एनटीपीसी
NTPC
A MAHARATAN COMPANY

एन टी पी सी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
(Formerly National Thermal Power Corporation Ltd.)
केन्द्रीय कार्यालय/Corporate Centre

CC: ESE: 9590:2013: GEN

Date: 01.01.2014

Director, IA-Thermal
Ministry of Environment and Forests
Paryavaran Bhawan
C.G.O. Complex, Lodi Road
New Delhi – 110 003

Sub.: Approval of Draft Terms of Reference (TOR) for carrying out EIA study for the proposed Pudimadaka Super Thermal Power Project, (5x800 MW) in Visakhapatnam district of Andhra Pradesh. – regarding

Dear Sir,

NTPC Ltd. is proposing to establish imported coal based Pudimadaka Super Thermal Power Project (5x800 MW) which comprises 5 (five) nos. super critical units and one (1) no. 800 MW Advance Ultra Super Critical unit demonstration project in the SEZ area under possession of APIIC near Pudimadaka village in Atchutapuram Mandal of Visakhapatnam district (Andhra Pradesh).

The draft Terms of Reference (TOR) for carrying out EIA Study along with Application in Form-I (Appendix-I to EIA Notification dated 14.09.2006) and Pre-Feasibility Report are enclosed herewith for your kind consideration. It is requested that the TOR for the EIA Study may please be approved at an early date.

Thanking you.

Yours faithfully,

For & on behalf of NTPC Ltd.

(R.K. Baderia)

HOD (Environmental Engineering)

Encl.: As Above

अभियांत्रिका कार्यालय परिसर, प्लाट नं. ए–8ए, सैक्टर–24, पोस्ट बाक्स नं. 13, नोयडा (उ.प्र.) पिन–201301
ENGINEERING OFFICE COMPLEX, Plot No. A-8A, Sector-24, Post Box No. 13, NOIDA (U.P.) Pin-201301
टेलिफोन : 0120–2410801 से 2410820, 0120–2410333 (10 लाइने) फैक्स : 0120–2410136, 0120–2410137
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पंजीकृत कार्यालय : एन. टी. पी. सी. भवन, स्कोप काम्पलैक्स, 7, इंस्टीट्यूशनल एरिया, लोधी रोड, नई दिल्ली – 110003
Regd. Office : NTPC Bhawan, SCOPE Complex, 7, Institutional Area, Lodhi Road, New Delhi-110003

APPENDIX-1

FORM-1

TECHNICAL SPECIFICATION FOR

ENVIRONMNETAL IMPACT ASSESSMENT STUDY

PRE-FEASIBILITY REPORT

FOR

PUDIMADAKA SUPER THERMAL POWER PROJECT
(5X800 MW)

NTPC LIMITED
(GOVT. OF INDIA UNDERTAKING)
NEW DELHI

JANUARY'2014

APPENDIX-1

FORM-1

PUDIMADAKA SUPER THERMAL POWER PROJECT
(5X800 MW)

NTPC LIMITED
(GOVT. OF INDIA UNDERTAKING)
NEW DELHI

JANUARY'2014

Application for Approval of Draft TOR for EIA Study
For
Pudimadaka Super Thermal Power Project (5X800 MW)

FORM 1

(I) Basic Information

SL. NO.	ITEM	DETAILS
1	Name of the Project:	Pudimadaka Super Thermal Power Project (5x800 MW),
2	S. No. in the Schedule	Item 1(d), column 3
3	Proposed capacity/ area length /tonnage to be handled/ command area/ lease area / number of wells to be drilled	Capacity: 5x800 MW 5 (five) nos. 800 MW super critical units + one (1) no. 800 MW Advance Ultra Super Critical unit demonstration project
4	New/ Expansion/ Modernization	New (Greenfield)
5	Existing Capacity/ Area	NA
6	Category of the project	'A' category
7	Does it attract the General condition? If yes, please specify	NA
8	Does it attract the special condition? If yes , please specify	NA
9	Location	The site is located approximately Latitude: 17° 30' 33" to 17° 31' 48" N Longitude: 82° 57' 48" to 82° 59'35" E
	Plot / Survey/ Khasra No.	
	Village	Lalamkoduru, Rambilli, Veduruvdda & Pudimadaka
	Tehsil/Mandal	Atchutapuram and Rambilli Mandals
	District	Visakhapatnam
	State	Andhra Pradesh
10.	Nearest railway station / airport / Port along with distance in kms.	i. **Nearest Railway Station:** Narsingpalli and Elamanchili located at about 15 Km North-West on Howrah-Chennai Section double track, Broad gauge electrified line. ii. **Nearest Port facility:** Gangavaram Port located at about 25 km and Visakhapatnam port at a distance of about 35 km North-East of the site. iii. **Nearest Commercial airport:** Visakhapatnam at about 40 Km from site.
11.	Nearest Town, city, District Headquarters along with distance in kms.	**Nearest Town:** Atchutapuram (about 4 Km) **District Headquarter:** Visakhapatnam (About 60 Km).

		Proposed project site is located at about 15Km in South-West of existing NTPC' s Simhadri STPP.
12.	Village Panchayats, Zila Parishad, Municipal Corporation, Local body (complete postal addressed with telephone nos. to be given)	------
13.	Name of the applicant	NTPC Limited
14.	Registered Address	NTPC Bhawan, Core-7 Scope Complex, Lodhi Road, New Delhi – 110 003
15.	Address for correspondence	Sh. R. K. Baderia, HOD (Environmental Engineering Dept.) Engineering Office Complex, NTPC Limited, A-8A, Sector – 24, Noida (U.P.) 201 301.
	Name	Sh. R. K. Baderia
	Designation (Owner/Partner/CEO)	HOD (Environmental Engineering Dept.)
	Address	Sh. R. K. Baderia, HOD (Environmental Engineering Dept.) Engineering Office Complex, NTPC Limited, A-8A, Sector – 24, Noida (U.P.)
	Pin Code	201301
	E-mail	rajeshbaderia@yahoo.com
	Telephone No.	0120-4946830
	Fax No.	
16.	Details of Alternative Sites examined, if any. Location of these sites should be shown on a topo sheet.	Two Nos. (2) Alternate Sites for the proposed Super Thermal Power Project were identified; ▪ **Site 1:** Near Pudimadaka at Atchutapuram (in Visakhapatnam district) ▪ **Site 2:** Near Nakkapali Mandal (in Visakhapatnam district) The details of site and the comparison table for selecting the Pudimadaka site is detailed under **Annexure-A** and the vicinity plan of all the aforesaid sites were depicted under **Exhibit- II & III.**
17.	Interlinked Projects	No
18.	Whether separate application of interlinked project has been submitted?	N.A.
19.	If yes, date of submission	N.A.
20.	If no, reason	N.A.
21.	Whether the proposal involves approval / clearance under: If yes,	Yes, the CRZ clearance under the C.R.Z. Notification, 1991 and its

	details of the same and their status to be given. (a) The Forest (Conservation) Act, 1980 (b) The Wildlife (Protection) Act, 1972 (c) The C.R.Z. Notification, 1991	amendment 2011 will be required for constructing intake well in the sea (Bay of Bengal) for drawing sea water for the power plant.
22.	Whether there is any Government Order / Policy relevant / relating to the site?	N.A.
23.	Forest land involved (hectares)	Nil
24.	Whether there is any litigation pending against the project and / or land in which the project is proposed to be set up? (a) Name of the Court (b) Case No. (c) Orders / directions of the Court, if any and its relevance with the proposed project.	Nil

(I) Activity

1. Construction, operation or decommissioning of the Project involving actions, which will cause physical changes in the locality (topography, land use, changes in water bodies, etc.)

S. No.	Information/Checklist confirmation	Yes/ No	Details thereof (with approximate quantities/ rates, wherever possible) with source of information data
1.1	Permanent or temporary change in land use, land cover or topography including increase in intensity of land use (with respect to local land use plan)	No	The land (1500 acres) for the proposed project site comes under Special Economic Zone (SEZ) area developed by Andhra Pradesh Industrial Infrastructure Corporation Limited (APIIC). The conversion of non agricultural and non forest land into industrial use will not have any significant impact on the land use pattern of the area. In addition, there will be some temporary changes in land use pattern due to construction activities. However, this shall be temporary and restricted to construction site only.

1.2	Clearance of existing land, vegetation and buildings?	Yes	The land area is devoid of any natural forests. However, clearing of some vegetation shall be required.
1.3	Creation of new land uses?	Yes	The land acquired for the proposed project will be for Industrial use.
1.4	Pre-construction investigations e.g. bore houses, soil testing?	No	Soil and Geo Technical investigations will be carried out for the project.
1.5	Construction works?	Yes	Construction of Main Plant its associated facilities and ash dyke is envisaged.
1.6	Demolition works?	No	-------
1.7	Temporary sites used for construction works or housing of construction workers?	Yes	Temporary accommodation facilities with proper sanitation for construction workers would be provided.
1.8	Above ground buildings, structures or earthworks including linear structures, cut and fill or excavations	Yes	Main Plant and Ash dyke. Earthwork involving excavation cut and fills activities.
1.9	Underground works including mining or tunneling?	No	----
1.10	Reclamation works?	No	----
1.11	Dredging?	No	----
1.12	Offshore structures?	No	----
1.13	Production and manufacturing processes?	Yes	Electricity generation of 4000 MW
1.14	Facilities for storage of goods or materials?	Yes	Storage of Coal, Water, Chemicals and alternate fuel *i.e, Heavy Furnace Oil/ HPS/ LSHS /LDO etc.* are envisaged.
1.15	Facilities for treatment or disposal of solid waste or liquid effluents?	Yes	A comprehensive Environmental Management Plan shall be formulated which shall include disposal of solid waste and liquid effluents. These measures will be highlighted in the EIA report.
1.16	Facilities for long term housing of operational workers?	Yes	Establishment of residential and infrastructure facilities will be envisaged.
1.17	New road, rail or sea traffic during construction or operation?	No	As the site is under SEZ, the road Rail/Port infrastructure already exists to the maximum extent. However, the need based new approach road to the project site will be constructed.

1.18	New road, rail, air waterborne or other transport infrastructure including new or altered routes and stations, ports, airports etc?	No	As the site is under SEZ, the road Rail/Port infrastructure already exists to maximum extent. However, the need based new approach road to the project site & transport infrastructures will be constructed.
1.19	Closure or diversion of existing transport routes or infrastructure leading to changes in traffic movements?	No	----
1.20	New or diverted transmission lines or pipelines?	Yes	Transmission lines for power evacuation will be constructed by PGCIL.
1.21	Impoundment, damming, culverting, realignment or other changes to the hydrology of watercourses or aquifers?	No	----
1.22	Stream crossings?	No	----
1.23	Abstraction or transfers of water form ground or surface waters?	Yes	The cooling water requirement for 5x800 MW shall be met by utilization of sea water either in Once Through System or Recirculation System with Cooling Towers. However, Water required for construction purposes shall be drawn from nearby surface water source or deep tube wells and shall be pumped into an over-ground tank for further distribution by gravity to various distribution points.
1.24	Changes in water bodies or the land surface affecting drainage or run-off?	Yes	The level of site will be raised due to which the surface drainage may get affected. A surface water drainage study will be undertaken.
1.25	Transport of personnel or materials for construction, operation or decommissioning?	Yes	⇒ Construction Material, Labour and Main Plant Equipment shall be transported during construction phase. Most of the transportation shall be through roads/rail route/sea route. ⇒ Coal and Oil shall be transported during operation phase through Sea route/Rail.

			⇒ Chemicals shall be transported through roads. ⇒ Personnel during construction and operation would use public transport or their own means.
1.26	Long-term dismantling or decommissioning or restoration works?	No	----
1.27	Ongoing activity during decommissioning which could have an impact on the environment?	No	----
1.28	Influx of people to an area in either temporarily or permanently?	Yes	Proposed project will generate employment avenues both during construction and operation phases leading to influx of people in the area.
1.29	Introduction of alien species?	No	----
1.30	Loss of native species or genetic diversity?	No	
1.31	Any other actions?	No	

2. **Use of Natural resources for construction or operation of the Project (such as land, water, materials or energy, especially any resources which are non-renewable or in short supply):**

S. No.	**Information/checklist confirmation**	**Yes/No**	**Details thereof (with approximate quantities /rates, wherever possible) with source of information data**
2.1	Land especially undeveloped or agricultural land (ha)	No	About 1500 acres of land under possession of APIIC in SEZ. Special Chief Secretary (Energy), GoAP vide letter dated 15.10.2013 directed APIIC for handing over the 1500 Acre land to NTPC and take action for handing over the possession of the land.
2.2	Water (expected source & competing users) unit: KLD	Yes	The water requirement for 5x800 MW in Once Through System is (1, 25,000 x 5 m3/hr) or in Recirculation System with CT (30,000 m3/hr). Water requirement for project shall be met from sea (Bay of Bengal) by constructing suitable intake well in the sea, which is

			about 2-3 Km from the project. Desalination plant will be provided for sweet water requirement.
2.3	Minerals (MT)	Yes	**Coal:** Imported coal has been envisaged for the project. The coal requirement for the project is estimated as 14.25 million tonnes/annum corresponding to 100% PLF considering GCV of 5700 kcal/kg and Station Heat Rate of 2317.44 kcal/kWh.
2.4	Construction material – stone, aggregates, sand / soil (expected source – MT)	Yes	The power plant has several components like Railway sidings, Coal handling system, Fuel Oil Handling system, Main Plant Building, Chimney, Water Treatment Plant, Cooling Towers, Ash Handling System, Effluent Treatment Plant, Switchyard, Infrastructure (roads / drains / culverts etc.), Administrative Building, and Township etc. Most of these units are designed and tendered on turn-key basis. Therefore, the detailed quantities, as required are not available.
2.5	Forests and timber (source – MT)	No	----
2.6	Energy including electricity and fuels (source, competing users) Unit: fuel (MT), energy (MW)	Yes	AP Transco has constructed a 220/132/33 kV substation for Brandex Apparel approx 2.5 KM from the proposed site. The substation has incoming 220 kV feeder from AP Transco Kalpaka S/S and two 132 kV feeders from Gazuwaka and Pedepuram as tie lines. One no. 220/132 kV 100 MVA transformer is commissioned. The construction power requirement for the said project can be availed from the above substation.
2.7	Any other natural resources (use appropriate standard units)	No	----

3. Use, storage, transport, handling or production of substances or materials, which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health.

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/ rates, wherever possible) with source of information data
3.1	Use of substances or materials, which are hazardous (as per MSIHC rules) to human health or the environment (flora, fauna, and water supplies)	Yes	Hydrochloric Acid, Caustic Soda, Liquid Ammonia and Liquid Chlorine are envisaged to be used.
3.2	Changes in occurrence of disease or affect disease vectors (e.g. insect or water borne diseases)	No	No water borne disease anticipated since due precautions for treatment and disposal of waste water will be taken.
3.3	Affect the welfare of people e.g. by changing living conditions?	Yes	The project will generate employment opportunity and would improve the socio-economic status and living conditions due to increased infrastructural facilities. It will also improve the power supply position in southern region of India & contribute in socio-economic growth.
3.4	Vulnerable groups of people who could be affected by the project e.g. hospital patients, children, the elderly etc.,	No	----
3.5	Any other causes	No	----

4. Production of solid wastes during construction or operation or decommissioning (MT/month)

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/ rates, wherever possible) with source of information data
4.1	Spoil, overburden or mine wastes	No	------
4.2	Municipal waste (domestic and or commercial wastes)	Yes	Small quantities of domestic solid waste shall be generated, which shall be disposed off in environment friendly manner.
4.3	Hazardous wastes (as per Hazardous Waste Management	Yes	Used oil from transformers, once in one or two years.

	Rules)		Used Lead acid batteries.
4.4	Other industrial process wastes	Yes	Fly ash and bottom ash generated due to combustion process of coal.
4.5	Surplus product	No	----
4.6	Sewage sludge or other sludge from effluent treatment	Yes	Small quantities, which will be disposed off in ash disposal areas or used as manures.
4.7	Construction or demolition wastes	Yes	The quantification of construction / demolition waste is not possible.
4.8	Redundant machinery or equipment	No	----
4.9	Contaminated soils or other materials	No	----
4.10	Agricultural wastes	No	----
4.11	Other solid wastes	No	----

5. Release of pollutants or any hazardous, toxic or noxious substances to air (Kg/hr)

S. No.	**Information/Checklist confirmation**	**Yes/No**	**Details thereof (with approximate quantities/ rates, wherever possible) with source of information data**
5.1	Emissions from combustion of fossil fuels from stationary or mobile sources	Yes	Emission from stack will comprise of particulates, SO_2, NOx and CO_2 due to coal combustion. Emission quantity will be known at detailed engineering stage.
5.2	Emissions from production processes	No	----
5.3	Emissions from materials handling including storage or transport	Yes	Fugitive dust from Coal handling Plant and storage area and ash handling area.
5.4	Emissions from construction activities including plant and equipment	Yes	Fugitive dust from construction site due to loosening of soil. Exhaust emission from construction equipment.
5.5	Dust or odors from handling of materials including construction materials, sewage and waste	Yes	Fugitive dust would be generated during construction and material handling. Odour from sewage will be negligible due to adoption of suitable and advanced aerobic sewage treatment plant.
5.6	Emissions from incineration of waste	No	No incineration process is proposed.
5.7	Emissions from burning of waste in open air (e.g. slash materials, construction debris)	No	----
5.8	Emissions from any other sources	No	----

6. Generation of Noise and Vibration, and Emissions of Light and Heat:

S. No.	Information/Checklist Confirmation	Yes/No	Details thereof (with approximate quantities/ rates, wherever possible) with source of information data with source of information data
6.1	From operation of equipment e.g. engines, ventilation plant, crushers	Yes	The noise level of the order of 90 dB (A) will be generated from these equipment during operation.
6.2	From industrial or similar processes	Yes	From Turbine, Generators, Fans, Pumps etc
6.3	From construction or demolition	Yes	During construction phase noise level of the order of 85 dB (A) will be generated due to construction equipment.
6.4	From blasting or piling	Yes	During piling noise level of the order of 85 dB (A) will be generated.
6.5	From construction or operational traffic	Yes	Due to vehicular movement there will be slight increase in the ambient noise level.
6.6	From lighting or cooling systems	Yes	The noise level due to operation of Cooling Towers will be of the order of 75 dB (A).
6.7	From any other sources	No	----

7. Risks of contamination of land or water from releases of pollutants into the ground or into sewers, surface waters, groundwater, coastal waters or the sea:

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/ rates, wherever possible) with source of information data
7.1	From handling, storage, use or spillage of hazardous materials	No	----------
7.2	From discharge of sewage or other effluents to water or the land (expected mode and place of discharge)	Yes	Sewage and all plant effluents will be treated adequately to conform to regulatory limits to avoid impact on water or land.
7.3	By deposition of pollutants emitted to air into the land or into water	No	----
7.4	From any other sources	No	----
7.5	Is there a risk of long term build	No	----

	up of pollutants in the environment from these sources?		

8. Risk of accidents during construction or operation of the Project, which could affect human health or the environment

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/ rates, wherever possible) with source of information data
8.1	From explosions, spillages, fires etc from storage, handling, use or production of hazardous substances	Yes	A Disaster Management Plan shall be prepared to deal effectively in case of any eventuality.
8.2	From any other causes	No	----
8.3	Could the project be affected by natural disasters causing environmental damage (e.g. floods, earthquakes, landslides, cloudburst etc)?	No	Adequate care will be taken during design and construction to resist natural disaster like flood and earthquakes.

9. Factors which should be considered (such as consequential development) which could lead to environmental effects or the potential for cumulative impacts with other existing or planned activities in the locality

S. No.	Information/Checklist confirmation	Yes/No	Details thereof (with approximate quantities/ rates, wherever possible) with source of information data
9.1	Lead to development of supporting utilities, ancillary development or development stimulated by the project which could have impact on the environment e.g.: • Supporting infrastructure (roads, power supply, waste or waste water treatment, etc.) • housing development • extractive industries • supply industries • other	Yes	The project will promote establishment of ancillary and small scale industries in the area to meet the various requirement of the project. Also the project will emerge as Regional project which will benefit and strengthen the power-supply gap specifically in States and UT of Southern Region.
9.2	Lead to after-use of the site, which could haven impact on the environment	No	----
9.3	Set a precedent for later	Yes	The project would promote

	developments		various types of commercial/industrial activities in the area.
9.4	Have cumulative effects due to proximity to other existing or planned projects with similar effects	No	----

(II) -Environmental Sensitivity

S. No.	Areas	Name/ Identity	Aerial distance (within 15 km.) Proposed project location boundary
1	Areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value	No	----
2	Areas which are important or sensitive for ecological reasons - Wetlands, watercourses or other water bodies, coastal zone, biospheres, mountains, forests	Yes	Sea Coast (Bay of Bengal at about 2-3 Km from the project site)
3	Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	No	However, during the detailed EIA study more information will be collected on these aspects.
4	Inland, coastal, marine or underground waters	Yes	Bay of Bengal (about 2-3 Km)
5	State, National boundaries	No	---------
6	Routes or facilities used by the public for access to recreation or other tourist, pilgrim areas	Yes	Site is about at about 18 Km from NH-5 and about 200 m from Pudimadaka road.
7	Defence installations	No	----
8	Densely populated or built-up area	No	----
9	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	No	----
10	Areas containing important, high quality or scarce resources (ground water resources, surface resources, forestry, agriculture, fisheries, tourism, minerals)	No	----

11	Areas already subjected to pollution or env. damage. *(those where existing legal environmental standards are exceeded)*	No	----
12	Areas susceptible to natural hazard which could cause the project to present env. problems (*earth-quakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions*)	No	----

I hereby give undertaking that the data and information given in the application and enclosures are true to the best of my knowledge and belief and I am aware that if any part of the data and information submitted is found to be false or misleading at any stage, the project will be rejected and clearance given, if any to the project will be revoked at our risk and cost.

Date: 01.01.2014
Place: Noida

Signature of the applicant
with Name and Full Address
(Project Proponent / Authorized Signatory)

R. K. BADERIA
HOD (ENV. Engg.)
NTPC Limited
(A Govt. of India Enterprises)
Sec-24, NOIDA-201 301 (UP)

ANNEXURE-A

ALTERNATE SITES

1.0 Description of alternate sites

NTPC Ltd. proposes to implement the super thermal power project near Pudimadaka village in Atchutapuram Mandal of Visakhapatnam district (Andhra Pradesh). The present site for the project is selected based on siting criteria of MoEF & following considerations:

i. Availability of suitable and adequate land
ii. Distance from source of coal
iii. Distance from reliable source of water
iv. Roads and railway access
v. Availability of infrastructural facilities
vi. Environmental aspects

Alternative sites:

Keeping in view the above technical and environmental requirement two alternative locations were identified for further examination:

I. Site near Pudimadaka at Atchutapuram (in Vizag district)
II. Site near Nakkapali Mandal (in Visakhapatnam district)

3.1 SITE I: Near Pudimadaka at Atchutapuram (in Vizag district)

Location & Approach

The site is located having Latitude of 17^0 30' 38" to 17^0 31' 48" N and Longitude of 82^0 57' 48" to 82^0 59' 35" E respectively. The project site is surrounded by villages Lalamkoduru, Rambilli, Veduruvada and Pudimadaka in Atchutapuram and Rambilli Mandals. Nearest Railway Station is Anakapalli about 15 Kms on Vijayawada – Kolkata Section and same is double track, Broad gauge electrified line. Visakhapatnam airport is located at about 40 Kms from site. Gangavaram Port is located at about 30 km in North East direction of the site. Yelamanchali town is located at about 20 km from site.

The vicinity map showing the details of the site is placed at **Exhibit-II.**

Land

About 5221 acres of land is under possession of APIIC as marked in attached layout of SEZ, which has been allotted to some industrial units. As per discussion with Dy. Zonal Manager, APIIC, about 1500 acres of land was identified for establishing Power Plant. The land

identified for the proposed project is dry in nature. The land is already acquired and villagers are compensated. It was learnt that Topo-graphical survey was carried out by APIIC and the data can be made available from Hyderabad head office once the formalities for allocating the said land in name of NTPC gets completed.

Water

Water for the project has to be drawn directly from sea by constructing a suitable intake well in the sea, which is about 2-3 Kms from the proposed site. However, for meeting Sweet water requirement desalination plant is proposed.

Sweet water can be made available from Yelluru canal (18 kms.) and pipeline has been laid by APIIC for supplying water to SEZ units but availability of sweet water for power project is difficult. Commitment for water needs to be obtained.

Coal

Washed/blended coal or imported coal is proposed as fuel. Import of coal shall be explored to meet coal requirement. Coal could be brought to the Gangavaram Port through the sea route. Gangavaram Port is located about 35 KM. The port has cargo handling facility for coal and iron ore.

Coal can also be brought to the Visakhapatnam port through the sea route and same is located about 50 KM from site. Presently M/s Vedanta is operating coal handling activities with capacity of 6MT per month. However, availability of coal for the project needs further elaboration.

Power Evacuation

Existing AP TRANSCO S/S in the SEZ area: AP Transco has constructed a 220/132/33 kV substation for Brandex Apparel approx 2.5 KM from the proposed site and the same substation was charged in Nov'2007. The substation has incoming 220 kV feeder from AP Transco Kalpaka S/S and two 132 kV feeders from Gazuwaka and Pedepuram as tie lines. One no. 220/132 kV 100 MVA transformer is commissioned.

The construction power requirement for the said project can be availed from the above substation.

Environmental Aspects:
The land identified is dry land. The site is 500 m away from Railway line, River and National Highway. The land identified is 2-3 Km away from the sea coast.

3.2 SITE II: Near Nakkapali Mandal (in Visakhapatnam District)

Location

The site is located at a distance of 8 K.M from NH-5 at about 18 Kms from Tuni town. Nearest Railway Station is Tuni about 18 Kms on double track, broad gauge electrified line in Vijayawada – Kolkata Section and Yelamanchali Railway Station is located at about 20 Kms from site. Vishakhapatnam Airport is at a distance of 100 Kms. A vicinity plan indicating the site is enclosed at **Exhibit-III**.

Land

About 4500 acres of land is being acquired by APIIC out of which APIIC informed that for setting of 4000 MW plant capacity, they can identify about 2000 acres land.

Around 2000 Acres of land is earmarked for this project. The area has commercial crops viz coconut and cashew plantation and has permanent settlements with 4 to 5 villages mainly Rajyyapeta (approx population 4500), Chandanada (approx population 2300), Bughiraju Peta (approx population 1300) and their hamlets. There are 5-6 hillocks in the area and the ground level is varying from 5 m to 60 m with lots of undulations.

Water

Sea water can be drawn to meet the water requirement by constructing suitable intake well in sea which is 1-2 kms from the proposed project site.

Sweet water may not be available for the proposed project as informed by APIIC officials. Further, suitable desalination plant shall be installed in the plant to meet plant and township requirement.

Coal

Raw/Washed/blended coal or imported coal is proposed as fuel. Import of coal shall be explored to meet coal requirement. Gangavaram Port at a distance of 75 Km and Vishakhapatnam Port at a distance of 110 Km may be explored for imported coal through the sea route.

Environmental Aspects

The site is 500 m away from Railway line, River and National Highway. The area comprises of dry and wet land and there are commercial crops like coconut, cashew and palm trees. The site is surrounded by

Payakaraopeta Reserved Forest and Vempadu Reserved Forest within 10 Kms radius. Social forest is existing near Rajayyapeta village. The land identified is along the sea coast and CRZ demarcation is to be carried out for the project land. There is a salt pan near village Rajayyapeta village. There is a creek passing through Chandanada village connecting to sea. HETERO drug is the major Industry existing in the vicinity.

The comparative summary of the two alternate sites proposed for STPP is detailed under **Table-I.**

TABLE I: COMPARISON OF ALTERNATE SITES

Sr. NO.	**DESCRIPTION**	**Site # 1 Pudimadaka**	**Site # 2 Nakkapalli**
1.	Land	Dry Land. Identified in SEZ area of 1500 Acres.	Dry and Wet land. Around 2000 acres
2.	Water	Sea Water (Bay of Bengal)	Sea Water (Bay of Bengal)
3	Fuel	Imported Coal	Imported Coal
Environmental Sensitive Zones (within 10 km)			
4	National Parks	NIL	NIL
5	Wildlife Sanctuaries	NIL	NIL
6	Monuments	NIL	NIL
7	Hills / Valleys	NIL	Yes
8	Rivers/sea	Bay of Bengal	Bay of Bengal
9	Nearest railway station	Anakapalli is approximately 15 Kms	Tuni is approximately 18 Kms
10	Nearest Airport	Visakhapatnam Air Port is approximately 40 Km.	Visakhapatnam Air Port is approximately 100 Km.
11	Nearest town	Atchutapuram is approximately 4 Km	Tuni is approximately 18 Km.
12	Nearest Sea Port	Gangavaram is approximately 35 Km	Gangavaram is approximately 75 Km.
13	Nearest forest	Panchadarla Reserved Forest and Gokivada Reserved Forest within 10 Km radius.	Payakaraopeta Reserved Forest and Vempadu Reserved Forest within 10 Km radius.

3.3 CONCLUSION

The site near Pudimadaka at Atchutapuram **(Site-I)** was preferred and selected after examining the following advantages & facts over the site near Nakkapali Mandal **(Site-II).**

Site-I:

- ✓ The land has already been acquired by APIIC and in their position. The villagers have already paid the compensation. No Rehabilitation and Resettlement is involved for this land.
- ✓ The land use of site near Pudimadaka is completely dry land (identified in SEZ) and also free from any forestland.
- ✓ The land identified near Pudimadaka is about 2-3 Km away from the sea coast.
- ✓ Hence the proposed site is most suitable for setting up of the power project.

Site-II:

- ✓ The site near Nakkapali comprises of 4 to 5 villages mainly *Rajyyapeta, Chandanada, Bughiraju Peta* and their hamlets.
- ✓ Land use of Nakkapali site comprises of dry and wet land with some commercial crops like coconut, cashew and palm trees etc. and also surrounded by Payakaraopeta and Vempadu Reserved Forest.
- ✓ About 5-6 hillocks are located near Nakkapali site.
- ✓ The land identified near Nakkapali site is along the sea coast and attracts CRZ demarcation study from the sea coast.
- ✓ There site near Nakkapali is having a salt pan area near village Rajayyapeta.

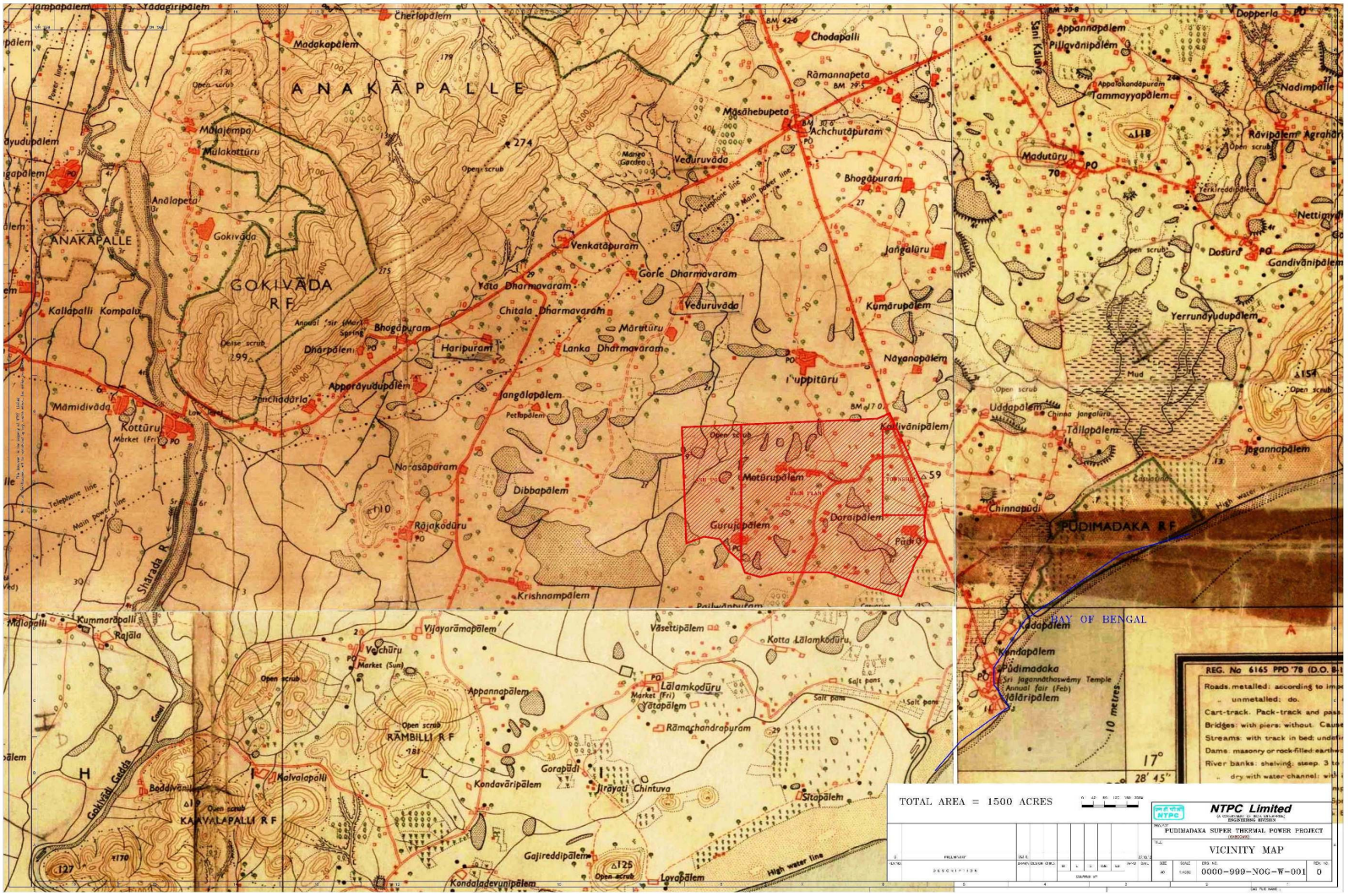
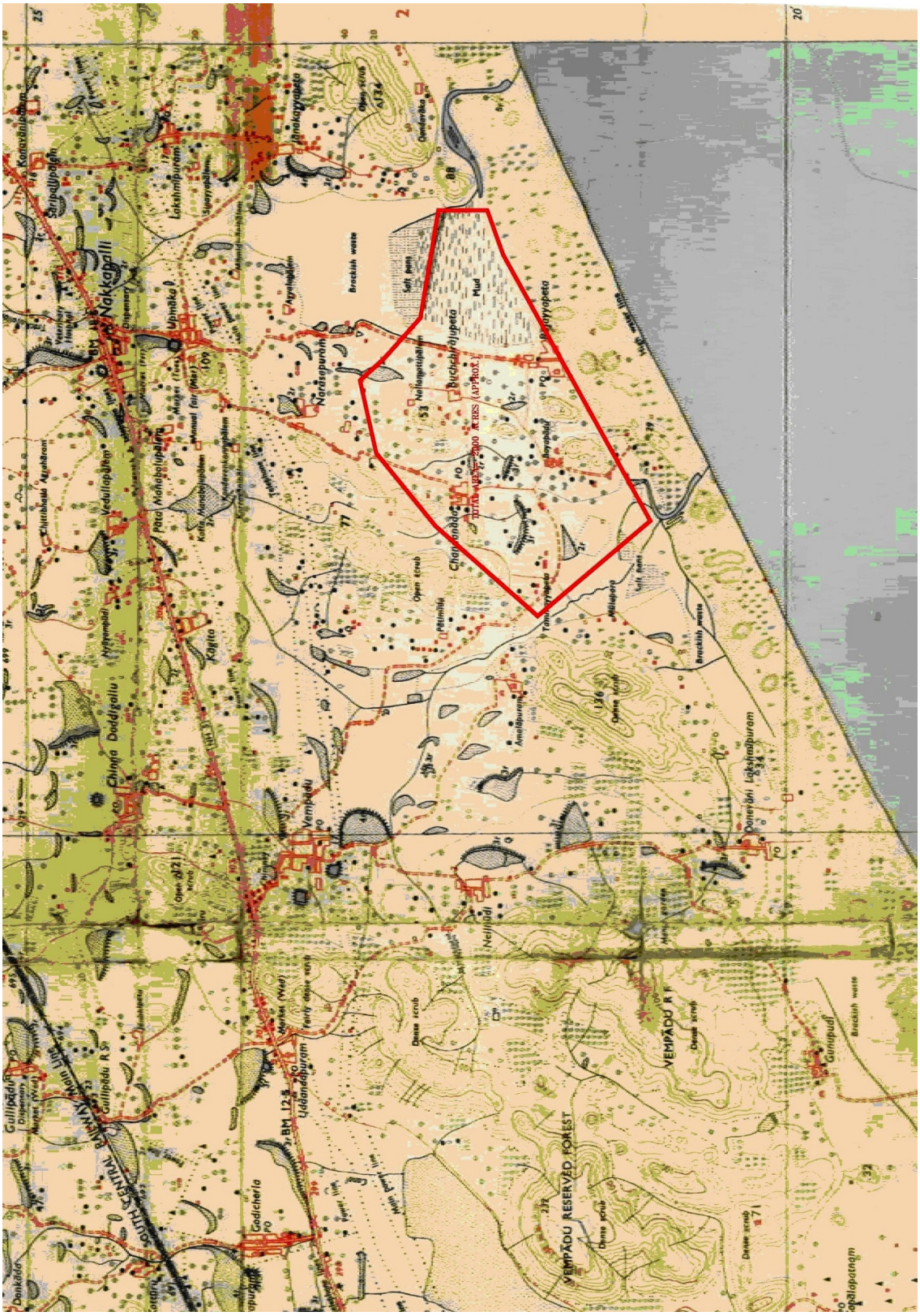

ANAKAPALLE
GOKIVADA R F
PUDIMADAKA R F
RAMBILLI R F
KAAVALAPALLI R F
BAY OF BENGAL
TOTAL AREA = 1500 ACRES
NTPC Limited
PUDIMADAKA SUPER THERMAL POWER PROJECT
VICINITY MAP
0000-999-NOG-W-001
0

EXHIBIT-II

EXHIBIT-III


Nakkapalli
Uppada
Nadimpalem
Vempadu
Gadicherla
Uddandapuram
Donerapalem
Lakshmipuram
Gullipadu
Kotauratla
Kapileswarapuram
Chinna Doddigallu
Pedda Nadimpalem
Buchchirajupeta
Nallampatlapalem
Chandanakuppam
Pallimitta
Amalapuram
Neelapudi
Gunipudi
VEMPADU RESERVED FOREST
VEMPADU R F
Brackish waste
Open scrub
Dense scrub
Mud
Salt pans
Creek
Main Road
Metalled Road
Unmetalled Road
Footpath
Railway
Market (Wed)
Ferry (boat)
Temple
Mosque
Church
Cemetery
Hut
Well
Tank
Sluice
Bridge
Culvert
Telegraph Line
Power Line
Contour
Spot Height
Trigonometrical Station
Village
Hamlet
Forest
Scrub
Sand
Marsh
Swamp
Cultivation
Orchard
Plantation
Nursery
Boundary
Reserved Forest
Protected Forest
Sanctuary
National Park
Elephant Corridor
Watch Tower
Check Post
Forest Office
Range Office
Section Office
Beat Office
Camp
Quarry
Kiln
Saw Pit
Timber Depot
Fuel Depot
Fodder Depot
Water Point
Salt Pan
Aquaculture
Prawn Farm
Fish Farm
Shrimp Farm
Boat
Jetty
Harbour
Lighthouse
Beacon
Buoy
Anchorage
Fishing Harbour
Fish Landing Centre
Auction Hall
Ice Plant
Cold Storage
Boat Building Yard
Net Mending Yard
Fish Curing Yard
Fish Drying Yard
Fish Processing Plant
Fish Meal Plant
Fish Oil Plant
Canning Plant
Freezing Plant
Packing Plant
Export Unit
Import Unit
Customs House
Port Office
Pilot Station
Signal Station
Radio Station
Meteorological Station
Tide Gauge
Current Meter
Wave Rider
Buoy Rope
Anchor
Chain
Shackle
Swivel
Mooring
Berth
Quay
Wharf
Pier
Groyne
Breakwater
Seawall
Revetment
Gabion
Geotextile
Sand Bag
Concrete Block
Rock
Boulder
Pebble
Gravel
Shingle
Shell
Coral
Seaweed
Mangrove
Casuarina
Palm
Coconut
Cashew
Tamarind
Neem
Banyan
Peepal
Bamboo
Grass
Shrub
Creeper
Fern
Herb
Weed
Algae
Fungus
Lichen
Moss
Liverwort
Hornwort
Pteridophyte
Gymnosperm
Angiosperm
Monocot
Dicot
Annual
Perennial
Biennial
Deciduous
Evergreen
Semi-evergreen
Leaf
Stem
Root
Flower
Fruit
Seed
Pollen
Nectar
Resin
Latex
Gum
Oil
Wax
Fat
Protein
Carbohydrate
Vitamin
Mineral
Water
Air
Soil
Rock
Sand
Silt
Clay
Loam
Peat
Humus
Litter
Duff
Topsoil
Subsoil
Bedrock
Aquifer
Groundwater
Surface Water
Spring
Well
Tube Well
Dug Well
Bore Well
Hand Pump
Windmill
Solar Pump
Diesel Pump
Electric Pump
Submersible Pump
Jet Pump
Centrifugal Pump
Reciprocating Pump
Rotary Pump
Screw Pump
Gear Pump
Vane Pump
Piston Pump
Diaphragm Pump
Peristaltic Pump
Hydraulic Ram
Water Wheel
Turbine
Generator
Transformer
Switchgear
Control Panel
Meter
Gauge
Valve
Pipe
Hose
Tank
Reservoir
Pond
Lake
River
Stream
Canal
Drain
Culvert
Bridge
Ford
Causeway
Embankment
Cutting
Tunnel
Viaduct
Aqueduct
Siphon
Weir
Barrage
Dam
Spillway
Sluice Gate
Flood Gate
Tide Gate
Navigation Lock
Fish Ladder
Fish Pass
Eel Ramp
Turtle Ramp
Crocodile Ramp
Otter Ramp
Beaver Dam
Muskrat Lodge
Otter Holt
Crocodile Nest
Turtle Nest
Bird Nest
Bird Box
Bird Feeder
Bird Bath
Bird Hide
Bird Watching Tower
Nature Trail
Interpretation Centre
Visitor Centre
Museum
Aquarium
Zoo
Botanical Garden
Arboretum
Herbarium
Seed Bank
Gene Bank
Germplasm
Tissue Culture
Micropropagation
Somatic Embryogenesis
Organogenesis
Callus
Protoplast
Cell Culture
Bioreactor
Fermenter
Incubator
Autoclave
Laminar Flow
Microscope
Centrifuge
Spectrophotometer
Chromatography
Electrophoresis
PCR
DNA
RNA
Gene
Chromosome
Cell
Tissue
Organ
Organism
Species
Genus
Family
Order
Class
Phylum
Kingdom
Domain
Taxonomy
Phylogeny
Evolution
Ecology
Biodiversity
Conservation
Sustainable Development
Climate Change
Global Warming
Greenhouse Gas
Carbon Dioxide
Methane
Nitrous Oxide
Ozone
Ozone Layer
Ozone Hole
Ozone Depletion
Ozone Depleting Substance
Chlorofluorocarbon
Hydrochlorofluorocarbon
Hydrofluorocarbon
Perfluorocarbon
Sulphur Hexafluoride
Nitrogen Trifluoride
Halon
Methyl Bromide
Methyl Chloroform
Carbon Tetrachloride
Montreal Protocol
Kyoto Protocol
Paris Agreement
United Nations Framework Convention on Climate Change
Intergovernmental Panel on Climate Change
World Meteorological Organization
United Nations Environment Programme
Global Environment Facility
Green Climate Fund
Adaptation Fund
Clean Development Mechanism
Joint Implementation
Emissions Trading
Carbon Credit
Carbon Offset
Carbon Footprint
Carbon Neutral
Carbon Sink
Carbon Capture and Storage
Renewable Energy
Solar Energy
Wind Energy
Hydroelectric Energy
Geothermal Energy
Biomass Energy
Biofuel
Ethanol
Biodiesel
Biogas
Hydrogen
Fuel Cell
Electric Vehicle
Hybrid Vehicle
Plug-in Hybrid Vehicle
Battery
Lithium-ion Battery
Nickel-metal Hydride Battery
Lead-acid Battery
Supercapacitor
Flywheel
Pumped Storage
Compressed Air Energy Storage
Thermal Energy Storage
Phase Change Material
Heat Pump
Air Conditioner
Refrigerator
Freezer
Chiller
Cooling Tower
Evaporative Cooler
Desiccant
Dehumidifier
Humidifier
Air Handling Unit
Fan
Blower
Duct
Filter
Heat Exchanger
Condenser
Evaporator
Compressor
Expansion Valve
Refrigerant
Insulation
Vapour Barrier
Air Gap
Radiant Barrier
Reflective Insulation
Thermal Mass
Passive Solar Design
Active Solar Design
Daylighting
Natural Ventilation
Mechanical Ventilation
Heat Recovery Ventilation
Energy Recovery Ventilation
Indoor Air Quality
Volatile Organic Compound
Particulate Matter
Carbon Monoxide
Nitrogen Oxides
Sulphur Dioxide
Ozone
Lead
Asbestos
Radon
Formaldehyde
Benzene
Toluene
Xylene
Ethylbenzene
Styrene
Naphthalene
Polycyclic Aromatic Hydrocarbon
Dioxin
Furan
Polychlorinated Biphenyl
Pesticide
Herbicide
Insecticide
Fungicide
Rodenticide
Molluscicide
Nematicide
Acaricide
Algicide
Bactericide
Virucide
Antibiotic
Antiviral
Antifungal
Antiparasitic
Vaccine
Immunization
Epidemiology
Public Health
Occupational Health
Environmental Health
Toxicology
Risk Assessment
Risk Management
Risk Communication
Hazard
Exposure
Dose
Response
Threshold
No Observed Adverse Effect Level
Lowest Observed Adverse Effect Level
Benchmark Dose
Uncertainty Factor
Safety Factor
Margin of Exposure
Acceptable Daily Intake
Tolerable Daily Intake
Reference Dose
Reference Concentration
Cancer Slope Factor
Unit Risk
Relative Potency Factor
Toxic Equivalency Factor
Mixture
Additivity
Synergism
Antagonism
Potentiation
Bioaccumulation
Biomagnification
Biotransformation
Metabolism
Excretion
Half-life
Clearance
Volume of Distribution
Bioavailability
Absorption
Distribution
Elimination
Pharmacokinetics
Pharmacodynamics
Dose-response Relationship
Dose-response Curve
Sigmoid Curve
Linear Curve
Threshold Curve
Hormesis
Carcinogen
Mutagen
Teratogen
Genotoxicity
Mutagenicity
Clastogenicity
Aneugenicity
Ames Test
Micronucleus Test
Chromosome Aberration Test
Comet Assay
Unscheduled DNA Synthesis Test
Sister Chromatid Exchange Test
Gene Mutation Test
Chromosome Mutation Test
Genome Mutation Test
Dominant Lethal Test
Heritable Translocation Test
Specific Locus Test
Mouse Spot Test
Mouse Visible Specific Locus Test
Drosophila Sex-linked Recessive Lethal Test
Drosophila Wing Somatic Mutation and Recombination Test
Drosophila Eye Somatic Mutation and Recombination Test
Drosophila Germline Mutation Test
Drosophila Chromosome Aberration Test
Drosophila Micronucleus Test
Drosophila Comet Assay
Drosophila Unscheduled DNA Synthesis Test
Drosophila Sister Chromatid Exchange Test
Drosophila Gene Mutation Test
Drosophila Chromosome Mutation Test
Drosophila Genome Mutation Test
Drosophila Dominant Lethal Test
Drosophila Heritable Translocation Test
Drosophila Specific Locus Test
Drosophila Mouse Spot Test
Drosophila Mouse Visible Specific Locus Test

ANNEXURE-I

GOVERNMENT OF ANDHRA PRADESH
ENERGY (PR.IV) DEPARTMENT

Letter No.8309/PR.IV/2010-6. Dated 15.10.2013.

From:
The Special Chief Secretary to Government,
Energy (Power.IV) Department,
Andhra Pradesh Secretariat, Hyderabad.

To
The Vice Chairman & Managing Director,
Andhra Pradesh Industrial Infrastructure Corporation Ltd.,
Parisrama Bhavan, 6th Floor, 5-9-58/B, Fateh Maidan Road,
Hyderabad - 500 004.

Sir,

Sub:- Energy Department - Setting up of coal based 5x800 MW (4000 MW) - Ultra Super Critical Thermal Power Station by NTPC - Allotment of land to an extent of Ac. 1500 to NTPC at Pudimadaka Village of Visakhapatnam District - Permission - Accorded.

Ref:1.From the Regional Executive Director (South) NTPC, Letter dated:19.11.2010.
2.Govt.Memo.No.8309/Pr.IV/2010-1, dt:19.11.2010.
3.From the Chairman/APPCC, & CMD, APTRANCO, Lr.No.CE/IPC/F.Pudimadaka/D.No.269/10, Dt:14.12.2010
4.Govt.Memo.No.8309/Pr.IV/2010-2, dt:31.12.2010.
5.From VC & MD, APIIC, Lr.No.210212/APIIC/Lands/A2/NPTC-Pudimadaka/2012, Dt:17.04.2012.
6.From the Regional Executive Director (South) NTPC, Letter ref No.09/SRQH/RED, dated:27.05.2013.
7.Govt. D.O.Lr.No. 8309/Pr.IV/2010, dt:10.06.2013.
8.From the Vice Chairman & Managing Directror, Andhra Pradesh Industrial Infrastructure Corporation Ltd., Hyderabad, D.O.Lr.No. 210212/APIIC/Lands/A2/NPTC-Pudimadaka/2012, dated 13.06.2013

*****

Adverting to the references cited on the above subject, the Competent Authority hereby directs the APIIC to take necessary action for handing over the contiguous area to an extent of Ac.1500 to National Thermal Power Corporation Limited at Pudimadaka Village of Visakhapatnam District, which was earlier shown to them for setting up of Coal Based 5x800 MW (4000 MW) - Ultra Super Critical Thermal Power Station.

2. The Vice Chairman & Managing Director, APIIC to take quick action for handing over the possession of the land within 15 days under intimation to the Government.

Yours faithfully,

for Special Chief Secretary to Government.

Copy to:

The Regional Executive Director (South) NTPC, RP. Road, Secunderabad. *(for arranging to take possession of the land. He is also to intimate at the earliest the maximum share of power to APDISCOMs beyond 50%, with reference to the State Government Letter dated 05-07-2013).*
The Chairman APPCC & CMD, APTRANSCO, Hyderabad.
The Industries and Commerce Department.

के.का.नि.का. सचिवालय
RED's Sectt.
15/10

TECHNICAL SPECIFICATIONS

FOR

ENVIRONMNETAL IMPACT ASSESSMENT STUDY

FOR

PUDIMADAKA SUPER THERMAL POWER PROJECT
(5X800 MW)

NTPC LIMITED
(GOVT. OF INDIA UNDERTAKING)
NEW DELHI

JANUARY'2014

DRAFT TERMS OF REFERENCE

FOR

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) STUDY

FOR

PUDIMADAKA SUPER THERMAL POWER PROJECT (5X800 MW) IN VIZAG DISTRICT (ANDHRA PRADESH)

NTPC Ltd.

(A Government of India Enterprise)

ENVIRONMENTAL ENGINEERING DEPARTMENT
Engineering Office Complex
Sector - 24, Noida, U.P.-201 301

DECEMBER, 2013

TABLE OF CONTENTS

TABLE OF CONTENT

1.0 INTRODUCTION

The present proposal is for implementation of 4000 MW imported coal based thermal power plant comprising of 5 (five) nos. super critical units and one (1) no. 800 MW Advance Ultra Super Critical unit demonstration project.

The project site is located near villages Lalamkoduru, Rambilli, Veduruvdda & Pudimadaka in Atchutapuram and Rambilli Mandals having Latitude of 17° 30' 35" to 17° 31' 48" N and Longitude of and 82° 57' 48" to 82° 59' 35" E. The site is about 15 Km South-West of NTPC's existing Simhadri STPP. Nearest Railway Stations Narsingpalli and Elamanchili are about 15 Km North-West on Howrah-Chennai Section double track, Broad gauge electrified line. Gangavaram Port is located about 25 km and Visakhapatnam port at a distance of about 35 km North-East of the site. Commercial airport at Visakhapatnam is located at about 40 Km from site.

The Vicinity Plan of the site is enclosed as **Exhibit - 1.**

1.1 OBJECTIVE:

In order to identify the environmental impacts due to the construction and operation of Pudimadaka STPP (5x800 MW) and associated facilities, an Environmental Impact Assessment (EIA) study is proposed to be undertaken. The aim of the study is to establish the existing baseline environmental conditions, predict impacts of the power plant, and associated facilities and formulate the Environmental Management Plan. The EIA report is required for conducting Public Consultation by Andhra Pradesh Pollution Control Board (APPCB) and Environmental Clearance (EC) from Ministry of Environment & Forests & Consent to Establish (CTE) APPCB.

2.0 SCOPE OF SERVICES

The EIA study is to be conducted covering all the disciplines of environment (Land Use, Water Use, Demography & Socio-economics, Geology, Soils, Hydrology, Water Quality, Sediments, Meteorology, Air Quality, Terrestrial Ecology, Aquatic Ecology, Noise & Ash utilization) and twelve month field monitoring in relevant discipline. The consultant will also

be required to present the findings of the EIA report before the Public Consultation meeting, State Pollution Control Board (SPCB) and Expert Appraisal Committee (EAC) of the Ministry of Environment & Forests (MOEF), and submit all clarifications/replies to the queries. The EIA report will be prepared as per MOEF notification dated 14.09.2006 and 01.12.2009.

The Scope of Services for the study will comprise of the following stages:-

Stage 'A'	Description of Site and Surrounding Description of the proposed project Establish Baseline Environmental Conditions
Stage 'B'	Impact Assessment Preparation of Risk Assessment and Disaster Management Plan, Occupational Health and Safety Plan, Environmental Management Plan and Green Belt Development Plan
Stage 'C'	Preparation of following Documents • Draft EIA Report based upon one season (non-monsoon) data for submission to SPCB for Public Consultation • Executive Summary of Draft EIA Report in English and Telugu language. • EIA report based on one year data and incorporating details of Public Consultation for submission to MOEF. • Comprehensive EIA Report based upon 12 months data

2.1 STAGE 'A':

Description of Site and Surrounding

The salient features in the core area which covers a radius of 10 km around the project site should be spelt out and highlighted on a colour map of appropriate scale. Ecological Sensitive Zones (ESZ) as notified by MOEF such as *National Park, Tiger Reserve/Elephant Reserve/Turtle Nesting Ground, Core Zone of Biosphere Reserve, Habitat for migratory bird, Lakes/Reservoir/Dam, Streams/Lakes, estuary/sea*

mangroves, Mountains/ Hills, Notified/ other Archeological Sites, Industries/Thermal Power Plants, Defense Installation, Airport and Coastal areas rich in corals, mangroves, breeding grounds of specific species etc need to be identified within 10 km radius of core area around the project site through primary and secondary data collection. However, the general area of study will cover a 25 Km radius around project site.

Description of the Proposed Project

Highlight the salient features of the project likely to affect the environment based on Feasibility Report of the project prepared by NTPC.

Establishment of Baseline Conditions

Baseline conditions in respect of Land Use, Water Use, Demography & Socio-economics, Geology, Soils, Hydrology, Water Quality, Sediments, Meteorology, Air Quality, Terrestrial Ecology, Aquatic Ecology and Noise are to be established in the study area. Please refer Annexure- I & II for details on establishment of Baseline Conditions.

Annexure-I: Summary of Scope of work

Annexure-II: Primary Data Collection/ Monitoring Schedule

However, the details presented in Annexure-I and II are only indicative and not exhaustive. The consultant shall explore all possible sources for data collection and generate relevant data as required in Gazette Notification on EIA by MOEF, dated 14.09.2006 and 01.12.2009.

2.2 STAGE 'B':

2.2.1 Environmental Impact

The features of the power plant which are likely to have impact on the environment have to be discussed in detail covering particulates and gaseous emissions, liquid effluents, solid wastes, noise, soil, ecology etc.

The impacts will be assessed for both construction and operation phases. Both short term and long term impacts on sensitive areas if any such as habitat of endangered species of wildlife or plants, sites/monuments of historical and cultural importance, centers with concentrated population in the core/study area etc, will be established wherever applicable.

The detailed methodologies of impact assessment for the different disciplines of study will be broadly defined by the consultant in his offer. Special reference should be made with respect to following impacts.

2.2.1.1 Air Quality Impact:

A computer based internationally recognized mathematical air quality model (e.g., ISC3) suitable for the region will be identified and run to predict the concentration of SO2, NOx, PM $_{10}$ & PM $_{2.5}$ due to the operation of the power plant. The results will be presented for annual, seasonal and short term (24 hourly) concentrations over a radius of 25 Km around the plant. The dispersion model results will be included in the report using isopleths or other graphical methods, over laying a land use map of the surrounding area. The predicted air quality has to be compared with existing regulations and mitigative measures, if any, to be identified. The impact at all the monitoring locations shall also be estimated including coastal fumigation modeling to envisage likely impact in coastal environment.

2.2.1.2 Impact on Water Quality:

The impact of liquid effluents on natural water bodies receiving the effluents shall be established and significant parameters, which are likely to change critically, shall be clearly spelt out.

Studies are to be conducted to understand the possibility of contamination of ground water from the ash pond leachates, based on probable composition of leachate infiltration characteristics of soil and geological characteristics of the ash disposal area. If the possibility of significant ground water contamination is established, suitable techno- economically viable mitigate measures are to be suggested.

2.2.1.3 Impact on Land Use:

The classification of land with respect to agricultural/forest/waste/Govt./Private and Revenue should also be indicated. The direct and indirect impacts of construction of power projects on the land use of the study area shall be assessed based on experience.

2.2.1.4 Impact on Ecology:

Impacts on terrestrial and aquatic ecosystems shall be established qualitatively based on predicted changes in the ambient air and water quality and experiences in similar power projects.

2.2.1.5 Social Impacts

Impacts on demographic and socio-economic characteristics of the population shall be established qualitively based on experiences in similar power projects. In addition, the impacts of displacement and needs for rehabilitation and resettlement of people from whom the land is to be acquired for the project affected persons shall be covered.

2.2.1.6 Impact on Noise Levels

The noise level at varying distances for multi-sources will be predicted using suitable noise model. A comparison of measured noise level (Leq) at monitoring locations to that of predicted noise levels (Leq) should be made and mitigatory measures required, if any, be recommended to conform to regulatory ambient air noise standards.

2.2.1.7 Risk Assessment and Disaster Management Plan and Occupational Health and Safety Plan

Risk assessment will be carried out for fuel oil storage, transport and handling. Thermal radiation contours will be drawn and any mitigative measures required will be suggested. A Disaster Management Plan (DMP) for dealing with on-site and off-site emergency situations arising due to fire, explosion, leakages of hazardous substances, etc. in the plant is to be prepared.

Occupational risk involved during construction and operation of the plant should be assessed and necessary safety and protective measures should be spelt out.

2.2.1.8 Environmental Management Plan (EMP)

An EMP identifying the measures to mitigate the adverse impacts of emissions and effluents will be prepared covering construction and operational phases. It will also include a green belt development plan for the project site.

Considering the requirements of Regulatory Agencies and identified critical parameters, the consultant will design a post study environmental monitoring program and identify all equipment and man power necessary for the implementation of this program and cost involved.

2.3 STAGE: 'C':

Preparation of EIA Report

Stage-C includes preparation of following reports –

- Draft EIA Report based upon one season data (non-monsoon) for submission to SPCB for Public Consultation
- Executive Summary of Draft EIA Report in English and Telugu language.
- EIA report based on one year data incorporating details of Public Consultation for submission to MOEF.
- Comprehensive EIA Report based upon 12 months data.

The report will include all references, and fulfill the requirements of MOEF. The basic format of the EIA will be as per MOEF Gazette Notification dated 14.09.2006 and 01.12.2009 on EIA. The report will be finalized in consultation with Engineer-In-Charge (E-I-C).

2.4 PRESENTATION OF REPORT

The Consultant shall be required provide necessary support and present the EIA/EMP report before regulatory agencies and judiciary such as MOEF/SPCB/ NGT/Courts etc, as and when required.

3.0 TIME SCHEDULE

The entire EIA study including mobilization of resources and submission of final deliverables for the complete scope of work is required to be completed within eighteen (18) months from the date of issue of the Letter of Award (LOA).

ANNEXURE-I

STAGE–A: ESTABLISHMENT OF BASELINE CONDITIONS: SUMMARY OF SCOPE

Discipline	Scope
General	• General description of the core study area (10 km radius around project site) and general study area (25 km radius around project site) • Highlight land, fuel and water requirements for the project and associated facilities as assessed by NTPC in Feasibility Report. • Infrastructure facilities and amenities available within the study area.
Land Use	• Procurement and analysis of current Satellite Imagery for core study area *i.e., 10 Km radius* along with ground truth verification. • Land use classification for Main Plant Area and Ash Dyke Area. • Analysis of Census Data for various land uses within core area to be carried out.
Water Use	• Assessment of water sources, current water use and identify conflicts, if any for core study area based on secondary data.
Demography & Socio-economics	• Establishment of demographic characteristics and occupational structure of population within and core study area based on Census Data.
Geology	• Presentation of geological map, geological profile and brief geological description of the study area, especially with respect to ash disposal area, based on secondary data.

Soil	• Establishment of physico-chemical characteristics and nutrient levels of soil in core study area based on primary data generation (Annexure-II). • Establishment of infiltration characteristics of soil in and around the ash disposal area based on primary data generation (Annexure-II).
Hydrology	• Establishment of surface and ground water hydrology of core study area based on secondary data.
Water Quality	• Establishment of physico-chemical characteristics, pollution levels and bacteriological contamination of surface and ground water bodies in the core study area through primary data generation (Annexure-II). • Sampling & monitoring to be done at the water intake source and outfall/discharge point.
Meteorology	• Monitoring of On-site Meteorological Parameters by setting up a meteorological station at site. (Annexure-II). • Collection of climatological data from nearest IMD station for long term analysis of climatological parameters for a period not less than 10 years.

Air quality	• Establishment of Ambient Air Quality in core study area through primary data generation (Annexure-II). • At least one monitoring station each in the upwind and in the pre dominant downwind direction to be selected for analyzing the likely maximum ground level concentration of pollutants. • Cumulative impact assessment on ambient air quality due to proposed plant and others (including existing sources as well as other proposed source of emission) to be carried out. • To undertake coastal fumigation modeling to envisage likely impact in coastal environment. • Analysis of rain water of the first rain.
Terrestrial Ecology	• General description of terrestrial ecosystems based on secondary data and seasonal field sampling • Listing of flora & fauna along with rare and endangered species present in the study area as per Wild life Act,1972 • List of flora and fauna duly authenticated by DFO. • Development of vegetation map with special demarcation of different kind of forests in the core study area through interpretation of satellite imagery including ground truth verification
Aquatic Ecology	• General description of aquatic ecosystems in core study area based on secondary data and primary data generation seasonal field sampling. (Annexure-II). • Identification of flora and fauna and endangered species in the surface water body falling in the study area (Sea). • Listing of fish in the receiving water body with special reference to spawning and breeding zone (Sea). • Listing of other species in the water body.

Noise	• Monitoring of noise at critical locations in and around the power plant in core study area through primary data generation (Annexure-II).
Risk & Disaster Management Plan	• Outline the major risk envisaged due to the project and its associated facilities and preparation of disaster management plan. • Fire pool modeling to plot the radiation contour due to emergency situations arising due to fire, explosion etc.

Notes:

- Any additional work deemed feel necessary for the project should be quoted separately along with the cost by the consultant. The consultant is required to undertake any additional work for completion of EIA study on mutually agreed terms.
- Action Plan along with locations of sampling sites will be finalized in consultation with the Engineer-in-Charge (EIC).

ANNEXURE-II

STAGE-A: ESTABLISHMENT OF BASELINE CONDITIONS: PRIMARY DATA COLLECTION/ MONITORING SCHEDULE

FIELD/ PARAMETERS	NO. OF SAMPLING LOCATION	FREQUENCY	REMARK
Ambient Air Quality			
SO_2 NOX TSPM PM $_{(10)}$ PM $_{(2.5)}$	4 (Four)	Twice a week	⇒24 hour sampling at each location using High Volume Sampler. Consultant has to deploy 4 (Four) numbers of HVS at site. Analysis of samples should be as per Gazette notification dated 16.11.2009 on AAQ. ⇒At least one monitoring stations each to be identified in upwind and predominant downwind directions.
O_3 (Ground Level) Hg	4 (Four)	Once in a month on 8 hourly basis.	
Meteorology			
Wind speed & direction	1 (One)	Continuous (averaging time of 1 hour)	A permanent meteorological station is to be established at site for monitoring the meteorological parameters like wind speed & direction, temperature (at 2 m and 10 m height), solar radiation, humidity, atmospheric pressure, rainfall.
Max. & Minimum Temp. (Wet & Dry bulb Temp.)		Daily (at 8.30 & 17.30 IST)	
Solar radiation		Continuous (averaging time of 1 hour)	
Humidity		Daily at 8.30 & 17.30 IST	
Atmospheric pressure		Daily at 8.30 & 17.30 IST	
Rainfall		Daily	
Storm		Daily	
Temperature at 2 m and 10 m height		Continuous (averaging time of 1 hour)	

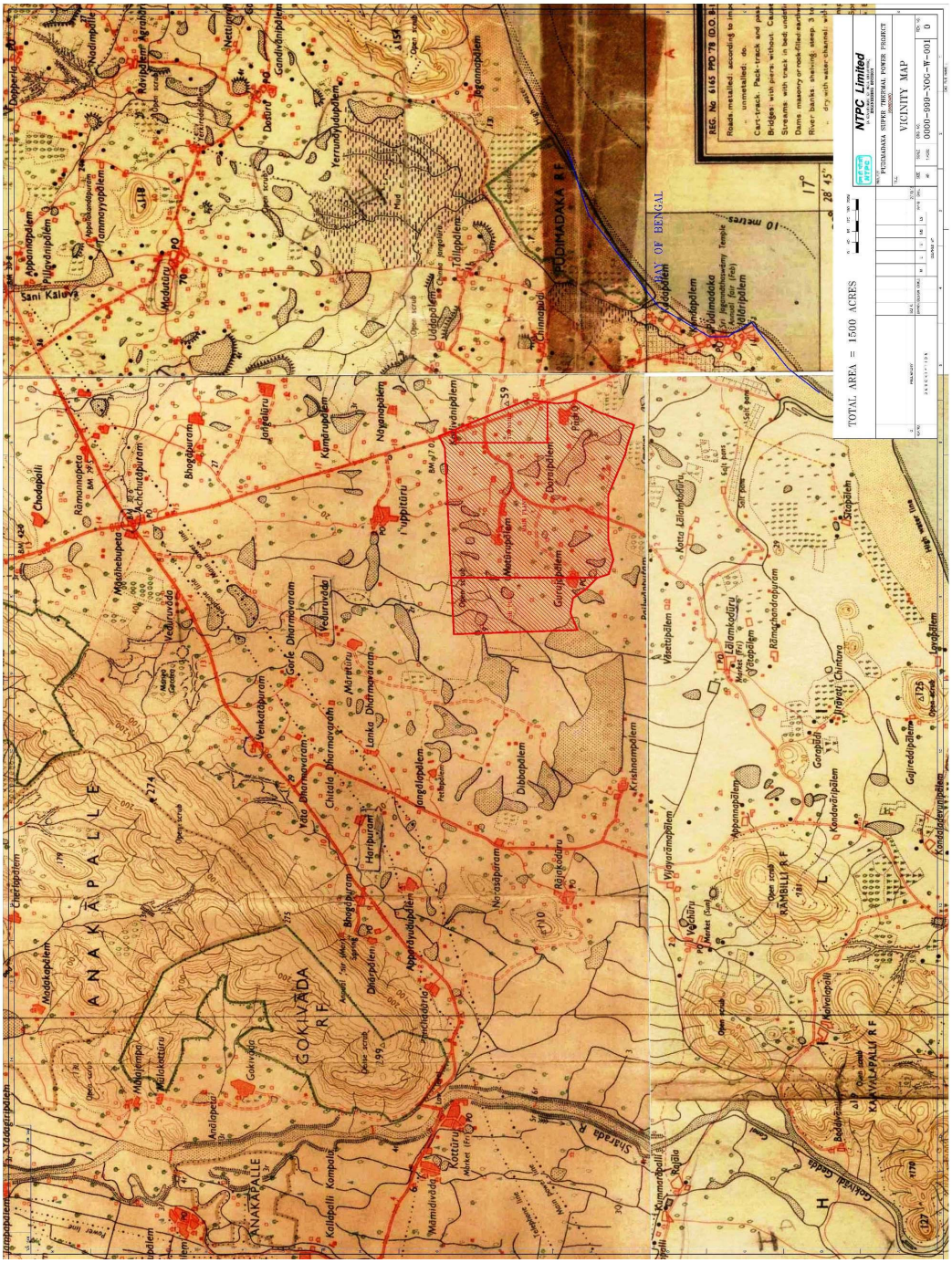
Water Quality (Surface & Ground Water)			
Physical parameters: pH, Temp., DO, conductivity & TSS	Six	Monthly	Consultant has to set up site laboratory for these parameters during the period of study.
Chemical Parameters: Total Dissolved Solids, Alkalinity, Hardness, BOD, COD, NO_3, PO_4, Cl, SO_4, Na, K, Ca, Mg, Silica, oil & grease, phenolic compounds	Six	Monthly	Consultant has to specify the laboratory facilities for analysis of these parameters.
Bacteriological MPN and Total coliform	Six	Monthly	As above
Heavy metals (As, Hg, Pb, Cd, Cr-6, total Cr, Cu, Zn, Se, Fe).	Six	Quarterly	As above
Soil			
pH, conductivity, cation exchange capacity; Total N, P, K, sand, silt and clay etc	Ten	Twice a year	As above Composite soil sampling to be undertaken
Infiltration Tests	Ten	Twice a year	In and around ash disposal area
Noise			
Leq	Ten	Twice a year	24 hourly sampling at each location using an integrating sound level meter
Aquatic/Marine Ecology			
Phytoplankton, Zooplankton, Fish	Three	Twice a year	Surface water bodies in the study area to be covered. Study of Intake water source to be characterized.
Terrestrial Ecology			
Density, diversity, abundance of species, IVI	Three	Twice a year	Different terrestrial ecosystems in the study are need to cover

Rain Water Analysis			
Quantity, pH, Conductivity, SO^{++}_4, Cl^-,NO^-_3	Three	Pre monsoon, post monsoon & winter	

General:

- The Consultant's offer shall indicate detailed methodology (including sampling and analysis procedures wherever applicable and sampling frequency)
- The parameters to be analyzed and the number of sampling locations indicated under various disciplines are only indicative. Consultant will determine the actual plan of action in consultation with E-I-C

EXHIBIT – 1: VICINITY MAP OF PUDIMADAKA STPP (5X800 MW)



PRE-FEASIBILITY REPORT

FOR

PUDIMADAKA SUPER THERMAL POWER PROJECT
(5X800 MW)

NTPC LIMITED
(GOVT. OF INDIA UNDERTAKING)
NEW DELHI

JANUARY'2014

TABLE OF CONTENT

1.0 Executive Summary

Name of Project:	Pudimadaka Super Thermal Power Project (5x800 MW), District- Visakhapatnam, Andhra Pradesh.
Name of Project Proponent:	M/s NTPC Ltd. (A Government of India Enterprise)
Location of the Project: **Correct**	The project site is located near villages Lalamkoduru, Rambilli, Veduruvdda & Pudimadaka in Atchutapuram and Rambilli Mandals having Latitude of 17° 30' 35" to 17° 31' 48" N and Longitude of and 82° 57' 48" to 82° 59' 35" E and is about 15 Kms South-West of NTPC's Simhadri STPP. Nearest Railway Stations Narsingpalli and Elamanchili are about 15 Kms North-West on Howrah-Chennai Section double track, Broad Gauge electrified line. Gangavaram Port is located about 25 kms and Visakhapatnam port at a distance of about 35 km North-East of the site. Commercial Airport at Visakhapatnam is located at about 40 Kms from site. Vicinity Plan of the project is placed at **Exhibit-II.**
Capacity & Unit Configurations:	4000 MW (5x800 MW)
Land Requirement, Current Land Use and Availability:	About 1500 acres of land under possession of Andhra Pradesh Industrial Infrastructure Corporation Limited (APIIC) in SEZ. Special Chief Secretary (Energy), Government of Andhra Pradesh vide letter dated 15.10.2013 directed APIIC for handing over the 1500 Acre land to NTPC and take action for handing over the possession of the land. (Copy of letter is attached as **Annexure-I**)
Water Requirement and Availability:	Water requirement for the project is to be met from sea by constructing suitable intake well in the sea, which is about 2-3 Kms from the project site. Desalination plant shall be provided for sweet water requirement.
Fuel Requirement:	Imported coal has been envisaged for the project. The coal requirement for the project is estimated as 14.25 million tonnes/annum corresponding to 100% PLF considering GCV of 5700 kcal/kg.
Environmental Setting of the Project	In accordance with the procedure laid down in the EIA Notification of 14th September, 2006, Andhra Pradesh State Pollution Control Board

	(APSPCB) will be approached for conducting Public Hearing. Subsequently, Ministry of Environment & Forests will be approached for obtaining Environmental Clearance (EC).

2.0 Introduction of the Project & Background Information

Power development is one of the key infrastructural elements for the economic growth of the country. National Thermal Power Corporation Limited was set up in November 1975 with the objective of planning, promoting organizing and integrated accelerated development of thermal power in the country. NTPC has diversified into hydro power, coal mining, power equipment manufacturing, oil & gas exploration, power trading and distribution. With an increasing presence in the power value chain, NTPC is well on its way to becoming an "Integrated Power Major." To embody its diverse business operations beyond thermal power generation, the company has been rechristened as NTPC Limited on October 28, 2005. Further, on 21 May 2010, NTPC was conferred Maharatna status by the Union Government of India.

NTPC Limited, the largest power generating major in the country presently has total installed capacity of 42,454 MW. NTPC has embarked on plans to become a 1,28,000 MW company by 2032. NTPC Limited shares 18.44% of the total national generation capacity and contributes 27.40% of total power generation as on March 31. 2013.

In pursuance to identification of new green field sites for setting up of large capacity thermal power plants, a multi disciplinary Engineering team along with SRHQ visited Special Economic Zone (SEZ) area near Atchutapuram village in Visakhapatnam district of Andhra Pradesh (AP) developed by Andhra Pradesh Industrial Infrastructure Corporation Limited (APIIC). The team, in their report, illustrated two options and out of which option-I (with 1500 acres land) was recommended. After a series of discussion with Government of Andhra Pradesh (GoAP), Special Chief Secretary (Energy) vide letter dated 15.10.2013 directed APIIC for handing over the 1500 acre of land near Pudimadaka Village to NTPC and take action for handing over the possession of the land.

2.1 Identification of Project & Project Proponent

The present proposal is for implementation of 4000 MW imported coal based thermal power plant comprising of 5 (five) nos. super critical units. Proposed project site is about 15 Kms South-West of NTPC's Simhadri STPP, at about 18 Kms from NH-5 and about 200 m from Pudimadaka road. Nearest Railway Stations Narsingpalli and Elamanchili are about 15 Kms North-West on Howrah-Chennai Section double track, Broad gauge electrified line. Gangavaram Port is located about 25 kms and Visakhapatnam port at a distance of about 35 km

North-East of the site. Commercial airport at Visakhapatnam is located at about 40 Kms from site.

2.2 Existing Infrastructure/ Social Infrastructure

A detailed analysis of social infrastructure available at site shall be undertaken during EIA Study. However, as the proposed site is located near villages Lalamkoduru, Rambilli, Veduruvdda & Pudimadaka in Atchutapuram and Rambilli Mandals.

2.3 Brief Description and Nature of the Project

Pudimadaka STPP shall be direct pulverized coal fired thermal power project based on super critical, once through boiler parameters. The main components of the projects include:

- ✓ Steam Generator, Turbine Generator and Auxiliary Units.
- ✓ Coal Handling System including Dust Extraction and Suppression System
- ✓ Closed Cycle Cooling System with Cooling Towers.
- ✓ Raw water reservoir, Water & Effluent Treatment System
- ✓ Fire Protection System
- ✓ Air Conditioning & Ventilation System
- ✓ Electrostatic Precipitators
- ✓ Chimney
- ✓ Ash Handling System with Dry Ash Extraction, Storage and Disposal Facilities.
- ✓ Electrical Systems: Generator Bus Duct, Transformers, Switchgears, Switch Yard etc.

2.4 Need for the Project & Its Importance to the Country & Region

Power is one of the key infrastructural elements for the economic growth of a country. The project is being implemented as Regional project for meeting the power demand of States and UT of Southern Region.

2.5 Demand Supply Gap

With rapid growth of the economy, power requirement is projected to increase significantly over the next decade. The projected power requirement for FY 2016-17 and 2021-22 is given below:

Projected Power Requirement

Region	Energy Requirement (MU)		Peak Load (MW)	
	2016-17	2021-22	2016-17	2021-22
Northern	422,498	594,000	60,934	86,461
Western	394,188	539,310	62,015	86,054
Southern	357,826	510,786	57,221	82,199
Eastern	163,790	236,952	24,303	35,928

Region	Energy Requirement (MU)		Peak Load (MW)	
	2016-17	2021-22	2016-17	2021-22
North-Eastern	16,154	23,244	2,966	4,056
Andaman & Nicobar	366	505	67	89
Lakshadweep	52	65	11	18
All India	1,354,874	1,904,861	199,540	283,470

Source: 18th Electric Power Survey (EPS) of CEA

The projected power requirement in the SR states is given below:

State-wise Projected Power Scenario in Southern Region

Region	Energy Requirement (MU)		Peak Demand (MW)	
	2016-17	**2021-22**	**2016-17**	**2021-22**
Andhra Pradesh	**1,29,767**	**1,91,912**	**22,445**	**33,194**
Karnataka	78,637	1,08,012	13,010	18,403
Kerala	26,584	34,691	4,669	6,093
Tamil Nadu	1,19,251	1,71,718	20,816	29,975
Pondicherry	3,586	4,452	630	782
Southern Region	**3,57,826**	**5,10,786**	**64,349**	**84,778**

Source: 18th Electric Power Survey (EPS) of CEA

Considering the demand-supply gap and slippages in the 5 year plan capacity addition targets, it is expected that power from the Project will help meet the huge demand for power. As per Load Generation Balance Report 2013-14 of CEA, Energy and Peak deficit still exists at all India basis and particularly in Southern Region.

2.6 Employment Generation (Direct & Indirect) due to the Project

The project will generate direct and indirect employment opportunities as well as opportunities for self-employment. Power projects have mechanized and automated plants. Therefore, the direct opportunities for employment during operation phase are limited. The estimated no. of employees during operation phase of the project is estimated to be about 900. However, during construction phase, the total no. of workers likely to be employed will be much higher (about 2,000). In addition to the people directly involved in construction and operation of the power project, employment opportunities in subsidiary industries and service sectors as well as self employment opportunities shall also be generated.

2.7 Project Description & Process Details

In a thermal power plant, the chemical energy of the fuel (coal) is first converted into thermal energy (during combustion), which is then converted into mechanical energy (through a turbine) and finally into electrical energy (through a generator). The schematic diagram of the process of power generation a coal based thermal power plant is shown in **Exhibit. I**. It has the following steps.

(1) The coal is transferred from the coal handling plant by conveyor belt to the coal bunkers, from where it is fed to the pulverizing mills, which grind it to fine powder. The finely powdered coal, mixed with air is then blown into the boiler by a fan where it burns like a gas.

(2) The process of combustion releases thermal energy from coal. The boiler walls are lined with boiler tubes containing high quality demineralized water (known as boiler feed water). The combustion heat is absorbed by the boiler tubes and the heat converts the boiler feed water into steam at high pressure and temperature. The steam, discharged through nozzles on the turbine blades, makes the turbine to rotate, which in turn rotates the generator coupled to the end of the turbine. Rotation of generator produces electricity, which is passed to the step-up transformer to increase its voltage so that it can be transmitted efficiently. The power is evacuated via switchyard through a Transmission System.

(3) During combustion, the non-combustible part of coal is converted into ash. A small part of ash (about 20%) binds together to form lumps, which fall into the ash pits at the bottom of the furnace. This part of ash, known as bottom ash is water quenched, ground and then conveyed to pits for subsequent disposal to ash disposal area or sale.

(4) Major part of the ash (about 80%) is in fine powder form, known as Fly Ash, and is carried out of the boiler along with the flue gas. The flue gas, after heat recovery, is passed through the electrostatic precipitators, where the ash is trapped by electrodes charged with high voltage electricity.

(5) The flue gases exiting from the Electrostatic Precipitators (ESPs) are discharged through a tall chimney for wider dispersal of remaining ash particles and gases. The ash collected in the ESP hoppers is extracted in dry form and conveyed to dry ash storage silos from where it is supplied to user industries.

(6) Unused part of fly ash is mixed with water and conveyed to ash disposal area in a slurry form. Ash can also be lifted from ash disposal areas for utilization.

(7) The steam, after passing through the turbines, is condensed back into water in condensers and the same is re-used as a boiler feed water for making steam. The reasons for condensing and reusing the steam are following: -

- The cost of boiler feed water is very high as it is very pure demineralised water hence reuse is economical.
- The use of condenser lowers the temperature at the exit end and hence increases the efficiency of the turbine.

(8) The condenser contains tubes through which cold water is constantly pumped. The steam passing around the tubes of condenser looses heat and

condenses as water. During this process, the steam gets cooled while cooling water gets heated up (by about 10^0 C). This hot water is cooled in a cooling tower and recycled for cooling. However, in order to control dissolved solids, a certain amount of blow down is required from the cooling towers, which is used in the plant for other usages such as service water, coal dust suppression etc.

2.8 Requirement of Raw Materials

Coal and Water are the main raw materials proposed to be used in Pudimadaka STPP for power generation. While imported coal shall be utilized as fuel sea water shall be utilized by suitable intake system.

In addition, Heavy Furnace Oil/ HPS/ LSHS shall be used during start-up, warm up and low load (up to 30%) operations. Light Diesel Oil (LDO) firing shall be used to facilitate cold start-up of the unit when no auxiliary steam is available for HFO heating and atomization.

2.9 Resource Optimisation, Recycle & Reuse

Land, Water and Coal are the three main natural resources required for setting up of Pudimadaka STPP. With extensive experience in thermal power generation, NTPC shall make the best efforts to optimize the utilization of resources.

Pudimadaka STPP shall be based on super critical boiler parameters, which higher thermal efficiency as compared to conventional pulverised coal has fired units based on sub-critical boiler parameters. The increase in efficiency results in lower coal consumption as well as lower generation of ash and gaseous emissions per unit of electricity generated. NTPC shall make maximum efforts to utilize the ash generated from the project.

While developing the details of water system for the project utmost care shall be taken to minimize water requirement as well as effluent generation. Main features of the water system shall include:

- Re-circulating type C.W. system with cooling towers / Open System complying with MOEF requirements.
- In case of Cooling Towers, utilization of Cooling Tower blow down for Coal dust suppression and extraction system, Service water system, Ash handling and Fire fighting.
- Recycle and reuse of effluents from coal dust suppression and extraction system and service water system.
- Ash water recirculation system.
- Recirculation of filter backwash to clarifier inlet.

2.10 Availability of construction Power

AP Transco has constructed a 220/132/33 kV substation for Brandex Apparel approx 2.5 KM from the proposed site and the same substation was charged in Nov'2007. The substation has incoming 220 kV feeder from AP Transco Kalpaka S/S and two 132 kV feeders from Gazuwaka and Pedepuram as tie lines. One no. 220/132 kV 100 MVA transformer

is commissioned. The construction power requirement for the said project can be availed from the above substation.

2.11 Quantity of Wastes to be Generated

The wastes generated in a coal based power station consist of flue gas and ash generated due to combustion of coal and liquid effluents generated due to cooling, various industrial processes and domestic use of water.

Ash generated due to combustion of coal will be the main industrial/ solid waste generated from the project. About 80% of the ash shall be generated as Fly Ash while 20% of the ash shall be generated as bottom ash.

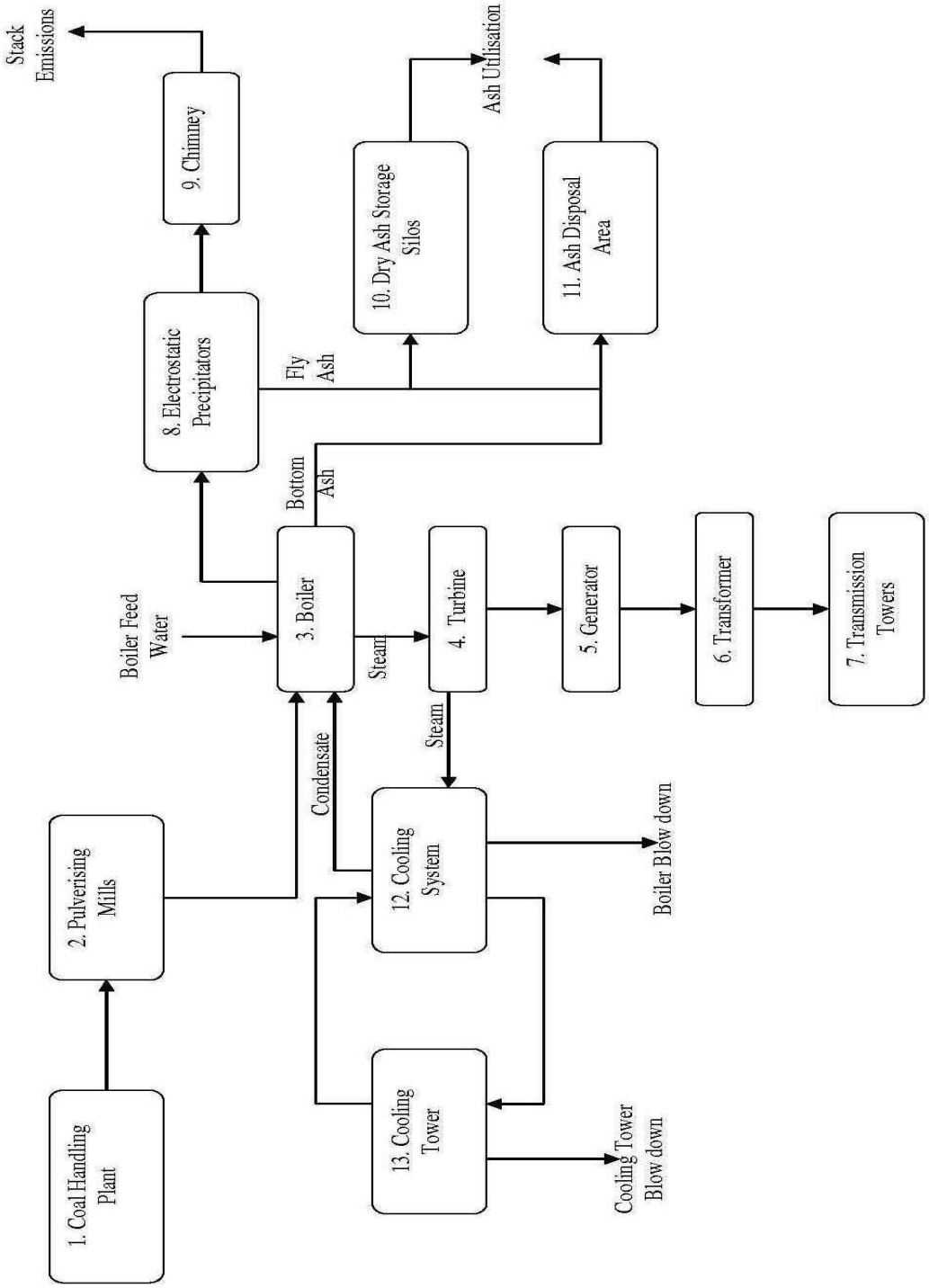


Exhibit-I: Schematic Representation of Thermal Power Generation in Coal Based Thermal Power Plant

3.0 Description of alternate sites

NTPC Ltd. proposes to implement the super thermal power project near Pudimadaka village in Atchutapuram Mandal of Visakhapatnam district (Andhra Pradesh). The present site for the project is selected based on siting criteria of MoEF & following considerations:

i. Availability of suitable and adequate land
ii. Distance from source of coal
iii. Distance from reliable source of water
iv. Roads and railway access
v. Availability of infrastructural facilities
vi. Environmental aspects

Alternative sites:

Keeping in view the above technical and environmental requirement two alternative locations were identified for further examination:

I. Site near Pudimadaka at Atchutapuram (in Vizag district)
II. Site near Nakkapali Mandal (in Visakhapatnam district)

3.1 SITE I: Near Pudimadaka at Atchutapuram (in Vizag district)

Location & Approach

The site is located having Latitude of 17^0 30' 38" to 17^0 31' 48" N and Longitude of 82^0 57' 48" to 82^0 59' 35" E respectively. The project site is surrounded by villages Lalamkoduru, Rambilli, Veduruvada and Pudimadaka in Atchutapuram and Rambilli Mandals. Nearest Railway Station is Anakapalli about 15 Kms on Vijayawada – Kolkata Section and same is double track, Broad gauge electrified line. Visakhapatnam airport is located at about 40 Kms from site. Gangavaram Port is located at about 30 km in North East direction of the site. Yelamanchali town is located at about 20 km from site.

The vicinity map showing the details of the site is placed at **Exhibit-II.**

Land

About 5221 acres of land is under possession of APIIC as marked in attached layout of SEZ, which has been allotted to some industrial units. As per discussion with Dy. Zonal Manager, APIIC, about 1500 acres of land was identified for establishing Power Plant. The land identified for the proposed project is dry in nature. The land is already acquired and villagers are compensated. It was learnt that Topo-graphical survey was carried out by APIIC and the data can be made available from Hyderabad head office once the formalities for allocating the said land in name of NTPC gets completed.

Water

Water for the project has to be drawn directly from sea by constructing a suitable intake well in the sea, which is about 2-3 Kms from the proposed site. However, for meeting Sweet water requirement desalination plant is proposed.

Sweet water can be made available from Yelluru canal (18 kms.) and pipeline has been laid by APIIC for supplying water to SEZ units but availability of sweet water for power project is difficult. Commitment for water needs to be obtained.

Coal

Washed/blended coal or imported coal is proposed as fuel. Import of coal shall be explored to meet coal requirement. Coal could be brought to the Gangavaram Port through the sea route. Gangavaram Port is located about 35 KM. The port has cargo handling facility for coal and iron ore.

Coal can also be brought to the Visakhapatnam port through the sea route and same is located about 50 KM from site. Presently M/s Vedanta is operating coal handling activities with capacity of 6MT per month. However, availability of coal for the project needs further elaboration.

Power Evacuation

Existing AP TRANSCO S/S in the SEZ area: AP Transco has constructed a 220/132/33 kV substation for Brandex Apparel approx 2.5 KM from the proposed site and the same substation was charged in Nov'2007. The substation has incoming 220 kV feeder from AP Transco Kalpaka S/S and two 132 kV feeders from Gazuwaka and Pedepuram as tie lines. One no. 220/132 kV 100 MVA transformer is commissioned.

The construction power requirement for the said project can be availed from the above substation.

Environmental Aspects:
The land identified is dry land. The site is 500 m away from Railway line, River and National Highway. The land identified is 2-3 Km away from the sea coast.

3.2 SITE II: Near Nakkapali Mandal (in Visakhapatnam District)

Location

The site is located at a distance of 8 K.M from NH-5 at about 18 Kms from Tuni town. Nearest Railway Station is Tuni about 18 Kms on double track, broad gauge electrified line in Vijayawada – Kolkata

Section and Yelamanchali Railway Station is located at about 20 Kms from site. Vishakhapatnam Airport is at a distance of 100 Kms. A vicinity plan indicating the site is enclosed at **Exhibit-III**.

Land

About 4500 acres of land is being acquired by APIIC out of which APIIC informed that for setting of 4000 MW plant capacity, they can identify about 2000 acres land.

Around 2000 Acres of land is earmarked for this project. The area has commercial crops viz coconut and cashew plantation and has permanent settlements with 4 to 5 villages mainly Rajyyapeta (approx population 4500), Chandanada (approx population 2300), Bughiraju Peta (approx population 1300) and their hamlets. There are 5-6 hillocks in the area and the ground level is varying from 5 m to 60 m with lots of undulations.

Water

Sea water can be drawn to meet the water requirement by constructing suitable intake well in sea which is 1-2 kms from the proposed project site.

Sweet water may not be available for the proposed project as informed by APIIC officials. Further, suitable desalination plant shall be installed in the plant to meet plant and township requirement.

Coal

Raw/Washed/blended coal or imported coal is proposed as fuel. Import of coal shall be explored to meet coal requirement. Gangavaram Port at a distance of 75 Km and Vishakhapatnam Port at a distance of 110 Km may be explored for imported coal through the sea route.

Environmental Aspects

The site is 500 m away from Railway line, River and National Highway. The area comprises of dry and wet land and there are commercial crops like coconut, cashew and palm trees. The site is surrounded by Payakaraopeta Reserved Forest and Vempadu Reserved Forest within 10 Kms radius. Social forest is existing near Rajayyapeta village. The land identified is along the sea coast and CRZ demarcation is to be carried out for the project land. There is a salt pan near village Rajayyapeta village. There is a creek passing through Chandanada village connecting to sea. HETERO drug is the major Industry existing in the vicinity.

The comparative summary of the two alternate sites proposed for STPP is detailed under **Table-I.**

TABLE I: COMPARISON OF ALTERNATE SITES

Sr. NO.	DESCRIPTION	Site # 1 Pudimadaka	Site # 2 Nakkapalli
1.	Land	Dry Land. Identified in SEZ area of 1500 Acres.	Dry and Wet land. Around 2000 acres
2.	Water	Sea Water (Bay of Bengal)	Sea Water (Bay of Bengal)
3	Fuel	Imported Coal	Imported Coal
Environmental Sensitive Zones (within 10 km)			
4	National Parks	NIL	NIL
5	Wildlife Sanctuaries	NIL	NIL
6	Monuments	NIL	NIL
7	Hills / Valleys	NIL	Yes
8	Rivers/sea	Bay of Bengal	Bay of Bengal
9	Nearest railway station	Anakapalli is approximately 15 Kms	Tuni is approximately 18 Kms
10	Nearest Airport	Visakhapatnam Air Port is approximately 40 Km.	Visakhapatnam Air Port is approximately 100 Km.
11	Nearest town	Atchutapuram is approximately 4 Km	Tuni is approximately 18 Km.
12	Nearest Sea Port	Gangavaram is approximately 35 Km	Gangavaram is approximately 75 Km.
13	Nearest forest	Panchadarla Reserved Forest and Gokivada Reserved Forest within 10 Km radius.	Payakaraopeta Reserved Forest and Vempadu Reserved Forest within 10 Km radius

3.3 CONCLUSION

The site near Pudimadaka at Atchutapuram **(Site-I)** was preferred and selected after examining the following advantages & facts over the site near Nakkapali Mandal **(Site-II).**

Site-I:

- ✓ The land has already been acquired by APIIC and in their position. The villagers have already paid the compensation. No Rehabilitation and Resettlement is involved for this land.
- ✓ The land use of site near Pudimadaka is completely dry land (identified in SEZ) and also free from any forestland.
- ✓ The land identified near Pudimadaka is about 2-3 Km away from the sea coast.

- ✓ Hence the proposed site is most suitable for setting up of the power project.

Site-II:

- ✓ The site near Nakkapali comprises of 4 to 5 villages mainly *Rajyyapeta, Chandanada, Bughiraju Peta* and their hamlets.
- ✓ Land use of Nakkapali site comprises of dry and wet land with some commercial crops like coconut, cashew and palm trees etc. and also surrounded by Payakaraopeta and Vempadu Reserved Forest.
- ✓ About 5-6 hillocks are located near Nakkapali site.
- ✓ The land identified near Nakkapali site is along the sea coast and attracts CRZ demarcation study from the sea coast.
- ✓ There site near Nakkapali is having a salt pan area near village Rajayyapeta.

4.0 Environmental Aspects

No Wildlife Sanctuary, National Park, Archeological Monument of National importance, Historical Places and industry exist within 10 Kms. radius.

4.1 Pollution Control Measures

4.1.1 Air Pollution Control System

Electrostatic Precipitator

High efficiency electrostatic precipitators (ESPs) of 99.9% will be installed to control the emission of fly ash particles. The precipitators will be designed to limit the particulate emission to 50 mg/Nm^3 under all design conditions.

Stack

To facilitate wider dispersion of particulate and gaseous pollutants after ESP from the 5x800 units, Two twin flues and one single flue reinforced concrete chimney of height 275 m above plant grade level is envisaged for this project.

The chimney will be provided with arrangements for undertaking stack emissions monitoring.

Retrofitting of FGD System

Flue Gas Desulphurization (FGD) system will be installed to control the emission of SO_2.

NOx Control System

The appropriate low NOx burners shall be adopted during the boiler design for controlled NOx emission.

Dust Extraction and Suppression System:

For control of fugitive dust emissions at all requisite points in coal handling plant and coal stockyard effective dust extraction / suppression systems would be provided.

4.1.2 Water Pollution Control System

An effluent management scheme, consisting of collection, treatment, recirculation and disposal of effluents shall be implemented in order to optimize the make up water requirement as well as liquid effluent generation.

The liquid effluents shall be collected and treated/ recycled as per the following design philosophy:

- The filter backwash water of PT Plant shall be collected and recycled back to the inlet of clarifiers.
- The sludge from clarifiers of Water PT Plant shall be collected in a sump/ pit and shall be pumped to bottom ash slurry sump for disposal to bottom ash dyke.
- The waste effluents from neutralization pits of DM Plant and Condensate Polishing Plant shall be collected in the respective neutralization pits and neutralized before pumping to the Central Monitoring Basin before final disposal.
- Re-Circulating type Cooling Water (C.W) system with cooling towers, with C. W. blow down from cold water side to ensure no thermal pollution.
- Part of CW system blow down would be used for service water system, fly ash handling, bottom ash handling and coal dust suppression. The unused blow down shall be led to Central Monitoring Basin after treating through clarifiers/ tube settlers. The sludge from clarifier/ tube settler shall be disposed off in bottom ash dyke along with bottom ash slurry.
- A coal particle settling pond shall be provided to remove coal particles from coal handling plant waste. Decanted water shall be pumped back to the coal dust suppression system.
- Service water effluent collected from plant drains shall be led to a sump. From the sump the service water shall be pumped upto tube settler/ clarifier for treatment of suspended solids. Treated service water shall be sent back to service water tank to the extent possible for re-use.
- The plant shall have two different systems for ash disposal – conventional wet slurry disposal with ash water re-circulation for bottom ash and High Concentration Slurry Disposal (HCSD) for fly ash. HCSD system will require less quantity of water and there will be no effluent from the fly ash disposal site.
- All the plant liquid effluents treated at the facilities at their origin and are mixed at different points and finally in Central Monitoring Basin (CMB) and disposed off to the final disposal point into Sea.

An independent plant effluent drainage system would be constructed to ensure that plant effluents do not mix with storm water drainage. Efficient operation of various treatment schemes shall be ensured so that the quality of treated effluent from CMB conforms to relevant standards, prescribed by regulatory agencies.

The sewage from plant and township shall be treated in a sewage treatment plant. The treated sewage conforming to prescribed

standards shall be utilized for plantation to the extent possible. The balance effluent shall be discharged.

4.1.3 Noise Pollution

The major noise generating sources are the turbines, turbo-generators, compressors, pumps, fans, coal handling plant etc. from where noise is continuously generated. Acoustic treatment/ equipment design shall be done to control the noise level below 90 dB (A).
Wherever required, specifically in high noise areas the workers shall be provided with protective equipment such as ear plugs/ ear muffs.

4.1.4 Solid Waste Management

Ash will be the solid waste generated from the power project. An ash management scheme shall be implemented consisting of dry collection of fly ash, supply of ash to entrepreneurs for utilization and promoting ash utilization to maximum extent and safe disposal of unused ash. The plant shall have two different systems for ash disposal – conventional wet slurry disposal with ash water re-circulation for bottom ash and High Concentration Slurry Disposal (HCSD) for fly ash. HCSD system will require less quantity of water.

4.1.5 Afforestation and Green Belt Development

A green belt of about 100 m width has been planned all around the main plant area except the switchyard side. In addition, all efforts will be made for preparing action plan for undertaking extensive Afforestation and plantation activities comprises of different selected recreational and socio-economical importance species, native species, species capable for controlling pollution etc. in all available spaces in the main plant and township area and raising shelterbelt plantations along the vicinity of ash storage/ disposal sites and along boundary walls.

4.1.6 Post Operational Monitoring Programme

Regular monitoring of pollutants in different environmental disciplines like ambient air, stack emission, treated waste water, etc. shall be conducted and the data shall be submitted to Andhra Pradesh State Pollution Control Board regularly. The monitoring locations will be finalized in consultation with Andhra Pradesh State Pollution Control Board (APSPCB). The plant will be equipped with all necessary equipment and manpower for ensuring effective monitoring.

4.1.7 Institutional Set-Up

An Environmental Management Group (EMG) will be established at Pudimadaka STPP (5x800 MW) to deal with various environmental aspects including follow up with Pollution Control Board & regional offices of MOEF and also to interact with inter-disciplinary groups responsible for maintenance and operation of pollution control equipments.

4.1.8 Statutory Clearances

A Draft Environmental Impact Assessment report for this project will be prepared. Andhra Pradesh State Pollution Control Board (APSPCB) will be approached for conducting Public Consultation. Thereafter, the EIA report will be finalized incorporating public hearing minutes & action plan for its submission to Ministry of Environment & Forests (MOEF) for obtaining Environmental Clearance (EC), in accordance with the procedure laid down in the MOEF Notification dated 14th September 2006 and its further amendment dated 01st December 2009.

4.1.9 Clean Development Mechanism

Sustainable power generation has been one of the prime objectives of NTPC limited since inception. Towards achieving this objective various measures have been introduced to ensure minimum degradation of the environment due to the operation of the power stations. As a part of agreement under Kyoto protocol the CDM has been introduced to enable trading of Certified Emission Reduction (CER) between the developed countries and the developing countries. It is envisaged to take up NTPC's proposed 5X800 MW coal based thermal power project having higher steam cycle supercritical parameters as CDM project. Adoption of higher cycle parameters will improve power plant efficiency and thereby reduce coal consumption per unit of electricity generation with consequent reduction in CO2 emission.

EXHIBIT-II

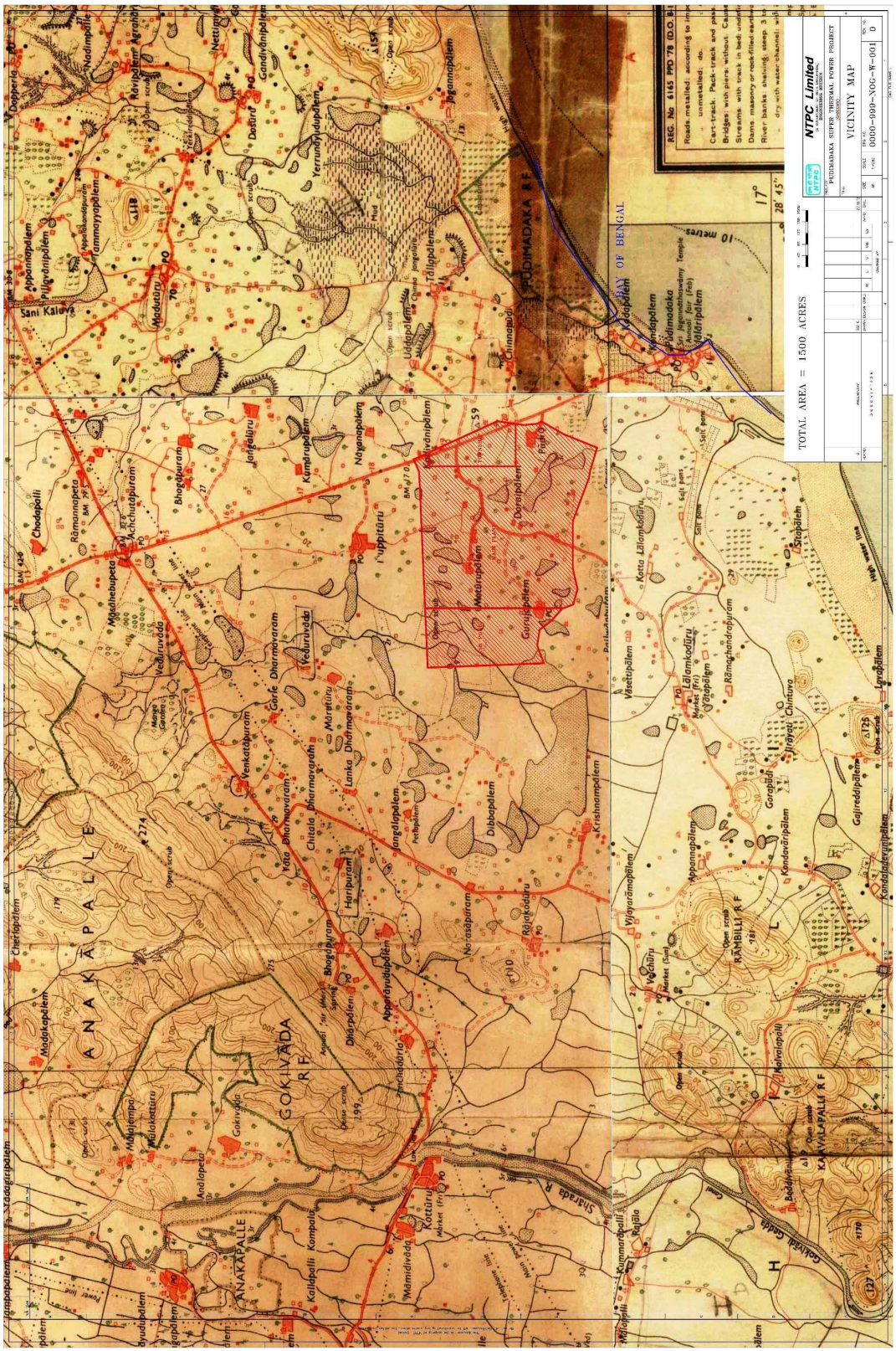
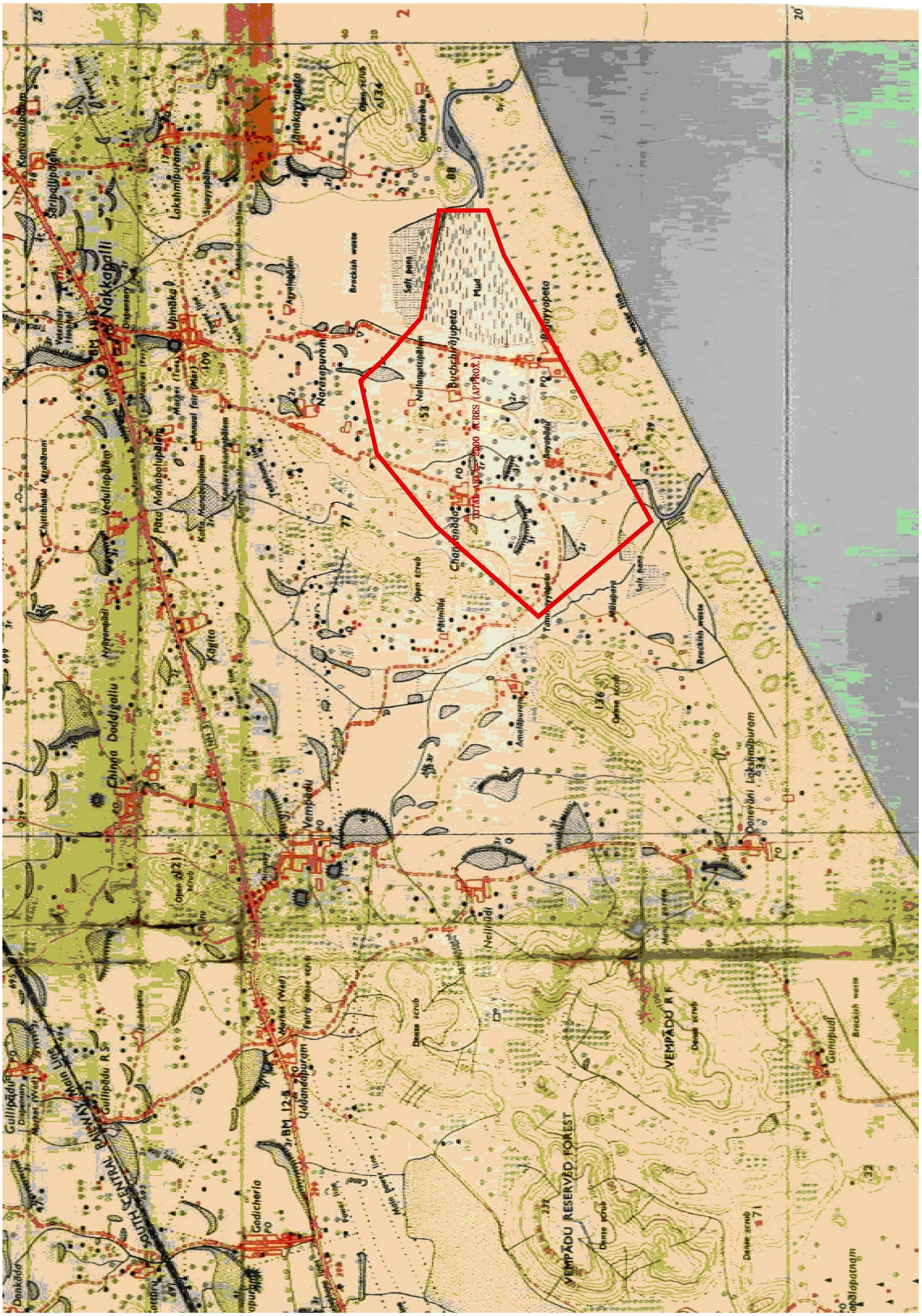

NTPC Limited
PUDIMADAKA SUPER THERMAL POWER PROJECT
VICINITY MAP
TOTAL AREA = 1500 ACRES
BAY OF BENGAL
PUDIMADAKA R.F
ANAKAPALLE
GOKIVADA R.F
RAMBILLI R.F
KAVALAPALLI R.F
Sharada R.

EXHIBIT-III


Nakkapalli
Buchchirajupeta
Narasapuram
Vempadu
Chinna Doddigallu
Kapila
Gudicherla
Uddandapuram
Gullipadu
Donerpalem
Lakshmipuram
Amalapuram
Nellipudi
Gumpudi
VEMPADU RESERVED FOREST
VEMPADU R F
SOUTH CENTRAL RAILWAY
Brackish waste
Open scrub
Dense scrub
Salt Pans
Habitation
Tank
Hut
Mangrove
Market (Wed)
Ferry
Hill
Hill Forest
Temple
Mosque
Church
Graveyard
Cremation ground
Sluice
Bridge
Culvert
Cart track
Footpath
Power line
Telephone line
Railway line
Canal
Stream
Tank
Sea
Contour
Spot height
Trigonometrical station
Benchmark
Boundary
Village
Hamlet
Post office
Police station
Dispensary
Veterinary hospital
Primary school
Middle school
High school
College
Industry
Quarry
Kiln
Windmill
Well
Tube well
Hand pump
Irrigation channel
Irrigation tank
Irrigation well
Irrigation tube well
Irrigation hand pump
Irrigation sluice
Irrigation bridge
Irrigation culvert
Irrigation cart track
Irrigation footpath
Irrigation power line
Irrigation telephone line
Irrigation railway line
Irrigation canal
Irrigation stream
Irrigation tank
Irrigation sea
Irrigation contour
Irrigation spot height
Irrigation trigonometrical station
Irrigation benchmark
Irrigation boundary
Irrigation village
Irrigation hamlet
Irrigation post office
Irrigation police station
Irrigation dispensary
Irrigation veterinary hospital
Irrigation primary school
Irrigation middle school
Irrigation high school
Irrigation college
Irrigation industry
Irrigation quarry
Irrigation kiln
Irrigation windmill
Irrigation well
Irrigation tube well
Irrigation hand pump
Irrigation sluice
Irrigation bridge
Irrigation culvert
Irrigation cart track
Irrigation footpath
Irrigation power line
Irrigation telephone line
Irrigation railway line
Irrigation canal
Irrigation stream
Irrigation tank
Irrigation sea
Irrigation contour
Irrigation spot height
Irrigation trigonometrical station
Irrigation benchmark
Irrigation boundary
Irrigation village
Irrigation hamlet
Irrigation post office
Irrigation police station
Irrigation dispensary
Irrigation veterinary hospital
Irrigation primary school
Irrigation middle school
Irrigation high school
Irrigation college
Irrigation industry
Irrigation quarry
Irrigation kiln
Irrigation windmill

ANNEXURE-I

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GOVERNMENT OF ANDHRA PRADESH
ENERGY (PR.IV) DEPARTMENT

Letter No.8309/PR.IV/2010-6. Dated 15.10.2013.

From:
The Special Chief Secretary to Government,
Energy (Power.IV) Department,
Andhra Pradesh Secretariat, Hyderabad.

To
The Vice Chairman & Managing Director,
Andhra Pradesh Industrial Infrastructure Corporation Ltd.,
Parisrama Bhavan, 6th Floor, 5-9-58/B, Fateh Maidan Road,
Hyderabad - 500 004.

Sir,

Sub:- Energy Department - Setting up of coal based 5x800 MW (4000 MW) - Ultra Super Critical Thermal Power Station by NTPC - Allotment of land to an extent of Ac. 1500 to NTPC at Pudimadaka Village of Visakhapatnam District - Permission - Accorded.

Ref:1.From the Regional Executive Director (South) NTPC, Letter dated:19.11.2010.
2.Govt.Memo.No.8309/Pr.IV/2010-1, dt:19.11.2010.
3.From the Chairman/APPCC, & CMD, APTRANCO, Lr.No.CE/IPC/F.Pudimadaka/D.No.269/10, Dt:14.12.2010
4.Govt.Memo.No.8309/Pr.IV/2010-2, dt:31.12.2010.
5.From VC & MD, APIIC, Lr.No.210212/APIIC/Lands/A2/NPTC-Pudimadaka/2012, Dt:17.04.2012.
6.From the Regional Executive Director (South) NTPC, Letter ref No.09/SRQH/RED, dated:27.05.2013.
7.Govt. D.O.Lr.No. 8309/Pr.IV/2010, dt:10.06.2013.
8.From the Vice Chairman & Managing Directror, Andhra Pradesh Industrial Infrastructure Corporation Ltd., Hyderabad, D.O.Lr.No. 210212/APIIC/Lands/A2/NPTC-Pudimadaka/2012, dated 13.06.2013

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Adverting to the references cited on the above subject, the Competent Authority hereby directs the APIIC to take necessary action for handing over the contiguous area to an extent of Ac.1500 to National Thermal Power Corporation Limited at Pudimadaka Village of Visakhapatnam District, which was earlier shown to them for setting up of Coal Based 5x800 MW (4000 MW) - Ultra Super Critical Thermal Power Station.

2. The Vice Chairman & Managing Director, APIIC to take quick action for handing over the possession of the land within 15 days under intimation to the Government.

Yours faithfully,

for Special Chief Secretary to Government.

Copy to:

The Regional Executive Director (South) NTPC, RP. Road, Secunderabad. *(for arranging to take possession of the land. He is also to intimate at the earliest the maximum share of power to APDISCOMs beyond 50%, with reference to the State Government Letter dated 05-07-2013).*
The Chairman APPCC & CMD, APTRANSCO, Hyderabad.
The Industries and Commerce Department.

क्षे.का.नि.का. सचिवालय
RED's Sectt.
15/10