off, and they are afraid to show up and tell their opinion, due to fear of losing their jobs if they oppose.

NKOV asked if regional water well "Boljesestre" was considered in scoring for location in Podgorica.

DMIL and DENV explained the scoring system.

NKOV said it was not good to base consultations on Study that had not been completed, but was still pending approval.

DVOJ, NKOV and VMIR gave following comments to scoring table:
Accessibility by road. Citizens' opinion is that location in Podgorica has much better accessibility than one in Nikšić . In addition, road to location in Nikšić leads close to downtown. Therefore, Podgorica should be given more points than Nikšić .

Total surface. Surface in Podgorica is bigger than in Nikšić . Therefore, Podgorica should be given more points than Nikšić .

Regional setting: Citizens believe that regional setting in Podgorica has more advantages than in Nikšić , due to its location and infrastructure; proposal was 2 points to be given to Nikšić , instead of 4.

On-site pollution, present day: Comments were that it was impossible for Nikšić to be given more points than Podgorica, since KAP is much bigger generator of pollution.

On-site waste piles: Citizens commented results of analyses from CETI that had not shown significant contamination; therefore, they believe Nikšić should be given less than 3 points. Our reply was that they confused results of analyses from waste itself and ones from area surrounding the dumpsite.

Hydrology: DVOJ believed that distance to the closest river was bigger in Podgorica than in Nikšić . Therefore, the location in Podgorica should be given more points than one in Nikšić .

Land use (site vicinity): Comment was that land surrounding the site was valuable and used for agriculture, just like land surrounding location in Podgorica, so Nikšić should not be given more points than Podgorica.

DENV said that their suggestions would be considered; but in any case, conclusion from their Study would be two locations, Nikšić and Podgorica, and it would be up to Client to decide between them; scoring may affect their decision, but would not be the final criteria.

ALAL again stated his doubts about criteria system, based on the comments above. He emphasized that there is no illegal settlements in vicinity of landfill Nikšić .

VMIR suggested that forecast of generated amounts of hazardous waste, given in Study, was not correct.

DMIL agreed with her, stating that they had been aware of the mistake in that forecast, and it would be corrected. As for issue of illegal settlements, methodology of the Study took into consideration all inhabitants who actually lived in vicinity of the sites, never mind of their legal status.

Several participants replied that suggestion of DVOJ, that river Moraca was several kilometers away from KAP, was incorrect.

VMIR said that detailed properties of facility, shown during presentation, had not been given in the Report.

DVOJ said that river Gracanica partially has underground stream, and asked if it had been taken into consideration.

VLAF replied that they had used Water management base of Montenegro, so that issue had been identified.

DVOJ asked why NHWF would be built strictly in brownfields, since it would not pollute the environment.

DASA replied that one of the reasons was easier remediation of existing pollution, which is guideline of WB, as well. This public consultation was only part of preliminary phase, to allow Government to apply for funds; once they are approved, Design will follow in accordance with Montenegrin legislation, and it will include new public consultations.

EMIK and ALAL said they did not agree with Study and scoring of locations.

EMIK said that in her opinion, Study was intentionally counterfeit.

Since there were no more questions or comments, DMIL thanked to all participants, and closed the consultation.

C R N A G O R A
GLAVNI GRAD PODGORICA
GRADSKA OPŠTINA GOLUBOVCI
Predsjednik Gradske opštine Golubovci
Broj: 22-031/12-4158
Golubovci, 12.07.2012.

Consulting Company COWI
-attn. of local consultant, Mr. Vuko Strugar-

Subject: Opinion of Administrative unit Golubovci on potential location for NHWF in Aluminum plant Podgorica

After reviewing documentation available at site of Arhus Center, after announcement of second round of public conusltations, and participation in public consultation – discussion about potential location for NHWF, on 10/07/2012 in Podgorica, and in accordance with Law on EIA, and Article 9 of Statutary decision of Administrative unit Golubovci, which rules that ***„Administrative unit takes care about environmental protection inside its area“****, we conclude as follows:*

- *Available preliminary documentation describes the most suitable locations for NHWF. Evaluation of location in KAP did not take into consideration cumulative impact of production process in KAP, of asphalt plants, of grinding plants, etc. to environment and inhabitants in closer and wider area. It also did not take into consideration that Detailed Urbanistic Plan „Industrial Zone – Aluminum Plant Podgorica“ anticipates construction of waste water treatment plant for Municipality Podgorica in vicinity of all pollutants mentioned above. Therefore, we suggest* ***to consider cumulative impact of existing and planned activities, and evaluate suitability of location for NHWF accordingly.***
- *Having in mind consitutional right of* ***each citizen to healthy envirohnment****, Local government of Administrative unit Golubovci will closely follow the further development of this project, and will retain the right to give its expert opinion in any phase of the Project.*

Prepared by:
Senior advisor III for environment
Baljević Milanka B. Sc. of Techn.

PRESIDENT OF ADMINISTRATIVE UNIT
Dušan Radonjić

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From: strugar@gmail.com [mailto:strugar@gmail.com] **On Behalf Of** Vuko Strugar
Sent: mardi 10 juillet 2012 21:23
To: Stefan HELSEN; Evert VERMAUT; Denis Stjepan Vedrina; Vladimir
Cc: Lars Bo Christensen
Subject: Fwd: Informacija u vasoj analizi o upravljnju industrijskim otpadom

Dear all,

below is translation and original mail that I received today, to mail address I left in public announcement in newspapers; mail is from company Hemosan, mentioned in your Interim report, chapter 2.2.2, page 18.

Regards,

Vuko Strugar

Translation of mail (I have splitted sentences into pargraphs, for easier reading):

Dear Mssrs.,

While reviewing your preparation of plan for industrial waste management, we noticed that you listed our company and data about it, i.e., what our company receives and exports or recycles.

You can contact us if you want us to give you data as clear as possible, since the data you provided are incorrect, and do not comply neither with the facts nor with operation of our company.

We'd like to emphasize that we have data related to MARPOL in capacity of 100%, but as usual, the one who knows the job is not in charge.

We are ready to provide our data once you show interest.

Unfortunatelly, we were not able to participate in public consultation for grit, and we had something to say, much of that.

Respectfully yours,

capt. Zoran Nikitovic

---------- Forwarded message ----------
From: **hemosan** <hemosan@t-com.me>
Date: 2012/7/10
Subject: Informacija u vasoj analizi o upravljnju industrijskim otpadom
To: mail@cowi.me

Poštovani,

Prilikom pregleda vase izrade plana upravljanje industrijskog otpada vdjeli smo da ste naveli našu firmu kao I podatke o njoj,tj sta nasa firma prima I izvozi ili reciklira.Sa željom da vam damo sto jasnije podatke možete se obratiti za informacije a podatke koje ste naveli su netacni,I neodgovaraju

cinjenicama kao I radu nase kompanije.Takodje napominjemo da podatke vezane za MARPOL imamo u kapacitetu 100 posto,ali kao sto obicno biva onaj ko zna taj se I ne pita.Spremni smo izaći sa podacima onda kada iskažete interes za njima.Nazalost zbog sprecenosti nismo prisustvola javnoj raspravi o gritu a imali smo sta da kažemo I to mnogo toga

Spoštovanjem,

Cap.Nikitovic Zoran

Appendix E COWI Registration

ERHVERVSSTYRELSEN

OFFICIAL CERTIFICATE

In its capacity as the competent authority pursuant to European Parliament and Council Directive 2004/18/EC of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts and European Parliament and Council Directive 2004/17/EC of 31 March 2004 coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors (Utilities Procurement Directive)

the Danish Commerce and Companies Agency
(Erhvervsstyrelsen)

hereby declares, certifies and confirms

that

COWI A/S

which has its registered office at Parallelvej 2, 2800 Kgs.Lyngby, is a Danish business established and existing according to Danish law and registered in the Central Business Register under CVR No. 44623528,

and that

pursuant to the above Council Directives 2004/18/EC and 2004/17/EC the following information applies to COWI A/S

----the business is not undergoing bankruptcy proceedings, restructuring proceedings, liquidation procedures or procedures to obtain a compulsory arrangement with its creditors, has not suspended payments, has not closed down its activities and is not in similar circumstances, no petition has been filed against the business for bankruptcy proceedings, restructuring proceedings, liquidation procedures, procedures to obtain a compulsory arrangement with its creditors, suspension of payments or any similar procedures

----the business has not, by any enforceable sentence pursuant to Danish law, been convicted of any punishable offence which might lead to any doubts about the professional integrity of the business/company and has not, by any enforceable sentence pursuant to Danish law, been convicted of any punishable offence falling within Article 45(1) of the Public Procurement Directive

----the business has met its obligations pursuant to Danish legislation to pay contributions to social security plans

----the business has met its obligations pursuant to Danish law to pay taxes and duties

Copenhagen, 16-04-2012

Pia Bøgh Jensen
Senior Clerk

ERHVERVSSTYRELSEN