

# Environmental Assessment Report

---

Summary Initial Environmental Examination  
Project Number: 41958  
April 2008

## Philippines: Privatization and Refurbishment of the Calaca Coal-Fired Thermal Power Plant Project

Prepared by Emerald Energy Corporation for the Asian Development Bank (ADB).

The summary initial environmental examination report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

## **CURRENCY EQUIVALENTS**

(as of 1 April 2008)

Currency Unit	–	peso/s (P)
P1.00	=	\$0.024931
\$1.00	=	P41.56

## **ABBREVIATIONS**

ACM	–	asbestos-containing material
ADB	–	Asian Development Bank
CEMS	–	continuous emissions monitoring system
DENR	–	Department of Environment and Natural Resources
EEC	–	Emerald Energy Corporation
EHS	–	environmental health and safety
ESP	–	electrostatic precipitator
IEE	–	initial environmental examination
IFC	–	International Finance Corporation
MMT	–	multipartite monitoring team
NPC	–	National Power Corporation
SIEE	–	summary initial environmental examination

## **WEIGHTS AND MEASURES**

dBa	–	decibels
m	–	meters
MW	–	megawatts

## **NOTE**

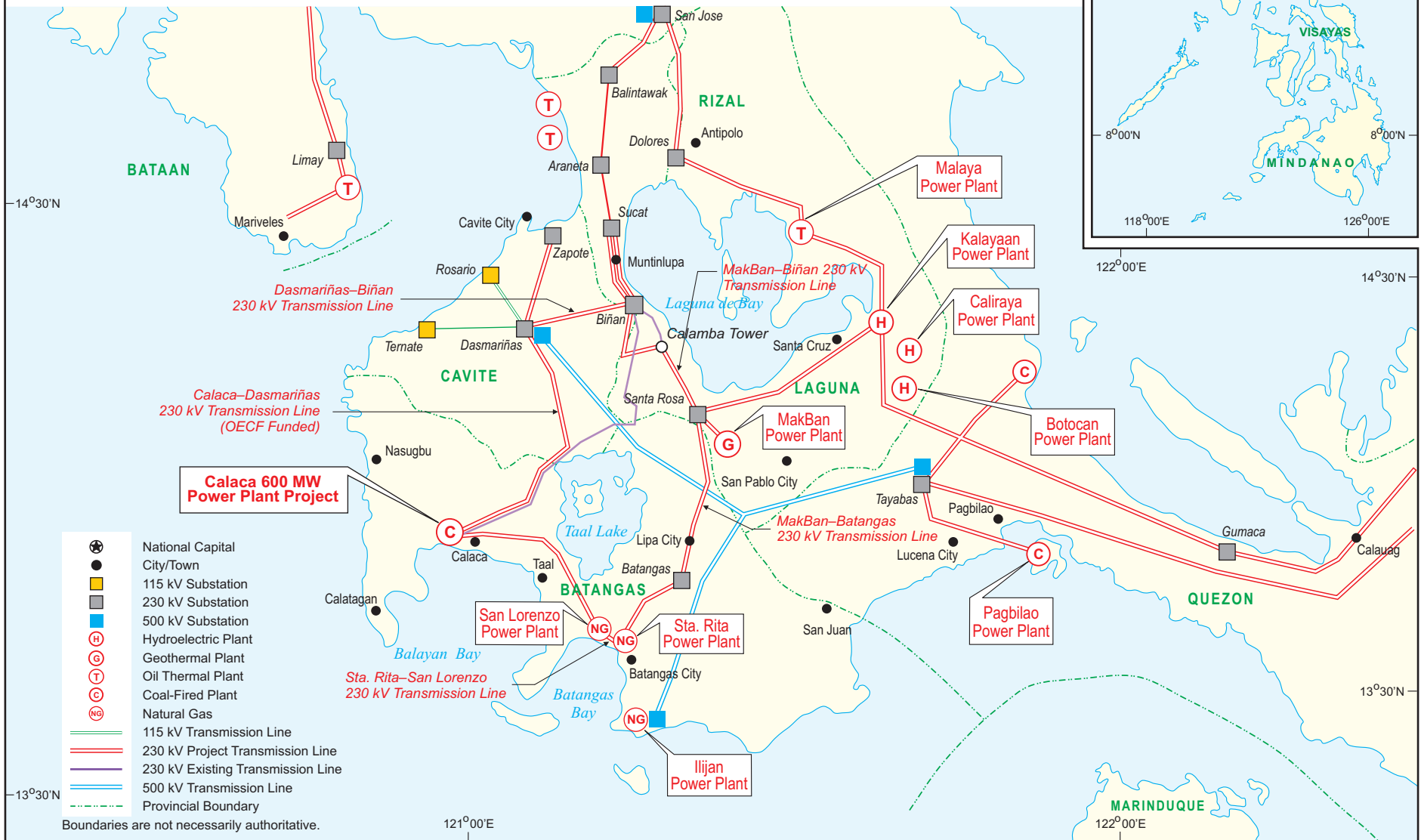
In this report, "\$" refers to US dollars.

## CONTENTS

	Page
MAP	
I. INTRODUCTION	1
II. DESCRIPTION OF THE PROJECT	1
III. DESCRIPTION OF THE ENVIRONMENT	2
A. Geology	2
B. Surface Water	2
C. Groundwater	2
D. Climate	2
E. Topography and Soils	3
F. Vegetation Cover	3
G. Protected Areas	3
H. Coastal Resources	3
I. Transportation	3
J. Socioeconomic Profile	3
K. Cultural Heritage	3
IV. ANTICIPATED IMPACT AND SUMMARY OF MITIGATION MEASURES	3
A. Air	4
B. Wastewater and Surface Water	5
C. Waste Management/Groundwater and Soil Contamination	5
D. Asbestos-Containing Materials and Risks	6
E. Noise	6
F. Ecology, Conservation, and Natural Resources	6
G. Cultural Heritage	7
H. Labor and Health, Safety, and Security Conditions	7
I. Socioeconomic Impact and Resettlement	7
J. Community Engagement	7
V. INSTITUTIONAL ARRANGEMENTS	7
A. Institutional Mechanisms	7
B. Applicable Environmental Laws and Regulations	8
C. Environmental Standards	8
D. Corrective Action and Environmental Management Action Plan	8
VI. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE	10
VII. FINDINGS AND RECOMMENDATIONS	10
VIII. CONCLUSIONS	11
APPENDIX: Environment and Social Action Plan	12

# PHILIPPINES

## PRIVATIZATION AND REFURBISHMENT OF THE CALACA COAL-FIRED THERMAL POWER PLANT PROJECT



- National Capital
- City/Town
- 115 kV Substation
- 230 kV Substation
- 500 kV Substation
- Hydroelectric Plant
- Geothermal Plant
- Oil Thermal Plant
- Coal-Fired Plant
- Natural Gas
- 115 kV Transmission Line
- 230 kV Project Transmission Line
- 230 kV Existing Transmission Line
- 500 kV Transmission Line
- Provincial Boundary

Boundaries are not necessarily authoritative.

## I. INTRODUCTION

1. The Calaca coal-fired thermal power plant in the Philippines is a 600 megawatt (MW) conventional, pulverized coal-fired power plant built by the National Power Corporation (NPC). It consists of two 300 MW coal-fired units commissioned in 1984 and 1995. The plant occupies an area of 168 hectares in the municipality of Calaca, province of Batangas, about 115 kilometers south of Manila.
2. Emerald Energy Corporation (EEC), a company formed by Suez-Tractebel S.A. (Suez),<sup>1</sup> was awarded the right to purchase the Calaca power plant by the Power Sector Assets and Liabilities Management Corporation, the entity responsible for privatizing state-owned power assets in the Philippines. EEC is now seeking project financing from the Asian Development Bank (ADB) and the International Finance Corporation (IFC), political risk insurance from the Office National du Ducreire, and loans from international and local commercial banks for the refurbishment of the Calaca power plant. EEC intends to optimize the use of plant capacity, improve performance, and ensure compliance with standards applicable to the project—local, national, ADB, World Bank and IFC.
3. Suez carried out preliminary environmental due diligence through a consultant, ENSR International Phils., Inc., and prepared an initial environmental examination (IEE) required by ADB and an environmental and social screening in fulfillment of the IFC's requirements and the lenders' Equator Principles.<sup>2</sup> This summary initial environmental examination (SIEE) assesses environmental issues relating to the planned privatization and rehabilitation of the Calaca coal-fired thermal power plant (the Project). Prepared according to ADB's *Environment Policy* (2002) and *Environmental Assessment Guidelines* (2003), this SIEE is based on the January 2008 report on the preliminary environmental due diligence. It gives an overview of the Project and the environmental conditions in the plant and its surroundings. It also recommends corrective actions and measures to mitigate the environmental impact of the Project.
4. The Project involves the refurbishment of the Calaca power plant. It will not increase designed power generation capacity beyond the original rating of the equipment and will not entail a change in fuel. No expansion in the site area is foreseen; all modifications will be confined to the present site. Hence, no full-scale environmental impact assessment, in addition to the environmental audit and environmental and social screening already made, is considered necessary. The Project is therefore classified as environmental category B.

## II. DESCRIPTION OF THE PROJECT

5. The Calaca power plant is located along the shorelines of Barangay San Rafael in Calaca municipality. The site is bounded on the north by the Calaca-Balayan National Highway, on the east by the Cawong (Bolboc) River, on the west by the Dacanlao River, and on the south by Balayan Bay.
6. This conventional, pulverized coal-fired power plant of typical modern design has two units, each with a rated gross generation capacity of about 300 MW. The plant uses local coal from Semirara and imported coal from Australia and Indonesia. Its main facilities are (i) a jetty

---

<sup>1</sup> Suez is an international industrial and services group in the energy and environment sectors, with over 150,000 staff working on four continents serving some 200 million people in 3,000 municipalities, and with annual revenues of over \$50 billion.

<sup>2</sup> The Equator Principles are a voluntary set of guidelines for managing environmental and social issues in project finance lending, initially applying to investments with capital costs above \$50 million. As of January 2008, 59 banks from 23 countries had adopted the principles, which now cover about 80% of global project lending in more than 100 countries.

with docking facilities and coal and fuel unloading systems, (ii) a coal yard with a sedimentation pond, (iii) a water spray system, (iv) a computerized central control system, (v) boilers, (vi) two steam turbines, (vii) a cooling water system drawing seawater and discharging into an 800 meter (m) canal leading to Balayan Bay, (viii) an electrical system and transformers, (ix) fuel oil and diesel storage and transfer systems, and (x) electrostatic precipitators (ESPs) to control particulate emissions.

7. After the turnover, EEC will refurbish the plant to optimize the use of its capacity, improve performance, and ensure compliance with standards applicable to the project—local, national, ADB, World Bank and IFC. Refurbishment activities are mainly associated with replacing existing equipment that has been in service for 10–20 years, but the fundamental plant design or capacity will not be altered, and local and imported coal will remain the primary fuel.

### **III. DESCRIPTION OF THE ENVIRONMENT**

#### **A. Geology**

8. The province of Batangas is part of the southwestern Luzon volcanic field, with many calderas, strato-volcanoes, and domes. Recent alluvium—irregular beds and lenses of clay, silt, sand, and gravel ranges from imperceptible to about 20 m in thickness of coastal and river deposits in the town of Calaca. Saltwater marshes and swamps around the plant and inside the ash ponds belong to this unit. Under the recent alluvium are pleistocene clastic deposits composed of loosely consolidated calcareous shale, sandstone, tuff breccia, and local conglomerate lenses that could be more than 150 m thick.

#### **B. Surface Water**

9. Several river systems traverse Calaca and drain into Balayan Bay. The Cawong (Bolbok) River is less than 50 m east of the plant, while Dacanlao River is west and is aligned with the plant's western perimeter boundary near the ash ponds. Balayan Bay is a 75,000 hectare shallow sea bay with a rocky seacoast, beaches, intertidal flats, mangroves, coastal lagoons, and marshes. The areas around the plant, especially along the ash ponds, are typical of river-dominated deltas and swamps.

#### **C. Groundwater**

10. Shallow groundwater occurs within 4–5 m below grade in the area, with known groundwater extraction via water wells in the municipality of Calaca. Water wells are commonly installed with hand pumps or mechanical pumps. But well water is generally used not for drinking but for other domestic purposes. Piped water supply serves Calaca's drinking-water needs.

#### **D. Climate**

11. The local climate is better defined by seasonal rainfall rather than temperature, which varies slightly during the year. Average annual temperature is 28.4 degrees centigrade (°C). The rainy season typically starts in May and ends in July or August. Comparative records show that typhoons pass much less often through Calaca than through other cities and municipalities of Batangas.

**E. Topography and Soils**

12. The topography of the plant site and Calaca in general is mostly flat. Steep slopes, ravines, and rolling hills occur only in the northern portion. Pyroclastic soil covers range from clay loam to sandy loam with clayey subsoil. Andesitic soils typically are clay loam with clayey subsoil.

**F. Vegetation Cover**

13. Cultivated lands around the plant are planted to rice, sugarcane, coconut, or vegetables. The ash-pond areas in the western part of the plant are vegetated with wild cogon grass and short trees with minimal ecological value.

**G. Protected Areas**

14. There is no ecologically sensitive area or protected area on or near the project site. The site will not be expanded during the Project.

**H. Coastal Resources**

15. The project site is adjacent to Balayan Bay, one of the country's most productive fishing grounds, which abounds with pelagic species such as round scad, jacks, and tuna. Fishermen and shrimp gatherers make up 30% of the coastal population. Fish and shrimp aquaculture and commercial seaweed farming are important sources of livelihood. Diving in the bay's coral reefs and clear waters is also a thriving industry in the area.

**I. Transportation**

16. From Manila, Calaca can be reached via the South Luzon Tollway and the Star Tollway, through Lipa City to the east, or via the National Highway through Tagaytay City to the north. From the National Highway, paved roads lead north and east of the plant.

**J. Socioeconomic Profile**

17. Calaca municipality is one of 31 municipalities in Batangas, which also has three cities. In 2000, the municipality comprised 39 barangays with a total population of 58,489 in 11,306 households. In 2007, the population was estimated at 65,946.

18. Per capita income in the province is about P32,055 (\$700) and poverty incidence is a high 24.5%.

**K. Cultural Heritage**

19. There are no areas of historical or cultural importance on or near the site of the plant. No land will be acquired for the Project.

**IV. ANTICIPATED IMPACT AND SUMMARY OF MITIGATION MEASURES**

20. Key environmental issues and impact were evaluated on the basis of the likely scale of operations, the expected magnitude of possible releases during both normal and emergency operations, and the proximity and sensitivity of receptors. The evaluation was completed with

reference to local regulations as well as the IFC performance standards<sup>3</sup> and other international standards.

21. The following key findings and observations as well as areas of concern and proposed mitigation measures are based on an analysis of operations and currently available monitoring data.

#### A. Air

22. The primary sources of emissions from the Project are stack emissions, fugitive dust from coal unloading and storage, and fugitive dust from ash handling and storage. The primary air pollution control facilities are ESPs for stack emissions, windbreak fencing, screw-type coal unloaders, and a coal dust suppression system. Some fugitive dust control equipment, including jet sprayers and coal screw unloaders, are functioning poorly or not at all. The Project will rehabilitate and refurbish these facilities to reduce the adverse effects on air quality and maintain good monitoring.

23. Monitoring records for unit 2 indicate generally good compliance with national emission standards for sulfur dioxide, oxides of nitrogen, carbon monoxide, and particulates. However, unit 1 with its damaged and poorly maintained ESP shows periodic noncompliance with particulate emission standards. The continuous emissions monitoring system (CEMS) is also poorly maintained, and one ambient air monitoring station is not functional.

24. For the upgrading and repair of the unit 1 ESP, EEC will hire a contractor to replace warped plates, repair transformers, and carry out other upgrades. Unit 1 will be commissioned after testing. The CEMS upgrade and the maintenance of the ambient air monitoring station will involve the repair and calibration of the instrument panel and maintenance of the CEMS. The ambient air quality station will be repaired or replaced if necessary, and the ash handling equipment will be refurbished and will undergo preventive maintenance to reduce fugitive dust from coal and ash handling.

25. Once these facilities are upgraded or repaired and running properly, air pollution will be reduced and air quality will significantly improve. The targeted air emission standards are foreseen to meet the emission requirements of the Philippines and the World Bank (in its *Pollution Prevention and Abatement Handbook*) for the rehabilitated coal-fired power plant.

**Table 1: Comparison of Air Emission Standards and Project Targets**

Parameter	World Bank Standard (mg/Nm <sup>3</sup> )	Philippine Standard (mg/Nm <sup>3</sup> ) <sup>a</sup>	Project Target Standard (mg/Nm <sup>3</sup> )
Particulates	100 <sup>b</sup>	200	100
NO <sub>x</sub>	750 <sup>c</sup>	1500 as NO <sub>2</sub>	750
SO <sub>2</sub>	Meet regional load <sup>b</sup> 2000 <sup>c</sup>	1500	1500
CO	—	500 as CO	500 as CO

— = not available, CO = carbon monoxide, mg/Nm<sup>3</sup> = milligrams per normal cubic meter, NO<sub>x</sub> = oxides of nitrogen, SO<sub>2</sub> = sulfur dioxide.

<sup>a</sup> Based on the Philippine Clear Air Act of 1999.

<sup>b</sup> Based on the World Bank/IFC Guidelines on Rehabilitation of Existing Thermal Power Plants.

<sup>c</sup> Based on the World Bank/IFC Guidelines for New Thermal Power Plants.

Source: Suez-Tractebel S.A. Preliminary Environmental Due Diligence Report prepared by ENSR International.

<sup>3</sup> IFC applies the performance standards to manage social and environmental risks and impact and thus enhance development opportunities in its private sector financing.

## B. Wastewater and Surface Water

26. The primary potential sources of wastewater and surface water impact in the plant are discharges from the coal sedimentation pond and ash ponds, the oil-water separator, and the condenser outlet, as well as oil and chemical spills on-site. Storm-water drains are close to the oil storage and handling installations, and the surface-water drainers are not equipped with oil interceptors to trap oil before the water is discharged. Oil contamination could therefore reach Balayan Bay. The plant also operates with an outdated effluent discharge permit.

27. Generally, the plant complies with applicable discharge standards except for total suspended solids (TSS) from sedimentation ponds. As part of the Project, the wastewater collection system, treatment system, and ponds will be rehabilitated to improve wastewater treatment and resolve the problem of increased TSS levels. The ash-pond dikes will also be inspected and upgraded. As required by the Department of Environment and Natural Resources (DENR), EEC will monitor water quality and then renew its effluent discharge permit. For future monitoring, samples will be collected regularly at the final discharge point to Balayan Bay, to comply with the targeted standards.

**Table 2: Comparison of Effluent Discharge Standards and Project Targets**

Parameter	World Bank Standard <sup>a</sup>	Philippine Standard <sup>b</sup>	Project Target Standard
TSS	50 mg/L	200 mg/L	50 mg/L
Metals	0.5–1 mg/L	0.003–0.5 mg/L	0.003–0.5 mg/L
Oil and grease	10 mg/L	15 mg/L	10 mg/L
Temperature	< 3°C difference between ambient and effluent water discharge at the point of discharge into the receiving area	< 3°C difference between ambient and effluent water discharge at the point of discharge into the receiving area	< 3°C difference between ambient and effluent water discharge at the point of discharge into the receiving area

<sup>a</sup> Based on the World Bank/IFC Guidelines for New Thermal Power Plants.

<sup>b</sup> Based on DENR Administrative Order 90-35.

Source: Suez-Tractebel S.A. Preliminary Environmental Due Diligence Report prepared by ENSR International.

## C. Waste Management/Groundwater and Soil Contamination

28. Coal ash is the primary waste generated by the plant. Each day the plant generates about 800–1,000 metric tons (MT) of coal ash, mostly from the ESP, given the current load of about 5,400 MT for both units and the 15% ash content of domestic coal. Fly ash is sold to a cement company, while bottom ash is conveyed to the ash lagoon. No horizontal expansion of the ash lagoon considered under the present financing will involve the acquisition of land outside the leased premises. Any expansion will conform to international good practices and standards.

29. The ash lagoon, coal stockpile area, and sedimentation ponds are unlined. However, monitoring indicates no negative effects on surrounding marine ecology and water quality, and no contamination of groundwater. EEC will nevertheless review the monitoring parameters and locations. Under the land lease agreement, EEC is obligated to conduct a thorough inspection of the leased premises and to have environmental waste materials found on the leased premises removed, disposed of, and cleaned up. EEC has therefore hired ENSR to do an environmental survey of the plant to determine the extent of environmental waste materials and to develop and implement appropriate mitigation plans.

30. Oil, hazardous waste, and hazardous chemical-handling equipment may release chemicals into the environment. During the Project, EEC will review and upgrade the monitoring regime for certain aspects, particularly soil and groundwater around the ash

lagoon, to make sure that they have no negative environmental impact. EEC will prepare a monitoring plan and will make a comprehensive environmental assessment of the site to evaluate the impact of the ash lagoon on groundwater. Soil and groundwater samples will be collected and analyzed for as the presence of hydrocarbons, heavy metals, and other materials related to the past operation of the plant. The analysis will focus on the oil transfer pipeline, the coal yard, and the ash storage and sedimentation ponds. Oil handling and storage facilities will be upgraded as necessary so that oil is properly contained within the oil system and the associated containment system. Housekeeping will also be improved to address the problem of oil leakages into the soil.

31. Other hazardous wastes and chemicals will be stored in the purpose-built building, and audits will be conducted for the proper management and disposal of wastes. A waste management plan for the proper management and disposal of wastes generated by the Project will also be developed and implemented.

#### **D. Asbestos-Containing Materials and Risks**

32. Asbestos-containing material (ACM) has been used in unit 1, and about 10% is friable. ACM is also buried in the ash lagoon. An asbestos management plan will be developed, and once the friable asbestos in unit 1 is removed, EEC will either send it to an appropriate licensed disposal facility off-site, or apply for a permit from DENR for the disposal of the asbestos in the ash lagoon on-site. The buried ACM, on the other hand, does not present a threat and therefore requires no action. However, its exact location will be recorded and physically demarcated in the ash lagoon.

#### **E. Noise**

33. Monitoring showed that noise levels at the plant exceed standards by 1–5 decibels (dBA). The DENR standards are 70 dBA for the morning hours (5 a.m.–9 a.m.), 75 dBA for the daytime (9 a.m.–6 p.m.), 70 dBA for evening (6 a.m.–10 p.m.), and 65 dBA for nighttime (10 p.m.–5 a.m.). However, the noise monitoring results were inconsistent, and the increased noise at the time of the monitoring could have been due to community activities and traffic rather than the Project. Further monitoring is required. EEC will conduct noise monitoring at receptors at the plant boundary and implement measures needed to meet the World Bank's standards for noise at industrial sites.

#### **F. Ecology, Conservation, and Natural Resources**

34. The project site has no ecologically sensitive receptors and will not be expanded. Therefore, no significant terrestrial ecology issues are expected.

35. Marine impact may arise from surface-water runoff contaminated with ash and coal dust, from coal and oil spilled during unloading at the jetty and transfer to the plant, and from cooling water intake and discharge. Temperature effects from cooling-water discharge are mitigated by the 800 m discharge canal before the water flows into Balayan Bay. However, monitoring by the multipartite monitoring team (MMT) from 1993 to 2007 indicated no adverse impact on marine water quality or marine ecological resources. Together with the involvement of the MMT,<sup>4</sup> regular and continuous monitoring will ensure that there is no adverse impact.

---

<sup>4</sup> The MMT for environmental monitoring was established in 1992 to evaluate the environmental effects of the plant and to conduct multisectoral environmental monitoring activities every 6 months during the plant's operation.

## **G. Cultural Heritage**

36. There are no areas of historical or cultural importance on the project site. No further land will be acquired under the Project. Thus, there are no cultural heritage concerns.

## **H. Labor and Health, Safety, and Security Conditions**

37. The plant employs 265 permanent and 204 contract workers. Safety incidents have been relatively numerous but minor. Nevertheless, the safety management program needs upgrading. The plant is working toward the certification of its environmental health and safety (EHS) management system (ISO 14001/OHSAS 18001). Fire and life safety systems at the plant are generally inadequate to keep workers safe and guarantee a rapid response in a fire. There is also no fence or other barrier restricting access to the ash lagoon.

38. The Project will upgrade and implement proper health and safety programs and plans, including the monitoring of safety and fire protection equipment to improve health and safety performance and community safety. A plan for restricting public access to the ash lagoon will be developed and a firefighting team will be formed. Auditors will also be trained in line with health and safety programs. EEC will procure on-site firefighting facilities. Emergency preparedness and security measures to safeguard personnel and property, consistent with the IFC's performance standards, will also be implemented.

## **I. Socioeconomic Impact and Resettlement**

39. No resettlement will be required for the Project, as the financing will go to the refurbishment of an existing facility and the site area will not be expanded. There are no indigenous peoples at or near the site that could be affected by the Project.

## **J. Community Engagement**

40. Local government units are involved in monitoring the plant operations as part of the MMT. Before the construction of unit 2, all 39 barangays heads endorsed a memorandum of agreement establishing the MMT in January 1992. No such endorsement was required when unit 1 was built.

41. Community-based improvement projects have been continuously carried out under Department of Energy Energy Regulation 1-94, which mandates the allocation of P0.01 per kilowatt-hour of electricity sales for community improvements. These ongoing community projects involve electrification, development and livelihood support, reforestation, watershed management, health, and environmental improvement.

42. Within 12 months of the turnover of the plant, EEC will undertake community engagement and implement a program, including a grievance procedure, for consulting with affected communities, reporting, and monitoring as part of its EHS management system. These activities will be consistent with ADB's *Public Communications Policy* (2005) and IFC's performance standards and will supplement the activities of the MMT.

# **V. INSTITUTIONAL ARRANGEMENTS**

## **A. Institutional Mechanisms**

43. The Environmental Protection Unit (EPU) of the Plant Technical Services Department and the MMT are the two primary institutional mechanisms that control the environmental and social issues associated with the Project. The EPU is composed of 28 staff, some of whom are

specifically assigned to the EHS management of the plant. The MMT was formed in compliance with a requirement in the environmental compliance certificate<sup>5</sup> issued by the DENR before the facilities were commissioned. It is made up of staff from the DENR, local government units, nongovernment organizations, and NPC.

44. EEC will draw up plans for emergency preparedness, security force management, EHS compliance, oil spill response, and solid waste management. These plans will generally conform, as far as practicable, to the IFC's performance standards.

45. These organizational arrangements are considered generally appropriate to ensure good EHS and social performance of the plant. EEC will focus in particular on engaging with and following through on the commitments to the MMT once it takes over the plant.

46. Human resources policies and procedures for employees and nonemployee workers will also be implemented. These will be consistent with national labor and employment laws, ADB's commitment to core labor standards, Suez policies, and IFC's performance standards.

## **B. Applicable Environmental Laws and Regulations**

47. The plant received environmental clearance from the DENR for unit 1 on 21 April 1987 and for unit 2 on 24 April 1992 in accordance with Presidential Decree 1586 establishing the Philippine environmental impact assessment system. No further environmental assessment requirement or clearance is needed for the turnover and refurbishment of the plant. However, the transfer of the environmental compliance certificate and other environmental permits from NPC to EEC needs to be carried out and has notification requirements from the issuing DENR offices.

## **C. Environmental Standards**

48. The Calaca plant is an existing facility built to modern standards. EEC has set target standards for its air emissions and effluent discharge comparable to key international and local standards. The initial targets assume that these standards are practical and attainable at reasonable cost in the context of the refurbishment of an existing power plant. These target standards are listed in Tables 1 and 2 mentioned in sections IV A and IV B.

## **D. Corrective Action and Environmental Management Action Plan**

49. Corrective actions and mitigating measures have been designed to address key environmental issues and will be implemented immediately or by June 2008, by December 2008, or during the shutdown and mechanical rehabilitation of units 2 and 1 to be completed by February 2009 and May 2009, respectively. These timelines are based on the assumption that the plant will be turned over to EEC by the end of March 2008. Any delay would mean a change in the timelines. A matrix of the corrective action and environmental management plan and proposed schedule is presented in Table 3 below.

---

<sup>5</sup> Environmental clearance issued by the national Government, laying down the conditions under which the plant is supposed to operate to protect the environment.

**Table 3: Corrective Action and Environmental Management Plan**

<b>Issues and Actions</b>	<b>Schedule</b>
<p>1. Air and Noise</p> <ul style="list-style-type: none"> <li>a. Contract services to assess and upgrade the ESP.</li> <li>b. Replace warped plates, repair transformers, and perform other upgrades.</li> <li>c. Test unit 1 after its commissioning.</li> <li>d. Upgrade and maintain CEMS by repairing instrument panel of CEMS.</li> <li>e. Calibrate and maintain CEMS and stack monitoring equipment.</li> <li>f. Repair or replace ambient air quality station.</li> <li>g. Refurbish jet sprayer, coal yard cleaning station, and other equipment; conduct preventive maintenance of ash handling equipment; upgrade dust control measures.</li> <li>h. Undertake noise monitoring at receptors at the plant boundary.</li> <li>i. Implement measures necessary to achieve noise levels corresponding to World Bank standards for industrial sites.</li> </ul>	<p>1a–1f to be completed by May 2009 for unit 1 and by February 2009 for unit 2  1g to be completed by May 2009  1h to be implemented by May 2009  1i to be completed within the 2-year grace period for securing all environmental permits to be agreed on among EEC, ADB, and IFC</p>
<p>2. Wastewater</p> <ul style="list-style-type: none"> <li>a. Rehabilitate wastewater collection system, treatment system, and ponds.</li> <li>b. Inspect, upgrade, and repair ash-pond dikes.</li> <li>c. Monitor water quality as required by DENR and renew wastewater operating permits.</li> <li>d. Review and update water quality monitoring plan, and identify further corrective measures needed to deal with any impact from cooling-water discharge.</li> </ul>	<p>2a and 2b to be completed by May 2009  2c and 2d to be completed within the 2-year grace period for securing all environmental permits to be agreed on among EEC, ADB and IFC</p>
<p>3. Waste Management/Groundwater and Soil Contamination</p> <ul style="list-style-type: none"> <li>a. Undertake an environmental survey focusing on asbestos, groundwater contamination, soil contamination, hazardous waste materials, and contamination in the sediment below the jetty, and develop mitigation plans.</li> <li>b. Conduct site assessment and review parameters, frequency, and procedure for monitoring of groundwater and water discharge around the ash lagoon.</li> <li>c. Conduct monitoring to obtain enough information on water and groundwater quality around the ash lagoon, and identify corrective actions as required.</li> <li>d. Ensure proper containment of oil within the oil system and its associated containment system, and improve housekeeping.</li> <li>e. Develop a waste management plan for the construction stage of the refurbishment project.</li> </ul>	<p>3a and 3b to be completed by December 2008  3c to be completed by December 2008  3d to be completed by May 2009  3e to be completed by December 2008</p>
<p>4. Hazardous Materials</p> <ul style="list-style-type: none"> <li>a. Develop an asbestos management plan.</li> <li>b. Execute the plan through removal, wrapping, and abatement by an approved contractor.</li> <li>c. Conduct work area monitoring for asbestos to rule out any unacceptable exposure for workers within the powerhouse building.</li> <li>d. Mark out location of asbestos on the ground and on a plan of the ash pond, and restrict works and access to the area.</li> <li>e. Implement programs to ensure proper storage of other chemicals and hazardous wastes.</li> <li>f. Continue audit of hazardous waste and chemicals for proper management and disposal.</li> </ul>	<p>4a to be completed by December 2008  4b and 4c to be completed by May 2009  4d to be completed by December 2008  4e to be carried out through project implementation phase</p>

Issues and Actions	Schedule
5. Labor and Health, Safety, and Security Conditions <ul style="list-style-type: none"> <li>a. Upgrade or formulate health and safety or fire and life safety plans, including a plan for community safety restricting public access to the ash lagoon.</li> <li>b. Implement programs and plans, including monitoring of safety and fire protection equipment.</li> <li>c. Form a firefighting team; procure on-site firefighting facilities; repair damaged fire pumps, hoses, fire alarm, and other equipment.</li> <li>d. Check and ensure safety of all lifting equipment and load-test heavy-lift cranes.</li> </ul>	5a to be completed by December 2008 5b and 5c to start by December 2008 5d to be completed by May 2009

CEMS = continuous emissions monitoring system, DENR = Department of Environment and Natural Resources, EEC = Emerald Energy Corporation, ESP = electrostatic precipitator  
 Source: Discussions between Suez-Tractebel S.A (Suez) and Asian Development Bank, Suez Preliminary Environmental Due Diligence Report prepared by ENSR International.

## VI. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

50. The local community has been informed about the potential privatization of the Calaca plant. Suez consulted with local officials and the community shortly after it was awarded the right to purchase the plant. The meetings were held in November 2007 at the plant site, the municipal hall, and the provincial office. The response of the participants was mostly positive and there was little adverse reaction to the Project. Among the issues that were discussed were ways of bringing about more local employment and benefits such as more reliable power supply to attract new business into the area. These meetings were the first steps in what will be a continuing dialogue with the local communities. Further consultation meetings will be held with the communities to identify projects or initiatives that will be most beneficial to them, such as livelihood, electrification, reforestation, watershed management, health, and environment enhancement projects. The well-established MMT is considered an effective forum for public consultation and information disclosure.

51. After the turnover, EEC will implement a public consultation program through the MMT. It will notify and engage with the local communities in implementing the Project. All such activities will be properly documented. Minutes of the meetings will be recorded and grievance procedures will be installed.

## VII. FINDINGS AND RECOMMENDATIONS

52. The IEE findings, confirmed by due diligence, indicate that the proposed refurbishment measures reflect the need for extensive maintenance of the plant. Corrective actions have been designed to improve environmental performance, including repairing and maintaining the ESPs, CEMS, and ambient monitoring stations; repairing fugitive dust control systems; rehabilitating the wastewater collection and treatment system; reviewing and updating environmental monitoring arrangements; conducting soil and groundwater investigations; developing and implementing management plans for ACM and other hazardous waste and chemicals; and forming a firefighting team and repairing fire protection equipment and facilities to improve safety. Environmental management includes strengthening existing monitoring and stakeholder engagement programs, conducting extensive training of staff, and introducing a formal and well-executed EHS management system.

53. The current MMT, combined with self-monitoring and reporting to DENR, is generally adequate provision for external feedback and reporting to key stakeholders. This process will

be strengthened and monitoring will be adequate and professionally done such that it covers all key parameters and uses valid monitoring and testing methods.

## **VIII. CONCLUSIONS**

54. All environmental issues and impact have been assessed and corrective and mitigating measures have been identified. The Project is not expected to have any significant adverse impact on the environment, provided the proposed corrective actions and environmental management plans are implemented. On the contrary, it is expected to improve air and water quality, as well as health and safety, thus producing major long-term benefits to the community.

### ENVIRONMENT AND SOCIAL ACTION PLAN

<b>Action</b>	<b>Description</b>	<b>Timing</b>
Environmental Health, and Safety (EHS) Management System	Implement a defined EHS management system consistent with Suez approach for owned facilities worldwide consistent with IFC's Performance Standards 1 and 2.	May 2009
Community Engagement	Implement a program, including a grievance procedure, for consulting with affected communities, and reporting and monitoring as part of the EHS management system, and as a supplement to activities undertaken by the multipartite monitoring team, consistent with IFC's Performance Standard 1.	May 2009
Human Resources Policies and Procedures	Implement human resources and policies and procedures for employees and nonemployee workers consistent with national labor and employment laws, Suez policies, ADB core labor standards, and IFC's Performance Standard 2.	May 2009
Training and Capacity Building	Implement programs for EHS and social awareness, technical, fire and life safety, and EHS auditor training.	May 2009
Security Plan	Implement measures for plant emergency preparedness and security to safeguard personnel and property, consistent with Suez policies and IFC's Performance Standard 4. Measures will include policies for the use of force (and firearms) and the use of government security personnel, a process for community engagement for the Project, and a grievance mechanism.	May 2009
Environmental and Social Compliance	Implement the corrective action plan (CAP) described above to meet Suez and Philippine requirements and IFC's performance standards. The CAP should meet ADB, Suez, and national requirements, as well as applicable IFC performance standards.	By the target date set for each action in the CAP

ADB = Asian Development Bank, CAP = corrective action plan, EHS = environment, health and safety, IFC = International Finance Corporation.

Note: As part of its financing requirements, ADB also requires the implementation of the Action Plan in accordance with its safeguard policies (environment, involuntary resettlement), and the technical standards set in IFC documents.

Source: Suez-Tractebel S.A. Preliminary Environmental Due Diligence Report prepared by ENSR International.