

EXECUTIVE SUMMARY OF THE EIA REPORT

for 2 x 35 MW Thermal Power Plant
At Sithoornatham Villages, Gummidipoondi Taluk,
Thiruvalluvar District

Prepared for
TULSYAN NEC LIMITED

Chennai



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EXECUTIVE SUMMARY

1. INTRODUCTION

The TULSYAN NEC LIMITED (TNL) is one of the pioneers in the fields of re-rolling having one of India's largest re-rolling mill in Tamil Nadu. TNL manufactures various iron and steel products, mainly catering to the fields of building construction.

2. LOCATION AND DESCRIPTION OF SITE ENVIRONMENT

The proposed 2 x 35 MW coal based Thermal Power Plant will be located at Village# 17, Sithoornattam Village, Gummidipoondi Taluk, Tiruvalluvar District. The location of which is shown in **Fig.1.0**.

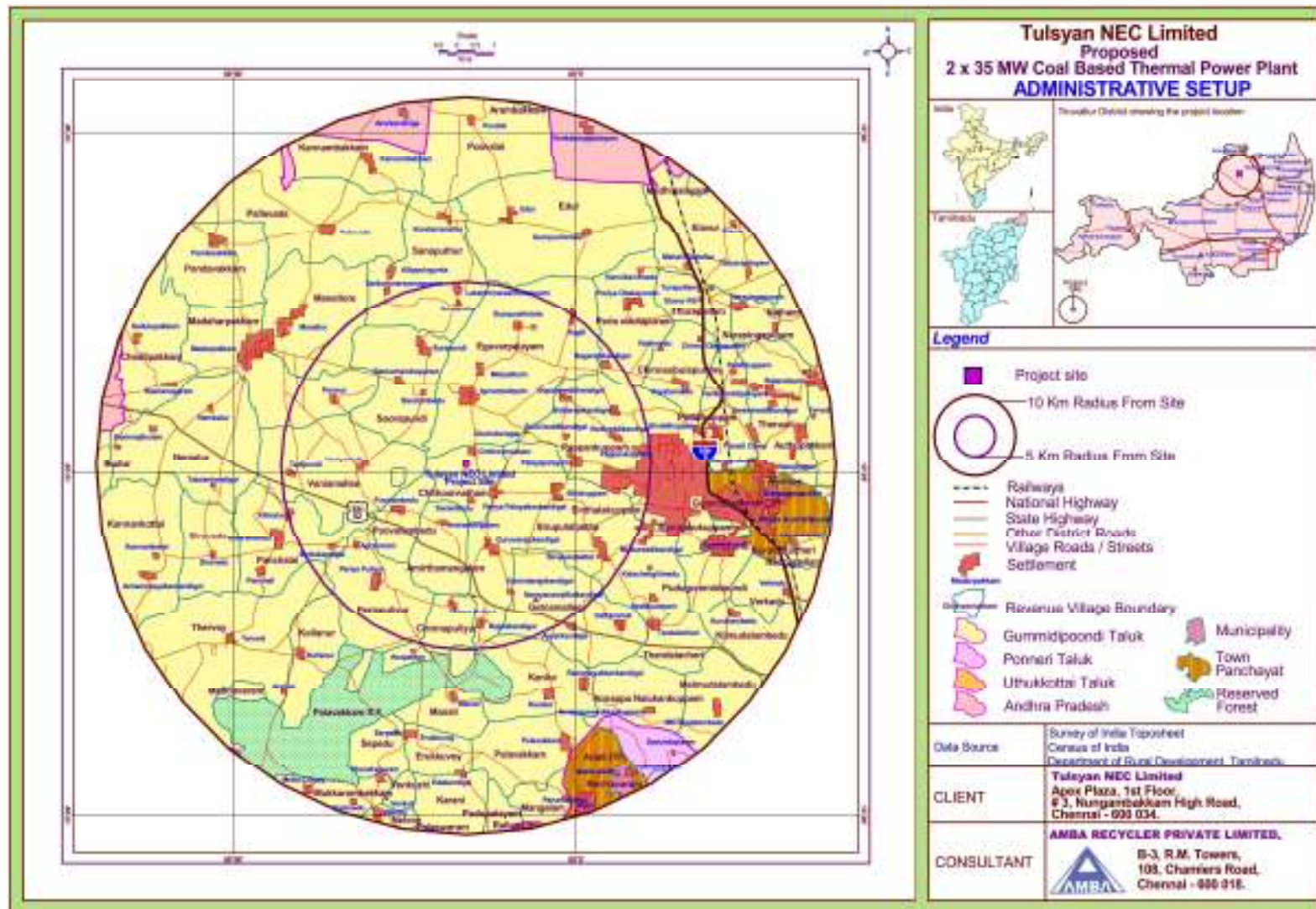
3. NEED FOR THE PROJECT

Thermal Power Plant

The power demand in the country is on the rise due to rapid economic and industrial growth warranting extensive infrastructure developments. As per the national electricity plan, the energy demand is likely to increase by 35.6% in 2011-12 from its 2006-07 value and by another 35.2% in 2016-17. The capacity addition at the present rate will not be able to meet the projected demand and would result in a huge power deficit. To mitigate the gap between demand and supply, the Government of India (GoI) is facilitating large scale capacity additions at shorter time through public private partnership. GoTN has approved the setting up of merchant power plants in Tamil Nadu with a total generating capacity of 16,000 MW and is in the process of permitting up to 30,000 MW of capacity addition on merchant basis.

The proposed thermal power plant of TNECL will contribute towards bridging the power supply and demand gap at regional as well as national level. Thus the proposed thermal power project is fully justified for implementation at the earliest possible.

Fig. 1.0 Location Map



4. PROJECT DESCRIPTION

4.1 Thermal Power Plant

The 2 x 35 MW thermal power plant planned with

- Fuel - Blended coal (50 % Indigenous coal + 50% Imported coal) is used as fuel.
Indigenous coal are sourced from Orissa
Imported coals are sourced from Indonesia
- Technology - Circulating Fluidized Bed Combustion Boiler

The coal-based thermal power plant comprising of following units:

- Steam generator
- Steam turbine
- Coal handling system
- Ash handling system
- Air Cooled Condenser
- ESP
- Power plant stack (110 m Height)
- Fuel system
- Utilities and services

4.2 Salient Features of the Proposed Project

S.No	Item	Description
Thermal Power Plant		
1	Capacity	70 MW
2	Configuration	2 x35 MW
3	Technology	CFBC technology
4	Power Evacuation	Power generated at TNECL will be evacuated at Nearby TNEB station.
5	Fuel	Blended Coal (1248 TPD) - (768 T of Indigenous coal and 480 T of imported coal)
6	Sources of Fuel	Indigenous coal are sourced from coal mines Orissa Imported coals are sourced from Indonesia
7	Fuel Requirement	About 0.43 MTPA (based on 1248 TPD @ 85% PLF and 2950 kcal/KWh heat rate).
8	Sulphur Content	Indian coal - 0.4% Imported Coal - 1.2%
9	Stacks	Single chimney of 110 m
General		
1	Land	40 Acres
2	Water Requirement	92 m ³ /day
3	Source	Borewell

4	Environmental Aspects	<ul style="list-style-type: none"> ○ Use of limestone to reduce emission ○ Use of environmental friendly CFBC technology ○ Use of Air Cooled Condenser to reduce water consumption ○ ESP to minimize the emission of particulate matter. ○ Single Stack of height of 110 m to get better dispersion. ○ Dust Control System to minimize the fugitive dust emission ○ Fire Protection system ○ Dust suppression system
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4.3 Utilities and Services

4.3.1 Water supply

The water requirement of 92 m³/day is to be met from bore well within the site. More-over use of Air Cooled Condenser reduces the water consumption.

4.3.2 Wastewater/ waste management

The boiler blow down will be taken to cooling ponds one after the other and then taken to a common guard pond. The D.M. Plant regenerant waste is neutralized, and then taken to a common guard pond, where it is mixed with the boiler blow down and then used for green belt development. The domestic sewage will be treated in Septic tank and dispersed in the dispersion trench

4.3.3 Fire protection system

An elaborate fire hydrant system covering all the buildings of the proposed power plant as well as outlying areas including coal stockyard would be provided. Rain water will be stored in a tank for further distribution to fire water storage tank and service water overhead tank.

In addition to the fire hydrant system, the following fire protection systems are proposed:

- Automatic High velocity water spray (HVWS) system for the protection of transformers;
- Automatic medium velocity water spray (MVWS) system and foam system for fuel oil tanks;
- Automatic MVWS system for coal conveyors, cable galleries, etc.;
- Automatic sprinkler systems for certain select areas;
- Manual HVWS system for the protection of turbine oil tanks; and
- Portable extinguishers and fire tenders as required

4.4 Project Cost & Implementation Schedule

The cost of the total project is estimated as **Rs.380 Crores**, which includes **Rs.32 Crores** for environmental protection measures. The project is scheduled to be commissioned in December 2011.

5. Baseline Environment

5.1 Study Area and Period

An area of 10 km radius around the project site was considered for the study. The baseline environmental data was generated during December 2009- February 2010.

5.2 Description of the Environment

The environmental setting of project site is given below.

S.No.	Particulars	Details
1	Latitude	13°25'7" N
2	Longitude	80°3'34" E
3	Elevation above MSL	15 M
4	Climatic conditions	Semi Arid
5	Present land use at the site	Dry Vacant Land
6	Nearest Highway	National Highway- NH-5 (7 km in the east)
7	Nearest Railway Station	8 km Gummidipoondi (East/SE)
8	Nearest Airport	45 Km Chennai Airport (South West)
9	Nearest town/city	8 km Gummidipoondi (East/SE) Chennai - 40 km
10	Nearest Sea	20 kms- Bay of Bangal
11	Hills/Valleys	None within 10kms
12	Topography	Plain
13	Archaeologically important places	None within 10 kms
14	National Parks/ wildlife sanctuaries	None within 10 kms
15	Reserved/protected Forest	5.2 km - Palavakkam R.F
16	Seismicity	Zone III

17	Water Source	Ground Water
18	Streams/Rivers	7.5 km –Araniyar River
19	Defence Installations	None within 10 kms

5.3 Baseline Environmental Conditions

Baseline environmental studies for various environmental attributes were carried out during the months December 2009 to February 2010, covering winter season.

5.3.1 Ambient air quality

Ambient Air Quality Monitoring (AAQM) stations were set up at eight locations. The samples were collected twice in a week for one complete season, respirable suspended particulate matter (RSPM), oxides of Sulphur (SO₂), oxides of Nitrogen (NO_x) were collected on a 24-hourly basis and CO, HC on an 8-hourly basis. The baseline air quality is as shown below:

Location		Concentration µg/Nm ³		
		SO ₂	NO _x	RSPM
Proposed site	SA1	6-15	8-16	12-20
PappanKuppam	SA2	7-19	7-18	15-23
Chitoornatham	SA3	8-20	9-17	16-26
Puvalmbedu	SA4	8-15	7-16	18-26
Billakuppam	SA5	8-17	9-19	14-26
Baratembedu	SA6	6-17	7-16	14-21
Iguvarpalayam	SA7	7-15	7-15	16-22
Buchireddikandigai	SA8	8-14	9-16	18-25
Overall		6-20	7-19	12-26

CO < 114.5µg/Nm³; HC < 65µg/Nm³

Observations:

The 98th percentile values of RSPM, Oxides of Sulphur (SO₂), Oxides of Nitrogen (NO_x), Hydrocarbons (HC), and Carbon Monoxide (CO) were monitored and found to be within the limits prescribed by Central Pollution Control Board (CPCB) for rural areas.

5.3.2. Ambient noise levels

Noise levels were monitored at eight (8) locations for assessing the existing noise levels in and around the project site. The monitoring was carried out once in the season for 24 hours and found to be within the permissible levels.

5.3.3 Water Quality

The baseline data on water in and around the proposed site was generated during the study period. In all 8 water samples were collected in different villages around the site, out of this 7 samples are from ground water sources and 1 sample from surface water. The water samples were analyzed as per Standard Methods for analysis of water and wastewater, American Public health Association (APHA) Publication. The Ph was varying for ground waters from 7.2 – 7.8 and in surface water the pH is observed 7.1. The chloride levels in the ground water samples collected in the study areas were ranging from 95 mg/l to a maximum of 170 mg/l, where as in surface waters levels it was 35 mg/l. In ground water samples collected from the study area, the hardness is varying from 173 mg/l to 307 mg/l. In the ground water samples of study area the fluoride value were in the range of 0.12 to 0.51 mg/l where as in the surface water the fluoride was 0.23 mg/l

5.3.4 Soil Quality

The soil at the plant site is deep, moderately well drained calcareous loamy soil with predominantly sandy texture. The NPK content was very low indicating requirement of good quality water for irrigation.

5.3.5 Flora and Fauna

The vegetation is mostly xerophytic type, dominated by *Acacia planiferns* and *A. nilotica*. Though the plant density and diversity is poor, the sporadic occurrence of the species viz., *Azadirachta indica*, *Albazzia lebbek*, *Terminatia catapa*, etc were recorded.

A total number of 17 species of birds were noticed during the present survey. Most common birds observed at various sites were black drongo, common myna, house crow, house sparrow, jungle crow and redvented bulbul. These birds were observed in close association with man and cattles. The majority of birds encountered in the study area are omnivorous in habit preferring insects, worms etc. as the main food item.

5.3.6 Baseline socio-economic conditions

The total population of Gummidipoondi Taluk in Census 2001 was 143,402, out of which 71,919 (or 50.15 per cent) are males and 71,423 (or 49.80 per cent) are females. Among the total population, 38,408 (26.78 per cent) belonged to the Scheduled Castes (SC) and 3,434 (2.39 per cent) belonged to the Schedule Tribes (ST). The literacy level is 54% the working population is 65% engaged as main Workers and 2% as marginal workers. The area does have moderates to good facilities for Primary and secondary education. There are also primary health centres available.

5.4 Anticipated Environmental Impact and Management Plan

5.4.1 Construction Phase

During construction, activities like soil cutting/filling, grading, concreting, piling and installation of main plant equipment like boilers, turbines etc., will be performed. Temporarily, some of the environmental parameters may get disturbed during the construction phase.

Dust pollution will be minimized by water spraying and maintenance of road. The construction heavy vehicles will be maintained properly to ensure emission within permissible levels and also reducing the noise levels. Adopting good construction and engineering practices will help in mitigating the water pollution. Temporary arrangements will be made for septic tank/pit to get rid of sanitary problem at construction site.

However, these impacts are expected to be temporary in nature that will subside once construction period is over.

Temporary beneficial socio-economic impact in terms of increased jobs and flow of money to the workers and villagers settled nearby is expected during the construction period. Migration of workers population is expected to be minimum, as local workers from the nearby area will be preferred for temporary employment.

5.4.2 Operation Phase

5.4.2.1 Air Environment

The major sources of air pollution from the proposed operation are

- Fuel burning
- Fuel Unloading and storage

The proposed coal based thermal power station will have emission in the form of SO₂, NO_x, and SPM from flue gases of the stacks. The emission from the stack is considered to be constantly distributed throughout the day for the dispersion analysis.

The emission rate and stack details considered for air pollution dispersion analysis is given below.

Stack Emission Characteristics

Particulars	Value
Number of stacks	One
Stack height	110 m
Stack Diameter	1.5 m
Volume Flow Rate (m ³ /s)	139
Velocity of flue gas (m/s)	21
Temperature of flue gas (oC)	140
Density of Flue Gas (Kg/Nm ³)	0.398
Fuel Consumption (Kg/s)	7.2
Sulphur content (% w/w)	0.8
Emission rate - NO _x (g/s)	130.0
Emission rate - SO ₂ (g/s)	231.12
Emission rate - SPM (g/s)	1.8

The sources & process of pollution, the pollutants and their respective control measures proposed are as follows

S.No.	Process of Pollution	Pollutants	Control Measures
1.	Fuel Burning i.e., coal	SO ₂ , NO _x , RSPM	ESP / Stack
2.	Fuel unloading and storage	SPM	Water sprinkler & bag filter at transfer points

The following environmental protection or pollution control systems have been proposed to be installed for mitigation of impacts on Air Environment.

- Installation of ESPs of 99.9% efficiency to limit the SPM concentrations below 50 mg/Nm³;
- Use of limestone in CFBC boiler to limit SO₂ emission
- Provision of 110-m stack for wider dispersion of gaseous emissions;
- Provision of low NO_x burners in the boilers;
- Dust extraction system will be provided at transfer points of conveyor system;
- Conveyor belt will be enclosed to prevent dust generation;
- Provision of water sprinkling system at material handling and storage yard;
- Asphaltting of the roads within the plant area; and
- Developing of Greenbelt around the plant to arrest the fugitive emissions

Air Dispersion Modeling

The incremental increase in ground level concentration using **ISCST3 predicated** that the concentration of SO₂, NO_x, SPM remain well within the permissible levels upon the operation of the Power Plant.

The ambient air quality monitoring and prediction of **GLC** for different averaging times depict that 24 hrs/avg, SO₂, NO_x, & **RSPM** remain within the permissible limits of CPCB. As effective

Air Pollution Control measures will be ensured for the proposed plant of TNECL, there will not be any significant impact on the Air Quality.

Suggested control measures for arresting fugitive dust emissions along with the envisaged pollution control equipment are adequate and will help to have a healthy and cleaner environment inside the plant thereby improve the productivity and the efficiency of the workers as well as that of plant machinery.

5.4.2.2 Water Environment

It is proposed to use Air Cooled Condensers for the condensate/auxiliary cooling thereby save water to a large extent.

The total wastewater generated from the proposed plant would be to the tune of **71.6 m³/day**.

The major sources of wastewater from the power plant are:

- Boiler Blow Down
- D.M. Plant Regenerate Waste
- Domestic Sewage

The details of wastewater from the different operations are as follows:

S. No.	Particulars	Wastewater m³/day
1.	Boiler Blow Down	60
2.	DM Plant Reject	10
3.	Domestic Sewage	1.6
	Total:	71.6

Wastewater Management at Proposed Power Plant

Type of Waste	Significant Parameters	Treatment Proposed
Boiler Blow Down	Temperature	This will be discharged to two successive cooling ponds and then taken to guard pond and then will be used for Green belt development.
DM Plant regeneration Waste	pH (4 to 10) TDS (5000 mg/l)	pH Neutralization and mixing with other effluents in the guard pond and then will be used for Green belt development.
Sanitary Effluents	BOD (200 -250 mg/l) TSS (300-450 mg/l)	The sewage will be treated in a septic tank and dispersed in dispersion trench.

5.4.2.3 Noise Environment

The sources of noise in a power plant are:

- Steam turbine generator
- Other rotating equipments
- Combustion induced noises
- Flow induced noises
- Steam safety valves

Following measures have been recommended to control the noise level below OSHA levels

- The work places like turbine halls, compressor rooms, DG set etc., will be provided with noise dampening materials like thin rubber/lead sheet and surrounded with double walled protection.
- The roofs, walls and floors will be covered with noise absorbing material to reduce the reflected noise.
- Control rooms will be in closed glass enclosures.
- Ear Muffs will be provided to the workers, and it will be ensured that these are used by the workers.

- A thick green belt with species of rich canopy will be developed to control the noise levels at the boundary.
- The specific species of Green Belt that will be used for control of noise emissions.
- Monitoring of noise levels.

In addition to the above mentioned noise control measures, **thick green belt absorbs more than 50%** of the **noise** generated at TNECL, and hence abate any impact on the community.

Provision of **15m** wide green belt around the plant will attenuate the noise levels at the plant boundary.

5.4.2.4 Solid Waste Management

The solid waste generated in form of fly ash, and bottom ash is inorganic in nature. The total ash generated will be 372.51 TPD and out of this 20% is bottom ash and remaining will be fly ash, i.e. 260.76 TPD of fly ash, and 111.75 TPD of bottom ash. This waste will be stored in silo, and maximum efforts will be made to sell ash from silos. The excess ash after selling will be stored in ash dykes.

About **5 Acres** of land is earmarked for the ash dyke. Therefore process solid waste will have no adverse impact on the land environment.

5.4.2.5 Land Environment

One of the activities with large potential effects on soil and groundwater is the disposal of waste on land and in landfill sites. When waste material is disposed off on land, rainwater and surface run-off may percolate through the material and carry contaminants into soil and groundwater. Change in soil surface and soil properties may have impacts on soil micro-organisms, natural and cultivated plants and animals, the visual landscape and amenity and on buildings and other constructions.

The ground level concentrations of the pollutants are predicted to increase by negligible level, more over the ponds and ash dykes are lined with impervious liners resulting in zero leachete. Hence, the impact on land environment due to the proposed project is marginal, and insignificant.

5.4.2.6 Green Belt Development

TNECL has proposed to develop a green belt of **10 Acres**. Natural features of the plant site will be retained as far as possible to integrate with the buildings to form a harmonious/pleasant environment. The green belt will consist of native perennial green and fast growing trees.

5.4.2.7 Biological Environment

Presently the site is devoid of any extensive agricultural activities and biotic resources. Hence introduction of proposed power plant shall not have any impact on the existing ecosystem.

RSPM, NO_x and SO₂ due to operation of the proposed power plants will remain within the National Ambient Air Quality standards. Therefore, the impact of these emissions on the surrounding ecosystem will be insignificant.

5.4.2.8 Socio-economic Environment

Approximately **50 persons** will be employed **directly** and many will be indirectly employed in the plant, when the power plant goes into operation. Indirect benefits will also accrue to a large extent around the project site. Support services in **commerce, transport and ancillary workshops** would further **enhance employment potential**.

The project proponent not only believe in the development of project area and their employees but also in the socio-economic growth of its neighbourhood by taking up several welfare activities which would help improving the environment with significant growth in the socio-economic status.

6.0 Environmental Monitoring Programme

S.No.	Parameter	Frequency
1	Ambient air quality	Twice in a week will be carried out for 24 hours continuously to monitor SPM, RSPM, SO ₂ , NO _x , CO, HC levels.
2	Source emissions	Continuous On-line monitoring will be carried out for SPM, SO ₂ , and NO _x .
3	Ground water quality	Once in a month except for heavy metals which will be monitored quarterly. Monitoring will be carried out for parameters specified under IS:10500, 1991.
4	Wastewater quality	Once in a month will be carried out for 24 hours continuously as per EPA Rules, 1986.
5	Soil sample	Soil samples will be monitored quarterly for parameters specified by TNPCB.
6	Solid waste	Monthly records of fly ash and bottom ash generation, collection, storage and disposal will be maintained as per the MoEF Notification on Fly Ash utilization.
7	Ambient Noise Environment	Ambient noise environment will be monitored once in a season.
8	Work Atmosphere Noise	Noise level monitoring will be carried out within the power plant premises once in a month.
9	Occupational Health and safety	Qualified doctors will carry out pre-employment and periodical medical check-up of all the employees.

7.0 Risk Analysis

Risk assessment study of the proposed power plant was carried out. All equipment vulnerable to explosion or fire are designed to relevant IS codes & statutory regulations. Suitable fire protection system comprising hydrants and spray systems are provided for fire protection.

Comprehensive on-site/off site emergency plan and disaster management plan for the proposed unit is prepared based on Risk Assessment Study.

8.0 Conclusion

The proposed **2 x 35 MW** coal based thermal power plant of **TNECL** being located as per norms of the siting guidelines of MoEF and adoption of extensive pollution control techniques to maintain the emission/discharges within the permissible norms will have least impact on the ambient environment.

- There are no resettlements.
- Terrestrial eco-system will not be affected.
- Almost no impact on air, water, soil and noise environment of the surrounding study area.
- The proposed project will generate direct and indirect employment during construction and operation phase.
- Separate organization set-up will be formulated to take care of all the pollution control steps.
- To prevent the occurrence of any disaster, comprehensive on-site/off site emergency plan and disaster management plan for the proposed unit will be prepared based on Risk Assessment Study.

