SUMMARY ENVIRONMENTAL IMPACT ASSESSMENT

AES KELANITISSA POWER PLANT (163 MW)

IN THE

REPUBLIC OF SRI LANKA

August 2000

ABBREVIATIONS

ADB	–	Asian Development Bank
CCGT	–	Combined Cycle Gas Turbine
CEA	–	Central Environmental Authority
CEB	–	Ceylon Electricity Board
EIA	–	environmental impact assessment
EPC	–	Engineering Procurement and Construction Contract
OECF	–	Overseas Economic Cooperation Fund of Japan
SEIA	–	summary environmental impact assessment
TSP	–	total suspended particulate

WEIGHTS AND MEASURES

°C	–	centigrade
dB	–	decibel
g	–	gram
km	–	kilometer
kV	–	kilovolt
m	–	meter
m^3	–	cubic meter
mg/Mj	–	milligram per mega joule
MW	–	megawatts
NOx	–	nitrogen oxide
sec	–	second
SO_2	–	sulfur dioxide
µg/scm	–	microgram per standard cubic meter

NOTE

In this report, "$" refers to the US dollar and rupees to the Sri Lanka rupees.

I. INTRODUCTION

1. A 163 megawatt (MW) auto diesel fired combined cycle gas turbine power plant (the Project) is proposed at the existing power plant site at Kelanitissa, Colombo, Sri Lanka. The Project is a private sector project sponsored by AES Kelanitissa (Private) Limited. Environmental Resources Management of the United Kingdom completed the environmental impact assessment (EIA) of the Project in August 1999. The Ministry of Irrigation and Power upon recommendation of the Technical Evaluation Committee and with the concurrence of the Central Environmental Authority (CEA), issued the environmental approval for the project on 4 November 1999. The Technical Evaluation Committee consists of experts from the CEA, the Ministry of Irrigation and Power, Ceylon Electricity Board (CEB), Irrigation Department, National Water Supply and Drainage Board, National Building Research Organization, and academe. Based on the comments and recommendations included in the environmental approval, the EIA was updated by Environmental Resources Management and the updated report was completed on 18 July 2000.

2. The Project is classified under category A and this summary environmental impact assessment (SEIA) is circulated to the Board of Directors of the Asian Development Bank (ADB) 120 days before loan consideration. The EIA report is available at the project office on request. This SEIA has been translated into Sinhala and Tamil. Copies of the translation are available at ADB's resident mission in Colombo, Sri Lanka. This SEIA and the EIA reports are documents of the project proponent, AES Kelanitissa (Private) Ltd.

II. DESCRIPTION OF THE PROJECT

3. AES Kelanitissa Power Project comprises a 163 MW auto diesel fired combined cycle gas turbine (CCGT) power plant to be constructed at the existing Kelanitissa power plant location. The site, which will not involve acquiring any new land, is in the lower reaches of the Kelani River, about 2 kilometers (km) north of the Colombo City Centre, and 0.3 km south of the Kelani River. The area is already classified as industrial. Construction is planned to begin in late 2000 and will be completed in the last quarter of 2002. This will be the largest privately constructed power project in Sri Lanka.

4. The CCGT will be powered with low sulfur auto diesel fuel, supplied through an existing pipeline by the Ceylon Petroleum Corporation. Storage of at least 20,000 tons capacity equivalent to 28 days of operation will be provided. No other back-up fuels will be used. Power generated by the plant will be delivered via a 220 kilovolt (kV), 500 meter (m) long underground cable. This will terminate at the interconnecting bay of the 220 kV gas insulated substation within CEB's existing Kelanitissa power station complex. The power evacuation system for this project already exists within the same complex, and the fuel supply will be through an existing pipeline running about 30 m from the site boundary.

5. Once the Project is operational, the two existing steam turbines will be decommissioned and the existing six auto diesel fired open cycle turbines will be operated only for emergency and peak loads. Those power plants are operating well beyond their economic life, their efficiency is very low, and the pollution emissions are very high per unit of power generated (para. 6).

III. DESCRIPTION OF THE ENVIRONMENT

6. The existing Kelanitissa power station complex comprises one 115 MW open cycle gas turbine (known as the Fiat Avio plant), six 20 MW open cycle gas turbines (the current plant

rating is 18.5 MW), and two 25 MW conventional boiler/steam turbines (the current plant rating is 20 MW). The gas turbines operate on auto diesel fuel and the conventional boiler/steam turbines use Lanka furnace oil as their fuel. A further 150 MW, naphtha-fuelled combined cycle project funded by the Overseas Economic Cooperation Fund of Japan (OECF) is being built within CEB's Kelanitissa power station complex. Major highways bound the plant site on two sides. The highways are major access routes to the container terminals of the Colombo Port, Katunayake airport and export processing zone, and Kandy.

A. Physical Environment

7. Sri Lanka has tropical climate characterized by five seasons: (i) the conventional convergence zone from March to April, with strong westerly winds and afternoon rain; (ii) the premonsoon season from mid April to late May, with primarily westerly and southwesterly winds; (iii) the southwest monsoon from late May until September; (iv) a cyclonic period from late September to late November, with strong westerly winds; and (v) the northwest monsoon from late November to February. The average rainfall in the area is 2,300 millimeters (mm)/year. Most of the rain falls in the premonsoon period of April to May and in the intermonsoon period of October to November.

8. Ambient air quality measurements have been collected at Fort Railway Station (about 4 km southwest of the project site) and the Meteorological Department (about 6 km south of the project site) since 1996. These data are very comprehensive and have been used to estimate the likely air quality at the Kelanitissa site. The 24-hour average concentration of sulfur dioxide (SO_2) and nitrogen oxides (NO_4) at the Fort ranged from 97 to 106 microgram per standard cubic meter (µg/scm)[1] and 73 to 120 µg/scm. At the Meteorology Department, the 24 average concentration of SO_2 and NOx ranges from 29 to 46 µg/scm and 43 to 80 µg/scm. The total suspended particulate matter (TSP) was not monitored at either location. The air quality in Kelanitissa area is likely to be between that measured at the Fort Railway Station and at the Meteorological Department. Fort Railway Station lies in a very heavily trafficked area where the density of human activity is high. The area around the Kelanitissa, while surrounded by major roads, includes some open and farming areas.

9. Noise surveys were carried out in the narrow strip of commercial and residential areas on the western side of the project site. The daytime noise level varied from 56 decibels (dB) at the rear of 46/6 Nagalagam Street to 71 dB at 4 Nagalagam Street. Nighttime noise level varied from 46 dB to 73 dB. The night noise level is primarily from heavy container trucks serving the container terminals, which are not allowed to ply the highways during daytime.

10. The San Sebastian canal, which separates the project site and the commercial and residential houses on the western side of the site, is heavily polluted. The canal water is septic and full of domestic solid wastes from the residential and commercial establishments. The San Sebastian canal flows to the north and discharges into the Kelani River. The Kelani River is approximately 150 km long. It originates from the central hills and discharges immediately north of the Colombo Port. The average flow of the river is 1.4 million cubic meters (m^3)/hour, although during drought this flow may drop to as low as 75,000 m^3/hour. The river water quality near the project site is affected by the tide. At present 13,000 m^3/hour is diverted by CEB to cool the existing gas turbine, steam generators, and the Fiat Avio turbine plant. Most of the warm water used by CEB is returned to the river as the process uses an open loop once through system.

[1] A standard cubic meter is one cubic meter of gas at one atmosphere pressure and 0°C temperature.

11. The ground water table is very high. During the monsoon season the water table is very close to the surface and during the dry season it falls to 1 m below ground level. No abstraction of the ground water was noted in the houses around the project site. The National Water Supply and Drainage Board supplies potable water to the area around the project site.

B. Biological Environment

12. The Project will be within the existing power plant compound, which has undergone significant ecological disruption. For safety and security, the vegetation in the project site is periodically cleared. Clearing is often done during the dry season when the risk of fire is high. During the rainy season the site is typically marshy and some vegetation regrows. The main vegetation is *Cymbepegen cenfertiflorus*, a common grass with no economic value. The grass provides some cover for a number of vertebrate species although the biodiversity is very low from the periodic clearing. No endangered or protected species were noted in the project site.

13. The San Sebastian canal is highly polluted. The main plant specie is water hyacinth. Biodiversity is very low. Tilapia, guppies, and mosquitoes and mosquito larvae were noted.

14. The 1995 study of the Kelani River showed wider biodiversity than in the San Sebastian canal. Twenty fish families were noted and six reptilian species. The Indian black freshwater turtle (*Melanochelys trijuga*) and the estuarian crocodile (*Crocodylus palustrisis*) were listed as inhabiting the Kelani River, but were not sighted during the study. The estuarian crocodile is listed as vulnerable in the 1996 International Union for Conservation of Nature (IUCN) Red list.

C. Social Environment

15. The study area has undergone significant changes in the last 40 years with the construction of the Kelani and the new Kelani bridges. The two bridges link Colombo City to Negombo and Kandy. The improved access resulted in rapid industrialization of the area as well as establishment of pockets of high-density settlements. The Urban Development Authority classifies the area as predominantly industrial. The project site is separated on the north from temporary houses by a railway line. Small agricultural plots are still found on the north, especially close to the Kelani River. The area south of the project site is predominantly industrial with the exception of a training school to the southeast. The western side is part of the Colombo Port and the commercial establishments supporting port activities. The eastern side is predominantly commercial area.

16. While the area surrounding the project site is classified as industrial, there are a number of pockets of residential houses. Thirty seven percent of the residential houses are classified as permanent, 48 percent as semi permanent, and 15 percent as temporary shelters. Many of the houses are considered substandard.

17. CEB supplies electricity for domestic and industrial uses. The electricity supply is insufficient especially during the peak hours and during the dry season when the output from the hydropower plants are insufficient. Approximately 98 percent of the houses have access to sanitation facilities. Three private clinics and a hospital are in the study area, and serious cases are referred to the National Hospital in Colombo.

18. There are 31 schools operating in the study area, including 2 private schools, 8 technical schools, the Automobile Training Institute, and the National Trades Testing Institute. The study area is within 2 km of the project site.

IV. ALTERNATIVES

19.The electricity demand in Sri Lanka has been increasing at 6.8 percent annually during the last 10 years. As of 1998 only 50 percent of the houses had electricity. The demand for electricity is expected to continue to increase well into the next 10 years. Sri Lanka has an estimated hydropower generating capacity of 2,000 MW and more than half of this potential has been exploited. In 1996, Sri Lanka experienced a very long drought, resulting in serious drops in the output from the hydropower plants. The resulting power shortages caused serious economic and environmental problems. Industries, commercial establishments, and rich families purchased secondhand and inefficient generators as temporary measures. The poor resorted to burning coconut oil, kerosene, and candles. For security purposes, CEB has planned to diversify the energy source to include naphtha, fuel diesel, and coal in addition to hydropower.

20. CEB reviewed the suitability of 19 sites throughout Sri Lanka for power generation as part of its master plan. Ten sites were eliminated for environmental, technical, and logistical reasons. Considering the surrounding area, available water supply, full route geography, and other items, the Ministry of Irrigation and Power has grouped the proposed sites into good, medium, and poor from an environment perspective. Kelanitissa was classified as medium but in terms of infrastructure and economic viability the site is ranked as good. The development of the Kelanitissa power plant was given priority for the following reasons: (i) a supply line for diesel fuel is already available, (ii) the site is in the as industrial, (iii) the site is in the existing power plant lot, (iv) the plant is close to the demand, (v) water intake structures and drainage to and from Kelani River are in place, and (vi) no additional land will have to be acquired and no person will be displaced or resettled.

21. The CCGT power plant has an operating efficiency of 50-58 percent compared to 36 percent for a steam fired generator or 35.0-42.5 percent for a coal fired power plant. Thus, the gaseous pollutant emission rate for CCGT is 30 percent lower than a steam generator and 50 percent lower than a conventional coal fired power plant.

22. CEB is also pursuing demand-side management to improve the electricity utilization efficiency. CEB is conducting an education campaign and demonstration projects of energy efficient technologies. Given the low electricity consumption rate in Sri Lanka, demand-side management is not expected to substantially reduce the electricity demand.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATING MEASURES

23. The environmental impacts of the Project will take place during construction, operation, and decommissioning. The environmental impacts during construction will primarily be from noise and dust. The potential impacts during operation will be noise from the generators and cooling towers; risk from oil spill and fire; air pollution from flue gas emissions, specifically SO_2 and NOx. The main impact during decommissioning is the disposal of soil that might be contaminated with spilled fuel and lubricants. The plant will not use any polychlorinated bi-phenyls or asbestos, which were typically used in power plants built before 1980s.

A. Physical Environment

24. Although residential properties are close to the project site boundary, careful management of the construction phase and incorporation of mitigation measures will ensure that the potential for dust nuisance is minimized. Dust control measures during construction will include (i) proper location of material stockpiles, especially sand and soil downwind from the commercial, residential and other establishments; (ii) frequent wetting of the stockpile and

working area; (iii) screening of or providing wind breaks for stockpiles; (iv) covering of trucks; and (v) proper selection of equipment and control of speed limits in construction area. The emissions from the construction equipment and trucks will be too low to affect the SO_2 and NOx levels within and adjacent to the construction site.

25. The impact of the Project on water quality during construction is expected to take place during heavy rain. Heavy rain may erode compacted soil and carry off materials such as sand and soil from the stockpile. Covering the stockpile will reduce carrying off of solids. A drainage canal will be built around the stockpile areas to divert the surface runoff from the stockpile. Precautionary bunding/construction of dikes around fuel and chemical stores, in combination with oil/water separators, will prevent contaminated water from reaching the canal or river. As a result of these mitigation measures, any impact of the wastewater on the quality of the Kelani River water will be minimal.

26. Since the submission of the EIA report to acquire local permits, Engineering Procurement and Construction Contract (EPC) contractor has concluded that piling will be required. The impact of this on the predicted construction noise levels has been calculated and the revised results are presented in the main EIA. Although the relevant Sri Lankan noise standard is not likely to be exceeded during the construction period, construction noise may nevertheless be disturbing and a series of mitigation measures have been recommended. Construction traffic off-site will not contribute significantly to noise levels on public highways because roads leading to the site already have very heavily traffic. Noisy equipment will be operated only during daytime. The Sri Lankan environmental regulations allow a maximum 75 dB noise level at the boundary of a construction area. Considering the existing background noise level, the construction activity during daytime is not expected to seriously affect the noise level in areas adjacent to the construction site. Modeling was carried out. During site preparation, the noise level to the east of the construction area is expected to range from 69 to 75 dB. On the southern side is a major highway and the eastern side is the power plant. The noise from the construction and operation of the project will have a minimal impact on the existing noise level from the traffic on the southern side and the noise from the existing power plants on the eastern side. The northern side is isolated from the houses and commercial establishments by the railway track and some agricultural plots. During foundation preparation the noise level on the western side is expected to be 64 to 74 dB, and during the construction of the structures the noise level will go down considerably to the 57 to 76 dB range.

27. Detailed computer dispersion modeling has been undertaken to assess the impact of stack emissions on air quality from the AES plant. In addition, the potential for cumulative air quality impacts as a result of emissions from the proposed power plant and from the neighboring CEB power plant has been assessed. The existing steam generators use bunker fuel with 3.5 percent sulfur content and the existing gas turbine use diesel fuel with 1 percent sulfur content. The Fiat Avio power plants uses similar fuel as the gas turbine. The proposed OECF power plant will use naphtha with minimal sulfur content. The existing steam generator generates 126 grams (g)/seconds (sec) of SO_2 and 11.5 g/sec of NOx. The existing gas turbine plants generate 35.4 g/sec of SO_2 and 30.8 g/sec of NOx. The Fiat Avio power plant discharges 156 g/sec of SO_2 and 21.4 g/sec of NOx. The proposed OECF-funded plant will not discharge any SO_2 and is estimated to discharge 38.3 g/sec of NOx. The project is expected to generate 82 g/sec of SO_2 and 47 g/sec of NOx. The Sri Lankan Government proposed emission standards is 340 mg/Mj (milligram per mega joule) of SO_2, 130 mg/Mj of NOx and 40 mg/Mj of TSP. The project is expected to emit 82 mg/Mj of SO_2, 47 mg/Mj of NOx, and 14.4 mg/Mj of TSP. The 1 hour average time ambient standards for SO_2, NOx, and TSP are 200, 250 and 500 µg/scm, respectively. The 8 hour averaging ambient standard for SO_2, NOx, and TSP are 120,

150 and 350 µg/scm, respectively. The 24 hour average ambient air quality standard for SO_2, NOx, and TSP are 80, 100, and 300 µg/scm, respectively.

28. In terms of NOx, the project will add 36.6 µ/scm of NOx to the hourly average, 13.2 µg/scm to the 8 hour average, and 10.2 µg/scm to the 24 hour average. However, the existing gas turbine plant is currently adding 2334 µg/scm to the hourly average in the worst expected atmospheric conditions and 628 µg/scm to the 8 hour average. In terms of ambient SO_2 emission, the project will add 64.1 µg/scm to the hourly average and 23.1 µg/scm to the 8 hour average. The existing source gas turbine power plant adds 1341 µg/scm to the hour average and 361 µg/scm to the 8 hour average. The proposed OECF power plant will not add any SO_2 but will add 347 µg/scm to the 1 hour average concentration of NOx and 156 µg/scm to the 8 hour average.

29. Based on computer modeling, it was recommended that the project emission be discharged through a 60 m high smoke stack and the sulfur content in the fuel must be below 0.5 percent. The project will use the steam injection method to reduce the NOx emitted. The fuel supply agreement between AES and Ceylon Petroleum Corporation incorporated this provision. If Ceylon Petroleum Corporation can not supply fuel with less than 0.5 percent sulfur, it will have to pay for damages equivalent to the income lost. In addition, the Ministry of Irrigation and Power has required CEB to close the two steam generators once the Project is commissioned. The six gas turbine power plant will be maintained and operated only during peak load and emergency. Because of the very high and low smokestack SO_2 and NOx generation rates from the six gas turbine power plants, the ambient air quality standard for 1 hour and 8 hour averaging will be exceeded during the worst expected conditions. The worst conditions are expected to take place when the wind is blowing inland, i.e., the southwest monsoon, and has sufficient downward gradient to bring the emission to the ground before proper dispersion. Considering the generation capacity shortage, CEB finds it difficult to decommission the six gas turbines.

30. Surface and ground water quality, and aquatic ecology of the Kelani River, will be protected from contamination during the construction phase with the installation of a site drainage system with solid settlement areas to reduce the sediment load of the runoff and oil interceptors for vehicle washing effluents. Bunding/secondary containment will be provided for temporary storage of fuel and this will virtually eliminate the risk of contaminating runoff water with oil. The water requirement for the AES Kelanitissa power plant is approximately 450 m^3/hour. Almost half of this is returned to the river after treatment and so the net effect of the abstraction is no more than 0.3 percent of the 50 year low water flow rate. The Project will use biodegradable dispersing and biocide chemicals in the cooling system. This will not constitute a significant impact on the flow of the river. In future the cumulative gross water requirements of the multiple plants at the Kelanitissa site will be reduced to around 10 percent of current use with the decommissioning of the steam turbine. Approximately 200 m^3/hour of warm water will be discharged to the river (either directly or via the canal). This water will be no more than 2°C above the ambient temperature at the point of discharge and will have little or no thermal impact on the river. The overall impact on the Kelani River will be positive when the two steam generators are closed and the six gas turbine plants are operated only intermittently. The existing power plant is abstracting 13,000 m^3/hour and it discharges hot water back into the river. The existing power plants use a once-through cooling system.

31. Although the water table at the site is very close to the surface, it is not used for domestic or industrial purposes. During construction, piling will be undertaken using casing and sealed with and inert material (sodium-based bentonite) to prevent contamination of the ground and surface water. Mud and slurry from pile holes will be disposed of at the designated disposal

site. The operation of the plant is unlikely to have any significant impact on groundwater as the drainage system with oil/water separators, combined with impermeable and bunded enclosures for storage of fuels and oils, will prevent contamination of the canal and/or Kelani River.

32. As a result of extensive noise modeling, an optimal site layout and combination of noise attenuation measures has been arrived at to ensure that Sri Lankan standards and guidelines will be met. Although the EPC contractor will be free to propose alternative site layouts and/or noise attenuation measures, the requirement to meet these guidelines is clearly stated in the EPC contract. The EPC contractor is currently working on the final layout and further details are not available at this stage.

B. Biological Environment

33. Construction of the power plant will entail the removal of all vegetation from the site. The site is typical of marshy habitats in the Colombo area, and its ecology is not considered to be a significant resource due to the area's small size, isolation, and disturbance by industry. AES will develop a buffer zone along the western side to serve as wind break and noise barrier, and to improve the aesthetics of the area. The buffer zone will also provide refuge for birds and invertebrates. The land will be filled on an average of 1 m above the current ground level of the site. Approximately 35,000 m^3 of soil will be used to fill the area. The source of this soil is yet to be identified by the EPC/subcontractors.

C. Social Environment

34. The project will provide a number of socioeconomic benefits: (i) more reliable and consistent energy supply to Colombo, furthering economic activity and development; (ii) approximately 150 jobs during the construction phase and 25 during operation; and (iii) an apprentice system or similar approach to raise the skills level of the local workforce.

35. The proposed project is currently on a large industrial site and does not involve taking any new land. It is surrounded on three sides by major roads. The land has no undisturbed natural habitats, and has little use for nonindustrial purposes. Given the industrial setting of the site, the visual impact is insignificant.

36. There are no sites of historical or cultural importance in the area, and therefore the construction and operation of the plant will have no impact on archaeology or cultural heritage.

VI. ECONOMIC ASSESSMENT

37. The project has a projected financial rate of return of 12 percent per annum. The cost stream includes the environmental mitigating measures during construction, the 60 m high smoke stack for emission dispersion, the NOx control using steam injection, the higher cost of low sulfur fuel, additional noise insulation for the generator building, water treatment plant, water holding pond prior to discharge to the San Sebastian canal, stack sampling facilities, and noise measuring equipment. The total cost of those facilities is estimated at $6.6 million as detailed in the table. No financial analysis was made without the environmental protection measures, as the equipment are integrated in the process and supply contract. The environmental cost of the grass and 10 small trees and shrubs that will be cut and removed when the site is converted to a power plant is not included in the analysis. The environmental benefits that are not quantified are (i) reduction in the SO_2 and NOx emission with the closure of the two steam generators and lowering of the operating time for the six gas turbine generators, (ii) reduction in water abstraction from Kelani River from 13,000 m^3/hour to 450 m^3/hour, and (iii) water temperature

discharge to the tributary of Kelani River (the San Sebastian canal) closer to the ambient temperature.

Estimated Cost of Mitigating Measures

Mitigating Measures	Cost ($)
Mitigating Measures During Construction	20,000
60 m High Smokestack	600,000
Steam Injection for low NOx	300,000
Additional Noise Insulation for Generator Building	310,000
Water Treatment Plant	1,200,000
Effluent Holding Pond	50,000
Stack Emission Monitoring	120,000
Noise Measuring Equipment	5,000
Extra Cost for low Sulfur Fuel (NPV)	4,000,000[a]

[a] NPV=net present value; 0.5 million $ per annum for 20 years at a discounting rate of 12 percent per annum.
Source:

VII. INSTITUTIONAL REQUIREMENTS AND MONITORING

38. AES will undertake environmental monitoring to ensure that the construction and operation of the power plant complies with high environmental standards and the requirements of the environmental legislation applicable in Sri Lanka and the policies and guidelines by ADB. AES, in response to local requests, proposes to form a monitoring committee that will include representatives from CEB, CEA, the EPC contractor, AES, Hayleys and the local community. This committee will meet at least quarterly. Annual monitoring reports arising from the monitoring activities will be made available to CEA and CEB and others as requested and appropriate. If any standards have been exceeded, the operator will investigate probable causes and if any are traced to the operation of the plant, remedial measures will be implemented to restore compliance.

39. A community liaison officer will be appointed to respond to inquiries regarding environmental or socioeconomic issues relating to construction or operation of the plant, and to investigate legitimate complaints. This individual will be trained to undertake this task, and will be represented on the proposed monitoring committee. AES will submit to ADB an annual report containing the summary of the (i) monitoring results for the stack emissions, noise, and water quality; (ii) copies of all permits, licenses, and clearances related to the environment and safety issued by the relevant government agencies; and (iii) in the event that in the reporting period the project has been cited for violation of any environmental or safety regulations, the report will include a certification from the relevant government agency that the defect has been corrected or an acceptable plan to correct the defect has been approved.

40. AEA proposed that the existing monitoring network by National Building Research Organisation (NBRO) be extended to include a continuous monitoring station in the Kelanitissa area. In this way, the cumulative impacts of the power plants at the Kelanitissa site would be reported by an independent organization.

41. Emissions from the AES main stack will also be monitored to demonstrate compliance with emission standards and guidelines. Noise will be monitored at the start of each construction phase and thereafter every month to test compliance with the appropriate noise standards described in this report. Noise will also be monitored at any time if legitimate complaints of excessive noise are received from the local community. If the appropriate noise standards are exceeded, action will be taken to reduce noise levels. All effluent monitoring will take place in the discharge pipe of wastewater. Temperature, pH, and flow rate will be monitored continuously and conductivity will be monitored at intervals.

VIII. PUBLIC INVOLMENT

42. A program of public consultation was designed early in the EIA process and a public consultation and disclosure plan was produced and agreed with CEA. Consultations have been undertaken with stakeholders including government, nongovernment, and community-based organizations. The primary concern of most government and nongovernment organizations is air quality. Representatives of the local communities have been more concerned with potential employment opportunities. Concerns that have been voiced about the existing plants relate to the possibility that dust emissions could make laundry dirty and to noise. A public meeting was held during the public consultation period (30 September 1999) at Ashoka Buddhist Centre, a social service center, about 400 m from the project site. About 65 local residents attended the meeting and their opinion toward the Project was generally neutral or positive. Explanations and details were proposed to residents who expressed concern over the potential for disturbance and nuisance.

IX. CONCLUSION

43. The assessment indicates that, with the adoption of the mitigation measures established by the EIA process, the overall environmental impacts of construction and operation of the power plant will not be significant. In the case of air quality, the assessment has shown that the operation of the AES plant will lead to a net improvement in ambient concentrations as AES' plant will displace older, less efficient, and more polluting plant on the Kelanitissa site, yielding more power for less ambient air quality impact. Although in the worst case scenario when all the existing power plant and the project are operating with minimal wind dispersion, the total NOx emissions from the site will increase by around 40 percent, total emissions of SO_2 will decrease to less than half of the current levels. Cumulative gross water requirements of the multiple plants at the Kelanitissa site will be reduced to around 10 percent of current use with the decommissioning of the steam turbines.