



1.0 EXECUTIVE SUMMARY

1.1 Introduction

NSL Nagapattinam Power and Infratech Pvt. Ltd, proposes to develop a greenfield 2X660 MW coal based Thermal Power Plant near Talanchankadu village (Thalaiudaiyarar Koli Pathy), Tharangambadi Taluk, Nagapattinam District, Tamil Nadu.

This chapter describes the purpose of the report, identification of the proposed project and project proponent, brief description of nature, size and location of the project and importance to the country and region. This chapter also describes the scope of the study and details of regulatory scoping carried out as per Terms of Reference (TOR) issued by Ministry of Environment and Forests (MoEF), New Delhi.

1.2 Justification for Implementation of the Project

The proposed power project will have marginal impacts on the local environment. However, with the implementation of the proposed pollution control and environment management measures, even the minor impacts anticipated due to construction and operation of the proposed power plant will be mitigated.

The total land required for the proposed project including colony, ash pond and cooling towers is 530.38-ha. There are no R&R issues involved. There is no forest land present in the plant site. The proposed project will provide direct employment to a large number of personnel. This project will also generate indirect employment to a considerable number of families, who will render their services for the project.

Thus, in view of considerable benefits from the project without any adverse environmental impact, the proposed project is most advantageous to the region as well as to the nation.

1.3 Summary of the EIA Report

1.3.1 Project Description

NSL Power Limited (NPL) is a 100% Subsidiary Company of **Nuziveedu Seeds Limited**, which was established for faster implementation of Power and other Infrastructure Projects in the Country. At present, land of about 526 ha (1300 acres) is being acquired for the Power Project. The estimated cost of the project is Rs.5940 Crores, which includes Rs.352 Crores for environmental protection measures.

TABLE-1.1
SALIENT FEATURES OF PROPOSED POWER PLANT

Sr. No.	Features	Details of Power Plant
1	Capacity	1320 MW
2	Configuration	2X660 MW
3	Type of boilers and	Pulverized Coal and Super Critical



Sr. No.	Features	Details of Power Plant
	technology	
4	Power evacuation	Power generated at NSL Nagapattinam Power and Infratech Pvt. Ltd will be evacuated at switchyard of 400 kV
5	Fuel	Blended coal (Indian 70%: imported 30%)
6	Source of Coal	From the Coal Mines within the Country and imported coal from countries like Indonesia or Australia
7	Coal Requirement	5.5 Million Tonnes Per Annum (17664 TPD)
8	Sulphur content	0.52%-1.2% (Design 0.75%)
9	Ash Content in Coal	10%-40% (Design-30%)
10	Ash generation	1.64 Million tons per annum(5299.2 TPD)
11	Bottom Ash	0.33 Million tons per annum(1060TPD)
12	Fly Ash	1.31 Million tons per annum(239TPD)
13	ESP efficiency	99.9%
14	Stack	One bi-Flue stack of 275-m height
15	Sea Water Requirement for makeup	17196 m ³ /hr

Source: Project Report

1.3.2 Description of the Environment

1.3.2.1 Location and Description of the Site

The terrain of the land in the plant site is plain with gentle slopes and no water streams present in the site area. The environmental setting of the proposed plant site is given in **Table-1.2**.

The study area map of 10 km radius is also given in **Figure-1.0**.

TABLE-1.2
ENVIRONMENTAL SETTING OF THE SITE

Sr. No.	Particulars	Details
1	Project Location	Talanchankadu village, Tharangambadi Taluk, Nagapattinam District, Tamil Nadu State
2	Plant Site Latitude	Latitude: 11° 07' 11.24" N to 11°08'23.9" N
3	Plant site Longitude	Longitude: 79° 47' 44.24" E to 79°50'51.01" E
4	Marine Intake point	Latitude: 09°14'9.42"N Longitude: 76°25'31.08"E
5	Marine Out fall point	Latitude: 09°14'9.96"N Longitude: 76°25'32.52"E
6	Plant site elevation above MSL	+4.5 m
7	Present land use at the site	Minimal agricultural land
8	Villages in 1-km radius area	Talanchankadu
9	Nearest highway	NH-45A Extension (1.0-km, W) SH-22 (1.3-km, NE)
10	Nearest railway station	Madapuram (3.8-km, SW)
11	Nearest airport	Trichy (88-km, SW)
12	Nearest town/City	Tharangambadi (6.1-km, S)
13	Hills/valleys	None in 10-km radius
14	Climatological conditions	
15	Climatic conditions : Annual	Annual Average Maximum . Temperate: 37.9°C



Sr. No.	Particulars	Details
	(IMD, Karaikal)	Annual Average . Minimum . Temperature: 20.9°C Annual total rainfall: 1359 mm Wind direction: W,NE,SW and SE
16	Climatic conditions : Monsoon season (IMD, Karaikal)	Average maximum Temperature 37.6°C Average minimum Temperature: 24.8°C monsoon total rainfall: 210.6 mm Wind direction: W,SW, WSW and SSW
17	Climatic conditions at site (monitored during study period: 1 st May-31 st July2008)	Temperature : Maximum 36.8 °C; Minimum: 25.3 °C Relative Humidity : Maximum : 73 %; Minimum: 60 % Rainfall: 31.8 Wind direction: SW,SE and E
18	Topography	Plain
19	Archaeologically important places	None within 10-km radius
20	Protected areas as per Wildlife Protection act,1972(Biospheres, Tiger reserves, Elephant reserves, National Parks / Wildlife Sanctuaries, Conservation reserves and Community reserves)	None within 10-km radius
21	Reserved / Protected Forest	None within 10-km radius
22	Seismicity	Seismic Zone-II according to IS:1893-2002
23	Surface water bodies	Sea (1.3-km, E)
24	Defence Installations	None within 10-km radius
25	Nearest seaport	Karaikal (35-km, S)
26	Industrial areas	M/s PPN Naphtha Power Plant (3.9-km, S)

Source: EIA Studies, Vimta Labs Limited, Hyderabad

1.3.3 Baseline Study

Baseline environmental studies have been carried during summer season-2008. Studies have been carried out in 10-km radius from project as centre for Soil quality, Ambient air quality, Water quality, Noise level monitoring studies, flora and fauna studies and demography.

Meteorology and Ambient Air Quality

The meteorological data generated at the site during study period. Ambient temperature recorded during study period is varies between 25.3^o C and 36.8^oC. The predominant wind direction during study period is Southwest, East and south east direction.

The prime objective of the baseline air monitoring is to evaluate the existing air quality of the area. This will also be useful for assessing the conformity to standards of the ambient air quality during the operation of the proposed power plant. Ambient Air Quality Monitoring (AAQM) stations were set up at Eleven locations in study area covering upwind, downwind and crosswind directions.

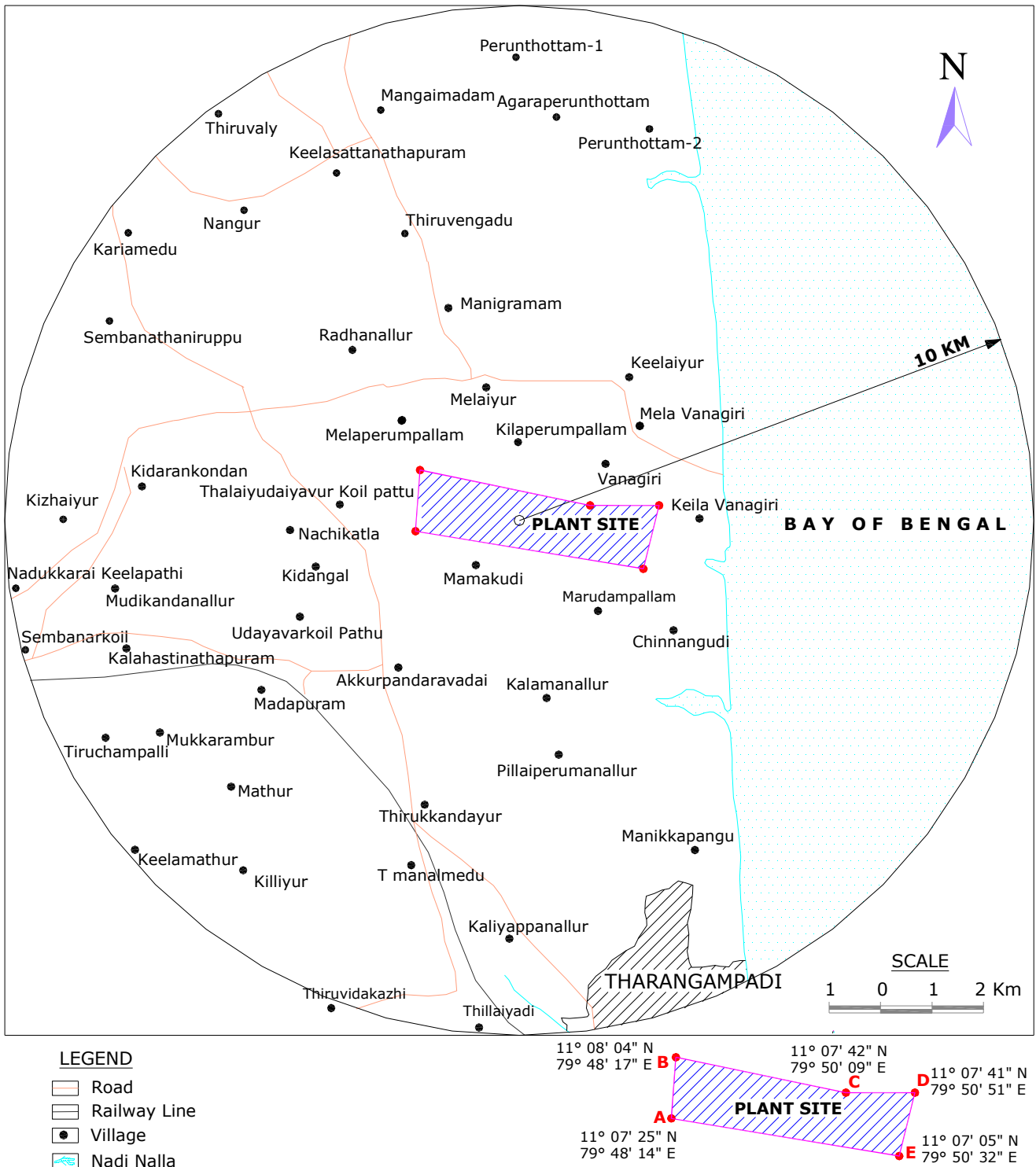


FIGURE-1
STUDY AREA MAP (10 KM RADIUS)



The observations based on a perusal of the results for pre-monsoon season are summarized below:

Total Suspended Particulate Matter

The minimum and maximum concentrations for TSPM were recorded as 65.7 $\mu\text{g}/\text{m}^3$ and 135.0 $\mu\text{g}/\text{m}^3$ and respectively. The maximum concentration was recorded at Melaiyur (AAQ1) and the minimum concentration was recorded at Nachikatla village (AAQ 10). The average concentrations were ranged between 72.8 to 124.5 $\mu\text{g}/\text{m}^3$.

Respirable Particulate Matter

The minimum and maximum concentrations for RPM were recorded as 20.0 $\mu\text{g}/\text{m}^3$ and 39.1 $\mu\text{g}/\text{m}^3$ respectively. The maximum concentration was recorded at Melaiyur (AAQ1) and the minimum concentration was recorded at Nachikatla village (AAQ10). The average values were observed to be in the range of 22.8 to 49.4 $\mu\text{g}/\text{m}^3$.

Sulphur Dioxide

The minimum and maximum SO_2 concentrations were recorded as 4.2 $\mu\text{g}/\text{m}^3$ and 11.7 $\mu\text{g}/\text{m}^3$. The maximum concentration was recorded at Melaiyur (AAQ 1) and the minimum concentration was recorded at Mamakudi (AAQ7). The average values were observed to be in the range of 5.1 to 9.2 $\mu\text{g}/\text{m}^3$.

Nitrogen Oxide

The minimum of 5.2 $\mu\text{g}/\text{m}^3$ observed at Mamakudi village (AAQ7) and maximum concentration of 13.1 $\mu\text{g}/\text{m}^3$ for NO_x was recorded at keelaiyur (AAQ2). The average concentrations were ranged 8.4 to 12.8 $\mu\text{g}/\text{m}^3$.

Carbon Monoxide

The minimum and maximum carbon monoxide concentrations were recorded as 126.2 $\mu\text{g}/\text{m}^3$ and 299.3 $\mu\text{g}/\text{m}^3$. The average concentrations were ranged between 216.9 to 266.0 $\mu\text{g}/\text{m}^3$.

Hydrocarbons

The minimum and maximum HC concentrations were recorded as 65.8 $\mu\text{g}/\text{m}^3$ and 139.3 $\mu\text{g}/\text{m}^3$. The average concentrations were ranged between 84.7 to 101.0 $\mu\text{g}/\text{m}^3$.

Ozone

The minimum and maximum and ozone concentrations were recorded as 2.3 $\mu\text{g}/\text{m}^3$ and 8.1 $\mu\text{g}/\text{m}^3$. The average concentrations were ranged between 2.4 to 6.1 $\mu\text{g}/\text{m}^3$.



Water Quality

Three Surface water and **Nine** ground water sources covering 10-km radial distance were examined for physico-chemical, heavy metals and bacteriological parameters in order to assess the effect of industrial and other activities on surface and ground water. The samples were analyzed as per the procedures specified in 'Standard Methods for the Examination of Water and Wastewater' published by American Public Health Association (APHA).

Surface Water Quality

- The analysis results indicate that the pH values in the range of 7.6 to 8.1, the maximum value was observed at canal near Talanchakadu, minimum value was observed at Melavanagari which is well within the specified standard of 6.5 to 8.5.
- The TDS was observed in the range of 470mg/l to 770 mg/l, the maximum TDS value was observed at canal near Talanchakadu and where as minimum value was observed at village Melaperumpallam.
- The chlorides and Sulphates were found to be in the range of 53.2 to 113.4 mg/l and 13.5 to 19.5 mg/l respectively. It is observed that chlorides and Sulphates are well within the permissible limits. It is evident from the above values that all the parameters are found to comply with the requirements of IS: 2296 specification of surface water. The surface water quality does not indicate any industrial contamination.

Ground Water Quality

Most of the villages in the project area have hand pumps, wells and Ponds, as most of the residents of these villages make use of this water for drinking and other domestic uses. Therefore 9 bore well samples and 3 surface water samples have been considered for sampling.

- The analysis results indicate that the *pH* ranges in between 7.1 to 7.8, which is well within the specified standard of 6.5 to 8.5. The maximum pH of 7.8 was observed at GW8 and the minimum pH of 7.1 was observed at GW1.
- Total *hardness* was observed to be ranging from 188 to 656 mg/l. The maximum *hardness* (656 mg/l) was recorded at GW3 and the minimum (188 mg/l) was recorded at GW8. The hardness was found to be above the permissible limit of 300 mg/l at GW1(441 mg/l),GW4 (428 mg/l), GW5 (364 mg/l), GW6 (368 mg/l),GW7 (404 mg/l), GW9 (628 mg/l),

Soil Quality

Ten locations within 10-km radius of the proposed plant boundary were selected for soil sampling. At each location, soil samples were collected and analysed as per standard methods.



- It has been observed that the pH of the soil in the study area ranged from 6.7 to 7.8 the maximum pH value of 7.8 was observed at Melaperumpallem village (S5), where as the minimum value of 6.7 was observed at Akur Village (S9).
- The electrical conductivity was observed to be in the range of 87 $\mu\text{mhos/cm}$ to 448 $\mu\text{mhos/cm}$, with the maximum observed at Talachangadu village (S7) with the minimum observed in Keelaiyur Village (S6).
- The nitrogen values range between 32.2-236.3 kg/ha. The nitrogen content in the study area falls in very less to better category.
- The phosphorus values range between 2.3 to 68.3 kg/ha, indicating that the phosphorus content in the study area falls in very less to sufficient category.
- The potassium values range between 111.6 – 376.3 kg/ha. The potassium content in the study area falls in less to more than sufficient category.
- The chlorides were found to be in the range of 53.2– 227.7 mg/kg of soil.

Flora and Fauna Studies

Detailed ecological studies were conducted during study to identify the floristic composition in and around proposed block and surrounding villages. Predominance of phanerophytes and therophytes could be observed during study period. 255 plant species were identified which are belong to 58 families. 93 wild animals observed/recorded through primary survey or with interaction local elderly people and forest officials of the area. 63 birds species, 9 species of reptiles, 9 species butterflies, 2 species of Amphibians and 10 species of mammals are recorded, out of which 2 species belongs to Schedule-II, 1 species belongs to Schedule-III rest belongs to Schedule- IV and V of Wildlife (Protection) Act,1972.

Land use Studies

The 10 km radius study area around the proposed project site theoretically covers 306.82 sq km or 30681.73 ha area. The village wise land use pattern of the study area is presented in report and satellite imagery studies were also carried out by using IRS P6 LISS-3 dated 20th May, 2007 and results are incorporated in report.

Socio-economic Details

The information on socio-economic aspects of the study area has been compiled from secondary sources, which include the public office indicated above. The sociological aspects of this study include human settlements, demographic and other socio-economic aspects and infrastructure facilities available in the study area. The economic aspects include agriculture, industry and occupational structure of workers. The village wise demographic data is presented in report and results are as follows:



1.3.4 Anticipated Environmental Impacts and Mitigation Measures

Air Environment

- Air pollution modeling, carried out for proposed power plant shows that resultant concentrations of SO₂, NO_x and SPM due to the proposed project for pre-monsoon season will remain well within the National Ambient Air Quality Standards;
- Limiting of pollutant discharge and minimizing its effect on air quality, within prescribed standards, will be achieved, consequent to selection eco-friendly Pulverized Fuel Super Critical Boiler technology and plant design for boilers and installation of stacks of adequate height that provides better dispersion of pollutants; and
- Consequently the proposal is unlikely to have any major impacts on local or regional air quality or to adversely affect human health or status of pollution-sensitive vegetation, either locally or on nearby terrain.

Air Dispersion Modeling

In the present case, **Industrial Source Complex [ISC3]** dispersion model based on steady state Gaussian plume dispersion, designed for multiple point sources for short term and developed by United States Environmental Protection Agency [USEPA] has been used for simulations from point sources.

Modelling studies reveal that the maximum incremental short term 24 hourly ground level concentrations for Particulates, SO₂ and NO_x likely to be encountered during study period are 0.75, 34.2 and 20.5 µg/m³ occurring at a distance of about 2.8-km in the NE direction. The resultant concentrations are predicted to be well within the standards specified by CPCB.

Water Environment

- The project will source its entire water requirement from the sea. The total water requirement for the project is 17196 m³/hr;
- The project will not extract groundwater or surface river water and hence there will be no impact on ground water or surface river water.

The wastewater generated in the plant area will be treated in the guard pond system and part of the wastewater will be utilized in various activities such as ash/coal handling, ash disposal, service water and greenbelt development. The balance treated wastewater will be disposed into sea at about 1.3-km from the seashore. No discharge is envisaged into any surface river water bodies; hence, no impact is envisaged on surface river water quality.

Solid Waste Management and Land Use

A long-term ash management agenda has been drawn to ensure compliance with the Ash Management Rules and meet CREP (Corporate Responsibility for Environment Protection) requirements. All efforts will be put to promote ash



utilization in construction business. 100% fly ash utilization will be achieved with in 9 yrs from the date of commencement of the project operations. Several major cement factories in South India have expressed their willingness to take the entire production of fly ash for their in-house consumption.

Noise Environment

The main noise generating sources are blowers from boilers and turbines. The impact of noise emission from boilers will be minimized by acoustic enclosures and the noise levels will be limited to 85dB [A].

Greenbelt Development

A 50-m wide greenbelt will be provided having trees planted in rows. 33% of the total project area will be developed as greenbelt and green cover as per CPCB/MoEF, New Delhi guidelines. The plant density of 2000 trees per hectare with local native species will be implemented.

Socio- Economics

The major economic impacts, which will accrue to the region, during the construction phase and operation of the Power Plant, will be an increased availability of direct and indirect employment. Local people will be benefited after commissioning of the proposed project in terms of petty to major contractual jobs and associated business establishments.

1.4 Environmental Monitoring Programme

Post project environmental monitoring is important in terms of evaluating the performance of pollution control equipments installed in the project. The sampling and analysis of the environmental attributes will be as per the guidelines of CPCB/TNPCB. Following attributes will be covered in the post project environmental monitoring in and around the project site:

- Ambient air quality monitoring on bi-weekly, 24 hours basis in the plant area and in the surrounding villages with respect to SPM, RSPM, SO₂, NO_x and CO;
- Source emissions will be monitored on monthly basis. Automatic continuous online monitoring system shall be installed in the stacks;
- Water quality monitoring at intake point, surface water bodies and ground water in the surrounding villages. Further, the wells around the ash pond area will be identified and monitored on the monthly basis;
- Treated wastewater before routing to clarifier will be analyzed on fortnightly basis. The pH, temperature, electric conductivity, TDS and flow will be monitored regularly;
- The noise levels will be recorded in and around plant. The noise levels at boundary of the plant will be recorded on monthly basis;



- The soil quality around ash pond area will be monitored on six monthly basis for the fertility of the soil;
- All the results will be compiled and thoroughly analyzed to assess the performance of the power plant; and
- The results will be reported on regular basis to the Tamil Nadu State Environment Conservation Board and regional office of MoEF.

1.5 Environment Management Plan

During operation phase, the impacts on the various environmental attributes should be mitigated using appropriate pollution control equipment. The Environment Management Plan prepared for the proposed project aims at minimizing the pollution at source.

✓ Air Pollution Management

Fugitive and stack emissions from the power plant will contribute to increase in concentrations of SPM, SO₂ and NO_x pollutants. The mitigative measures proposed in the plant are:

- Installation of ESP's of 99.9% efficiency to limit the SPM concentrations below 100 mg/Nm³;
- Provision of 275-m high stack for wider dispersion of gaseous emissions;
- Providing low NO_x burners to reduce the NO_x emissions;
- Dust extraction system will be provided at transfer points of conveyor system;
- Conveyor belt will be closed to prevent dust generation;
- Provision of water sprinkling system at material handling and storage yard;
- The ash will be transported by closed bulkers;
- Asphalted of the roads within the plant area;
- Development of Greenbelt around the plant to arrest the fugitive emissions.

✓ Water Pollution Management

Wastewater will be generated from cooling towers and , RO rejects in the power plant. Additionally, domestic wastewater from canteen and employees wash area will also be generated. The cooling tower blow down water along with RO reject water will be discharged into sea at about 1000m from the shore.

The measures proposed to minimise the impacts are:

- Provision of sewage treatment plant to treat domestic sewage from plant and township;
- Utilization of treated domestic wastewater for greenbelt development;
- Lining of guard pond suitably to prevent any seepage into ground to avoid any groundwater contamination;
- Provision of separate storm water system to collect and store run-off water during rainy season and utilization of the same in the process to reduce the water requirement;
- Suitable rainwater harvesting structures to be constructed.



Noise Pollution Management

In the process, various equipments like pumps, cooling tower, compressors etc generate noise. The proposed means to mitigate higher noise levels are:

- Equipment will conform to noise levels prescribed by regulatory authorities;
- Provision of acoustic enclosures to noise generating equipments like pumps;
- Provision of thick greenbelt to attenuate the noise levels; and
- Provision of earplugs to the workers working in high noise level area.

Solid Waste Management

The main solid waste from the proposed Power Plant will be ash (Fly ash and Bottom ash). The average coal consumption rate for the power project will be 5.88 MTPA, which will result in ash generation of about 1.76 MTPA. Out of this, the bottom ash will be about 20% of the total ash generated i.e. 0.35 MTPA and the fly ash will be about 1.41 MTPA. It is proposed to utilize 100% of the fly ash generated. Several major cement factories in South India have expressed their willingness to take the entire production of fly ash for their in-house consumption. During emergency the ash will be disposed off safely in ash pond area to avoid environmental hazards. All efforts, however, will be made to utilize fly ash for various purposes. Unused fly ash and bottom ash will be disposed off in the ash pond in an area of about 166-ha. To control fugitive dust emission from the ash pond area water sprinkling would be done. After the ash pond is abandoned, its area will be reclaimed through tree plantation. HDPE liners will be provided in the ash pond in order to arrest any seepage of ash pond water into groundwater.

1.6 Risk Assessment And Disaster Management Studies

Hazard analysis involves the identification and quantification of the various hazards (unsafe conditions) that exist in the proposed power plant. On the other hand, risk analysis deals with the recognition and computation of risks, the equipment in the plant and personnel are prone to, due to accidents resulting from the hazards present in the plant.

Risk analysis follows an extensive hazard analysis. It involves the identification and assessment of risks the neighboring populations are exposed to as a result of hazards present. This requires a thorough knowledge of failure probability, credible accident scenario, vulnerability of population etc. Much of this information is difficult to get or generate. Consequently, the risk analysis is often confined to maximum credible accident studies and these details discussed in details in EIA report.

1.7 Project Benefits

The proposed project by **NSL Nagapattinam Power and Infratech Pvt. Ltd** would enable to meet part of the growing power demand in the southern states due to rapid industrialization and also due to large scale use of electricity for irrigation, domestic and commercial purposes. Further, the proposed power plant will result in improvement of infrastructure as well upliftment of social structure in the area. It is anticipated that the proposed power plant will provide benefits for



the locals in two phases i.e. during construction phase as well as during operational stage.

1.8 Conclusions

The proposed power plant has certain level of marginal impacts on the local environment. However, development of this project has certain beneficial impact/effects in terms of bridging the electrical power demand and supply gap and providing employment opportunities that will be created during the course of its setting up and as well as during the operational phase of the project.