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BANDIRMA NATURAL GAS COMBINED CYCLE POWER PLANT PROJECT ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN



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**BANDIRMA NATURAL GAS COMBINED CYCLE POWER
PLANT PROJECT**

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

PROJECT NUMBER: 058.09

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ABBREVIATIONS

BMP	Best Management Practices
BOTAŞ	Petroleum Pipeline Corporation
CONTRACTOR	The Contractor to conduct construction works of the Project
DOKAY	DOKAY Engineering and Consultancy Ltd.
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESMP	Environmental and Social Management Plan
ERP	Emergency Response Plan
EHS	Environment, Health and Safety
HSE	Health, Safety and Environment
IFC	International Finance Corporation
IPCC	Intergovernmental Panel on Climate Change
IPPC	Integrated Pollution Prevention Control
MoEF	Ministry of Environment and Forestry
NGCCPP	Natural Gas Combined Cycle Power Plant
NGO	Non-Governmental Organization
PCM	Public Consultation Meeting
PROJECT	Bandırma NGCCPP
PROJECT OWNER	Enerjisa Energy Generation Inc.
TEDAS	Turkish Electricity Distribution Company
WB	World Bank

1 INTRODUCTION

1.1 Purpose and Scope

Enerjisa Energy Generation Inc. (PROJECT OWNER) is planning to construct a natural gas combined cycle power plant (NGCCPP) with 930.75 MWe installed capacity in Bandirma District of Balıkesir Province in Turkey. Bandirma NGCCPP Project (PROJECT) will be financed by the international lenders (World Bank (WB)) as well as the national lenders. In this respect, the WB requires the preparation of an Environmental and Social Management Plan (ESMP) and its implementation accordingly. The social issues are discussed in Appendix B of this report.

The purposes of the ESMP prepared for PROJECT are as follows:

- To address the environmental consequences resulting from the activities performed during construction and operation periods of the PROJECT,
- To specify related mitigation measures considering both the national legislation and WB's criteria,
- To propose environmental monitoring program,
- To set-up an institutional structure where environmental issues are followed up during construction and operational phases of the PROJECT,
- To discuss the potential social issues and possible social impacts of the PROJECT (see Appendix B);
- To specify the mitigation measures to be taken by the PROJECT OWNER; and
- To propose a social monitoring program
- To inform local people, governmental and non-governmental organizations (NGO) about the PROJECT.

The mitigation measures and the monitoring plan proposed in the ESMP require the approval of the WB. In this regard, the scope of the ESMP follows the typical ESMP format of the WB.

1.2 Project Description

Having an installed capacity of 930.75 MWe, annual average energy production of the PROJECT will be 7,300,000,000 kWh. 175,000 m³/year natural gas consumption is expected within the Project.

It is expected that the operational lifetime of the PROJECT is assumed to be 25 years. Production License of the facility has been received from Energy Market Regulatory Authority for 49 years (see Appendix-A).

Cooling water and process water of the facility will be withdrawn from Marmara Sea and sent to the system after being treated. Cooling water will be discharged to the Marmara Sea in compliance with relevant discharge standards.

During the construction phase of the PROJECT, the workers will settle at the temporary camp sites that will be established at the Project Site. The camp site will have cafeteria for the workers. Food will be prepared by a catering company and served to the workers at the cafeteria. In short, food and water will be provided by the contractor on site.

1.2.1 Infrastructures

The infrastructural facilities of the PROJECT (gas pipeline, access roads, construction power) are located within the Project Site. Figure 1-1 demonstrates these facilities to be established within the PROJECT.

Natural gas to be used at the facility as fuel shall be supplied from Turkey-Greece Natural Gas Main Transmission Line constructed by Petroleum Pipeline Corporation (BOTAS) and passing from 3 km south of the Project Site. A connection pipeline will be constructed from the Turkey-Greece Natural Gas Main Transmission Line to the power plant that passes through the own property of PROJECT OWNER. As the connection pipe line, pressure reduction and measurement station shall be designed and constructed by PROJECT OWNER as per BOTAS Standards stated in the agreement to be executed between PROJECT OWNER and BOTAS. All new pipeline and accompanying station will be located completely inside the property of PROJECT OWNER. Moreover, all relevant mitigation measures (such as prevention for dust formation) will be taken during construction.

In order to provide accession to the Project Site, 6 km road was required; hence, 2 km of the existing road was improved whereas 4 km of new road was fully constructed within the property of the PROJECT OWNER in order to connect the renovated road to the power plant site. During the renovation of the existing road and construction of new road, relevant mitigation measures were taken to minimize the impacts on environment. These measures include; watering the unpaved sites to minimize dust generation, limiting the speed of heavy machineries to provide the public and worker safety and minimize dust generation, inserting warning signals at the site of construction. On the other hand, the renovation of the existing access road did not require acquisition of new land and helped the villagers to transport their harvest easily. Hence, the PROJECT has positive impact on local infrastructure.

The generated electricity shall be given to TEIAS network by means of the 380 kV transmission line connecting the transformer center to the current electricity network. The distribution of this electricity shall be done by TEIAS. Within the scope of the project, 6 stopping and 8 carrier total 14 towers will be erected along the route and a transmission

line of 5,849 m length will be constructed. All environmental impacts including the electromagnetic fields and corona effects are evaluated in an EIA Report whose findings are summarized in Chapter 3.

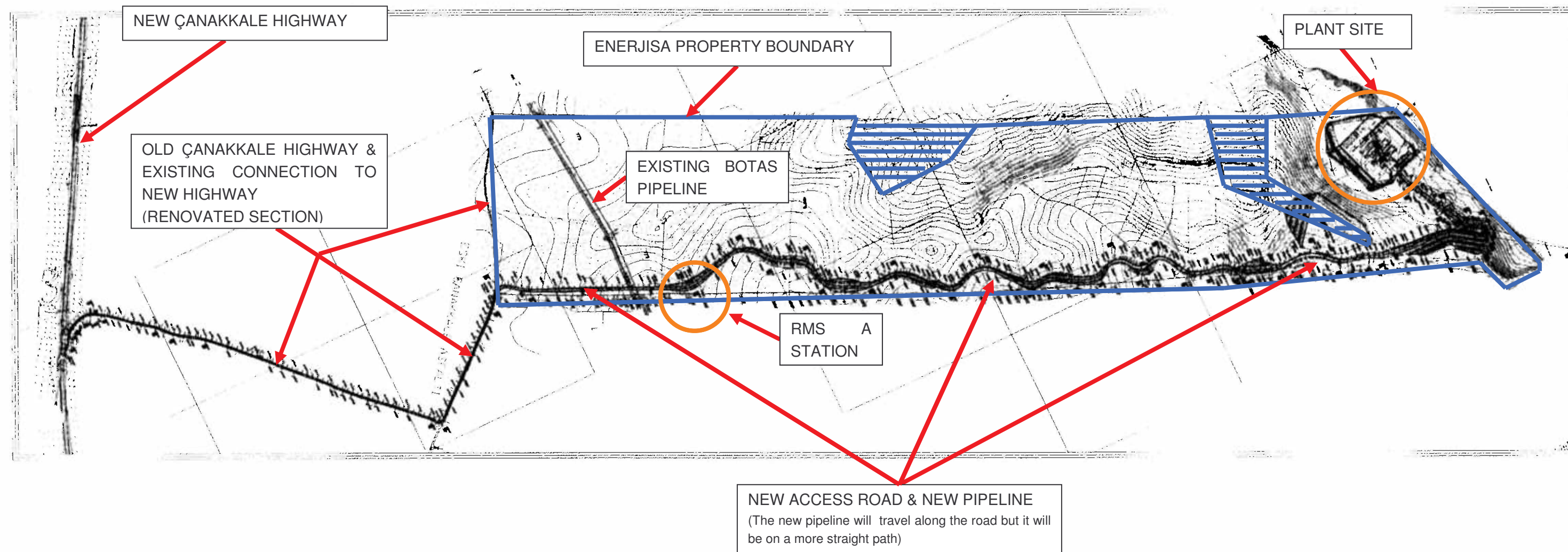


Figure 1-1. Infrastructural Facilities to be Established within the PROJECT

During the construction phase of the PROJECT, construction power will be supplied from the existing distribution line which is carrying electricity to the villagers. This line is replaced by utilizing the existing right of way and no additional land was required for this purpose. Rather, the existing Turkish Electricity Distribution Company (TEDAS) right of way was used to avoid additional land acquisition. This new line not only meets the constructional power demand of the PROJECT, but also ensures reliable and continuous power supply to the villages.

1.3 Project Site

1.3.1 Location

The PROJECT is planned to be established in Balıkesir Province, Bandırma District, Sirincavus Village, Hacılibey Locale on a 20 ha area. In total, 240 ha are allocated for the whole PROJECT.

The Project Site is at approximately 3.5 km air distance to Sirincavus, approximately 3.5 km to Hidirköy and approximately 5.5 km to Bezirci Village.

At the beginning, the Project Site was bought from the land owners by KEAS which is a company 100 % owned by Enerjisa, without recourse to expropriation. After the acquirement, the PROJECT was transferred to Enerjisa together with the Project Site.

Figure 1-2 shows the Project Site location in Turkey.



Figure 1-2. Project Site Location

The Project Site is selected accordingly as the cooling water of the plant will be withdrawn from and discharged to Marmara Sea. Moreover, being close to natural gas pipeline route is an important factor for selection.

1.3.2 Characteristics of the Project Site

The characteristics of Marmara Climate are generally observed in Project Site. Marmara Climate displays transitional characteristics among Black Sea, Mediterranean Sea and Continental climates. Summers are relatively cool because of the effect of Black Sea Climate.

Economy of the region mostly depends on industry. After the foundation of Bandirma Harbor, industrial facilities have developed significantly.

1.4 **Environmental Impact Assessment**

Environmental Impact Assessment (EIA) Report of the PROJECT was prepared by Serdar Engineering Environment and Waste Management Ltd. Co. and DOKAY Engineering and Consultancy Ltd. (DOKAY) and approved by the Ministry of Environment and Forestry (MoEF) in March 27, 2008. Having an installed capacity of 930.75 MWe, the PROJECT has been included in Annex I which covers the project requiring EIA Report as stipulated by the Turkish EIA Regulation issued by the MoEF. In the context of the EIA Regulation, necessary EIA studies were conducted (such as, preparation of Acoustic Report, calculation of cumulative dust emissions and air quality modeling, thermal discharge modeling, etc.) and official requirements (e.g., Public Consultation Meeting (PCM), EIA Report Examination and Evaluation Meetings) were complied for the PROJECT.

Besides the environmental impacts of the PROJECT, the socio-economic status and the use of the lands in the territory where the Project Site lies are considered in the EIA Report.

Since there will be no specific activities beyond conventional methods as indicated by the EIA process, it is predicted that environmental impacts during the construction phase of the PROJECT will stay at a limited level and no irreversible negative impacts will take place. Moreover, DOKAY predicts that the environmental performance of the proposed PROJECT will comply with both the national environmental legislation and WB's criteria provided that the items mentioned in the ESMP will be ensured.

2 LEGAL FRAMEWORK

Turkish legislation and international standards have been considered through the preparation of the ESMP while analyzing the activities during the constructional and operational phases of the PROJECT. Relevant legislation and international standards for the social issues are discussed in Appendix B.

2.1 Turkish Legislation

The below mentioned laws and regulations include the legal requirements to reduce environmental impacts that may occur during construction and operation activities of the PROJECT.

- Environmental Law numbered 2872 and related regulations,
- Turkish EIA Regulation (Official Gazette dated July 17, 2008 and numbered 26809),
- Environmental Audit Regulation (Official Gazette dated January 05, 2002 and numbered 24631),
- Regulation on Assessment and Management of Air Quality (Official Gazette dated June 06, 2008 and numbered 26898),
- Regulation on Control of Air Pollution Originating From Industrial Establishments (Official Gazette dated July 22, 2006 and numbered 26236),
- Water Pollution Control Regulation (Official Gazette dated December 31, 2004 and numbered 25687),
- Regulation on Assessment and Management of Environmental Noise (Official Gazette dated March 07, 2008 and numbered 26809),
- Regulation on Control of Excavation Material, Construction and Demolition Wastes (Official Gazette dated March 18, 2004 and numbered 25406),
- Solid Waste Control Regulation (Official Gazette dated March 14, 1991 and numbered 20814),
- Regulation on Control of Waste Oils (Official Gazette dated July 30, 2008 and numbered 26952),
- Regulation on Control of Used Batteries and Accumulators (Official Gazette dated August 31, 2004 and numbered 25569),
- Regulation on Control of Medical Wastes (Official Gazette dated January 21, 2004 and numbered 25353)
- Packaging Materials Wastes Control Regulation (Official Gazette dated June 24, 2007 and numbered 26562),
- Hazardous Wastes Control Regulation (Official Gazette dated March 14, 2005 and numbered 25755),
- Soil Pollution Control Regulation (Official Gazette dated May 31, 2005 and numbered 25831),

- Regulations related to the law in the scope of changes in the Forest Law numbered 5192 and the Forest Law numbered 6831,
- Regulation Related to Protection and Utilization of Farmlands (Official Gazette dated March 25, 2005 and numbered 25766),
- Law on Protection of Cultural and Natural Assets (Law Numbered 2863 with Amendment by Law Numbered 5226)
- Labor Law Numbered 4857 and related regulations,
- Guideline on Occupational Health and Safety (Official Gazette dated February 11, 1974 and numbered 14765),
- Regulation on Health and Safety Temporary or Definite Period Occupation (Official Gazette dated May 15, 2004 and numbered 25463),
- Regulation on Health and Safety in Constructive Works (Official Gazette dated December 23, 2003 and numbered 25325).

2.2 International Criteria

Since some part of the PROJECT expenditures is planned to be financed with the credit supplied by the WB, the WB's environmental criteria¹ shall be considered together with the Performance Standards assigned by the International Finance Corporation (IFC) in April 2007. Since it is obligatory to conduct a project complying with Turkish Environmental Legislation, this plan will mostly be based on the national legislation mentioned in this section. However, all project activities will comply with the Equator Principles, the IFC Performance Standards, the 1998 EHS Guidelines for thermal power plants and the April 30, 2007 General EHS guidelines.

¹ "Pollution Prevention and Abatement Handbook", published by the WB in 1998, was considered in this respect. Items in the Handbook encourages the protection human health, reduction of pollutant emissions, use of cost-effective technologies, compliance to the national and international legislation updates and the application of best engineering and environmental management practices.

3 MITIGATION MEASURES

3.1 Construction Phase

This EMP including the assessment of measures against environmental impacts that may occur during construction will be presented to the firms upon request with tender documents prior to the proposal period. The main responsibilities of the CONTRACTOR to be determined by tender are as presented below:

- In order to contribute the environmental performance of the PROJECT, training the construction staff to raise the environmental consciousness and assigning a person responsible for “Health, Safety and Environment” (HSE),
- Fulfilling the requirements of Turkish Environmental Legislation mentioned in Chapter 2, and taking necessary mitigation measures,
- Acquiring required licenses in accordance with the national legislation presented in Chapter 2 to conduct construction activities,
- In addition to the present legal framework, fulfilling the new national or international legislation that may come into force or be issued during construction phase.

3.2 Operational Phase

The PROJECT OWNER will be responsible for fulfilling the requirements in the EMP for the facility that will be constructed by the CONTRACTOR. The CONTRACTOR has to commit and prove that he/she will provide the conditions mentioned in the tender document.

Below are the requirements that need to be fulfilled by the PROJECT OWNER:

- Assigning an HSE engineer to implement the EMP as the HSE authority and to follow the compliance with internal audits,
- Training operational and maintenance staff to raise the environmental consciousness to provide their contribution to the environmental performance of the PROJECT,
- Fulfilling the requirements of Turkish Environmental Legislation mentioned in Chapter 2 and taking necessary mitigation measures,
- In addition to the present legal framework, fulfilling the new national or international legislation that may come into force or be issued during operational phase.

Potential environmental impacts that may be generated in water, air, soil and other receiving media during construction and operational phases of the Project and the proposed mitigation measures are presented in Table 3-1.

Table 3-1. Potential Environmental Impacts of the Project and Mitigation Measures

Phase	Issue	Mitigating Measure	Cost of Mitigation	Institutional Responsibility
Construction (including the transmission line)	Dust	Work sites shall be watered under warm, dry and windy weather conditions. Material shall be loaded and unloaded without slueing; 30 km/hr speed limit shall be set on non-paved roads. Top of the trucks will be covered when carrying the excavations. Dust suppression system will be used if crushing will be carried out.	Included in the civil works	CONTRACTOR
Construction (including the transmission line)	Air Emission	Regular maintenance of heavy machinery. Exhaust emissions of the heavy machinery shall regularly be measured, controlled and recorded by authorized institutions.	Included in the civil works	CONTRACTOR
Construction (including the transmission line)	Noise and vibration (Excavation and drilling)	Local people will be informed prior to such activities that may cause a temporary disturbance. Regular maintenance of heavy machinery. Construction works should be carried out during the day time period (07:00-19:00) stated in Regulation on Assessment and Management of Environmental Noise.	Included in the civil works	CONTRACTOR
Construction	Excavated material	Excavated materials will be stored at the Project Site. Some portion of the excavated materials will be used for backfilling; remaining portion will be used for site arrangement and leveling.	Included in the civil works	CONTRACTOR
Construction (Transmission Line)	Excavated material	The material extracting from each hole will be stored near the same tower. After preparation of the iron bars, concrete will be poured. After this step, holes will be closed with the material stored and then concrete will be poured. Therefore, there will not be any excavation waste and thus, excavation waste will not be transported to out of construction area.	Included in the civil works	CONTRACTOR
Construction	Vegetative top soil	Vegetative top soil of the Project Site will be stripped prior to excavation works and will be stored in the construction site separately to be used in landscaping.	Included in the civil works	CONTRACTOR
Construction	Construction wastes	Recyclable wastes will be collected separately and recycled. Remaining part will be transported by trucks with necessary license and disposed to the proper disposal sites.	Included in the civil works	CONTRACTOR

Phase	Issue	Mitigating Measure	Cost of Mitigation	Institutional Responsibility
Construction (Transmission Line)	Packaging waste	Recyclable package waste will be segregated as paper, glass, and plastic, metal and collected in the closed containers or durable bins. Then the solid waste will be transported to Bandırma Natural Gas Combined Cycle Power Plant to be sold to licensed recycle plants.	Included in the civil works	CONTRACTOR
Construction	Domestic solid waste	Formed where construction sites are established. Wastes will be collected in the closed containers at the Project Site and handled by related municipalities by the execution of necessary agreement.	Included in the civil works	CONTRACTOR
Construction (Transmission Line)	Domestic solid waste	Formed where construction sites are established. Wastes will be collected in closed containers or durable bins and will be transported to Bandırma Natural Gas Combined Cycle Power Plant to be handled by the nearest municipality.	Included in the civil works	CONTRACTOR
Construction	Waste sludge	Generated in wastewater treatment plant. Amount will be insignificant so will be collected periodically, analyzed in accordance with Regulation on Control of Hazardous Wastes, and their disposal will be realized according to the analyses results.	Included in the civil works	CONTRACTOR
Construction	Hazardous Waste (such as florescent lamp, water/temperature isolation material, waste oil, waste batteries and accumulators batteries, medical wastes)	Hazardous wastes will be handled in compliance with Regulation on Control of Hazardous Wastes, Regulation on Waste Oil, Regulation on Control of Used Batteries and Accumulators, Regulation on Medical Wastes (i.e., disposal of these wastes to a proper landfill or collection by a company certified by the MoEF for collection and disposal).	Included in the civil works	CONTRACTOR

Phase	Issue	Mitigating Measure	Cost of Mitigation	Institutional Responsibility
Construction (Transmission Line)	Hazardous Waste	Hazardous wastes will be handled in compliance with Regulation on Control of Hazardous Wastes and Regulation on Waste Oil. Oil change will not occur at the site during construction phase of the transmission line. If the oil change has to be realized in the project location, it will be done by the experienced repairs or maintenance workers at a proper area of Bandırma Natural Gas Combined Cycle Power Plant. During oil change waste oils will be collected at the containers and contamination of soil and surface waters will be prevented. Maintenance of the construction machines will be conducted regularly and oil spills will be prevented. Hazardous will be stored separately at an appropriate area and will be sent to Bandırma Natural Gas Combined Cycle Power Plant to be disposed by licensed recycle plants	Included in the civil works	CONTRACTOR
Construction	Domestic wastewater	Formed where construction sites are established. Wastewater will be treated in compliance with Table 21.1 of WPCR in package treatment plant installed at the Project Site and discharged via municipal disposal trucks or where possible treated waste will be used for irrigation or dust elimination	Included in the civil works	CONTRACTOR
Construction (Transmission Line)	Domestic wastewater	Personnel working in the construction phase will supply all the needs from social and administrative facilities of Bandırma Natural Gas Combined Cycle Power Plant or the nearest residential areas, and in any case domestic wastewater will not be generated at the site.	Included in the civil works	CONTRACTOR
Construction	Accidents Involving Hazardous Chemicals	Risk Management, Emergency Action and Preparedness Plan, Communication Chain will be prepared.	Included in the civil works	CONTRACTOR
Construction	Marine cooling water system construction activities	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 will 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 will need to be performed during periods of low fish activity.	Included in the civil works	CONTRACTOR

Phase	Issue	Mitigating Measure	Cost of Mitigation	Institutional Responsibility
Construction	Public health and safety	Drivers of the vehicles carrying materials to construction site should obey speed limit of 30 km/hour. Warning signals should be installed around the sites where heavy construction facilities are carried out. Materials displaying explosive characteristics such as dyes and solvents will be stored away from the residential areas and construction sites and handled accordingly.	Included in the civil works	CONTRACTOR
Construction	Social Relations	The constructional workers will settle at the camp site to be established in the Project Site. There should be disturbance of the local people by the workers or interferences between two groups. In order to prevent such situations, code of conduct will be established and the workers will be required to follow this code. During the induction training, temporary construction workers will be trained on the socio-cultural aspects of the region and ethical issues for preventing the disturbance of local people by the constructional workers.	Included in the civil works	CONTRACTOR

Phase	Issue	Mitigating Measure	Cost of Mitigation	Institutional Responsibility
Construction	Erosion and Sedimentation	Several precautions will be put into action to minimize destruction, degradation and loss of natural pattern and preserve and enhance scenic values. Invasive species will be avoided during storage. Land-disturbing activities will be performed in a way to minimize landslides, surface erosion and sedimentation transport by means of Best Management Practices. Slope Control Plan has been prepared attached with Civil Works Specification. Revegetation and restoration will be performed where applicable. Runoff will be properly controlled not to form channels and erode loose soils. Silty water leaving from construction site will be prevented by means of appropriate method such as avoidance, filtering, collecting or diversion. Borrow and excavation areas will be rehabilitated and converted into green field after construction to protect scenic values. Major elements of Erosion and Sedimentation Control Plan will be as follows, 1. Coordination with the contractor to determine the sequence they plan to use. 2. Selection criteria for the best management practices (BMPs) to be used. 3. Regular inspections during construction by the professionals who prepared the plans. Selection of BMPs to be used as part of the plan will be agreed on by the Contractor.	Included in the civil works	CONTRACTOR

Phase	Issue	Mitigating Measure	Cost of Mitigation	Institutional Responsibility
Construction	Occupational health and safety	Water will be sucked by a drainage system or pumps to prevent its accumulation in pits and muddy water that is sucked will be discharged after allowing soil to settle down. Barriers should be used to obstruct soil collapse in deep excavation areas. Compliance with the relevant Occupational Health and Safety Regulation¹ of Turkey (including use of personal protective equipment and preparation of an emergency action plan, to be prepared by the CONTRACTOR and approved by the PROJECT OWNER prior to the start of the activities, for accidents during maintenance of power plant). The Contractor shall prepare an OHS plan in cooperation with Enerjisa, all construction workers and people nearby the construction site will have safe, healthy and reliable working and living environment by means of good management practices in construction site.	Included in the civil works	CONTRACTOR
Construction (Transmission Line)	Lightning	After foundation installation and tower erection operations during construction, optical ground wires will also be strung for protection from the lightning.	Included in the civil works	CONTRACTOR
Operation	Noise and vibration	Warning signs shall be located at the units where the noise level of 80 dBA is exceeded. Personnel working in these areas shall use earplugs and ear protectors. Noise would be minimized at the source with proper installation of noise barriers and isolation.	Included in the operational costs	PROJECT OWNER
Operation	Dust and Gas Emissions	Appropriate burning conditions should be provided to achieve complete combustion. Limit values given in APCR must be obeyed.	Included in the operational costs	PROJECT OWNER
Operation	Domestic solid waste	Wastes will be collected in the closed containers at the Project Site and handled by Balıkesir municipalities at its waste disposal sites. Domestic solid wastes will be transported to the waste disposal sites by trucks with necessary license and transportation costs will be paid by the PROJECT OWNER.	Included in the operational costs	PROJECT OWNER
Operation	Excess sludge	Generated in wastewater treatment plant. Amount will be insignificant so will be collected periodically, analyzed in accordance with Hazardous Waste Control Regulation, and their disposal will be realized according to the analyses results.	Included in the operational costs	PROJECT OWNER

Phase	Issue	Mitigating Measure	Cost of Mitigation	Institutional Responsibility
Operation	Hazardous Waste (such as florescent lamp, water/temperature isolation material, waste oil, waste accumulator and batteries, medical wastes)	Hazardous wastes will be handled in compliance with Regulation on Control of Hazardous Wastes, Regulation on Waste Oil, Regulation on Control of Used Batteries and Accumulators, Regulation on Medical Wastes (i.e., disposal of these wastes to a proper landfill or collection by a company certified by the MoEF for collection and disposal).	Included in the operational costs	PROJECT OWNER
Operation	Domestic wastewater	Formed where construction sites are established. Wastewater will be treated in package treatment plant installed at the Project Site in compliance with Table 21.1 of WCCR and discharged to the sea together with cooling water discharge in compliance with WCCR.	Included in the operational costs	PROJECT OWNER
Operation	Occupational health and safety	Compliance with the relevant Occupational Health and Safety Regulation of Turkey (e.g., use of personal protective equipment, etc.).	Included in the operational costs	PROJECT OWNER
Operation	Cooling water and process wastewater	After passing through an oil retainer, process water will be discharged together with cooling water and treated domestic wastewater in compliance with WPCR.	Included in the operational costs	PROJECT OWNER
Operation	Cooling water intake structure	Fish nets and screens will be installed around the entrance of cooling water intake pipe to prevent the entrance of the fishes to the pipe. The intake velocity will be kept rather low. The application of mitigation measures will be assessed after receiving the results of sea ecology survey.	Included in the operational costs	PROJECT OWNER

Phase	Issue	Mitigating Measure	Cost of Mitigation	Institutional Responsibility
Operation (Transmission Line)	Corona effect	In the scope of the project, against each risky and hazardous approaches for human health and environment, Chapter 7 of High Voltage Electricity Installations came into force by 30.11.2000 dated and No: 24246 Official Gazette, Clauses on Operation Safety Article "Entrance to High Voltage Installations" and Article 60 "Working at High Voltage Installations" will be complied and all measures will be taken to provide safety of the employees. Furthermore, entrance of unfamiliar people to the facilities will not be allowed in compliance with the related articles. All grounding operations will be in compliance with technical specifications for assembling and the measures for electromagnetic compatibility of control systems and mitigation of high frequency interferences will be in compliance with Regulation on Grounding in Electricity Installations came into force by 21.08.2001 date and No: 24500 Official Gazette. To minimize impacts of corona on human and environment health, steep intersections will be avoided in the final route determination, the highest technology products will be used in the selection of all hardware and equipments, maintenance of the ETL will be done regularly and contamination in the isolators increasing the corona effect will be cleaned at specific periods.		PROJECT OWNER
Operation (Transmission Line)	Electric Shock	Anti-bird devices will be set to protect birds from the transmission line.	Included in the operational costs	PROJECT OWNER

* Contractor's responsibilities will be stated in the tender document

3.3 Waste Minimization Plan

3.3.1 Waste Minimization Policy

The PROJECT OWNER is committed to excellence and leadership in protection of the environment and sustainable environmental management in every energy generation facilities as well as offices and other establishments. Corporate objective is to reduce all types of waste and emissions generated from company activities. They strive to minimize adverse impact on the air, water, and land through excellence in pollution prevention and waste abatement. By preventing pollution at the source, resources can be saved, operational efficiencies can be increased, and a safe and healthful work place can be maintained for the employees and residential public nearby the Project Site. By abating

those wastes that cannot be eliminated at the source, useful resources will be recovered and the environmental and economic burden of waste disposal will be reduced.

The PROJECT OWNER will achieve pollution prevention and waste abatement under the following guidelines.

- Include the reduction of both hazardous and non-hazardous wastes and emissions at the source as a prime consideration in service and operations. The PROJECT OWNER is committed to identifying and implementing pollution prevention opportunities through encouragement and involvement of all employees and contractors.
- Give top priority to technologies and methods, which substitute non-hazardous materials and utilize other source reduction approaches in addressing all environmental issues.
- Vigorously pursue waste abatement programs such as recycling, reuse, and purchase of recycled materials to reduce the need for disposal of waste that cannot be reduced at the source.
- Encourage pollution prevention and waste abatement through changes in purchasing policies and specifications.

The PROJECT OWNER seeks to demonstrate its leadership role in Turkish energy market by aggressively adhering to all environmental regulations. Hence they will promote cooperation and coordination among the staff, shareholders, public authorities, and the affected public toward the shared goals of preventing pollution and abating waste.

3.3.2 Waste Minimization

The PROJECT OWNER is committed to the protection of human health and the environment in its core business activities. To meet these commitments, they will strongly encourage the employees to utilize domestic and industrial waste minimization techniques to reduce the volume and hazardousness of wastes produced within CCPP. An important benefit from waste minimization will be that it will help reduce the Company's waste disposal costs. The following sections describe common waste minimization techniques. Detailed Waste Management Procedure will be established during ISO 14001 Environmental Management System certificate studies.

3.3.3 Product Substitution

Where applicable, non-hazardous or less toxic materials used in processes and lab analysis should be substituted.

3.3.4 Process Selection

Where applicable technologies to minimize emission and waste amount to be generated throughout CCPP lifetime would be taken into consideration during the selection of cogeneration power technologies and other service and utilities. If a proven waste mitigation technology is available on the market, all possibilities for modification of existing system should be assessed.

Maintenance shops or service areas should also utilize pollution prevention techniques. Vendors should be contacted for information on non-hazardous substitutes

3.3.5 Segregation and Characterization

- Wastes should not be mixed. Especially hazardous wastes and non-hazardous wastes should be kept, handled and removed separately.
- Accurate labeling should be made on the waste bottles as to their exact content.

Segregation and characterization allows waste to be redistributed for reuse if someone else in the power plant can use the substances; if the waste cannot be redistributed, segregation simplifies recycling, and minimizes costs.

3.3.6 Reclamation

The PROJECT OWNER reclaims some treated water to reduce waste treatment and water utilization costs, where applicable.

3.3.7 Neutralization and Deactivation

Water treatment plant waste streams, heat recovery steam generator blowdown, acid pickling and other chemical cleaning wastes should be neutralized and deactivated in order not to disturb marine environment.

3.3.8 Inventory Management and Control

All chemical and other substances supplies should be audited for inventory control:

- All the chemicals and substances in the facility, labs, shops and storerooms and dispose of those chemicals and substances that have not been used within the past year or two should be surveyed periodically.
- Only the quantity of chemical required for specific studies should be purchased

When purchasing automated equipment, the type and amount of hazardous waste generated by the machine should be used as one of the purchasing criteria.

3.3.9 Training and Awareness

The employees when they are first hired and annually thereafter in waste minimization concepts should be trained. Training should include:

- The concepts described above.
- Annual documentation of the training signed by both the employee and supervisor.

3.3.10 Documentation of Waste Reduction Efforts

All waste reduction in the work area should be documented.

Other plans, policies, procedures or statements not mentioned in this plan shall be covered within ISO 14001 Environmental Management System framework.

3.4 **Erosion and Sedimentation Control**

From an erosion preventive perspective, establishing a vegetative cover is the most effective means to combat erosion problem. So, following the completion of construction activities, landscaping works will be carried out at the Project site and the plants selected will be compatible with both the regional conditions and vegetation species of the area. Use of invasive species will be avoided. Moreover, borrow and excavation areas will be rehabilitated and converted into green field after construction to protect scenic values.

Topsoil that will be stripped from the surface of the site prior to construction activities will be used for landscaping. Hence, maintenance of topsoil quality particularly its structure and integrity of its seed bank, is vital to both restoration and erosion control. Topsoil shall be carefully stripped to its full depth and stored separately.

Areas affected by construction should clean-up all after backfilling and before replacement of soil. That will include removal of all plant, equipment and materials not required for the replacement of soil. However, where possible, stumps should be left in place to provide soil stabilization.

In addition to the landscaping, land-disturbing activities will be performed in a way to minimize landslides, surface erosion and sedimentation transport by means of Best Management Practices. Moreover, runoff will be properly controlled not to form channels and erode loose soils. Slope Control Plan has been prepared attached with Civil Works Specification in order to provide stabilization of sloping lands.

Disposal of solid wastes originated from construction and operational activities of the PROJECT shall be strictly avoided. Moreover, silty water leaving from construction site will be prevented by means of appropriate method such as avoidance, filtering, collecting or diversion.

Major elements of Erosion and Sedimentation Control Plan will be as follows:

1. Coordination with the contractor to determine the sequence they plan to use;
2. Selection criteria for the BMPs to be used; and
3. Regular inspections during construction by the professionals who prepared the plans.

Selection of BMPs to be used as part of the plan will be agreed on by the Contractor. A detailed Erosion and Sedimentation Control Plan is provided in Appendix C.

3.5 Greenhouse Gas Emissions

As mentioned in the EIA Report of the PROJECT, the only main source of gas emissions is the gas turbine. The main emissions expected from the proposed PROJECT are nitrogen oxides (NO_x), sulphur oxides (SO_x), methane (CH₄), carbon dioxide (CO₂) and carbon monoxide (CO). In order to determine the ground level concentrations of SO_x, NO_x, CO, air modeling study was conducted within the context of EIA studies of the proposed PROJECT. Detailed information and the results of the modeling study were given in Section V.2.7 and Appendix-17 of the EIA Report.

On the other hand, CO₂ and CH₄ emissions have been calculated by using Tier 1 approach defined in documents of Intergovernmental Panel on Climate Change (IPCC) as Turkey has not completed the preparation of greenhouse gas emission inventory. The following formula was applied for the calculation of CO₂ emissions from the proposed PROJECT.

$$\text{CO}_2 \text{ emission (Gg)} = \text{FC (1000 toe)} \times \text{CC (TJ} \times \text{/1000 toe)}^{-1} \times \text{FOC} \times \text{EF (tones Carbon} \times \text{TJ}^{-1}) \times \text{CO}_2 \times \text{C}^{-1} \times 1000^{-1} \text{ (Gg} \times \text{tonnes}^{-1})$$

where;

FC	: Fuel Consumption (1000 toe)
CC	: Conversion Coefficient (41.868 TJ.1000 toe ⁻¹)
TJ	: Tetra Joule
Gg	: Giga gram
FOC	: Fraction of Carbon Oxidized
CO ₂ /C	: 44/12
EF	: Emission Factor

The amount of gas to be consumed for the electricity production is 175,000 m³/hour. Assuming that nearly 1,125 m³ natural gas is equal to 1 toe, the amount of natural gas to be consumed is 155.55 toe/hour. Moreover, considering Table 1-4 of Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories Reference Manual, EF can be taken as 15.3 t C / TJ. According to Table 1-6 of the same document, FOC is taken as 0.995. Inserting the values in the formula,

$$\begin{aligned}\text{CO}_2 \text{ emission} &= 0.155 \text{ (1000 toe)/hour} \times (41.868 \text{ TJ} \times (1000 \text{ toe})^{-1}) \times 0.995 \times \\ &\quad 15.3 \text{ t C / TJ} \times (44/12) \\ \text{CO}_2 \text{ emission} &= 362.2 \text{ tonnes/hour} \\ &= 3,172,872 \text{ tonnes/year}\end{aligned}$$

Similar to CO₂ emission, non-CO₂ emission is also calculated by the method mentioned in Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories Reference Manual. According to this method, the following formula is applied;

$$\text{Non-CO}_2 \text{ Emission} = \text{EF} \times \text{Activity}$$

where;

EF : Emission Factor (kg/TJ)
Activity : Energy Input (TJ)

According to Table 1-7 of IPCC document, EF is taken as 1 kg/TJ for the NH₄ emission originated from the use of natural gas in energy industry. Moreover, assuming that the energy content of natural gas is 10.427 kcal/m³, energy input of the facility is calculated as 0.007 TJ/hour. Inserting these values in the formula;

$$\begin{aligned}\text{CH}_4 \text{ Emission} &= 1 \text{ kg/TJ} \times 0.007 \text{ TJ/hour} \\ &= 0.007 \text{ kg/hour} \\ &= 61.32 \text{ kg/year}\end{aligned}$$

N₂O emission of the plant is calculated by using the same formula. According to Table 1-8 of IPCC document, N₂O emission factor for energy industries of natural gas is 0.1 kg/TJ. Inserting these values in the formula;

$$\begin{aligned}\text{N}_2\text{O Emission} &= 0.1 \text{ kg/TJ} \times 0.007 \text{ TJ/hour} \\ &= 0.0007 \text{ kg/hour} \\ &= 6.132 \text{ kg/year}\end{aligned}$$

The emission of the greenhouse gases is planned to be compensated by afforestation.

3.6 Emergency Response Plan (ERP)

Emergency Response Plan (ERP) is to establish an organizational structure and procedures for response to major emergencies. It assigns the roles and responsibilities for the implementation of the plan during an emergency. This Plan will be prepared to address all types of emergencies affecting the PROJECT in a coordinated and systematic manner. This Plan shall be designed to maximize human safety and preservation of property, minimize danger, restore normal operations of the power plant, and assure responsive communication to all appropriate parties.

For the proposed PROJECT, fire, illnesses, civil disturbances, bomb attacks, hazardous material and gas releases, natural disasters (such as storm, flood, earthquake) and armed intruders can be considered as emergency cases.

The measures to be taken to warn the endangered population during the danger and prior to occurrence of any hazardous situations are the major concerns of ERPs. Beside these, the following items shall be of concern in preparing ERPs:

- The tools required for an immediate response in an emergency state (fire, explosion etc.) will be identified and stored in a separate place. Mattocks and oars, face masks, protective eye-glasses, gloves, various pumps, electrical engines with explosion protection, wireless and similar equipment shall be listed among these tools.
- It will be planned in advance how the heavy construction machinery like scoop and bulldozer will respond to any emergency state and the parking locations of this machinery will be chosen accordingly.
- ERP's will also comprise the list of emergency response teams, the locations of safety equipment, emergency exits, emergency procedures as well as the telephone numbers to be contacted.
- ERP's will be continuously reviewed and all the relevant equipment will be periodically inspected and maintained. Key personnel will be trained on this topic.
- The nearest security unit (police or gendarme) and fire department will be alarmed in case of emergency.

3.7 Risk Management

In general, risk management is a structured approach to managing uncertainty related to a threat, a sequence of human activities including: risk assessment, strategies development to manage it, and mitigation of risk using managerial resources.

The strategies include transferring the risk to another party, avoiding the risk, reducing the negative effect of the risk, and accepting some or all of the consequences of a particular risk.

The risk management should include the following issues:

- Planning how risk management will be held in the particular. Plan should include risk management tasks, responsibilities, activities and budget.
- Assigning a risk officer - a team member other than a project manager who is responsible for foreseeing potential project problems.
- Maintaining live project risk database. Each risk should have the following attributes: opening date, title, short description, probability and importance. Optionally a risk may have an assigned person responsible for its resolution and a date by which the risk must be resolved.
- Creating anonymous risk reporting channel. Each team member should have possibility to report risk that he foresees in the project.
- Preparing mitigation plans for risks that are chosen to be mitigated. The purpose of the mitigation plan is to describe how this particular risk will be handled – what, when, by who and how will it be done to avoid it or minimize consequences if it becomes a liability.
- Summarizing planned and faced risks, effectiveness of mitigation activities, and effort spent for the risk management.

The PROJECT OWNER should establish a risk management organization and process which is comprised of the following components:

- Standardized risk definitions.
- Identifying origination of risks.
- Reliable methods for measuring risks.
- Effective risk management for manageable risks.
- Reporting in accordance with established routines.
- Management in accordance with established strategies and fixed rules.

Oil, fuel, dye, hazardous chemicals etc. may spill on the operation sites and/or roads that are used for transportation. The activities that shall be performed in 30 minutes following these spills are important in terms of prevention of contamination. The actions to be taken in case of leakage and/or spill after an accident are as follows:

1. Leakage source will be determined and if possible, leakage will be stopped.
2. In order to prevent spreading of leakage sandbags will be placed around the leakage source.

3. In case of big leakages, depending on the slope of the land, a small canal will be opened in the downstream part of the leakage, and this canal will be filled with absorbent material to collect leakage in this canal and prevent mixing with groundwater.
4. Pollutant material, polluted absorbent material and soil will be put into bags that have proper size and durability, and these bags will be labeled properly.
5. In case of a big leakage and/or spill, the incident will be reported to the supervisor immediately.
6. If the dykes are available under the storage areas and leakages and spills are collected in them, reuse alternatives of the chemicals will be considered.
7. Trucks, equipment etc. that had an accident on the roads will be brought into their normal position as fast as possible and by this way more leakage and/or spill will be prevented.

4 MONITORING PLAN

It is suggested that environmental monitoring studies should be conducted separately because different activities during construction and operation period of the PROJECT will result in different possible environmental impacts. Data acquired during monitoring studies will be compared with national legislation items which are mentioned in Chapter 2.

Monitoring plan of the PROJECT is presented in Table 4-1.

4.1 Construction Phase

For construction period, water and air quality, waste management practices and noise levels will be monitored and the results will be compared to legal limit values. The CONTRACTOR will in coordination with the PROJECT OWNER regarding monitoring studies and taking the necessary mitigation measures for environmental protection.

If there exist any non compliance with the environmental legislation or PROJECT OWNER's environmental policy, the CONTRATOR will inform the project owner immediately.

4.2 Operational Phase

In the operational phase of the PROJECT, fewer environmental effects are expected than construction period. At the operational phase of the PROJECT, environmental monitoring will be carried out in line with Table 4-1.

Flue gas emissions, ground level concentrations and cooling water measurements will be carried out monthly whereas ecological monitoring and soil quality measurements will be done twice and once a year, respectively.

4.3 Decommissioning Phase

After the decommissioning phase, cooling water intake system will stop working. However, the parameters proposed for the operational phase will be monitored seasonally at the first year of decommissioning.

Table 4-1. Monitoring Plan

Phase	What <i>parameter is to be monitored?</i>	Where <i>is the parameter be monitored?</i>	How <i>is the parameter be monitored/ type of monitoring equipment?</i>	When <i>the parameter is monitored- periodical or continuous measurement?</i>	Monitoring Cost	Responsibility
Construction	Dust	Nearest neighboring sensible receptor (ex. backyard of the nearest house)	Site observation and measurements with a PM ₁₀ device	Daily observation by the Project staff for routine control; quarterly measurements after the initiation of construction facilities; measurements during the facilities that increase dust formation (measurements should be performed more frequently depending on the complaint of the public)	Included in the civil works	PROJECT OWNER
Construction	Air emissions from heavy machineries	Heavy machineries	Measurement of exhaust gases of heavy machineries	Yearly measurement and recordings by authorized institutions; control of these records.	Included in the civil works	CONTRACTOR
Construction	Noise (Excavation and drilling)	Nearest neighboring sensible receptor	Noise measurement with a calibrated sound level meter	Monthly and especially during the activities that increase noise levels (measurements should be performed more frequently depending on the complaint of the public) Measurements will be repeated if a new facility will be performed that cause an increase in noise level or construction works will be carried out during night time after getting necessary permissions.	Included in the civil works	PROJECT OWNER
Construction	Excavated material	Excavation and storage sites	Site observation at the excavation and storage sites	Daily by the constructional staff	No cost implementation	CONTRACTOR

Phase	What parameter is to be monitored?	Where is the parameter be monitored?	How is the parameter be monitored/ type of monitoring equipment?	When the parameter is monitored- periodical or continuous measurement?	Monitoring Cost	Responsibility
Construction	Vegetative top soil conditions (height of the storage-1.5 m at max. and cover over piles)	Excavation and storage sites	Site observation	Daily by the constructional staff	No cost implementation	CONTRACTOR
Construction	Construction waste	Construction and storage sites	Site observation	Daily by the constructional staff	No cost implementation	CONTRACTOR
Construction	Domestic solid waste disposal method	Storage sites	Site observation, environmental audits	Daily control by the constructional staff	Included in the civil works	CONTRACTOR
Construction	Hazardous Waste (such as florescent lamp, water/temperature isolation material, waste oil, waste batteries and accumulators batteries, medical wastes)	Storage sites	Site observation	Daily control by the constructional staff	Included in the civil works	CONTRACTOR
Construction	Waste sludge	At wastewater treatment plant	Site observation, sludge sampling and analyses	Sludge will be sampled and analyzed to determine the hazardous material content before being discharged.	Included in the civil works	CONTRACTOR
Construction	Domestic wastewater	Outlet of wastewater treatment plant	Sampling and analyzing	Monthly pH, SS, BOD and COD analysis	Included in the civil works	PROJECT OWNER
Construction	Public health and safety measures	Excavation and construction site, storage sites	Site observation	Daily by the constructional staff	No cost implementation	CONTRACTOR
Construction	Occupational health and safety measures (please refer to Section 3 of the Act on Occupational Health and Safety (Official Gazette dated September 12, 1974 and numbered 15004)	Construction site	Internal HSE audits to check the requirements of the Act on Occupational Health and Safety (Official Gazette dated September 12, 1974 and numbered 15004).	Daily by the constructional staff	Included in the civil works	CONTRACTOR

Phase	What parameter is to be monitored?	Where is the parameter be monitored?	How is the parameter be monitored/ type of monitoring equipment?	When the parameter is monitored- periodical or continuous measurement?	Monitoring Cost	Responsibility
Operation	Dust and gas emissions	Stack of the plant and sampling locations where highest amount of accumulation is expected according to the modeling results	PM ₁₀ measurements by calibrated PM ₁₀ meter at sampling locations, soil sampling for pH measurement at sampling locations, flue gas and ground level concentration measurement of emissions by diffusion tubes.,	Monthly PM ₁₀ , flue gas and ground level concentration measurement of emissions, annual soil sampling and pH measurement.	Included in the operational costs	PROJECT OWNER
Operation	Greenhouse gas emission	Overall plant activities including combustion and transportation, direct and indirect emissions	Estimation methodologies validated by Integrated Pollution Prevention Control (IPPC)	Once every year	Included in the operational costs	PROJECT OWNER
Operation	Noise	Nearest neighboring sensible receptor	Noise measurement with a calibrated sound level meter	Monthly measurements (measurements should be performed more frequently depending on the complaint of the public)	Included in the operational costs	PROJECT OWNER
Operation	Domestic solid wastes	Operation and maintenance sites	Site observation	Daily recordings and monthly assessment of the solid wastes generated	Included in the operational costs	PROJECT OWNER
Operation	Waste sludge	Wastewater treatment plant	Site observation, sludge sampling and analyses	Sludge will be sampled and analyzed to determine the hazardous material content before being discharged.	Included in the operational costs	PROJECT OWNER
Operation	Hazardous waste (such as florescent lamp, water/temperature isolation material, waste oil, waste accumulator and batteries, medical wastes)	Operation and maintenance sites	Site observation	Daily by the operational staff	Included in the operational costs	PROJECT OWNER

Phase	What <i>parameter is to be monitored?</i>	Where <i>is the parameter be monitored?</i>	How <i>is the parameter be monitored/ type of monitoring equipment?</i>	When <i>the parameter is monitored- periodical or continuous measurement?</i>	Monitoring Cost	Responsibility
Operation	Domestic wastewater treatment	Outlet of the wastewater treatment plant	Water sampling and pH, SS, BOD and COD analyses	Monthly sampling and analyses of given parameters	Included in the operational costs	PROJECT OWNER and Environmental Engineer
Operation	Occupational health and safety measures	Operation site	Internal HSE audits to check whether the Act on Occupational Health and Safety is complied	Daily by the operational staff	Included in the operational costs	PROJECT OWNER
Operation	Cooling water and process wastewater	Outlet of main discharge system, drainage system of each project unit	Flow rate, pH, conductivity, residual chlorine and temperature measurement at the outlet of main discharge system. pH, conductivity, flow rate, silica and dissolved oxygen measurements at the drainage systems, phosphate measurement at the drainage system of boiler blowdown in addition to other parameters. Marine ecology survey for monitoring of possible impacts of cooling water and process waste water discharges	Monthly measurements at the outlet of the main discharge system, continuous measurements (pH, conductivity, flow rate, DO) at the drainage system of each unit. Marine ecology survey at impact area of the discharge, twice a year (once every 6 months)	Included in the operational costs	PROJECT OWNER and Environmental Engineer

5 INSTITUTIONAL STRENGTHENING

In general, in this section of ESMP's, the recommendations related to the institutional strengthening are provided in order to ensure that environmental measures are applied for an environmentally sound and sustainable project development.

This section of the report is mainly based on proposals for construction phase in terms of environmental monitoring. The recommendations on institutional strengthening for the operational phase will be developed when the organizational structure for that phase is finalized.

In this context, in the construction phase of the PROJECT, if necessary the PROJECT OWNER will hire an Environmental Consultant to follow up and implement the requirements of the EMP and hence commitments of the EIA Report. So, the following sub-sections are structured based on this proposed methodology.

5.1 Equipment Purchase

The Environmental Consultant will utilize his own equipment for environmental monitoring works since the Environmental Consultant will be a company authorized by the Turkish MoEF for carrying out environmental measurements and analyses according to the requirements of the Turkish environmental legislations.

5.2 Training

Either the PROJECT OWNER or the Environmental Consultant will assign an Environmental Engineer for performing the proposed environmental monitoring works at the Project Site. Prior to the execution of the environmental monitoring works, Environmental Engineer will carry out a training campaign in order to increase the environmental awareness of the construction staff and to convey the requirements of the EMP and EIA Report.

The scope of the training will include mainly the scope of the EMP, the relevant environmental legislations of Turkey, requirements of the WB and Performance Standards of the IFC and the following concepts should be included in the training program:

- Understanding of the PROJECT's environmental requirements and their implementation at the site by the staff (i.e. what kind of environmental impacts are expected and what kind of mitigation measures are proposed; where and how to take these measures);
- Understanding of the procedures to be followed in improper situations;
- Reporting principals and understanding rules;

- The PROJECT's environmental dimension and informing the related official institutions about it;
- Understanding how to treat the public and media visiting the site; and
- Understanding how to act in case of unexpected environmental accidents.

The CONTRACTOR is in charge of keeping the records related to the environmental training of the staff. Internal audits should test the effectiveness and the adequacy of the training

5.3 Consultancy Services

The environmental engineer appointed by the PROJECT OWNER will do provide environmental consultancy services to ensure the compliance with environmental rules and regulations as well as guidelines and to meet the necessities that may occur during audits by the WB or local authorities such as the provincial directorates of the MoEF in Balikesir.

The Environmental Engineer will do carry out monitoring work outlined in Section 4 and will hold meetings with construction contractor to obtain information about the progress in the works as well as environmental issues encountered.

5.4 Public Relations

5.4.1.1 Relations with the Media

It is the PROJECT OWNER's responsibility to conduct relations with media as a requirement of general implementations rules of public investments. For this reason, the CONTRACTOR will not arrange a direct meeting with media without the permission of the PROJECT OWNER. A procedure, concerning the relations with the media, should be prepared and applied when such authorization is given to the CONTRACTOR.

5.4.1.2 Handling Complaints

In the construction phase of the PROJECT, the CONTRACTOR will prepare a procedure to direct complaints to the PROJECT OWNER. The PROJECT OWNER is responsible to deliver the phone numbers, mail and e-mail addresses to interest groups (local people and NGO's) for receiving and recording any complaints. Hence, a public relations mechanism should be constructed for the complaints from NGO's and governmental establishments of the province.

Any complaints received will be recorded and directed by the relevant units to the related technical personnel in the construction site to take necessary measures and corrective actions. The complainant will be informed about the progress after necessary

measures are taken and the subject environmental problem is resolved. All records of complaints and relative action taken will be recorded by the relevant unit.

A public relation mechanism should be established by the PROJECT OWNER in the operational phase of the PROJECT like the one developed in the construction phase and the public relations process will be followed by this mechanism in order to evaluate complaints and suggestions from people.

5.5 Special Studies

No residents will be displaced from Project Site due to the fact that the PROJECT OWNER holds the possession of whole land where the PROJECT will be constructed. Hence, no involuntary resettlement is expected because of the PROJECT. There is no indigenous group of people within Bandirma District as described in IFC Performance Standard 7. Historical and cultural assets existence within the Project Site has been investigated by Ministry of Tourism and Culture inventory database and no conservation area has been found. The PROJECT OWNER committed that if any archaeological or cultural asset is found during construction, relevant authorities will be contacted.

6 INSTITUTIONAL ARRANGEMENTS

This chapter gives information about how and by whom the environmental monitoring data will be used.

6.1 Constructional Phase

The PROJECT OWNER is the responsible party to minimize or eliminate possible environmental impacts of the PROJECT. Therefore, to guarantee the environmental performance of the PROJECT, the CONTRACTOR will be aware of his/her responsibilities in the construction period. In this way, the CONTRACTOR will be aware of the environmental responsibilities and the requirements of PROJECT.

CONTRACTOR will perform the following activities for a balanced environmental performance:

- Assigning his/her own HSE personnel to implement the EMP.
- Working in coordination with Environmental Engineer to ensure that the personnel working in the construction period are trained to raise the consciousness on environmental issues and EMP requirements.
- Minimization of the emissions and noise originating from the construction equipments, protection of water resources, compliance with the requirements of EMP

The CONTRACTOR, who will conduct the environmental monitoring studies according to the issues stated in the EMP under the control of the PROJECT OWNER and Environmental Engineer, will present the results to the PROJECT OWNER with environmental monitoring reports.

The PROJECT OWNER will evaluate the monitoring reports which are presented by the CONTRACTOR in terms of related environmental measures. Moreover, the PROJECT OWNER will keep a copy of the environmental monitoring reports and submit another copy to the field office of the CONTRACTOR to present it to authorities in the controls that are made by Balıkesir Provincial Directorate of Environment and Forestry.

When non-compliance is detected by the Provincial Directorate of Environment and Forestry, the CONTRACTOR will resolve the situation and declare it to the PROJECT OWNER.

Within the context of this EMP, the task distribution concerning anticipated activities in the construction phase is presented in Table 6.1.

Table 6-1. Task Distribution related to the construction phase EMP requirements
(R: responsible, S: supervisor, A: assistant)

Task Item	CONTRACTOR	PROJECT OWNER
Environmental Quality Monitoring	R ¹	S
Training of Key Personnel ²	R	S
Training of Staff	R	S
Corrective Actions	R	S
Internal Audit	R	S
Reporting	R	S
Relations with the Media	A	S ³
Handling complaints	R	S

¹ Measures should be conducted by the qualified institutions and establishments according to the national legislation

² Training activities will be carried out in coordination with the Environmental Engineer

³ Relations with the media are the responsibility of the PROJECT OWNER as a requirement of general implementation rules of public investments. This forbids the CONTRACTOR from arranging a direct meeting with the media.

6.2 Operational Phase

As the proposed environmental monitoring works for the operation phase are very limited and the organizational structure of the operational staff is not certain yet, there is no detailed proposal for institutional arrangements at the moment. In short, there should be one HSE officer in the organizational structure of the PROJECT OWNER who will be responsible for following up the EMP requirements, related to the operational phase, and for coordination with the Environmental Engineer to be appointed by PROJECT OWNER.

7 CONSULTATION WITH NGO'S AND PROJECT-AFFECTED GROUPS

Detailed data regarding social assessment is provided in Appendix B. A public relation mechanism should be set up and applied throughout the construction and operational phases of the PROJECT. In this respect, local people and NGO's as well as local authorities will be informed about the project progress. Hence, any public objection that might be raised by local people due to lack of information could be prevented and good relations between the local people and the PROJECT OWNER as well as contractors can be established and maintained.

Any complaint raised by local people or NGO's will be recorded and followed up whether or not corrective actions, if necessary, are taken. Therefore, a log book for such complaints will be available at the site office (during the construction phase) or power plant administrative building (during the operational phase).

7.1 Construction Phase

During the construction phase, periodic public consultation meetings (PCM) will be held in the nearest settlement or at the site office of the PROJECT OWNER. In these meetings, the relevant stakeholders (villagers, village head, representatives of local NGO's as well as local authorities) will be informed about the progress of the project development.

A separate section will be allocated for the public relation activities in the environmental monitoring reports to be prepared by the Environmental Engineer in the context of the PROJECT.

During PCMs, minutes of meeting will be taken together with a list of participants who will sign an attendance sheet. In the monitoring reports, there will be an annex including these minutes and the participant list as well as a copy of the presentations and brochures, if available.

7.2 Operational Phase

During the operational phase of the project, regular PCMs should also be held. During PCMs, minutes of meeting will be taken together with a list of participants who will sign an attendance sheet. These records should be kept at the site office of the PROJECT OWNER.

REFERENCES

1. "Pollution Prevention and Abatement Handbook", July 1998, World Bank
2. Environmental Impact Assessment Report of Bandirma Natural Gas Combined Cycle Power Plant Project, February 2008
3. www.ifc.org
4. Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual, Intergovernmental Panel on Climate Change, 1996.
5. http://www3.vattenfall.com/annual_report_2005/filter.asp?filename=page_025.html

Appendix – A. Production License

İADELİ YAAHİKTİĞÜ



T.C.
ENERJİ PİYASASI DÜZENLEME KURUMU
Elektrik Piyasası Düzenleme, İzleme ve Değerlendirme Dairesi Başkanlığı

Sayı : B.62.0.EPİ/10.30.213- -8644 **29681** 4.12.2007 14.16.2007
Konu : Lisans verilmesinin uygun bulunması

ENERJİSA ENERJİ ÜRETİM ANONİM ŞİRKETİNE
Sabancı Center, Kule II, 4. Levent Beşiktaş/İSTANBUL

İlgi : 04/07/2007 tarihli üretim lisansı başvurunuz.

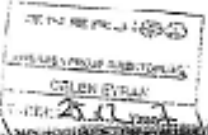
Balıkesir ili, Bandırma ilçesinde kurmayı planladığınız 1025 MWm / 1000 MWe kurulu gücündeki, doğalgaz yakıtlı, termik – kombine çevrim santrali tipindeki üretim tesisi için ilgi yazı ile yapmış olduğunuz üretim lisansı başvurunuz incelenmiş ve değerlendirilmiş olup, Elektrik Piyasası Lisans Yönetmeliğinin (Yönetmelik) 10 uncu maddesinin üçüncü fıkrası hükmü uyarınca ve Enerji Piyasası Düzenleme Kurulu'nun 06/12/2007 tarihli ve 1398-15 sayılı kararı ile söz konusu üretim tesisi için Şirketinize, Türkiye Elektrik İletim A.Ş. (TEİAŞ) Genel Müdürlüğü tarafından bildirilen bağlantı ve sistem kullanimına ilişkin görüşler doğrultusunda, lisans alma tarihinden itibaren inşaat öncesi dönem için 12 (oniki) ay ve inşaat dönemi için 36 (otuzaltı) ay olmak üzere toplam 48 (kırksekiz) aylık tesis tamamlanma süresi ile 49 (kırkdokuz) yıl süreli üretim lisansı verilmesi uygun bulunmuştur.

Bu şartlar çerçevesinde, Şirketinize söz konusu üretim tesisi için üretim lisansı verilmesi için;

- Kuruma muhatap düzenlenmiş 10.350.000 (on milyon üçyüzelli bin)YTL'lik banka teminat mektubunun (Teminat mektubuna ilişkin Banka teyit yazısı ile Banka yetkililerinin imza sirkülerinin aslı veya noter onaylı suretleriyle ile birlikte) Kurumumuza sunulması,
- Lisans alma bedelinin kalan tutarı olan 247.500 (ikiyüzkırkyedi bin beşyüz) YTL'nin Enerji Piyasası Düzenleme Kurumunun T.C. Ziraat Bankası Ankara Kurumsal Bankacılık Şubesindeki 37712133-5001 numaralı "Lisans Alma Bedelleri Hesabına" yatırılması,

gerekmekte olup bu yükümlülüklerin yerine getirildiğine ilişkin belgelerin, lisans verilmesinin uygun bulunmasına ilişkin Kurul kararının bu yazımız ile tebliğinin yapılmasından itibaren 90 (doksan) gün içerisinde Kurumumuza ibraz edilmesi hususunda bilgilerinizi rica ederim.


Ahmet OCAK
 Başkan a.
 Daire Başkanı







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Appendix – B. Social Impact Assessment and Management Plan

Appendix – C. Erosion and Sedimentation Control Plan