TERMS OF REFERENCE

FOR

ENVIRONMENTAL IMPACT ASSESSMENT & ENVIRONMENTAL MANAGEMENT PLAN

FOR

PROPOSED

UDANGUDI SUPER CRITICAL THERMAL POWER PROJECT

STAGE – II (2 x 660 MW) and STAGE – III (2 x 660 MW)

Udangudi Village, Tiruchendur Taluk,

Tuticorin District,

Tamil Nadu.

Submitted to

MINISTRY OF ENVIRONMENT AND FORESTS

GOVERNMENT OF INDIA

By

TAMIL NADU GENERATION AND DISTRIBUTION CORPORATION LIMITED (TNEB)

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October 2015

TERMS OF REFERENCE

FOR

CARRYING OUT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) STUDY AND PREPARATION OF ENVIRONMENTAL MANAGEMENT PLAN (EMP)

REPORTS FOR OBTAINING ENVIRONMENTAL CLEARANCE (EC)

FROM REGULATORY AUTHORITIES

FOR

UDANGUDI SUPER CRITICAL THERMAL POWER PROJECT

STAGE – II (2 x 660 MW) and STAGE – III (2 x 660 MW)

Introduction

Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) is developing a 2 x 660 MW Udangudi Super Critical Thermal Power Project (2 x 660 MW) in Udangudi village, Tiruchendur Taluk, Tuticorin District of Tamil Nadu. TANGEDCO has already obtained Environmental Clearance for setting up the above Project from Ministry of Environment and Forests, Government of India. The tender for EPC Contract for establishing the project is under analysis and the work will be awarded shortly. Tamil Nadu is facing an increasingly growing demand for electric power as a result of the rapid population growth, urbanization and industrialization in the state. Currently the state depends on the central power sector and independent power producer for nearly 50% of its requirement. In view of acute shortage of power in the State and in order to bridge the demand-availability gap of power, Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) is exploring the possibility of establishing more thermal power projects. In this connection, TANGEDCO has envisaged to expand the capacity of the Udangudi Thermal Power Project by adding additional 4 units of 660 MW capacity, viz., Udangudi Super Critical Thermal Power Project Stage-II of 2 x 660 MW and Stage – III of 2 x 660 MW.

Location of the project:

About 554.25 Ha of lands are available contiguous to the existing Udangudi Stage-I Project, in in Udangudi village, Tiruchendur Taluk, Tuticorin District. The lands are dry patta lands, mostly barren with few plantations of coconut / palm trees. The site is at a distance of 12 KM south of Tiruchendur Town. The site is on the western side of State Highway SH-176. The nearest Airport is Vagaikulam at a distance of 60 Km. The nearest Port is Tuticorin at a distance of 45 Km.

The site is located in Latitude: 8^{o} 25′ 20.50″ N to 8^{o} 26′ 49.26″ N and Longitude: 78^{0} 02′ 55.15″ E to 78^{0} 04′ 13.07″. It is flanked on the West by Vagaivilai village, on the North by Kil Thiruchendur village and South by Kulasekarapattinam village

Components of the proposed project:

The proposed 4 x 660 MW Thermal power plant consist of super critical boilers. Imported Coal with maximum ash content of 10% will be used. All three options, viz., (i) 70% Indian coal & 30% Imported coal; (ii) 100% Imported coal & (iii) 70% Imported and 30% Indian coal will be considered and the optimum choice will be adopted. "Closed Cycle Cooling System with Natural Draft Cooling Towers" is proposed. The chimney height is 275 meters. ESP efficiency is 99.9% to limit outlet dust concentration below 100 mg/Nm^3. Entire water requirement for the Plant will be drawn from Sea. Sweet water for the Plant will be met from Desalination Plant.

Objective of EIA study:

The objective is to carry out the Environmental Impact Assessment (EIA) study to identify, predict and evaluation of potential environmental and socio-economic effects which may result from the proposed Udangudi Super Critical Thermal Power Project Stage-II & III (2 x 660 MW each)" and develop suitable Environment Management Plan (EMP) to mitigate the undesirable effects.

The study is aimed at:

- Establishing the existing environmental conditions, identifying potential environmental impacts and identifying areas of significant environmental concerns due to the proposed project;
- Prediction of impacts on environment, socio-economic conditions of the people etc. due to the proposed project;

- Preparation of Environmental Management Plan (EMP) including detailed plan for CSR;
- Risk Assessment and Disaster Management Plan ; and
- Development of post project environmental monitoring programme.

The EIA and EMP reports shall be prepared for seeking necessary environmental clearances from the Ministry of Environment & Forests, Government of India and Tamil Nadu Pollution Control Board according to the relevant EIA notifications and its subsequent amendments.

The EIA study shall be conducted as per the applicable rules/guidelines of Ministry of Environment and Forests, Govt. of India /Tamil Nadu Pollution Control Board (TNPCB) including general/ Sectoral provisions

EIA Study

Terms of Reference (TOR) for EIA Study Report

EIA Study generally shall include requirements of the MOE&F, GOI and TNPCB. The EIA study will necessarily include but not get restricted to the following:

The TOR shall include (a) literature review, (b) field studies (c) impact assessment and preparation of the EIA/EMP document covering the disciplines of Meteorology, Air quality, Noise, Water Quality, Land Use, Soils, Water Use, Demography and Socio-economics, Ecology, etc.

Stage 'A'

Establishing the relevant features of the project that are likely to have an impact on the environment during construction and operation phases. Establishing base line air, water, soil, noise, socio economic and ecological conditions for all 3 seasons except monsoon season. Comprehensive EIA Study will be carried out.

Stage 'B'

Assessment of likely emissions, effluent and solid waste quantities from the proposed expansion unit. Assessment of impacts using scientific tools to delineate post project scenario.

Stage 'C':

Suggesting adequate pollution control measures to offset adverse impacts if any. Preparation of the EIA and EMP document. Defence of the study findings before the regulatory authorities.

Stages A, B & C may have concurrent activities.

An outline of the activities to be undertaken for each stage is given below:

Stage 'A': Study Area

The study area shall be up to 10 KM radial distance from the proposed project with reference to air, water, soil, noise, Socio economic and ecological studies.

Baseline Conditions

The baseline environmental conditions shall be established using GSI Topo sheets, through literature survey and field investigations. In addition to the above, information on the location of towns/cities, national parks, wildlife sanctuaries and ecologically sensitive areas like tropical forests, important lakes, bio-sphere reserves and sanctuaries within impact area shall be furnished.

A review and analysis of the information available with various governmental, educational and other institutions shall be carried out for each discipline. Based upon preliminary review of the available data, detailed field work shall be planned to collect information on the parameters critical to characterize the environment of the area.

The baseline environmental studies shall be undertaken in the following disciplines.

Disciplines

Meteorology, Air quality, Noise, Water Quality, Land Use, Soils, Water Use, Demography and Socio-economics, Ecology, etc.

Various aspects to be covered under different disciplines are as follows:

(a) Meteorology

Following meteorological parameters of the area shall be measured at the project site. In addition, data shall be collected from the nearest IMD observatory also for reference.

Temperature (Dry & Wet)

Barometric pressure

Relative humidity

Wind speed and direction, and

Rainfall

In addition, whether phenomena like hail, thunder storms, dust storms, fog/smog and cloud cover shall be noted in terms of their intensity and duration using IMD data. From this data wind roses shall be prepared.

(b) Air Quality

Ambient Air Quality shall be monitored at 10 locations considering the prevailing meteorological conditions, topography, nearby villages etc. The parameters for monitoring shall be SPM, RSPM, SO_2, NOx and CO.

(c) Noise

Noise monitoring survey shall be carried out to characterize the noise environment in the study area. The noise level shall be measured using high level precision sound level meter at 10 locations. Attenuation model shall be developed to predict the noise level in the surrounding areas.

(d) Water

Surface water samples (2 locations) and Ground water samples (10 locations) shall be collected and analysed for pH, Temperature, TDS, Turbidity, DO, Iron, Fluoride,

Nitrates etc. The effluent water quality from the proposed unit shall be assessed and necessary treatment system proposed.

(e) Soil

Significant Physico-chemical parameters of soil shall be determined at ten (10) locations in the study area with respect to pH, electrical conductivity, organic carbon, NPK contents etc., to establish agricultural potential and likely impact on soil due to proposed thermal station is to be determined. An interpretation report on the results obtained shall be presented.

(f) Land Use

The present land use pattern shall be established using satellite imageries if available to the location, literature review and field studies with respect to irrigated and non-irrigated agricultural land, barren stretches, pasture land, plant, forest and human settlements. The land use pattern shall be presented on maps. Current practice and locations of disposal of industrial and municipal solid wastes, affecting the land use pattern, if any, shall also be determined and depicted on the map. Important archaeological, historical, cultural and ecological sensitive areas like National Park/Sanctuary/Biosphere Reserve within impact area, if any, shall be identified. The land requirement for the project including plant, township etc. shall be spelt out. The classification of land i.e. agricultural/forest/waste land/ Government land/Private land etc., shall also be described in detail.

(g) Demography and Socio-Economics

A study of the existing population in the study area shall be conducted and its socio-economic characteristics and historical trends for the past decade shall be determined through literature review. The study shall include assessment and characterization of population with respect to male and female ratio, literacy, religion, family size, irrigation, source of livelihood, economical opportunities and financial position of the population. The study shall also include available infrastructure facilities related to health services, present status of health and disease pattern in the study area, water supply, road and transport system, communication, sanitary facilities, schools etc. Labour force characteristics shall also be determined in terms of skilled and non-skilled workers available and the role of women in the labour force. Collection of epidemiological data on prominent endemic diseases like malaria, fileria, gastro enteritis and respiratory diseases within the study area.

(h) Ecology

Details of flora and fauna shall be enumerated through secondary sources such as Forest Department. Species density, diversity, frequency, relative abundance etc., shall be studied. In addition, relative abundance of wild animals and birds shall be estimated. Path of migratory birds, if any, shall also be demarcated. A list of endangered species shall be prepared. Presence of wet lands and other ecologically sensitive areas such as national parks/sanctuaries, if any, shall be identified and indicated on a map.

Stage 'B': Assessment of Environmental impacts of proposed project

With the knowledge of baseline conditions in the study area and proposed project activities, impact on the environment shall be discussed in detail covering flue gas emissions, discharge of liquid effluents and particulates emission during construction, noise & solid waste generation etc. Detailed projections shall be made to reflect influence of the project on different environmental components using appropriate scientific tools acceptable to MOE&F and TNPCB. The projections shall identify critical environmental conditions due to operation of the project. It shall also to be established as to whether these critical conditions shall be further degraded with the proposed project and what additional environmental conditions are likely to become critical.

Both short term and long term impacts on sensitive areas, if any, such as habitat of endangered species of wildlife or plants, sites, historical and cultural monuments shall be determined. Important centers with concentrated population in the study area shall be established. Assessment of potential damage to terrestrial and aquatic flora and fauna due to flue gas emissions, discharge of effluents, noise pollution, ash disposal, and change in land use pattern, habitat degradation and fragmentation, anthropogenic activities from the proposed project and delineation of guidelines to minimize adverse impacts is to be done.

Assessment of economic benefits arising out of the project shall be done.

Proposal on corporate social responsibility (CSR) will be evolved based on a "Need based Assessment study"

Stage 'C': Environmental Management Plan

At this stage, it may become apparent that certain mitigative measures are necessary to offset the impacts of the proposed project. Environmental management plan and pollution control measures shall be necessary to meet the requirements of the regulatory agencies.

Environmental Management Plan shall consist of mitigation measures for item-wise activity to be undertaken for construction and operation of the plant for its entire life cycle to minimize adverse environmental impacts. It shall also delineate the environmental monitoring plan for compliance of various environmental regulations. The EIA/EMP shall also include disaster management plan for the anticipated hazards due to storage and handling of fuel oil, fire hazards etc,.

The EMP shall include at least the following aspects but not restricted to them:

Delineation of mitigation measures for all the identified significant impacts;

Effluent treatment plan

Ash utilisation plan

Green belt plan

Water harvesting and conservation plan

Disaster management plan

EMP Implementation schedule with costs;

Budget support in the project cost

Post project monitoring plan

Proposal on 'Corporate Social responsibility'(CSR)

Public Hearing

The TNPCB will be requested to conduct Public Hearing at designated location. After the Public Hearing of the project, the TANGEDCO will make appropriate changes in the draft EIA and EMP reports so as to prepare the final EIA and EMP report for submission. Alternatively, a supplementary report to the draft EIA/EMP will be prepared addressing all the concerns expressed during the Public Hearing as per the requirement of the regulatory authorities.

Sd/- dt.21.9.2015

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Annexure-A

TENTATIVE MONITORING SCHEDULE FOR EIA STUDY

Sl. No	Attribute	Parameters	No. of Locations	Frequency	Remarks
1	Air				
(a)	Meteorology	Temperature (Dry & Wet), Barometric pressure, Relative humidity, Wind speed & direction and Rainfall.	One	Hourly	-
(b)	Ambient air	SPM, RPM, SO_2, NO_x and CO	10	Twice a week, 24 hourly sampling	
(c)	Noise	Leq. Max, Min	10	Day & Night Once in a season	
2	Water				
	Ground/Surface water	All the parameters specified under the IS:10500	10/2	Once in a season	
3	Soil	pH, electrical conductivity, organic carbon, NPK contents etc.	10	Once in a season	
4	Land use		10 KM radius		
5	Socio-economic		10 KM radius		

6	Ecology		10 KM radius		
7	Other aspects		As per MOE&F direction		

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Annexure-I

Salient Features of the Proposed Udangudi Thermal Power Project Stage-II Site

Soil type	Silica Sandy
Ground elevation	The ground elevation of the site is + 3.3m above MSL.
Available Land	554.25 Ha
Topo sheet No.	
Latitude	8^{o} 25′ 20.50″ N to 8^{o} 26′ 49.26″ N
Longitude	78^{0} 02′ 55.15″ E to 78^{0} 04′ 13.07″ E
Nearest City	Tiruchendur (12 Km)
Distance for CRZ	>500m
Seismicity Zone	II
Nearest Villages	Udangudi – 2 km
Nearest Railway Station	Tiruchendur (12 Km)
Nearest Highway	State Highway SH 176 – 0.5 Km
Nearest Air Port	Vagaikulam - 60 km
Nearest sea	Bay of Bengal at 1.2 km
Wildlife sanctuary	Nil
Historical Places	None

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Annexure-II
Land Breakup

Sl. No.	Description	Udangudi Stage-I (2x660 MW) (In acres)	Udangudi Stage-II & iii (4x660 MW) (In acres)	Remarks
1.	Main Plant, Transformer Yard, Switch yard and FGD	65	111.8	
2.	Coal Yard	65	33	Stock piles common for three stages.
3.	Cooling water system	43	54	
4.	Fuel Oil system	4.2	4.2	
5.	Water system including Chlorination system	19.23	35.14	
6.	Ash Dyke	120	240	
7.	Administrative Block and Non-plant facilities	11.66	0.86	Shared with Stage - I
8.	Miscellaneous such as Corridor for CW piping, Ash piping, Intake & Outfall, Silo & its Utility building, Workshop, Stores, Roads, etc	198.1	343	Shared with Stage - I
9.	Green Belt	927.8		Common for all 3 Stages
8.	Township	130		Common for all 3 Stages
	Total	2406		