Summary of Environmental Impacts associated with the Vlore Thermal Power Station

0. Background

The European Bank for Reconstruction and Development (EBRD) has been requested by Korporata Elektroenergjetike Shqiptare (KESH), the state owned power utility of Albania, to participate in the funding of the construction of a Combined Cycle Generation Facility in Vlorë. The power station will provide base-load capacity of 85-135MW. It will be fuelled by distillate oil and be designed to allow conversion to natural gas. As the construction and operation of the power station may result in environmental impacts, an Environmental Impact Assessment (EIA) has been carried out.

This summary of the Environmental impacts associated with the project was prepared for EBRD's disclosure purposes related to the Bank's participation in this project. It is based on the Environmental Impact Assessment and makes, to a large extent, use of materials prepared by the World Bank for public disclosure and consultation.

1. Site Selection and Alternatives

The United States Trade and Development Agency (USTDA) awarded a grant to the Government of Albania to assist in the development of a new thermal generation facility. The Albanian Ministry of Industry and Energy subsequently retained international consultants (Montgomery Watson Harza; MWH) to perform three tasks.

- Task One was to evaluate and select the best site, technology, and fuel for a new base load, thermal generation facility.
- Task Two was to conduct a feasibility study to evaluate the technical requirements as well as the environmental, economic, and financial viability of the generation facility at the selected site.
- Task Three was to conduct an Environmental Impact Assessment (EIA) of the proposed generating facility.

In Task One, MWH evaluated seven potential sites including sites near Durrës, Elbasan, Korçë, Fier, Shëngjin and two sites near Vlorë – Vlorë A and B. The sites were evaluated using an automated methodology, which scored each site on a number of development criteria such as fuel supply, water supply, transmission availability, cost, and environmental considerations, among others. A Draft Siting Report documenting the results of Task One was issued on June 6, 2002 and recommended Vlorë B, hereafter refer to as the Vlorë site, as the best site and distillate oil-fired, base load, combined cycle generation as the best generation technology.

Based on the site location, technology, and fuel selected in Task One, MWH conducted a detailed feasibility study in Task Two to evaluate the technical requirements as well as the financial, environmental, and social viability of the potential generation facility at the selected site. The Feasibility Study focused on the development of a facility with an installed capacity range of 90 to 130 MW. The Study reconfirmed the recommendations that were originally provided in the Siting Study.

Task Three, an Environmental Impact Assessment of the Vlorë site in accordance with the requirements of the three potential financing institutions (World Bank; EBRD; EIB) was subsequently carried out. The environmental assessment (EIA) and environmental management plan were prepared by the Montgomery Group with financing from USTDA. An independent review of the EA and EMP was carried out by Consultants financed by CIDA.

2. The Site

The selected site at Vlore is a six hectare green field site adjacent to the offshore oil tanker terminal located on the Adriatic coast north of the Port of Vlorë. It is located approximately six km from the Port of Vlorë. The site is situated on a relatively barren coastal area with little vegetation or wildlife.

There are no major point sources of air emissions in the Vlorë area. Several industrial facilities that operated in Vlorë in the past were closed down in the 1990's. Due to the lack of industrial activity in the area and the lack of reliable data, it is assumed that current air quality conditions in the Vlorë area satisfy a "moderate" air quality classification according to World Bank criteria.

No land acquisition is involved for the power plant itself as the land is already owned by the Government. About 0.8 hectares of land will need to be acquired for the foundations of the transmission towers for the 7 km of double circuit 220 kV transmission line needed to connect the plant to the Babica substation. The land acquisition does not involve any resettlement.

3. Public Consultation

The public was well engaged in a dialogue concerning the project early on in the EIA process. Public announcements were thorough, transparent, and well distributed. In accordance with a public Disclosure and Consultation Plan, direct invitations to attend public meetings were also sent to institutions and individuals. The National Agency for Energy (NAE) coordinated this process closely with the Ministry of Industry and Energy, KESH, Ministry of Environment, Regional Agency of Environment for Vlorë, Ministry of Territory and Tourism, UNDP Project for the Narta Lagoon, the Municipality of Vlorë, District of Vlorë, Prefecture of Vlorë, citizens of Vlorë, Vlorë University students and faculty, local and national television stations, more than 20 non-governmental organizations (NGO's), and others associated with social and environmental issues.

Three public consultation meetings were held in Vlorë regarding the project. The first meeting was held in Vlore in autumn of 2002 to introduce the project to the public and begin the public consultation process. The second (scoping) meeting was held in Vlore on April 2, 2003 to receive public input on the scope of the EIA study. Over 100 persons attended the second meeting, representing various Government agencies, universities, non-governmental organizations and the general public. The meetings were covered by Albanian television stations and broadcast through a segment on the nightly news.

The third public consultation meeting was held on September 3, 2003 in Vlore to discuss the draft EIA. It was attended by 35 persons representing national and local Government agencies, businesses, non-government agencies and the general public. Additional details of the project and the EIA were disclosed to the public more than 30 days prior to the meeting. Copies of the draft EIA report had been distributed to the Ministry of Environment, Ministry of Territory and Tourism, Ministry of Energy, KESH, National Agency of Energy and Vlore Library. Draft EIA report in English and copies of the EIA Summary translated in Albanian were also sent to Municipality of Vlore, District of Vlore and Prefecture of Vlore. An announcement had been done in three main Albanian newspapers to inform all interested persons for the availability of the draft EIA Report for review and comments.

Throughout the public disclosure process, meetings were well attended by a varied group of people, and the Public provided input on any major concern or issue. The Public was able to provide concerns or issues either in general or with respect to specific effects of the proposed plant. Comments were received and incorporated further into the EIA process.

In October 2003, the World Bank disclosed the Final EIA report and the EIA Summary on its website www.worldbank.org.

4. Environmental Impacts

Potential environmental issues were identified in the Environmental Impact Assessment and are described below. This also included identification of suitable mitigation measures which have been included in the Environmental Management Plan (EMP), presented in section 5 . Both the issues and the mitigation measures are listed below.

4.1. Impacts during the Construction Phase

Emissions to air. Fugitive dust may be emitted from general site work, road improvements (the existing dirt access road will require upgrades and resurfacing), and truck traffic (related to deliveries of materials and equipment). Concrete and asphalt batch plants may also contribute to particulate emissions. The operation of diesel power construction machinery and vehicles would also have air quality impacts.

Fugitive emissions from roads and site work can be eliminated or minimized by applying water on an as needed basis to dirt roads and exposed construction areas during the dry season. Emission points from concrete batching plants can be controlled with appropriate

equipment such as fabric filters or cyclone separators. Diesel powered construction equipment and vehicles can be well maintained to minimize tailpipe emissions.

Air dispersion modelling showed that the likely fugitive dust resulting from construction and vehicles on the site roadways would comply with World Bank and European Union ambient air quality standards.

Noise. Noise from construction activity may be significant. Noise emitting equipment should comply with the applicable EU noise standards and should be properly maintained.

Ground and surface water. Minor short-tern lowering of the groundwater table may occur in the vicinity of the site during dewatering of foundation excavations. However, groundwater resources in this area are limited and the groundwater is not typically used for domestic or other purposes. Therefore the limited drawdown from dewatering activity is not expected to have a significant impact. Storm water discharges can be managed to minimize water quality impacts to nearby surface water resources such as the Narta Lagoon, Bay of Vlore and the Vlore floodplain. Sediment control measures such as retention weirs could be used, as necessary, to minimize sediment transport off site. Measures such as seeding and silt fencing may also be implemented to minimize erosion of the stockpiles.

Water from dewatering activities could contain suspended solids, oil and grease. Measures could be taken to remove settleable solids prior to discharging water from the site, including the use of sediment sumps or other sediment control structures. Visible oil or grease can be skimmed off the surface using absorbent pads.

Accidental spills of fuels or other materials could contaminate coastal or inland waters. Workers can be trained in the proper handling, storage and disposal of hazardous or toxic materials. A written emergency response plan should be prepared and retained on site and the workers should be trained to follow specific procedures in the event of a spill. The mitigation measures include:

- segregating all waste oils and lubricants from maintenance of construction equipment and disposing of them properly;
- constructing secondary containment areas and other sumps;
- inspecting secondary containment areas and other sumps regularly; and
- constructing and maintaining facilities to remove rainwater from the secondary containment structures and properly removing oil from the surface of the accumulated material.

Aggregate sources. Existing stone and gravel quarrying operations close to the site would provide sufficient resources for construction requirements without depleting local resources. However, when actual aggregate requirements become known, further investigations should be undertaken. Off-site sources of fill should be identified and the appropriate approvals be obtained prior to opening a borrow site. Such sites should be regarded and revegetated following use.

Marine habitat. Installation of the cooling water intake and discharge outfall pipelines could have impacts on the marine habitat. The work may involve dredging and disposal of excavated material, which could cause sediment release to the surrounding marine environment. Any marine disposal should be done away from sensitive fisheries or breeding grounds and timed to be outside of the upwelling period. Water construction activities associated with the pipelines for the cooling water intake and discharge systems should be performed during periods of low fish activity.

Coastal navigation. Construction activities are not likely to interfere with coastal navigation of shipping or passenger vessels. All barges, buoys and watercraft associated with the construction project should be clearly marked and illuminated at night.

Transportation. To alleviate pressure on existing roads in the Vlore area, the main access roads would be upgraded to accommodate the additional traffic. Scheduling the delivery of major plant components for off-peak traffic times can also help mitigate impacts on the local traffic flow.

4.2 Impacts during the Operational Phase

Emissions to air. Combustion of the distillate oil during plant operation would result in emissions of sulphur dioxide, nitrogen oxides, carbon monoxide, carbon dioxide, particulate matter less than 10 microns, and total suspended particulate. The particulates may contain small amounts of trace metals. The generation facility would be designed to meet the more stringent of the EU or World Bank emission standards and ambient air quality impact limits. Sulphur dioxide emissions would be controlled by limiting the sulphur content of the fuel. Nitrogen oxide emission would be controlled through burner management and water injection to the combustion turbines. Particulate emissions would be reduced through good combustion control to minimize the products of incomplete combustion.

The United States Environmental Protection Agency Industrial Source Complex Model (ISC3) was used to estimate the impact of plant operation on ambient air quality. The results meet the World Bank and EU standards for carbon monoxide, nitrogen oxides, particulates and sulphur dioxide. Using baseline data provided by the Regional Environmental Agency in Vlore, it was determined that emissions from the Vlore power plant would result in the air quality in Vlore remaining within the "moderate category." This result would comply with the World Bank, EBRD and EIB air quality requirements for thermal generating plants.

Noise. Significant noise levels can result from operation of the turbines. The transformers in the switchyard can also generate significant noise levels. The combustion turbines would be designed to limit noise to 85 decibels (A), and thereby meet EU and World Bank requirements.

Oil spills. Oil spills could occur during the shipping, unloading and transfer of the fuel to on-site storage. A floating boom should be used to contain spillage during ship unloading and disconnection procedures. Frequent inspection and maintenance of facilities can minimize spilling from the transfer pipeline or the mooring buoy.

Water intake. Water intake for the once-through cooling system may affect a localized zone of the marine ecosystem where the intake structure is located. The primary impacts of concern are impingement of marine life on the intake screens and entrainment of marine species in the cooling water system. Design parameters that can be used to minimize the impact on fish communities are location, inlet spacing and inlet velocity. An intake bar screen would be used to prevent large fish from being entrained in the system.

Thermal discharge. Once-through plant cooling water that is discharged to the Bay of Vlore would increase temperatures in the vicinity of the discharge location. Thermal impact modelling was evaluated using the Cornell Mixing Expert System (CORMIX). It was determined that the potential increase in water temperature would be less than the World Bank's guideline of three degrees Celsius. If the impacts are found to be greater than predicted after operation begins, modifications to the diffuser can be made to enhance diffusion of the thermal plume.

Chemical discharge in cooling water. Chemical discharge in the plant cooling water is expected to be negligible.

Wastewater discharge. The wastewater discharge would be designed to comply with World Bank standards.

Hazardous waste. The amount of hazardous waste created would be very low and originate from maintenance sources. The waste would consist primarily of spent lubricants, used rags and spent clean-up solvents. There would be no ash residue from the combustion of the distillate fuel oil and no sludge accumulation from fuel storage.

Proximity to the Narta Lagoon. The site is located about two kilometres south of the Narta Lagoon. The lagoon and the surrounding ecosystem that extends north to the Vjosa River delta covers approximately 10,000 hectares, is composed of forests, wetlands, sand dunes, beaches and agricultural land., and is home to a number of endangered species. Parliament is expected to designate the Narta Lagoon as a "Protected Area" under a new law which provides for the establishment of protected areas to ensure the conservation of natural resources, protect biodiversity, and restore and maintain habitats and species.

The Government has confirmed that the proposed Vlore power plant site will be outside of the boundaries of the Narta Lagoon protected area. There will be no adverse impacts on the Narta Lagoon from the thermal discharge or wastewater discharge from the plant. The plant meets all air quality standards, including those set to protect vegetation and ecosystems.

5. Environmental Management Plan.

An Environmental Management Plan (EMP) has been developed for this project and will be implemented by KESH. The EMP defines the measures needed to prevent, minimize, mitigate, or compensate for adverse impacts, improve environmental performance and ensure compliance with applicable safeguard policies, and these are being incorporated in the proposed project. The recommendations for main environmental mitigation measures include the following:

5.1 EMP: Construction Phase

- While few trees would be affected by the site work, no trees would be cut that do not interfere with the site work, and any cleared wood would be made available to local residents.
- The final site grade would facilitate drainage and avoid flooding and pooling. A site drainage plan would be developed to protect against erosion. Protecting stockpiles through the use of silt fencing and reduced slope angles would also minimize soil erosion during construction.
- Construction equipment would meet the applicable noise standard in EU Directive 2000/14/EC of May 2000. Work involving nuisance noise would be minimized during locally recognized days of rest and at night.
- To reduce dust from site access upgrades, disturbed areas would be watered on an as-needed basis.
- Where site excavations require dewatering, the excess water would be visually inspected for oil contamination prior to discharge to the site drainage system. Oil contaminated water would be treated prior to disposal.
- Borrow areas would avoid agricultural areas; borrow areas would be reworked to blend into the surroundings. Re-vegetation would be performed using local plants. All slopes and working surfaces would be returned to a stable condition.
- The water supply for use in construction of the generation facility would be monitored to ensure that it does not adversely affect other water uses in the area.
- Fuel storage tanks would have secondary containment with sufficient volume to contain a spill from the largest tank in the containment structure. The containment area would have a means of removing accumulated water. Drains would be routed through the site/water separator.
- A spill and emergency response plan would be developed and put in place prior to commencement of construction.
- Existing sources of aggregate would be used and no new sources would be developed.
- Storm water runoff from the batch plant would be directed to the site drainage system.
- The influx of workers is not expected to exceed 350 to 500 individuals. Workers would be housed in Vlore and transported by bus to the site. A first aid station would be provided on-site.
- The upgrade of the main access road to the plant would have a positive effect on local traffic. Dust from the road would be minimized with water during construction and by

providing a paved surface. Trucks would be covered when carrying load. Road speeds would be controlled to reduce the potential for accidents.

- Solid waste would be disposed of appropriately using a local contractor.
- A packaged sewage disposal facility would be provided. No direct discharge of untreated liquid waste would be allowed.
- Disturbance to aquatic life would be minimized by careful siting of the intake and outfall.
- Construction wastes would not be disposed of in the bay. The intake and outfall would be constructed in such a way as to minimize the release of sediments to the bay. The period for construction of the intake and outfall would be scheduled to minimize the impact on fishermen. All barges and buoys would be clearly marked and illuminated at night.
- Topsoil on the final site would be graded and planted as appropriate.

5.2 EMP: Operational Phase

- The combustion turbines would employ state of the art control technology for all pollutants. Nitrogen oxides would be controlled using water injection. Sulphur dioxide would be controlled by firing only low-sulphur distillate fuel oil. Employing good combustion control would control carbon monoxide, particulate matter and volatile organic compounds.
- The combustion turbines would be enclosed in an acoustic enclosure to ensure that noise does not exceed 85 dB(A) at 1 m. Workers in close proximity to this equipment would be required to use hearing protection. Off-site noise would not exceed 70 dB(A) at one meter. There is no residential housing in the area of the site.
- The location of the cooling water intake would be chosen to minimize the impact on the aquatic environment. Bar screen intake screens would be utilized. Final screening with travelling water screens at cooling water pump suctions would be employed. An inlet velocity of less than I m/s would be used to minimize entrainment.
- The plant would supply its own fresh water supply from the Adriatic Sea through a membrane desalinization system.
- A sewage treatment facility would be provided at the plant and discharge of treated effluent would be combined with the cooling water discharge.
- Many of the workers would be from the Vlore area. However, the infrastructure of the City of Vlore would be able to accommodate all workers coming from outside the area.
- A spill response plan and necessary response equipment would be provided to handle fuels and hazardous materials.
- Oil storage would include secondary containment of sufficient size to contain 110% of the contents of the largest tank. A means of removing rainwater would be included. Drains would be routed through the plant oil/water separator.
- Clearing for transmission lines would be minimized. The line would be routed to minimize the impact on residential areas. The electromagnetic field emitted by the line would be checked.
- The plant would be shielded by trees and set back from the ocean. Landscaping would be used to enhance the appearance of the generation facility.

5.3 EMP: Monitoring

A detailed environmental monitoring plan has been developed to verify that predictions of environmental impacts are accurate and that unforeseen impacts are detected at an early stage and allow corrective measures to be implemented, if needed.

- During the construction phase the plan provides for dust, noise and water discharge monitoring.
- During the operation period, monitoring is planned for air emissions and air quality, noise, water discharge and biological marine environment, as well as a routine inspection of the oil pipeline, storage and handling area.
- A specific environmental monitoring consultant is planned to be engaged for the project to ensure the monitoring will carried out in accordance to the plan.

6. Public Disclosure and Consultation Procedure

In the framework of potential participation of the EBRD in the project, the EIA materials will be available, in accordance with EBRD's public disclosure and consultation procedures, for a 120-day public review and comment period from 9 February to 7 June 2004 at the following locations:

- Vlore library
- Public Relations Office, KESH
- EBRD Resident Office in Tirana
- Business Information Centre, EBRD, London, UK, tel +44 171 338 6747

The materials in English are also available through Internet at the World Bank's website, www.worldbank.org.

KESH requests written comments be sent, before or on 7 June 2004, at latest, to the attention of:
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