REVISED FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

4000 MW
YADADRI THERMAL POWER STATION
(5 x 800 MW - Supercritical Coal Based Thermal Power Plant)

At

Veerlapalem Village, Damercherla Mandal,
Nalgonda (Dist.), Telangana State.

Category: A



By

Telangana State Power Generation Corporation Limited
Vidyut Soudha, Hyderabad, Telangana state.

Prepared By

B.S. ENVI-TECH (P) LTD
Secunderabad – 500 017
NABET Accreditation No : NABET/EIA/1316/RA002

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EXECUTIVE SUMMARY (ENGLISH)

EXECUTIVE SUMMARY

For

4000 MW
YADADRI THERMAL POWER STATION
(5 x 800 MW - Supercritical Coal Based Thermal Power Plant)

At

Veerlapalem Village, Damercherla Mandal,
Nalgonda (Dist.), Telangana State.

Category: A



By

Telangana State Power Generation Corporation Limited
Vidyut Soudha, Hyderabad, Telangana state.

Prepared By

B.S. ENVI-TECH (P) LTD
Secunderabad – 500 017
NABET Accreditation No : NABET/EIA/1316/RA002

EXECUTIVE SUMMARY

A.1 INTRODUCTION

M/s. Telangana State Power Generation Corporation Limited (TSGENCO) proposed to setup a 4000 MW (5X800 MW) - Supercritical Coal Based Yadadri Thermal Power Station at Veerlapalem Village, Damercherla Mandal, Nalgonda (Dist), Telangana to meet the present and future power demand of newly formed Telangana State.

The proposal is a Category - A project as per Environmental Impact Assessment (EIA) Notification SO 1533 dated 14-09-2006 which necessitates obtaining the Environmental Clearance from Ministry of Environment and Forests & Climate Change (MoEF&CC), Government of India. TSGENCO as per the requirement of EIA notification has submitted necessary application to MoEF&CC, GoI for issuing Terms Of Reference (TOR).

The proposal was considered by the Expert Appraisal Committee - Thermal Power (EAC-T) during 45th EAC meeting of MoEF&CC, GoI, New Delhi held on 29th-30th October2015. During the appraisal, EAC opined that a site visit by a Sub-Committee is required to ascertain the ground situation before taking a decision in connection with the matters relating to a tributary/channel of River Krishna passing through the proposed site etc. Standard Terms of Reference was issued by MoEF & CC, GoI vide letter No. J-13012/18/2015 - IA.I(T)s dated 2nd November, 2015. The Sub-Committee visited the site on 05-12-2015 and its report was discussed by EAC-T, MoEF & CC in the EAC-T meeting held on 18th December, 2015. The committee during the meeting sought replies to the concerns that have been raised by EIA Resource and Response Centre, New Delhi (ERC) vide their representation dated 28.10.2015 before issue of the TOR. TSGENCO submitted the replies vide lr.No.CE/C/Thermal/SE/C/TCD-I/F.YTPS (5x800MW)/D.No237/15 Dt 22.12.2015 to the concerns raised.

TOR for the proposal was granted by MoEF & CC after further appraisal in the EAC meeting held on 28-29th January, 2016. The Additional Terms of Reference (Addl.ToR) was approved in

addition to Standard ToR granted by MoEF&CC for carrying out the EIA study vide letter No. J-13012/18/2015-IA.I(T) Dt 16.02.2016.

Draft EIA report was prepared by M/s. Bhagavathi Ana Labs Pvt. Ltd.(a Bureau Veritas Group Company), Hyderabad based on site specific baseline data collected during the period December, 2015 to February, 2016.

The Public Hearing was conducted on 31.05.2016 by Telangana State Pollution Control Board.

Final EIA report incorporating the details of the Public Consultation was prepared and submitted to MoEF&CC through online on 25.06.2016. The proposal was discussed in 63rd Reconstituted Expert Appraisal Committee meeting held on 30.08.2016 for grant of Environmental Clearance. During the discussions, the committee observed major short comings in the EIA/EMP and opined that the report needs to be redone to address the points listed under major shortcomings as per EAC, MoEF&CC minutes (MOM) of meeting dated 31.08.2016.

TSGENCO has appointed M/s B. S. Envi-Tech (P) Ltd., Secunderabad for preparing the Revised EIA Report. The subject report is the Revised EIA Report prepared incorporating all the issues raised in the MOM of EAC, MoEF & CC.

MoEF& CC vide its minutes of meeting held during 29th & 30th of August, 2016 has directed TSGENCO to re-conduct the Public Hearing based on the Revised EIA Report. TSGENCO appealed to MoEF & CC to exempt from re-conducting the Public Hearing.

MoEF& CC has exempted the proposal from re-conducting the public hearing vide Minutes of Meeting of 1st EAC (Thermal Power) MoEF&CC, GoI dated 28.12.2016 subject to compliance of certain conditions:

TSGENCO vide the Minutes of Meeting of 1st EAC (Thermal Power) MoEF&CC, GoI dated 28.12.2016 has published the public notice in the following newspapers to make the Public aware about the revised EIA/EMP to seek comments.

Newspaper 1- The Hindu News Paper (English Daily) dated 02.02.2017
Newspaper 2 – Namasthe Telangana News Paper (Telugu) dated 02.02.2017

The Revised Final EIA Report was uploaded on Telangana State Pollution Control Board website on 01.02.2017 for minimum 21 days after the public notice.

Four representations giving the comments on the Revised EIA Report were received by TSPCB. The representations/comments received on the Revised EIA report along with response statement of TSGENCO are enclosed in the Revised Final EIA Report.

A.2 PLANT CAPACITY, COST AND IMPLEMENTATION SCHEDULE

TSGENCO proposes to implement the 4000 MW power project as given below:

PROJECT SCHEDULE

S.No	Unit Capacity	Tentative time schedule
1.	2 X 800 MW	Unit#1 and #3 : 36 months from Zero date
2.	3 X 800 MW	Unit#2, #4 and #5 : 48 months from Zero date

Source : TSGENCO

A.3 TECHNOLOGY SELECTION & IMPLEMENTATION

TSGENCO proposes to establish 4000 MW (5 X 800 MW) Yadadri Coal Based Thermal Power Station based on Super-Critical Technology. The Plant is based on use of blended coal (50% Indigenous and 50% Imported coal) or 100% Imported Coal. TSGENCO has taken adequate measures in consultation with BHEL to comply with the proposed emission standards as per latest Government Gazette Norms, dated 07.12.2015.

A.4 PROJECT SITE AND ITS ENVIRONS

The project site is located at Veerlapalem (V), Dameracherla (M), Nalgonda District, Telangana State with an average msl of about 79 m. Photographs of the plant site are shown below

PHOTOGRAPHS OF THE PROJECT SITE









A.5 REQUIREMENTS OF THE PROJECT

- The total land requirement of the project is estimated to be about 2800 acres complying with CEA norm of 0.7 acres/MW. Of the total area of 2800 acres, 2095.28 acres is Forest Land falling under the jurisdiction of Veerlapalem Forest Block and 704.12 acres is Patta Land, Government Land, Udafa patta Land and D-Patta Land falling under the jurisdiction of Damaracherla Mandal, Nalgonda District.

- The landuse of the project site is mainly degraded reserved forest, semi-agricultural and partly revenue land with two isolated pockets of habitation i.e Modugulakunta Tanda and Kapura Tanda.

- The project will use blended coal having ratio of 50 % Indigenous coal and 50 % Imported coal or 100 % Imported coal supported by the secondary fuel oil (LDO) for start-up and Heavy Oil for flame stabilization at low loads.

- The estimated coal requirement of the plant is 12.28 (blend coal)/11.02 (imported coal) MTPA

- TSGENCO has entered into Memorandum of Understanding (MOU) with M/s Singareni Coal Collieries Ltd (SCCL) for supply of Indigenous Coal

- TSGENCO has entered into Memorandum of Understanding (MOU) with M/s MSTC, a Government of India Enterprise for supply of Imported Coal.

- Indigenous coal will be transported by rail through proposed railway line.

- Imported coal will be received by ships at Krishnapatnam/Kakinada/Visakhapatnam ports. From the Ports, coal will be transported by Indian Railways to the project site.

- The project is based on Zero Discharge considering recycling of treated wastewater. Water requirement of the project is estimated to be 10,000 m^3/hr (97.8 cusecs/3.10 TMC per year) considering optimized COC of 5.0 and complying with the new norm of 2.5 m^3/MWHr. This requirement will be met from River Krishna.

- Govt of Telangana, Irrigation and CAD Department has allocated 208 cusecs of water (6.60 TMC/year) from Krishna River water. TSGENCO will utilize about 97.8 cusec (3.10 TMC per year) for the proposed 4000 MW from this allocation.

- TSGENCO will install intake structure including pumping station near Madachelu area which is about at 1.0 km distance i.e. on upstream side of confluence point of Tungapahad Vagu & Krishna river. Pipeline will be laid from this point to the project site.

- The Power generated will be evacuated through 400KV double circuit Quad Core Moose Conductor to the following interconnecting substations, namely

  i. Choutuppal
  ii. Dindi
  iii. Maheshwaram
  iv. Jangoan

- The total manpower requirement during construction 5150 (150 – Direct and 5000 indirect and during operation is 4000 (2000 – Direct and 2000 – indirect)

- Preference will be given to local persons from neighboring villages based on suitability during construction and operational phase.

- Colony will be constructed within the project site for the employees of the power plant in 80 acres. The colony will include the following

  a. Quarters for 2000 employees
  b. Project Hostel
  c. Guest House
  d. Community Center
  e. Recreational Facilities
  f. Health Center

A.6 BASELINE STUDY

Baseline data was collected during study period of Winter season covering the months of December, 2015, January, 2016 and February, 2016 by M/s. Bhagavathi Ana Labs Pvt. Ltd. (a Bureau Veritas Group Company).

MoEF&CC, Expert Appraisal Committee permitted use of baseline data collected during Winter, 2015-16 for the Revised EIA Report which is presented in this report. Additionally, Baseline data was collected for one month during Post Monsoon 2016 (October, 2016) as part of validation. The baseline data of both Winter, 2015-16 and Post Monsoon 2016 (October, 2016) is presented in this report.

Ambient air quality of the study area has been assessed through a network of 10 ambient air quality locations representing the downwind, cross wind and upwind impact scenario of the project site.

- The Ambient Air Quality monitored in the study area was found to be well within the limits of NAAQ standards prescribed for Residential, Rural & Other Areas.

- The day equivalent noise levels were found to be moderately higher due to local activities in the villages. Noise levels recorded in the night time were found to be less. Noise levels recorded during the day and night time were found to be less than 50.3 dB (A).

- Assessment of water quality in the study area included the quality assessment of parameters as per the Indian standard IS 10500 (Drinking Water standard). Ten Ground water samples and ten Surface water samples from various locations in and around the Project site within 10 km radius were collected for assessment of the physico-chemical and bacteriological quality during Post Monsoon, '16

- Ground water samples collected from ten locations within the study area showed compliance of all parameters with the drinking water standard of IS 10500 except for fluoride content.

- Surface water samples collected from different locations within the study area showed compliance of all parameters with the drinking water standard of IS 10500 except for fluoride and bacteriological content.

- Ten samples were collected to assess the soil quality in the 10 km study area of plant site which revealed low fertile quality

- There are no wild life sanctuaries, national parks, elephant/tiger reserves within 10km radius of the study area. Amrabad Tiger Reserve is located at a distance of 14.03 km from project site.

- As per Wild Life (Protection) Act, 1972, four schedule – I species i.e Indian Peafowl, Indian python, Monitor lizard and Indian softshell turtle are present in the study. However these Schedule – I species are not falling in the endangered category.

A.7 ENVIRONMENTAL IMPACTS AND MANAGEMENT PLAN – CONSTRUCTION PHASE

The environmental impacts and management plan during construction phase are detailed below.

- The construction of power project would result in increase of Particulate Matter/dust concentrations due to fugitive dust. Frequent water sprinkling in the vicinity of the construction sites would be undertaken. It will be ensured that both gasoline and diesel powered vehicles are properly maintained to comply with exhaust emission requirements.

- Noise levels generated during construction activity sometimes may be high. Onsite workers working in noise prone areas would be provided with earmuffs & ear plugs.

- Water for construction will be met from River Krishna. The location of the proposed water intake structure is about at 1.0 km distance which is on upstream side of confluence point of Tungapahad Vagu & Krishna river. Pipeline will be laid prior to commencement of construction. Raw water reservoir which is proposed for storage of water in the operational phase will be constructed initially during the construction phase to store the river water for meeting the requirement during construction.

- Construction camps will be setup with full-fledged drinking water supply and sanitation facilities. These facilities would be connected to a septic tank and maintained to ensure minimum impact on the environment. It will be ensured that there will be no discharge of any wastewater into River Krishna or Tungapahad Vagu. The facilities will be designed to meet the construction manpower of 5000.

- Existing roads will be utilized for initial construction needs. TSGENCO will strengthen the approach road to the project site.

- Measures will be taken to ensure least inconvenience to the local people by restricting speed (speed breakers will be built by the Company).

- A senior Environment and Safety Officer belonging to the EPC contractor will coordinate the Safety and Environmental aspects in consultation with TSGENCOs Station Level Environmental Group.

- A 24 Hr Medical Aid Room with qualified para-medical staff, and fully equipped Ambulance will be made available at site.

- TSGENCO will tie up with nearby Hospitals in Nalgonda to provide timely medical help and treatment in case of medical emergency. In addition, proper co-ordination will be made with neighboring industries so as to ensure that emergency medical aid is extended in the least time.

- Adequate number of fire tenders with trained personnel will be made available to handle any fire accident at site.

- The manpower working will be given training on Occupational Safety and Health during construction.

A.8 ENVIRONMENTAL IMPACTS AND MANAGEMENT PLAN – OPERATIONAL PHASE

The major activities which are likely to result in impact on various environmental components during the operation phase are as follows:

a) Emissions from boilers due to combustion of coal
b) Dust emission from coal stock pile, limestone and gypsum storage areas
c) Noise from various noise generating sources
d) Water consumption and wastewater generation
e) Ash generation and other solid waste generation

The changes over the existing baseline quality due to the proposed activities of the power project during operation have been predicted using suitable air quality models coupled with qualitative and quantitative predictive techniques. After evaluation of the changes in relevant parameters, the overall impacts on the environment have been workedout based on which a detailed Environmental Management Plan has been formulated.

A.8.1 AIR ENVIRONMENT

The proposed power project will result in emission of Particulate Matter, Sulphur Dioxide and Oxides of Nitrogen due to combustion of coal in the boilers.

Coal storage and coal handling will result in fugitive dust emissions.

Groundlevel concentrations are estimated considering the emissions from proposed power plant and cumulative ground level concentrations are estimated considering the emission details of the existing and proposed sources located within 15 km.

The emissions from the operating industries are reflecting in the baseline monitoring studies carried out during the study period. The additional emissions in 15 km radial extent are from the proposed industries. However, in order to assess the cumulative impact of all the industries within 15 km radius, emissions from all the listed industries (Operating and Proposed) have been considered for estimation of Cumulative Ground level concentrations of PM10, SO_2 and NOx.

There is no overlap of concentration of one industry on the other due to inter distance of various industries and position of the emission sources. Also the subject power plant will have release of emission from chimneys of 275 m height compared to other plants located within 15 km radius.

In order to estimate overall scenario, the incremental cumulative ground level concentration due to emissions from proposed industries computed under Scenario – B are superimposed on the baseline concentrations (village wise) to estimate the overall post project scenario which would prevail at the post operational phase. The overall scenario is well within the limits stipulated by NAAQS, 2009.

AIR POLLUTION CONTROL MEASURES

Air pollution control measures of Power plant have been redesigned at an additional cost, considering ***FLUE GAS TREATMENT SYSTEM*** to comply with the following new emission norms of MoEF & CC

stipulated for Thermal Power Plants as per the Gazette Notification S.O. 3305 (E) dated 07.12.2015

ESP outlet dust concentration	: 30 mg/Nm^3
SOx	: 100 mg/Nm^3
NOx	: 100 mg/Nm^3
Mercury	: 0.03 ppm

Flue gas treatment system is proposed for:

a. Reduction of Particulate emissions
b. Reduction of SO_2 emissions
c. Reduction of NO_x emissions

The design of ESP has been revised and reduction in particulate matter emission will be obtained by adding one more field in series along the gas path of the Electrostatic precipitator. Accordingly 10 fields are considered in series along the gas path

The power project is designed to meet the SO_2 limit of 100 mg/Nm^3 by adopting the Flue Gas Desulphurization system (FGD). Wet Flue Gas Desulphurisation System will be installed for reduction of SO_2.

The power project is designed to meet the NOx limit of 100 mg/Nm^3. NOx reduction will be achieved in two stages to attain the NOx level of 100 mg/Nm^3 in these boilers:

In boiler modification and SCR is proposed to reduce NOx level efficiently to 100 mg/Nm^3. SCR will be located between the economizer outlet and APH inlet.

One single flue and Two bi-flue stacks of 275 m height will be provided as per CPCB guidelines.

FUGITIVE DUST CONTROL

The measures proposed for control of Fugitive dust from various sources of the power project are detailed below

a. Coal Storage Yard: Water spray arrangement will be provided all-round the coal stockpiles to suppress the dust and to wet the coal while compacting to minimize the dust nuisance.

b. Coal handling Plant: Coal will be conveyed to the coal handling plant through closed conveyor system which will minimize the dust nuisance. All transfer points will be provided with bag filters.

c. Limestone Handling: Limestone will be unloaded in the covered sheds near to the limestone crusher. The limestone will be loaded into the crusher for crushing to a size of <25 mm. The hopper of the crusher will be provided with atomized water sprinkling system to suppress while loading limestone into the crusher. The crushed limestone will be conveyed to the storage silo hoppers provided with Bag filters for control of dust emissions.

d. Ash pond: Dry flyash from the plant will be transported to ash storage silos through pneumatic system. Three Flyash silos are proposed for storing dry flyash. All silos will be provided with Bag filters for control of dust emissions. Unutilized flyash and bottom ash will be conveyed to ash pond.No dust emissions are anticipated due to wet handling system.

e. Gypsum handling & Storage: Gypsum generation from FGD is in wet form which will be dewatered in hydro-cyclones and vacuum belt filters. The Gypsum cake from the belt filter will be discharged through a Hopper to a Belt conveyor. The Belt Conveyor will transport the Gypsum to the Gypsum storage shed. No dust emissions are anticipated due to wet handling system.

A.8.2 NOISE ENVIRONMENT

During operation, the major noise generating sources are Steam turbines, Compressors, Boiler Feed Pump, Forced Draft Fans, Induced Draft Fans, Cooling Towers, coal unloading, Coal crushers, Limestone crusher, DM Plant and Ash Slurry pumps

All the above sources will have inter distance of minimum of 50-100 m. The combined noise level of the above sources will not cross 100 dB(A).

Predictions carried are on as is basis, without taking into consideration any attenuation factors showed noise level of 50 dB(A) at project boundary which is far below the noise standard specified for Industrial Areas by CPCB i.e 75 dB(A) during day time and 70 dB(A) during night time.

Additional attenuation is expected, due to atmospheric effect and 100 m greenbelt and the compound wall along the project boundary which will further reduce the noise levels.

Nearest village/habitation to the project site is at 1.0 km distance ie. Veerlapalem Village. Impact of Noise level at this location due to the project in the operational phase is negligible.

NOISE PREVENTION MEASURES

Encasement of noise generating sources will be done to control the noise levels. The steam turbine generators would be provided with acoustic enclosures and would be located in a closed building which considerably reduces the noise outside the turbine hall.

All operations and maintenance personnel working near noise prone areas would be provided with earmuffs & earplugs. Stand alone noise proof cabins will be provided to operators. Job rotation for operators will be done to minimize continuous exposure.

Greenbelt will be developed in an area of 1352 acres within the project area. Of which, 100 m width all along the project boundary in an area of 432.00 acres is proposed which acts as noise barrier and fugitive dust control.

A.8.3 WATER ENVIRONMENT

The daily water requirement of the power project is estimated to be about 2,40,000 m^3/day complying with the proposed new norm of 2.5 m^3/MWh and Zero wastewater discharge. Water requirement will be met from Krishna river which is located at a distance of 0.5 km from the project site in the southern direction. Intake well for tapping Krishna water will be constructed at a distance of 1.0 km on the upstream of confluence of River Krishna and Tungapahad Vagu

The total wastewater generation is estimated to be about 43320 m^3/day

WATER POLLUTION CONTROL MEASURES

The wastewater generated will be segregated as Industrial wastewater (42360 m^3/day) and domestic wastewater (960 m^3/day) for adopting different treatment methods.

The details of total waste water generation, recycling and treatment from various units of the project are given below in Table.

WASTE WATER GENERATION, TREATMENT AND REUSE, M^3/DAY

<table>
<tr><th colspan="2"></th><th>WASTE WATER</th><th>Utililisation</th><th>Treatment</th><th>REUSE/DISPOSAL</th></tr>
<tr><td colspan="2" rowspan="2">Cooling Tower Blowdown</td><td rowspan="2">39360</td><td>19080 – Ash handling</td><td rowspan="4">2400 - treated in side stream and disposed to CMB

9480 - to Central Monitoring Basin (CMB) and for treatment in ETP</td><td rowspan="4">• 9240 - RO Permeate recycled as freshwater to CWS
• 2640 – RO reject disposal to ash water recovery sump for ash handling.</td></tr>
<tr><td>9600 – Coal Handling</td></tr>
<tr><td colspan="2">DM Regeneration</td><td>720</td><td>Neutralisation followed by CMB</td></tr>
<tr><td colspan="2">Condensate Polishing Unit</td><td>240</td><td>-</td></tr>
<tr><td colspan="2">Service Water</td><td>240</td><td>-</td><td>-</td></tr>
<tr><td colspan="2">Flue Gas Desulphurisation</td><td>1440</td><td>Neutralisation</td><td>-</td><td>Disposal to Ash water recovery sump for ash handling</td></tr>
<tr><td rowspan="2">Domestic use</td><td>Plant</td><td>192</td><td>-</td><td>STP-1</td><td rowspan="2">960 - Treated water reuse for greenbelt</td></tr>
<tr><td>Colony</td><td>768</td><td>-</td><td>STP-2</td></tr>
<tr><td colspan="2">Mixed Bed Filter & Clarifier</td><td>360</td><td>-</td><td>Thickner & Centrifuge</td><td>360 - Sludge for use in Greenbelt</td></tr>
<tr><td colspan="2">Total Wastewater</td><td>43320</td><td colspan="3"></td></tr>
</table>

No treated wastewater will be discharged into Krishna River or Tungapahad Vagu.

OTHER MEASURES

Krishna river is perennial in nature and even during the summer, just before the first monsoon rain, the minimum flow (June, 2005) has been measured as 25.72 Mm^3/month at Pondugala G/D station and the minimum flow (June, 2005) has been measured as 27.84 Mm^3/month at Wadenapalli station against the power plant requirement of 7.21 Mm^3/month. Thus the withdrawal percentage is less than 30% in lean season.

Water drawal by TSGENCO will be about 0.24 million m^3/day. Flow of River Krishna as per the gauging station of Pondugala which is near to the project site vary from 4.34 To 31018 million m^3/day (Average – 617 million m^3/day). Thus the withdrawal of water (0.03 % of average flow) from River Krishna by TSGENCO project will not have significant impact.

River Krishna flows at a distance of 0.50 km from the project boundary in southern direction. The elevation of nearest point of ash pond is at 12 metres above HFL and its distance is around 790 metres. There is no possibility of ash pond and the plant being affected by Krishna river during any flood.

Tungapahad Vagu (stream) passes through the project area. About 3.90 km of this Vagu passes through the project site taking south-easterly course and flows for a distance of 2.40 km before joining River Krishna.

The project activities will not interfere with flow of Tungapahad Vagu since there is no extraction of water or discharge. No diversion of Tungapahad vagu is proposed. Plant layout is designed to keep a minimum distance of 500 m buffer between ash pond and Tungapahad Vagu to prevent contamination. A 100 m barrier on either side of banks of the vagu will be left as barrier which will be developed under greenbelt.

Storm water management measures will be implemented to harvest rainwater

A.8.4 LAND ENVIRONMENT

The major solid waste generation from the project is ash in the form of fly ash and bottom ash. Maximum ash generation is due to use of blend coal having ash content of 22.5 %. Steam generating units are the main sources of the solid waste where coal is burnt.

The peak generation of ash due to use of coal is estimated to be about 2.76 MTPA (at 85 % PLF). Of the total ash Flyash generation is 2.20 MTPA (80% of Total Ash) and Bottom ash is 0.56 MTPA (20 % of Total Ash).

BOTTOM ASH

Bottom ash generation from the plant is 0.56 MTPA. TSGENCO will explore disposing of bottom ash for utilization in road construction, foundation and use as aggregate. The ash pond has been designed considering the unutilized flyash in first three years and 25 years bottom ash generation.

ASH POND

Ash pond will be designed to store ash unutilized flyash and bottom ash in an area of 400 acres. HDPE liner will be provided over the clay lining as per design standards.

LAND POLLUTION CONTROL MEASURES

TSGENCO has acquired 2800 acres for settingup of the project. The landuse of the project site is mainly degraded reserved forest, semi-agricultural and partly revenue land with two isolated pockets of habitation i.e Modugulakunta Tanda and Kapura Tanda.

2095.28 acres is Forest Land falling under the jurisdiction of Virlapalem Forest Block and 704.12 acres is Patta Land, Government Land, Udafa patta Land and D-Patta Land falling under the jurisdiction of Damaracherla Mandal, Nalgonda District.

TSGENCO has obtained Forest Clearance from MoEF & CC for diversion of Forest Land Vide letter F.No.8-07/2015-FC dated 7th July, 2015.

The landuse of Patta Land is semi-agricultural with two isolated pockets of habitation i.e Modugulakunta Tanda and Kapura Tanda.

R & R has been initiated in accordance with Section 45 of Right to Fair Compensation and Transparency (RFCT) in Land Acquisition (LA), Rehabilitation and Resettlement Act (RRACT), 2013 by Govt of Telangana through Rehabilitation and Resettlement Committee under the Chairmanship of District Collector. It is proposed to pay an amount of Rs. 40.37 Crores towards R & R benefits.

The District Administration (DA) has identified about acres 13.21 gts. of land at Kallepalli Village. The DA has sanctioned an amount of Rs 61.30 lacs to be paid to the owners of the land for acquiring the land to establish R & R Center along with other necessary infrastructural facilities.

R & R Committee was appointed by District Collector Nalgonda as per the RRACT, 2013 to monitor and review the progress of implementation of R & R scheme and to carryout post implementation social audits in consultation with the Gramsabha

ASH MANAGEMENT

TSGENCO has approached the various cement plants located within 50 km radius for offtake of flyash generated from the plant. Cement Industries have expressed their willingness through letters. The estimated ash requirement quantity by Cement Plants in the 50 km radius is about 0.864 MTPA.

TSGENCO as per the MoEF notification S.O.254 (E) will setup ash based brick manufacturing facility within the project area. The estimated ash requirement quantity by the proposed brick manufacturing unit is 0.011 MTPA.

TSGENCO will also promote, support and assist the locals in settingup of ash based product manufacturing units.

TSGENCO has firm tieup for offtake of about 0.875 MTPA of flyash (including TSGENCO) consumption for brick plant) from 1st year itself.

TSGENCO will pursue with other cement plants located in 200 km radius for offtake of flyash.

Also TSGENCO will explore utilization of flyash in road construction projects under Pradhan Mantri Gramin Sadak Yojna and asset creation programmes of the Government involving construction of buildings, road, dams and embankments

With the above action plan, TSGENCO is confident of disposing balance flyash of 1.32 MTPA complying with the notification of MoEF & CC of 100 % ash utilization by fourth year.

GREENBELT DEVELOPMENT PLAN

Greenbelt development will be taken up from the construction stage itself. Greenbelt will be developed in 1352 acres of the project area which will include restoration of the forest area of 1049 acres and development of greenbelt in nonforest area of 303 acres. It is proposed to develop an in-house nursery for developing greenbelt.

It is proposed to plant 600 saplings/acre for development of the greenbelt within the project site.

TSGENCO will takeup additional plantation in the Reserved Forest that demarcates the project boundary on the south. In this regard, TSGENCO has sought the recommendations of the Forest Department, Government of Telangana.

Forest Department, Government of Telangana vide letter no. rc.No. 3561/2016/S6, dated 23.12.2016 has advised TSGENCO to takeup the following activities

a. Plant species Naravepa and Nemilinara species which are highly suitable for the area.
b. Atleast one year old seedlings (bag plants) have to be planted in 0.60 m X 0.60 X 0.60 m cube pits
c. Soil moisture conservation works like Continuous contour Trenches, percolation tanks, Rock fill dams and Check dams have to be takenup to improve the sub surface moisture which will help in the success of plantations

A.9 CSR - COMMUNITY DEVELOPMENTAL ACTIVITIES

TSGENCO will contribute to the following socio-economic development of surrounding villages:

- ❖ Conducting Medical camps and awareness camps on adult education
- ❖ Distribution of fruit bearing saplings
- ❖ Infrastructure development (Construction of Community buildings & Bridges)
- ❖ Education to the students of surrounding villages
- ❖ Bus facility to the students of surrounding villages who will be studying in local schools
- ❖ Payment of better wages leading to improvement of living conditions

Apart from the above activities, TSGENCO will also be involved other development activities such as:

1. Providing drinking water facility
2. Health camps and distribution of Homeo medicines
3. Cooking gas supply through TSGENCO Co-operative stores
4. Providing accommodation for Public utilities

A total of Rs. 100.40 Crores which is approximately 0.4% of the total cost of the project has been allocated.

A.10 BUDGET FOR IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT PLAN.

A budget of Rs 5597 Crores and Rs 430 crores/annum is earmarked towards capital cost and recurring cost respectively for implementing the various pollution control measures as described in the Environmental Management Plan.

A.11 POST PROJECT MONITORING PLAN

Post Project monitoring programme formulated for implementation during construction and operation phase will have a check on the pollution levels and compliance with the Standards prescribed.

A.12 PUBLIC CONSULTATION

Public Consultation for the project was conducted on 31.05.2016. Revised detailed response and Action plan with budgetary provisions for issues raised in Public Consultation are enclosed as **Annexure – 7 B.**

A.13 CONCLUSION

TSGENCO will implement the 4000 MW (5X800 MW) - Supercritical Coal Based Yadadri Thermal Power Station at Veerlapalem Village, Damercherla Mandal, Nalgonda (Dist), Telangana. The project will meet the present and future power demand of newly formed Telangana State.

The project is designed to comply with all the conditions stipulated by MoEF & CC and TSPCB

TSGENCO will implement additional pollution control equipment to comply with the new norms of MoEF & CC stipulated for Thermal Power Stations. An additional budget of Rs 0.9 crore/MW will be incurred to comply with new emission norms of MoEF & CC stipulated for Thermal Power Plants as per the Gazette Notification S.O. 3305 (E) dated 07.12.2015.

The project is based on zero discharge concept with no discharge to any streams or water bodies. Tertiary treatment measures are proposed for treating and reusing the wastewater generated from the power plant

TSGENCO has firm tieup for offtake of flyash (including TSGENCO) consumption for brick plant) is 0.875 MTPA from 1st year itself.

With the above action plan, TSGENCO is confident of disposing balance flyash of 1.32 MTPA complying with the notification of MoEF & CC of 100 % ash utilization by fourth year.

TSGENCO has allotted Rs. 100.40 Crores for undertaking various socio economic development activities as per the community development plan which will help improving the overall quality of life of the people living in the area.

TSGENCO has allotted a sum of Rs 5597 Crores towards implementation of the various pollution control measures to comply with the latest notification of MOEF & CC. the project deserves Environmental Clearance considering implementation of various pollution control and socio economic measures in the Nalgonda District if the newly formed State of Telangana.

CHAPTER - 1

INTRODUCTION



CHAPTER –1: INTRODUCTION

1.1 PURPOSE OF THE REPORT

M/s. Telangana State Power Generation Corporation Limited (TSGENCO) proposed to setup a 4000 MW (5X800 MW) - Supercritical Coal Based Yadadri Thermal Power Station at Veerlapalem Village, Damercherla Mandal, Nalgonda (Dist.), Telangana to meet the present and future power demand of newly formed Telangana State.

The proposal is a Category - A project as per Environmental Impact Assessment (EIA) Notification SO 1533 dated 14-09-2006 and subsequent amendments which necessitates obtaining the Environmental Clearance from Ministry of Environment and Forests & Climate Change (MoEF&CC), Government of India. TSGENCO as per the requirement of EIA notification has submitted necessary application to MoEF&CC, GoI for issuing Terms of Reference (TOR).

The proposal was considered by the Expert Appraisal Committee - Thermal Power (EAC-T) during 45th EAC meeting of MoEF&CC, GoI, New Delhi held on 29th-30th October 2015. During the appraisal, EAC opined that a site visit by a Sub-Committee is required to ascertain the ground situation before taking a decision in connection with the matters relating to a tributary/channel of River Krishna passing through the proposed site etc. Standard Terms of Reference was issued by MoEF & CC, GoI vide letter No. J-13012/18/2015 - IA.I (T)s dated 2nd November, 2015 (**Annexure-1A**).

The Sub-Committee visited the site on 05-12-2015 and its report was discussed by EAC-T, MoEF & CC in the EAC-T meeting held on 18th December, 2015. The committee during the meeting sought replies to the concerns that have been raised by EIA Resource and Response Centre, New Delhi (ERC) vide their representation dated 28.10.2015 before issue of the TOR. TSGENCO submitted the replies vide Lr.No. CE/C/Thermal/SE/C/TCD-I/F. YTPS (5x800MW)/D.No237/15 Dt: 22.12.2015 to the concerns raised.

TOR for the proposal was granted by MoEF & CC after further appraisal in the EAC meeting held on 28-29th January, 2016. The Additional Terms of Reference (Addl.TOR) was approved in addition to Standard TOR granted by MoEF&CC for carrying out the EIA study vide Lr. No. J-13012/18/2015-IA.I (T) Dt 16.02.2016 (**Annexure-1B**).

Draft EIA report was prepared by M/s. Bhagavathi Ana Labs Pvt. Ltd. (a Bureau Veritas Group Company), Hyderabad based on site specific baseline data collected during the period December, 2015 to February, 2016.

The Public Hearing was conducted on 31.05.2016 by Telangana State Pollution Control Board.

Final EIA report incorporating the details of the Public Consultation was prepared and submitted to MoEF&CC through online on 25.06.2016. The proposal was discussed in 63rd Reconstituted Expert Appraisal Committee meeting held on 30.08.2016 for grant of Environmental Clearance. During the discussions, the committee observed major short comings in the EIA/EMP and opined that the report needs to be redone to address the points listed under major shortcomings as per EAC, MoEF&CC minutes (MOM) of meeting held during 29th & 30th of August, 2016 (**Annexure-1C**).

TSGENCO appointed M/s B. S. Envi-Tech (P) Ltd., Secunderabad for preparing the Revised EIA Report. The subject report is the Revised EIA Report prepared by incorporating all the issues raised in the MOM of EAC, MoEF & CC.

MoEF& CC vide its minutes of meeting held during 29th & 30th of August, 2016 has directed TSGENCO to re-conduct the Public Hearing based on the Revised EIA Report. TSGENCO appealed to MoEF & CC to exempt from re-conducting the Public Hearing.

MoEF& CC has exempted the proposal from re-conducting the public hearing vide Minutes of Meeting of 1st EAC (Thermal Power) MoEF&CC, GoI dated 28.12.2016 (**Annexure-1D**) subject to compliance of certain conditions:

TSGENCO vide the Minutes of Meeting of 1st EAC (Thermal Power) MoEF&CC, GoI dated 28.12.2016 has published the public notice in the following newspapers (Enclosed as **Annexure – 1 H**) to make the Public aware about the revised EIA/EMP to seek comments.

Newspaper-1-The Hindu News Paper (English Daily) dated 02.02.2017
Newspaper-2-Namasthe Telangana News Paper (Telugu) dated02.02.2017

The Revised Final EIA Report was uploaded on Telangana State Pollution Control Board website on 01.02.2017 for minimum 21 days after the public notice.

Four representations giving the comments on the Revised EIA Report were received by TSPCB. The representations/comments received on the Revised EIA report along with response statement of TSGENCO are enclosed as **Annexure – 1I**.

1.2 PROJECT PROPONENT - TELANGANA STATE POWER GENERATION CORPORATION LIMITED (TSGENCO)

Telangana Power Generation Corporation Limited has been incorporated under Companies Act, 2013, on 19th May, 2014 and commenced its operations from 02.06.2014 with the following Mission and Vision.

Vision

"To be the best performing power utility in the country, and one of the best utilities in the world with the use of state–of–the–art technology and smart solutions".

Mission

"To generate adequate, reliable, cost effective power generation by spearheading accelerated power development through proper planning and implementation of new power projects".

TSGENCO as a sequel to Government's reforms in power sector to un-bundle the activities relating to generation, transmission and distribution of power. All the Generating Stations owned by erstwhile Andhra Pradesh State Electricity Board (APSEB) in Telangana area were transferred under the control of TSGENCO. Total Installed

capacity of TSGENCO as on 30.11.2016 from the following power generation sources is 5235.26 MW.

a. Thermal Power : 2882.50 MW
b. Hydel Power : 2351.76 MW
c. Solar Power : 1.00 MW

1.2.1 IDENTIFICATION OF THE PROJECT

TSGENCO has proposed to setup a 4000 MW (5X800 MW) - Supercritical Coal Based Yadadri Thermal Power Station at Veerlapalem Village, Damercherla Mandal, Nalgonda (Dist), Telangana to meet the present and future power demand of newly formed Telangana State.

Vision document specifying prospective long term plan of the project is enclosed as **Annexure – 1E**.

1.3 BRIEF DESCRIPTION OF PROJECT

1.3.1 NATURE AND SIZE

TSGENCO has proposed to setup a 4000 MW (5 x 800 MW) Supercritical Coal Based Yadadri Thermal Power Station at Veerlapalem Village, Damercherla Mandal, Nalgonda (Dist), Telangana State

The Plant is based on use of blend coal (50% Indigenous and 50% Imported) or 100% Imported Coal.

Salient features of the proposed project are given in **Table - 1.1**

1.3.2 PROJECT COST

The estimated capital cost of the project is about Rs. 25099.42 crores. An additional budget of Rs 0.9 crore/MW will be incurred to comply with new emission norms of MoEF & CC stipulated for Thermal Power Plants as per the Gazette Notification S.O. 3305 (E) dated 07.12.2015.

TABLE - 1.1
SALIENT FEATURES OF THE PROPOSED PROJECT

			Details
Installed Capacity (MW)			4000
Steam Turbine Capacity, (MW)			800 MW
Number of Units			5
Technology			Supercritical Boiler Technology
Steam Generators Capacity (TPH)			2600 (5 nos)
Cost of the Project (Rs. in Crores)			25099.42 An additional budget of Rs 0.9 crore/MW will be incurred to comply with new emission norms of MoEF & CC stipulated for Thermal Power Plants as per the Gazette Notification S.O. 3305 (E) dated 07.12.2015.
Land (Acres)			2800
Fuel			Blend coal or Imported Coal
Fuel Consumption	**Blend Coal** (50% indigenous coal and 50% imported coal)	t/day	39657.6
		Million TPA (@85 % PLF)	12.28
	Or		
	Imported Coal (100 %)	t/day	35587.2
		Million TPA (@85 % PLF)	11.02
Fuel Supply			Indigenous – Singareni Collieries Company Limited (SCCL) Imported Coal – Supply by MSTC, Government of India Enterprise.
Chimney (m)			One single flue stack and Two bi flue stacks of 275 m height
Water Requirement (m^3/hr)			10000 m^3/hr complying with new norm of 2.5 m^3/MWhr
Source of Water			Krishna River
Type of cooling			Water Cooled Condensor System
Ash Pond (acres)			400
Air Pollution Control Equipment			Flue gas cleaning system comprising High Efficiency ESPs, Flue Gas Desulphurisation and Selective Catalytic Reduction unit to comply with new emission norms of MoEF & CC stipulated for Thermal Power Plants as per the Gazette Notification S.O. 3305 (E) dated 07.12.2015.
Water Pollution Control Equipment			Effluent Treatment Plant for power plant effluent and Sewage Treatment Plant for plant and colony

1.3.3 LOCATION OF THE PROJECT SITE

The project site is located near Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State

The salient locational features of the project site are given in **Table – 1.2.**

1.4 IMPORTANCE OF THE PROJECT

The State of Telangana requires substantial addition to its power generating capacity to meet power demand of its rapidly growing industrial, agricultural and other sectors. As per the 18th EPS, the installed capacity required by 2018-19 would be 17041 MW to meet the peak demand of 13108 MW. The capacity addition by TSGENCO to meet the increased demand for power in Telangana State is tabulated below

CAPACITY ADDITION ENVISAGED BY TSGENCO

S. No.	Project	MW
1	Kothagudem TPS Unit # 12 (1x800 MW)	800
2	Bhadradri TPS (4x270 MW)	1080
3	Yadadri TPS (5x800 MW)	4000
	Capacity Addition Programmed	**5880**

1.5 SCOPE OF THE STUDY

The subject report is the Revised EIA Report prepared duly incorporating the issues raised as per the minutes of 63rd EAC (Thermal Power) meeting of MoEF&CC, GoI dated 30.08.2016 & 1st EAC (Thermal Power) meeting of MoEF&CC, GoI dated 28.12.2016.

The Scope of the revised Environmental Impact Assessment study is:

- Collection of one month baseline data for Post monsoon, 2016 (October, 2016) as part of validation by BSET.

TABLE - 1.2
SALIENT LOCATIONAL FEATURES OF THE PROJECT SITE

Feature	Details
Village, Tehsil, District, State	Veerlapalem Village, Damercherla Mandal, Nalgonda (Dist), Telangana State
Latitude & Longitude	16°40'30.98"N - 16°43'7.98"N latitude 79°32'51.75"E - 79°35'37.23"E longitude
Altitude	79 m above MSL (average)
Max. Temp., °C	45.5
Min. Temp., °C	6.1
Relative Humidity,%	23-82
Annual rainfall,	812.5 mm
Topography	Uneven topography
Nearest Water Bodies	Tungapahad Vagu passing through the project site Krishna River – 0.5 km – SE Musi River – 7.4 km – E
Nearest Highway	National Highway (NH-9) Connecting Hyderabad - Vijayawada – 45.0 km Northern Direction. The State Highway (SH- 2) connecting Narkatpally – Addanki – 7.0 km in Southern Direction.
Railway Junction	Nadikudi – 16.0 km - SE
Nearest Railway station	Vishnupuram RS – 4.0 km - W
Nearest Industries	• Parasakti Cement Industries Limited - 8.7 km – SW • The India Cements Limited – 5.9 km – E • Penna Cement Industries Limited - 10.9 km – ENE • Krishna Godavari Power Utilities Limited – 5.4 km – ESE (Not commissioned) • Deccan Cements Ltd – 12.5 km - E • Andhra Cements Ltd – 12.8 km – SE • My Home Industries Ltd Plant (Green field project)- 14.1 km- SE
Nearest Villages	Veerlapalem– 1.0km – WSW Veerappagudem – 0.9km - SE
Nearest Town	Nalgonda – 50.0 km - NW
National Parks/Bird Sanctuary	Nagarjunasagar Tiger Reserve (Name changed as Amrabad Tiger Reserve after Telangana State formation) – 14.03 km - SW
Inter State Boundary	Telangana - Andhra Pradesh – 0.8 km - SE
Nearest Air port	Hyderabad (Shamshabad) – 120.0 km - NW
Nearest Forests	Veerlapalem R F – Part of Project site Rajagutta RF – 0.3 km – E Daida RF – 1.2 km – SE Adividevulapalli RF – 4.7 km – SW Oshipalem RF – 4.0 km –NW Dilawarapur RF – 2.9 km – N
Historical places	Janpahad Darga – 13 km

All distances mentioned in the above table are aerial distances

- Identification of significant environmental parameters to assess the present environmental quality within the impact zone with respect to air, water, noise, soil and socio-economic components of environment.
- Study of various activities of the proposed power project to identify the areas leading to impact/change in environmental quality.
- Identification and Prediction of cumulative impacts for the identified activities of the proposed power project alongwith the industries located within 15 km radius on various environmental components.
- Evaluation of impacts by superimposing the predicted scenario on the existing scenario and comparing with standards.
- Formulation of Environmental Management Plan to comply with current and proposed standards.

Compliance to the Terms of Reference is enclosed as **Annexure-1F**. Compliance to the issues raised by MoEF & CC vide minutes of meeting are enclosed as **Annexure-1G.**

CHAPTER - 2

PROJECT DESCRIPTION



CHAPTER – 2 PROJECT DESCRIPTION

2.1 TYPE OF THE PROJECT

TSGENCO has proposed to setup a 4000 MW (5X800 MW) - Supercritical Coal Based Yadadri Thermal Power Station with the fuel as blend coal (50% Indigenous and 50% Imported coal) or 100% Imported Coal.

2.2 NEED FOR THE PROJECT

The anticipated Peak Demand (MW) of the State of Telangana by 2018 -19 as per the 18th Electric Power Survey (EPS) is 13108 MW. About 17041 MW of installed capacity is required to meet the anticipated demand.

The water requirement for agriculture in Telangana area is mostly met through bore wells. Thus agriculture in Telangana is heavily dependent on electrical power. To meet the present and future agricultural power demand as well as other developmental activities in the state, the need for setting up of the proposed 5x800 MW Yadadri Thermal Power Station is justified.

Source: Desein Feasibility Report/18th EPS Survey.

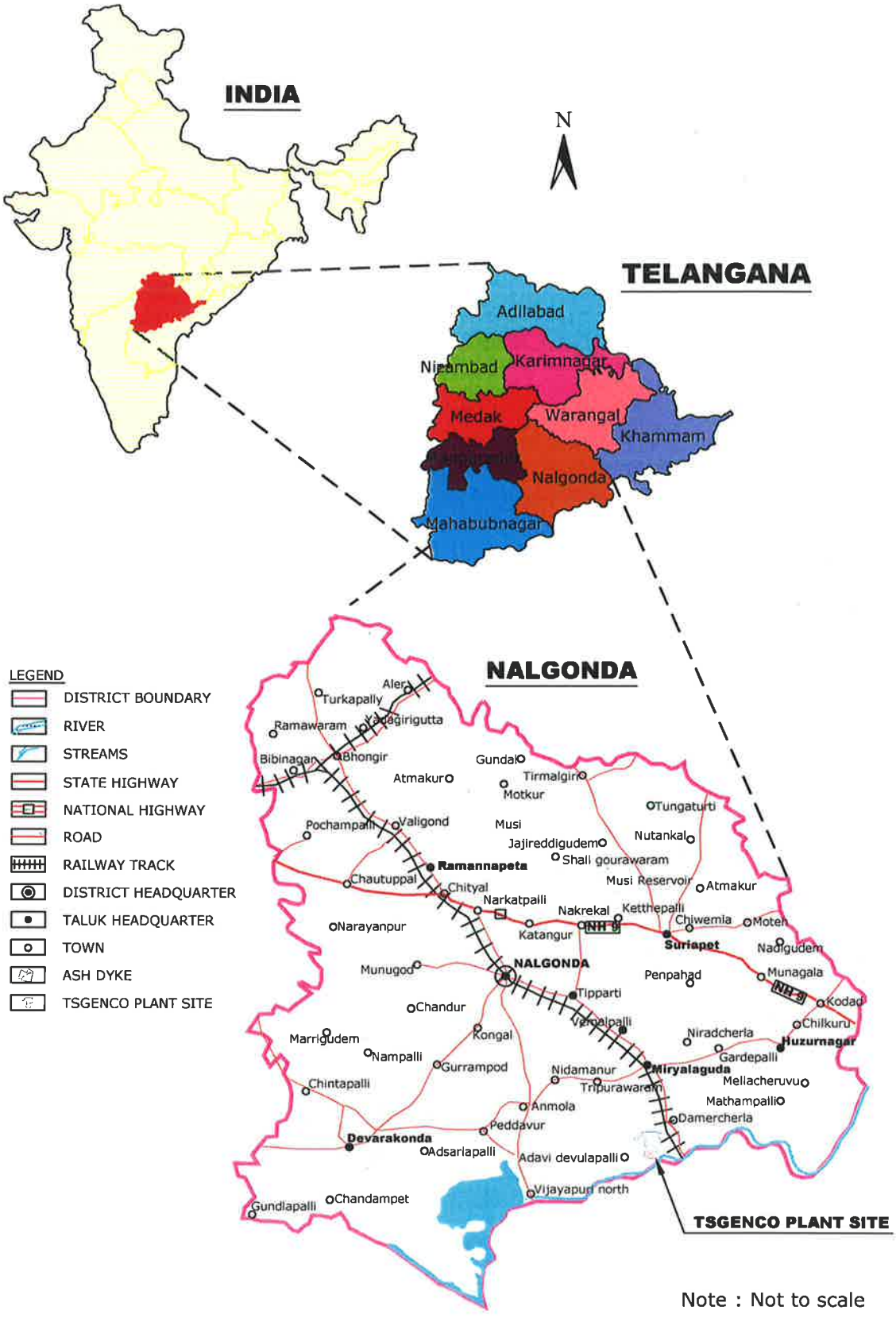
2.3 LOCATION OF THE PROJECT

The project site is located at Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State with an average msl of about 79 m. **Fig – 2.1** shows the location map of the site. The project site is part of Survey of India Toposheet No. 56/P/10 (Scale: 1:50000). The coordinates of the project site are given below:

PROJECT SITE

A) 16°40'30.98"N-79°35'09.67"E
B) 16°41'55.95"N-79°35'37.23"E
C) 16°43'00.04"N-79°35'32.16"E
D) 16°43'07.98"N-79°33'55.34"E
E) 16°42'15.23"N-79°32'51.75"E
F) 16°40'45.12"N-79°33'58.69"E

FIG - 2.1
LOCATION MAP



Note : Not to scale

Ash pond is proposed within the project site. Coordinates of the ash pond are given below:

ASH POND

a) 16°40'47.88"N-79°34'04.90"E
b) 16°41'20.45"N-79°34'15.31"E
c) 16°41'08.57"N-79°34'36.33"E
d) 16°41'23.48"N-79°34'42.84"E
e) 16°41'22.58"N-79°35'02.14"E
f) 16°40'35.47"N-79°34'52.71"E
g) 16°40'40.13"N-79°34'18.26"E
h) 16°40'47.36"N-79°34'18.11"E

Map showing coordinates of the project site and ash pond is shown in **Fig – 2.2.**

Nearest railway line connecting Miryalaguda – Guntur of South Central Railway line is at a distance of 4.8 km to Eastern direction of project site. The nearest railway station is Vishnupuram at 4.8 km in Eastern direction.

Key Map showing the location of various features around the project site is shown in **Fig – 2.3**. Photographs of the project site are shown in **Fig – 2.4.**

The State Highway (SH- 2) connecting Narkatpally-Addanki is at a distance of 7.0 km in Southern Direction. The National Highway (NH-9) connecting Hyderabad - Vijayawada is at a distance of about 45.0 km in Northern direction.

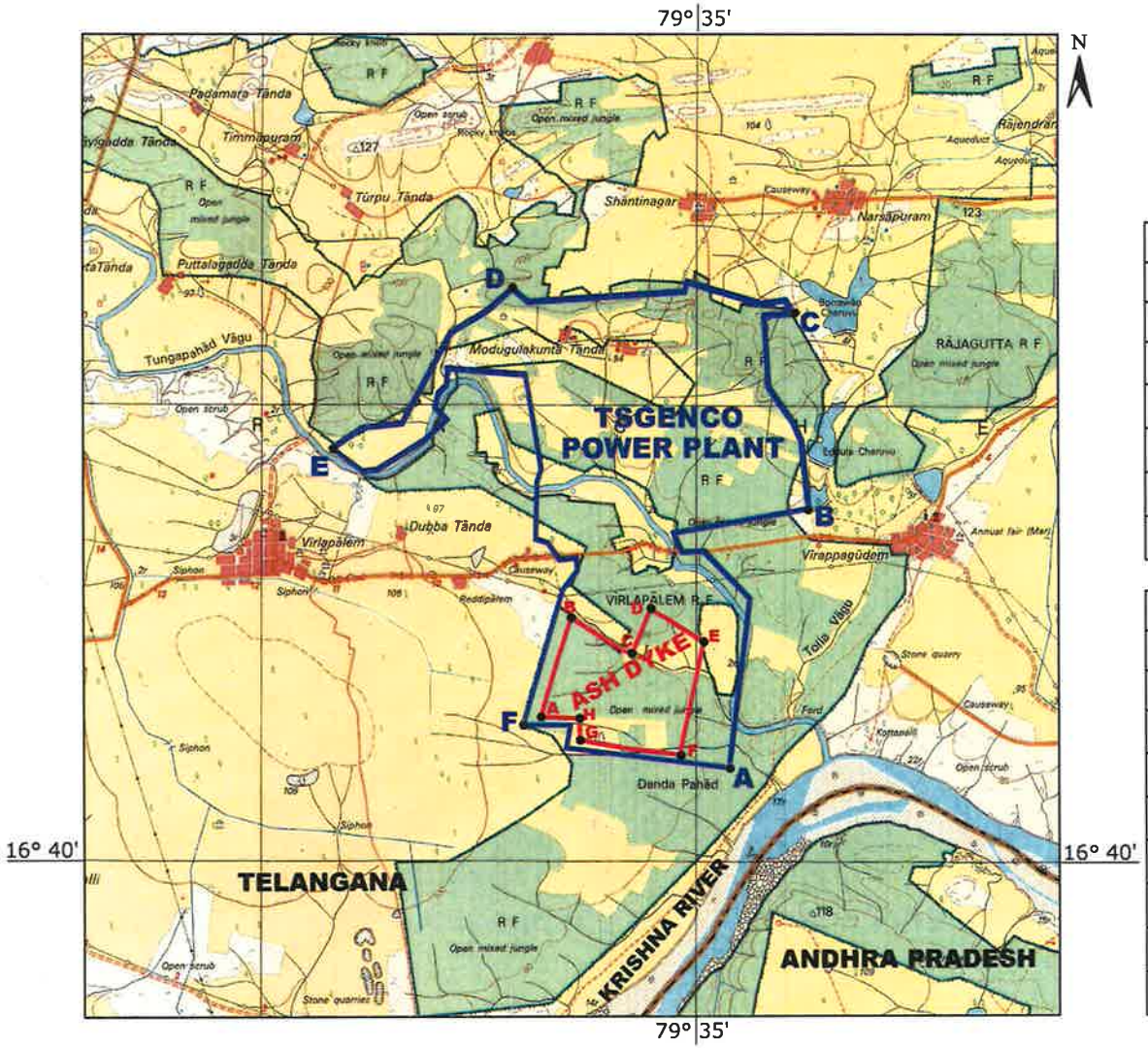
Nearest Settlements from the project site are:

- Veerlapalem – 1.0km – WSW
- Veerappagudem – 0.9km - SE

Two isolated pockets of habitation i.e., Modugulakunta Tanda and Kapura Tanda are located within the project site.

Nalgonda is the major town at a distance of 50.0 km in NW direction.

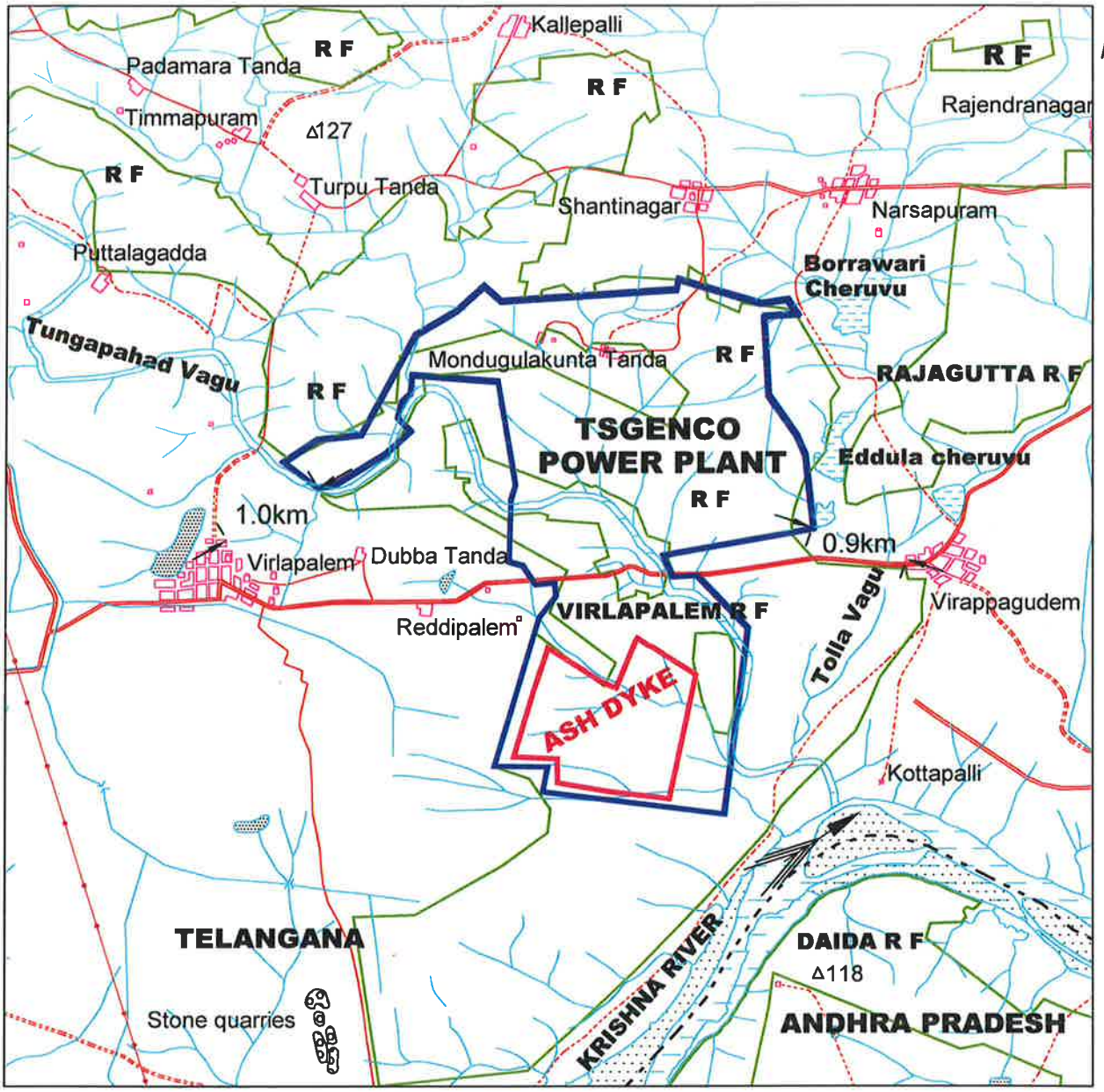
MAP SHOWING CO-ORDINATES OF THE PROJECT SITE AND ASH POND



TSGENCO POWER PLANT GEO-COORDINATES		
S.No.	LATITUDE N"	LONGITUDE E"
A	16°40'30.98"N	79°35'09.67"E
B	16°41'55.95"N	79°35'37.23"E
C	16°43'00.04"N	79°35'32.16"E
D	16°43'07.98"N	79°33'55.34"E
E	16°42'15.23"N	79°32'51.75"E
F	16°40'45.12"N	79°33'58.69"E

ASH DYKE GEO-COORDINATES		
S.No.	LATITUDE N"	LONGITUDE E"
A	16°40'47.88"N	79°34'04.90"E
B	16°41'20.45"N	79°34'15.31"E
C	16°41'08.57"N	79°34'36.33"E
D	16°41'23.48"N	79°34'42.84"E
E	16°41'22.58"N	79°35'02.14"E
F	16°40'35.47"N	79°34'52.71"E
G	16°40'40.13"N	79°34'18.26"E
H	16°40'47.36"N	79°34'18.11"E

FIG - 2.2



LEGEND

- ROADS
- STREAMS / TANKS
- FOREST
- RIVER
- SETTLEMENTS
- ▲118 SPOT HEIGHT
- STONE QUARRIES
- MAIN POWER LINE
- DISTRICT BOUNDARY AND INTER STATE BOUNDARY TELANGANA - ANDHRA PRADESH
- ASH DYKE
- TSGENCO POWER PLANT

SCALE

0 1 2km

FIG - 2.3

CLIECT : **M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED**

PROJECT : **4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)**
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana.

TITLE : **KEYMAP**

PREPARED BY
B.S.ENVI-TECH (P) LTD.,
SECUNDERABAD

FIG – 2.4
PHOTOGRAPHS OF THE PROJECT SITE









Krishna River flows in Southern Direction of the project site with its nearest point at 0.50 km. Musi River, a tributary of river Krishna flows at a distance of 7.4 km in the Eastern direction with its confluence point with Krishna at 8.4 km in SE direction.

Tungapahad Vagu (stream) passes (stretch of 3.9 km) through the project area taking south-easterly course before joining River Krishna.

Village road connecting Veerappagudem and Veerlapalem passes (stretch of 1.35 km) through the project site.

The nearest airport is Hyderabad (Shamshabad) at a distance of 120 km in NW direction.

The Nearest Reserved Forests to the project site are:

- Veerlapalem R F – Part of the Project site
- Rajagutta RF – 0.3 km – E
- Daida RF – 1.2 km – SE
- Dilawarapur RF – 2.9 km – N

The industries located within 15 km radius of the project site are:

- Parasakti Cement Industries Limited - 8.7 km – SW
- The India Cements Limited – 5.9 km – E
- Penna Cement Industries Limited - 10.9 km – ENE
- Krishna Godavari Power Utilities Limited – 5.4 km – ESE (Not commissioned)
- Deccan Cements Ltd – 12.5 km - E
- Andhra Cements Ltd – 12.8 km – SE
- My Home Industries Ltd Plant (Green field project)- 14.1 km-SE

There are no wild life sanctuaries, national parks, elephant/tiger reserves within 10km radius of the study area. Amrabad Tiger Reserve is located at a distance of 14.03 km from project site. The Letter and Authenticated Map obtained from Principal Chief Conservator of Forests (WL) and Chief Wild Life Warden, Forest

Department, Government of Telangana is enclosed as **Annexure – 2A.**

Fig – 2.5 shows the 10 km radius of the project site.

2.4 SIZE AND MAGNITUDE OF OPERATIONS

The proposed plant of 4000 MW installed capacity will have five units of 800 MW capacity each based on super critical technology. The steam parameters of supercritical technology are as follow:

Pressure	:	247 kg/cm^2
Main Steam Temperature	:	565°C
Reheat Steam Temperature	:	593°C

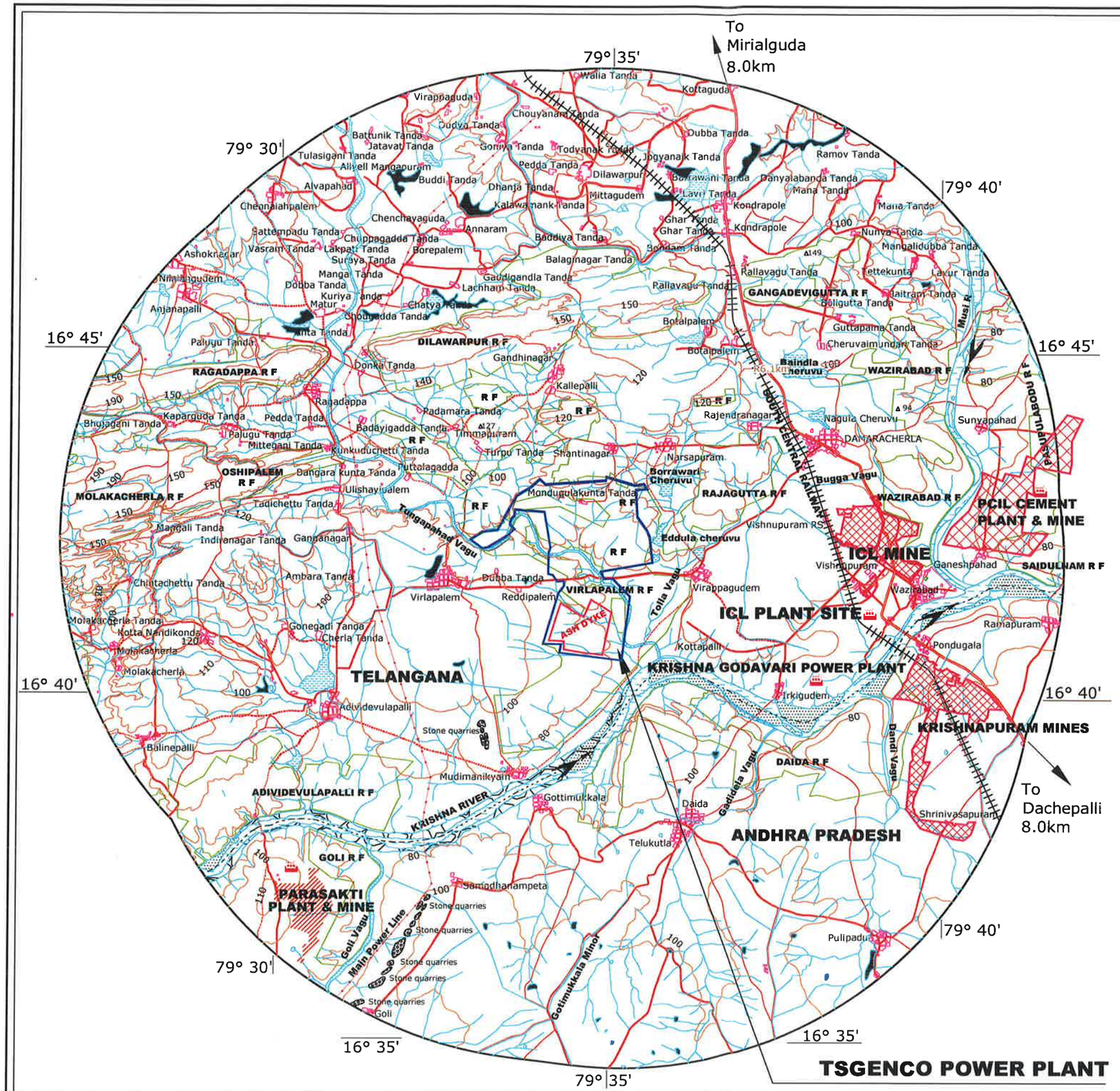
The main advantages of adopting higher unit size of 800 MW with supercritical parameters are detailed below:

- Reduction in coal consumption.
- Reduction in ash generation.
- Reduction in flue gases to atmosphere.
- Better heat rate at full load as well as partial load.
- Lesser percentage of auxiliary consumption, hence increase in net power export.
- Lesser startup time and hence less consumption of startup fuel and power.
- Quicker load following capabilities i.e. better response to load rise/fall.
- Lesser consumption of cooling water.
- Boiler drum is eliminated hence no need of level control.
- More favorable for frequent start/stop even for two-shift operation.
- Lesser requirement of services like compressed air; water etc. because of reduction in number of units.

2.5 REQUIREMENTS OF THE PROJECT

2.5.1 LAND

The total land requirement of the project is about 2800 acres complying with CEA norm of 0.7 acres/MW. Of the total area,



LEGEND

- ROADS
- STREAMS / TANKS
- FOREST
- RAILWAY LINE
- CONTOURS
- RIVER
- SETTLEMENTS
- Δ 94 SPOT HEIGHT
- STONE QUARRIES
- MAIN POWER LINE
- DISTRICT BOUNDARY AND INTER STATE BOUNDARY TELANGANA - ANDHRA PRADESH
- ASH DYKE
- TSGENCO PLANT SITE

N

REFER TO THIS MAP AS:- 1:50,000
SHEET 56 P / 10 FIRST EDITION
Published under the direction of
the Surveyor General of India - 2007

Index to
Survey of India Toposheets

56 P/5	56 P/9	56 P/13
56 P/6	56 P/10	56 P/14
56 P/7	56 P/11	56 P/15

SCALE

0 3 6km

FIG - 2.5

CLIENT: **M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED**

PROJECT: 4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana.

TITLE: **TOPOGRAPHICAL MAP SHOWING 10 km RADIUS**

PREPARED BY:
B.S.ENVI-TECH (P) LTD.,
SECUNDERABAD

2095.28 acres is Forest Land falling under Veerlapalem Forest Block and 704.12 acres consists of Patta Land, Government Land, Udafa patta Land and D-Patta Land under the jurisdiction of Damercherla Mandal, Nalgonda District, Telangana State.

DETAILS OF PROPOSED PROJECT AREA

	Area (acres)		Survey Numbers	Village Jurisdiction	Acquisition Status
Forest Land	2095.28		Compartment Nos 41, 42,43,44 & 45	Veerlapalem Forest Block	Stage –II Forest Clearance obtained vide Lr. No. F.No. 8-07/2015-FC, dated: 7th July 2015.
Non Forest Land	Udafa Kharaj Khata	9.10	3 & 4	Veerappagudem	Total Land Acquired
	D-Form Patta	168.38	96	Veerlapalem	
	Govt Assigned	136.20	71,76,80,90,92-95		
	Patta Land	174.24	66-70,72-75,77-79,81-89 & 91		
	Udafa Patta	147.38	1,211,12,13,17, 19,20,21,22,24, 27-31,34-41		
	Udafa Kharaj Khata	66.02	3,4,5,6,7,9,10, 14-16,18,23,25, 26,32,33		

Source: TSGENCO

The landuse of the project site is mainly degraded reserved forest, semi-agricultural and partly revenue land with two isolated pockets of habitation i.e Modugulakunta Tanda and Kapura Tanda.

Based on the Mineralogical map provided (Prepared by Geological Survey of India) by Department of Mines and Geology, Govt of Telangana, the proposed project site is partly covered by shale and partly by limestone. Project site marked on Geological Survey of India map is shown in **Fig – 2.6.** The letter obtained from Department of Mines and Geology, Govt of Telangana is enclosed as **Annexure – 2B.** As per the letter furnished by the Assistant Director, Mines and Geology, Nalgonda there is no presence of coal deposits in the proposed project site. Also letter issued by the M/s SCCL in support of absence of coal projects is enclosed as **Annexure – 2B (I).** As per the letter given by the General Manager, Exploration, SCCL, Kothagudem the proposed project site is not located

PROJECT SITE MARKED ON GEOLOGICAL SURVEY OF INDIA MAP

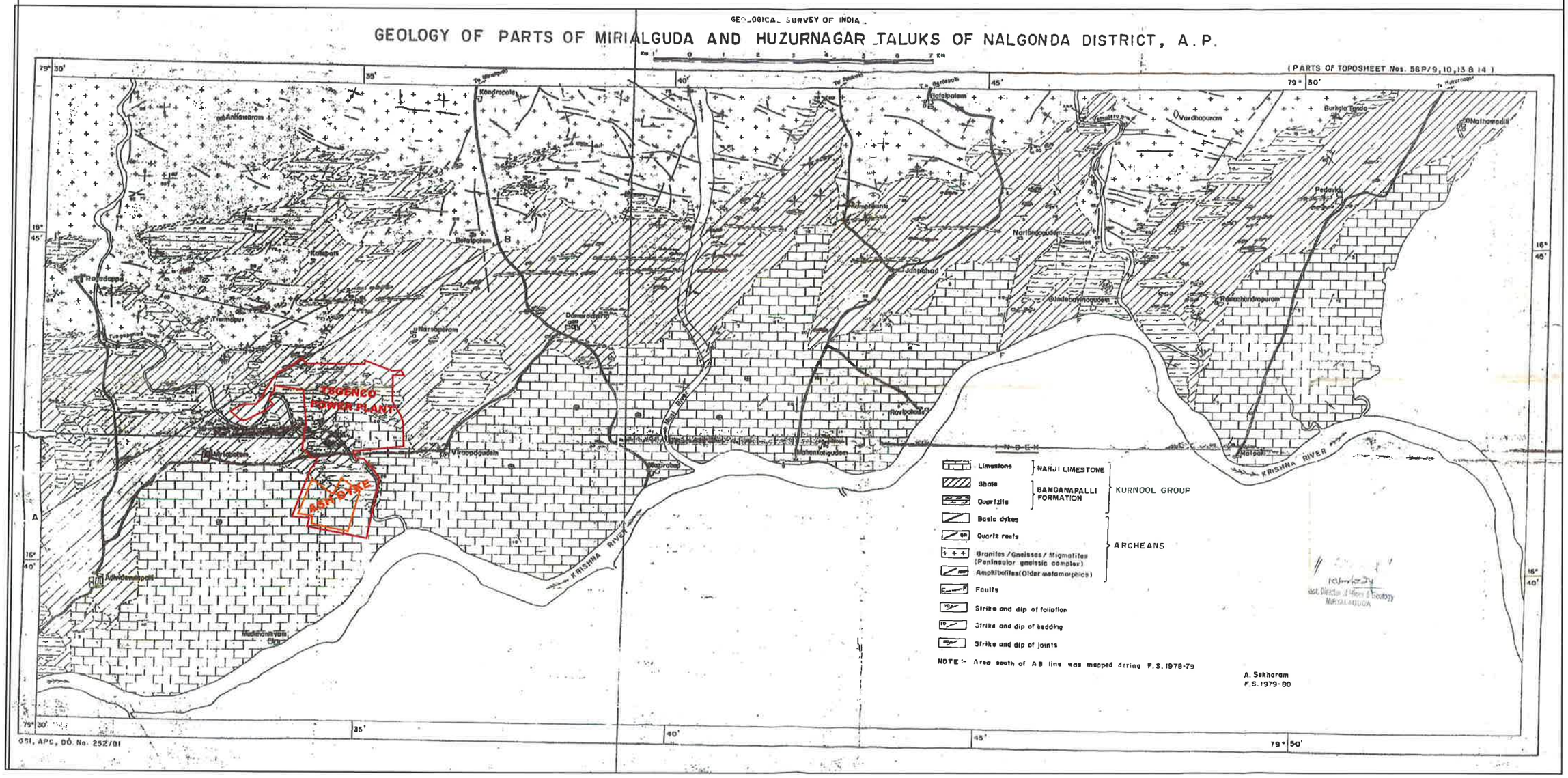


FIG - 2.6

in the sedimentary terrain of Gondwana formation. As such it is confirmed that there will not be any presence of coal deposits.

Soils in the project area are of in-situ type and are derived from the underlying rock formations through pedalogical processes of rock disintegration and decomposition over a prolonged period of time.

Sandy clay loams occur over sedimentary rock formations. Thickness of soil cover varies from place to place on sedimentary rock formations having uneven topography and it is about one meter in thickness. Higher soil thickness occurs on the surfaces of higher relief and less soil cover thickness in the low grounds along drainage courses of higher gradient.

2.5.2 FUEL – COAL

The project will use blend coal having ratio of 50 % Indigenous and 50 % Imported coal or 100 % Imported coal with LDO as startup fuel and Heavy Fuel Oil (HFO) for flame stabilization. The following are the characteristics of the coal proposed for use in the power project.

COAL ANALYSIS

	Unit	Indian Coal (based on SCCL data)	Imported Coal (based on MSTC's Imported Coal)	Blended Coal (50% Indian Coal & 50 %Imported Coal)
Proximate Analysis				
Fixed Carbon	%	33.0	42.94	37.97
Volatile Matter		27.00	28.92	27.96
Moisture		10.00	13.14	11.57
Ash		30.00	15.00	22.50
Calorific Value	Kcal/kg	4530	5700	5115
Total				
Ultimate Analysis				
Carbon	%	49.41	57.75	53.58
Hydrogen		2.83	3.53	3.18
Sulphur		0.42	0.80	0.61
Nitrogen		0.85	1.08	0.97
Oxygen (difference)		6.49	8.70	7.59
Moisture		10.00	13.14	11.57
Ash		30.00	15.00	22.50

Source: TSGENCO

Coal analysis considered by BHEL for design of Power Plant is enclosed as **Annexure – 2C**. Radio activity and heavy metal content of coal is enclosed as **Annexure – 2D**.

COAL REQUIREMENT

The estimated coal requirement is given below

ANNUAL COAL REQUIREMENT

Fuel		**5x800 MW (4000 MW)**
Blend Coal (50% Indigenous Coal and 50% Imported Coal) (@GCV of 5115 kcal/kg)	TPH	1650
	TPD	39600
	MTPA	12.28 @ 85 % PLF
Or		
Imported Coal (100%) (@GCV of 5700 kcal/kg)	TPH	1480
	TPD	35520
	MTPA	11.02 @ 85 % PLF
MTPA – million tonnes per annum, TPH -Tonnes Per Hour, TPD-Tons per day PLF-Plant Load Factor		

Source: TSGENCO

COAL SOURCE AND LINKAGE

The MOU with M/s SCCL for supply of Indigenous coal is enclosed as **Annexure - 2E (I).** M/s SCCL has also furnished the commitment letter for supply of coal as per the MOU is enclosed as **Annexure - 2E (II)**. M/s MSTC for supply of imported coal is revised as directed by the EAC during the 63rd meeting is enclosed as **Annexure - 2E (III)**.

COAL TRANSPORTATION

Indigenous coal received will be transported from SCCL Mines using the Rail network. Imported coal will be received by ships at Krishnapatnam/Kakinada/Visakhapatnam ports. From the Ports, coal will be transported by Indian Railways to the plant site.

FUEL OIL

Start-up, warm-up and low load operation will be carried out by HFO/LDO for which following storage tanks and associated

facilities have been envisaged for the plant. HFO will be brought to the plant by rail tankers and unloaded into the storage tanks. LDO will be brought by Road tankers and stored in storage tanks.

DETAILS OF FUEL OIL STORAGE

Fuel	No. of Tanks	Design Capacity (Cu.m))
LDO	2	1000 (each)
HFO	2	4000 (each)

Source: TSGENCO

2.5.3 WATER

The project is based on Zero Discharge Concept considering recycling of treated wastewater. Water requirement of the project is estimated to be 10,000 m^3/hr (97.8 cusecs/3.10 TMC per year) considering a COC of 5.0 and complying with the new norm of 2.5 m^3/MWHr.

This requirement will be met from River Krishna. Govt. of Telangana, Irrigation and CAD Department has allocated 208 cusecs of water (6.60 TMC/year) from Krishna River vide G.O. Ms No. 13 dated 30.01.2015 (Enclosed as **Annexure – 2F**). TSGENCO will utilize about 97.8 cusec (3.10 TMC per year) for the proposed 4000 MW from this allocation.

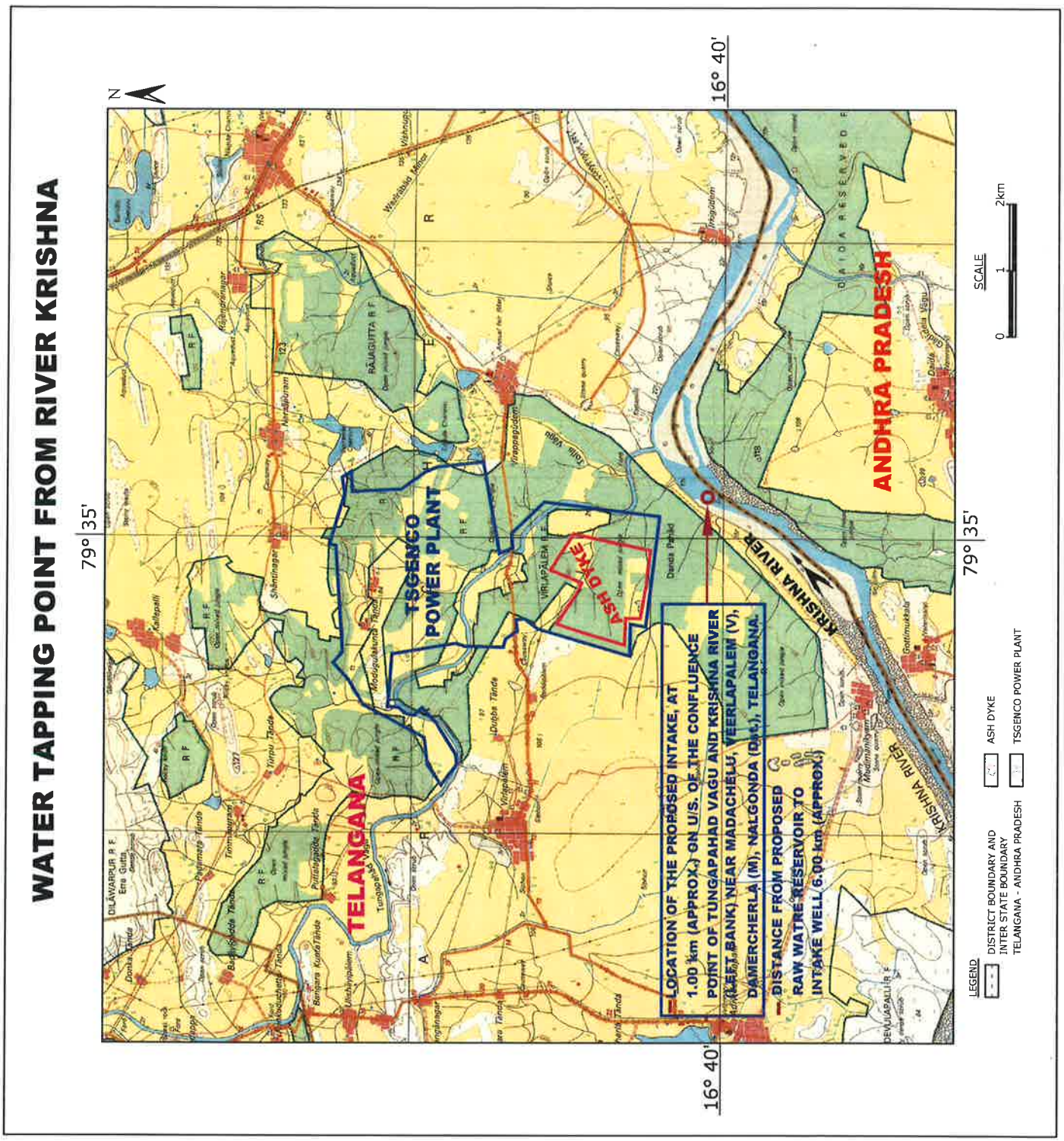
TSGENCO will install intake structure including pumping station near Madachelu area which is about 1.0 km distance i.e., on upstream side of confluence point of Tungapahad Vagu & Krishna river. **Fig – 2.7** shows the tapping point of TSGENCO on River Krishna. Pipeline will be laid from this point to the project site.

2.5.4 POWER EVACUATION

The Power generated will be evacuated through 400KV double circuit Quard Core Moose Conductor to the following interconnecting substations, namely

i) Choutuppal
ii) Dindi
iii) Maheshwaram
iv) Jangoan

FIG - 2.7


WATER TAPPING POINT FROM RIVER KRISHNA
N
79° 35'
16° 40'
TELANGANA
ANDHRA PRADESH
TSGENCO POWER PLANT
ASH DYKE
KRISHNA RIVER
KRISHNA RIVER
LOCATION OF THE PROPOSED INTAKE, AT 1.00 km (APPROX.) ON U/S. OF THE CONFLUENCE POINT OF TUNGAPAHAD VAGU AND KRISHNA RIVER (LEFT BANK) NEAR MADACHELU, VEERLAPALEM (V), DAMERCHERLA (M), NALGONDA (Dist.), TELANGANA.
DISTANCE FROM PROPOSED RAW WATRE RESERVOIR TO INTAKE WELL 6.00 km (APPROX.)
SCALE
0
1
2km
LEGEND
DISTRICT BOUNDARY AND INTER STATE BOUNDARY TELANGANA - ANDHRA PRADESH
ASH DYKE
TSGENCO POWER PLANT

2.5.5 MANPOWER

The manpower requirement during construction and operation of the power plant is given below:

REQUIREMENT OF MANPOWER

	Direct	Indirect
During Construction	150	5000
During Operation	2000	2000

Preference will be given to local persons from neighboring villages based on suitability during construction and operational phase.

2.5.6 COLONY

Colony will be constructed within the project site for the employees of the power plant in 80 acres. The colony will include the following

a. Quarters for 2000 employees
b. Project Hostel
c. Guest House
d. Community Center
e. Recreational Facilities
f. Health Center

2.6 SCHEDULE OF IMPLEMENTATION

TSGENCO proposes to implement the 4000 MW power project as given below:

PROJECT SCHEDULE

S.No	Unit Capacity	Tentative time schedule
1.	2 X 800 MW	Unit#1 and #3 :36 months from Zero date
2.	3 X 800 MW	Unit#2, #4 and #5 : 48 months from Zero date

Source : TSGENCO

2.7 PROJECT LAYOUT

Layout of the power plant has been designed considering the existence of Tungapahad Vagu and Village road. Layout is designed without disturbing Tungapahad Vagu and the village road. A barrier zone of 100 m on either side of Tungapahad Vagu and 50 m on either side of the road connecting the village will be developed under greenbelt. A total of 1352 acres of the Plant area is earmarked for greenbelt. The proposed land use break-up is presented in **Table-2.1**.

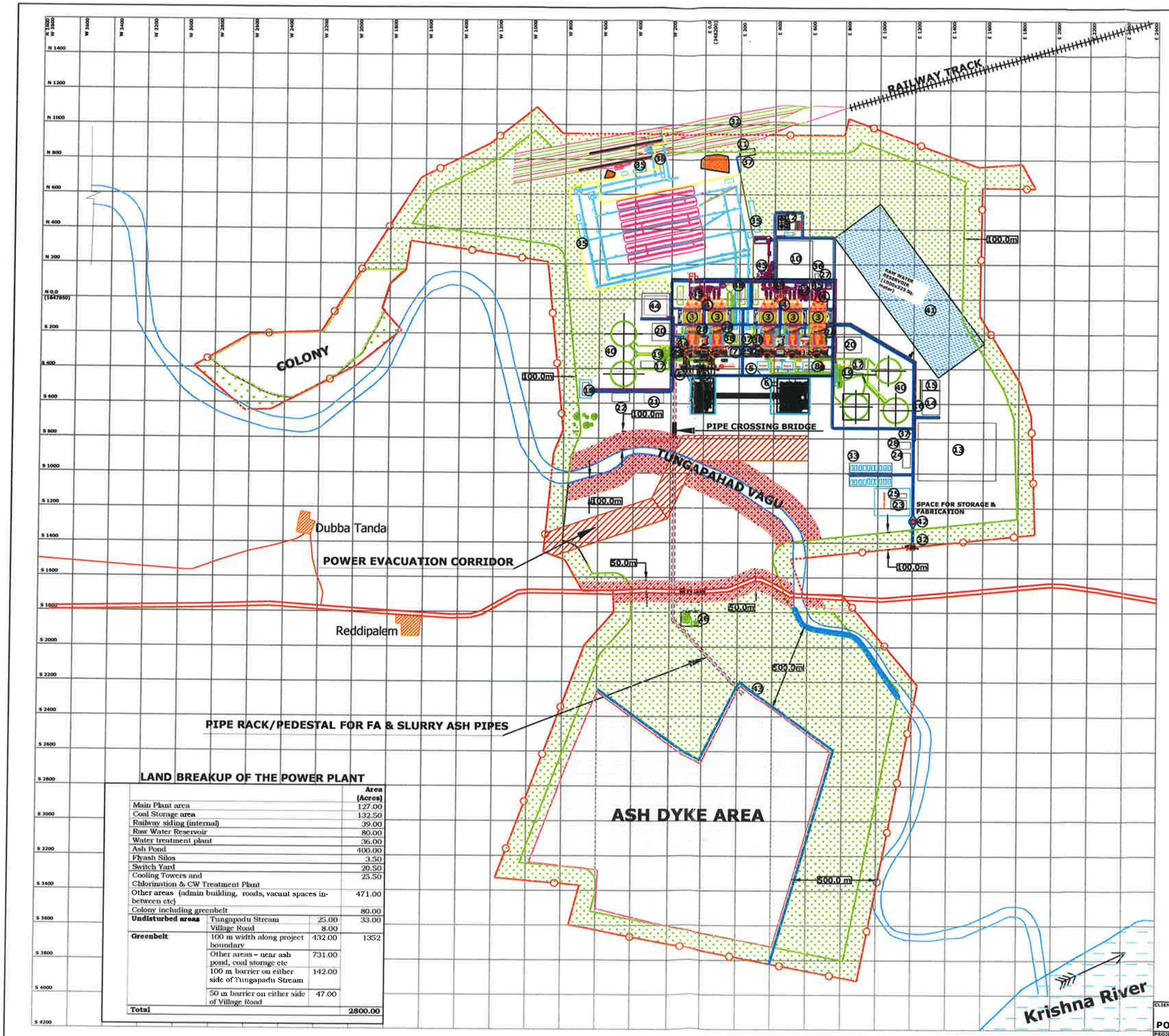
TABLE – 2.1
LAND BREAKUP OF THE POWER PLANT

			Area (Acres)
Main Plant area			127.00
Coal Storage area			132.50
Railway siding (internal)			39.00
Raw Water Reservoir			80.00
Water treatment plant			36.00
Ash Pond			400.00
Flyash Silos			3.50
Switch Yard			20.50
Cooling Towers and Chlorination & CW Treatment Plant			25.50
Other areas (admin building, roads, vacant spaces in-between etc)			471.00
Colony including greenbelt			80.00
Undisturbed areas	Tungapahad Stream	25.00	33.00
	Village Road	8.00	
Greenbelt	100 m width along project boundary	432.00	1352
	Other areas – near ash pond, coal storage etc	731.00	
	100 m barrier on either side of Tungapahad Stream	142.00	
	50 m barrier on either side of Village Road	47.00	
Total			**2800.00**

The layout of the plant is shown in **Fig – 2.8**.

REVISED PLANT LAYOUT DULY INCORPORATING FGD

FIG - 2.8



S.No.	DESCRIPTION	CONFIG.
1	POWER HOUSE BLDG	-
2	BOILER	-
2A	SCR	-
3	ESP	-
4	CHIMNEY	2+2+1
5	TRANSFORMER YARD	-
6	SWITCHYARD (CONT. ROOM)	-
7	SERVICE BLDG.	COMMON
8	DG BUILDING	2 Nos
9	COOLING TOWER(NDCT)	-
10	DM PLANT & CPU REGEN.	COMMON
11	FUEL OIL UNLOADING	COMMON
12	FUEL OIL COMPLEX	COMMON
13	PRE-TREATMENT PLANT	COMMON
14	CLARIFIED WATER TANK	COMMON
15	FIRE WATER TANK	COMMON
16	CLARIFIED CUM FIRE WATER P/H	COMMON
17	SIDE STREAM FILTERATION	2 + 3
18	H2 GEN. PLANT & CYLINDERS SHED	COMMON
19	CW P/H & FOREWAY	2 + 3
20	CHLORINATION & CW TREAT. PLANT	2 + 3
21	EFFLUENT TREAT. PLANT	COMMON
22	SEWAGE TREAT. PLANT	COMMON
23	ADMIN. BUILDING	COMMON
24	FIRE STATION BUILDING	COMMON
25	CANTEEN	2NOs
26	FLY ASH SILO AREA	COMMON
27	CHEMICAL LAB	COMMON
28	WORKSHOP	COMMON
29	COMPRESSOR HOUSE	2 + 3
30	COAL STOCK AREA	COMMON
31	MARSHLING YARD (BY TSGENCO)	COMMON
32	GATE COMPLEX CUM SECURITY BLDG.	COMMON
33	PERMANENT STORES (15MX30M)	18+1
34	AUXILIARY BOILER	-
35	CHP MCC	4 NOs
36	CHEMICAL LAB (PCRI)	COMMON
37	----------	-------
38	CST + PUMP HOUSE	2 + 3
39	AWRP/H & MCC	1
40	COOLING TOWERS (NDCT)	5
41	RAW WATER RESERVOIR	COMMON
42	PYLON/FOUNDATION STONE	-
43	ASH DYKE AREA	-
44	AMMONIA STORAGE&HANDLING PLANT	COMMON
45	FLUE GAS DESULFURIZATION (FGD)	-
46	LIMESTONE HANDLING AREA	COMMON
47	GYPSUM DEWATERING & STORAGE	COMMON
48	FGD CONTROL ROOM	COMMON

NOTES :-

1. ALL DIMENSIONS AND CO-ORDINATES ARE IN METER UNLESS NOTED OTHERWISE.

REFERENCE DRGS.

1. TENDER STAGE PLOT PLAN:TSGENCO\NLG\RF\VRPM\01
2. CONTOUR PLAN DRG : SUV/2015/3512/PLAN

LEGEND

- RIVER
- ROAD
- RAILWAY TRACK
- PLANT BOUNDARY
- 100 m BARRIER ZONE
- COLONY
- CORRIDOR FOR TRANSMISSION LINES
- GREEN BELT
- ROAD WITH 50 M BARRIER ZONE ON TWO SIDES
- STORM WATER DRAIN
- TUNGAPAHAD VAGU WITH 100 M BARRIER ZONE ON TWO SIDES

LAND BREAKUP OF THE POWER PLANT

			Area (Acres)
Main Plant area			127.00
Coal Storage area			132.50
Railway siding (internal)			39.00
Raw Water Reservoir			80.00
Water treatment plant			36.00
Ash Pond			400.00
Flyash Silos			3.50
Switch Yard			20.50
Cooling Towers and Chlorination & CW Treatment Plant			25.50
Other areas (admin building, roads, vacant spaces in-between etc)			471.00
Colony including greenbelt			80.00
Undisturbed areas	Tungapadu Stream	25.00	33.00
	Village Road	8.00	
Greenbelt	100 m width along project boundary	432.00	1352
	Other areas – near ash pond, coal stornge etc	731.00	
	100 m barrier on either side of Tungapadu Stream	142.00	
	50 m barrier on either side of Village Road	47.00	
Total			**2800.00**

CLIENT:
M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED

PROJECT:
4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State

LAND REQUIREMENT FOR EXTERNAL FACILITIES

S.NO	DESCRIPTION	AREA (Acres)
1	Railway siding (External) from Vishnupuram Railway station to Inplant yard (8km x 60m width)	120.00
2	Water Pipeline - (6km x 5m width)	7.50
	Total	127.50

2.8 POWER GENERATION PROCESS

2.8.1 SUPER CRITICAL TECHNOLOGY

A supercritical boiler burns pulverized coal and is a once-through boiler and doesn't require a drum to separate steam from water. Supercritical boiler operates at such high pressure which ceases fluid matrix to become "supercritical fluid." which turns the turbine that generates electricity. The significant advantages of super critical boiler technology are:

a. Improved Efficiency,
b. Reduced Emissions and
c. Lower Operating Costs

The proposed power project of 4000 MW will have 5 numbers of 800 MW units. Steam parameters of supercritical technology are as follow:

Pressure	:	247 kg/cm² (a)
Main Steam Temperature	:	565°C
Reheat Steam Temperature	:	593°C

2.8.2 POWER GENERATION PROCESS

Coal will be fired in a boiler to produce steam at about 247 kg/cm², 565⁰C and fed to steam turbine which will drive the generator connected rigidly to it. The power output from the generator through appropriate electrical system will be fed to the grid.

Exhaust steam from the turbine will be cooled in the water cooled condenser. Water requirement will be mainly for condensate cooling system, auxiliary systems of boiler, turbine and generator etc. In addition water is required for bottom ash handling system, dust suppression system of coal handling, firefighting systems, drinking (in plant and colony), Make-up will be required to be added for replenishing the loss due to evaporation, blow down and other consumptive use.

To conserve water, a Full Fledged Effluent Treatment Plant (comprising pressure sand filter, basket strainer filter, ultra filtration and micron cartridge filter and RO plant) is being implemented to treat part of cooling tower blowdown. The RO permeate is used in Cooling Tower and the rejects will be disposed to ash water recovery sump.

Fly Ash generated from burning of coal in the boiler will be collected in ESP and conveyed pneumatically to storage silo within the premises. Total Flyash generated in the power plant will be collected in dry form and disposed to nearby cement plants. Unutilized Flyash (if any) will be disposed to ash pond. Bottom ash will be ground and disposed to Ash Pond in the form of slurry.

Typical Power Generation schematic diagram is shown in **Fig - 2.9**

2.9 TECHNICAL FEATURES OF THE BOILER & TURBINE GENERATOR

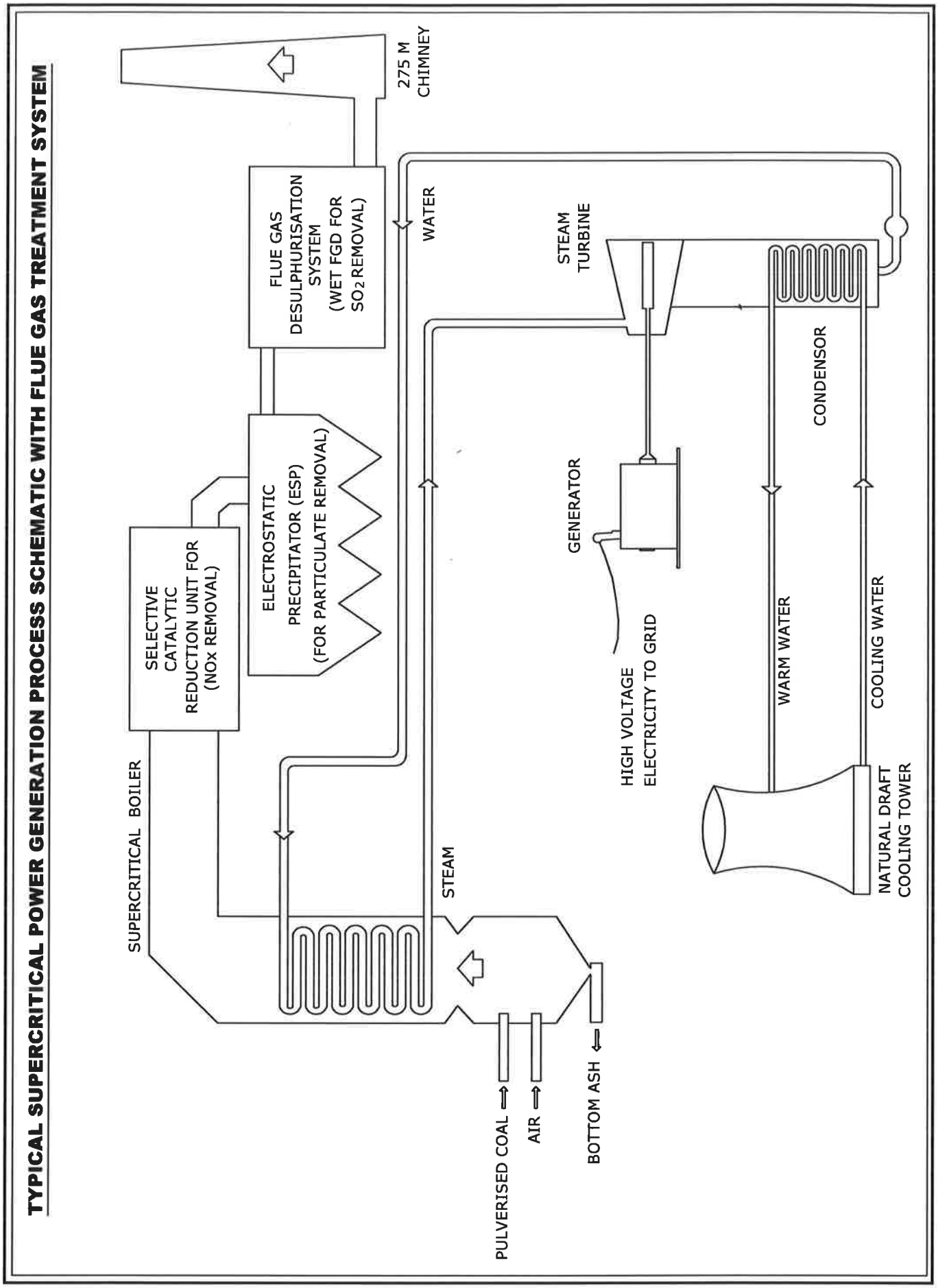
The following technical features of the power plant have been sourced from the Detailed Project Report and BHEL.

2.9.1 STEAM GENERATOR AND ACCESSORIES

2.9.1.1 STEAM GENERATOR

The steam generator will be of supercritical technology designed for firing coal as primary fuel, balanced draft furnace suitable for semi-outdoor installation. Boiler including auxiliaries will be

FIG - 2.9


TYPICAL SUPERCRITICAL POWER GENERATION PROCESS SCHEMATIC WITH FLUE GAS TREATMENT SYSTEM
275 M CHIMNEY
FLUE GAS DESULPHURISATION SYSTEM (WET FGD FOR SO_2 REMOVAL)
WATER
STEAM TURBINE
SELECTIVE CATALYTIC REDUCTION UNIT FOR (NOx REMOVAL)
ELECTROSTATIC PRECIPITATOR (ESP) (FOR PARTICULATE REMOVAL)
GENERATOR
CONDENSOR
SUPERCRITICAL BOILER
STEAM
HIGH VOLTAGE ELECTRICITY TO GRID
WARM WATER
COOLING WATER
NATURAL DRAFT COOLING TOWER
PULVERISED COAL
AIR
BOTTOM ASH

designed for operation with 100% Imported coal and with a coal blending of imported coal and indigenous coal in the ratio of 50:50.

The steam generator will be capable of operating on sliding pressure. The load change for sliding pressure will be from 40%. Steam Generator Maximum Continuous Rating (SGMCR) to 100%. However, it will be possible to operate the steam generator with modified pressure sliding mode with constant pressure mode operating between 90% Turbine Generator Maximum Continuous Rating (TGMCR) to 100% SGMCR. Steam generator will be designed to meet the Indian Boiler Regulation (IBR) requirement.

Steam and water system will essentially comprise of steam separator, separator storage tanks evaporator down comers, water walls, superheater, reheater, desuperheater, economizer, valves, fittings, piping, insulation, supporting hanger's instrumentation etc.

The furnace will be designed to withstand pressure regimes without permanent deformations and will be made of gas tight welded membrane walls design required for openings of wall blowers, observation ports, access doors and instruments.

The furnace walls will either be spiral wound and vertical tubes or vertical rifle tubes as per the manufacturer's design. The furnace will have hopper bottom with stainless steel seal plates suitable for connection to an ash hopper. A suitable sealing arrangement will be provided for connecting to water impounded wet type bottom ash hopper.

The water/steam separators will be arranged at the evaporator outlet and will be so sized to ensure adequate steam separation. The water/steam mixture will be fed into the separators by connecting pipe work which will enter around the circumference at an inclined angle to ensure mixture moving spirally downwards and the water/steam separation is done by means of applied centrifugal force. The water will be led downwards to the

collecting vessel and the steam escapes centrally upwards to the connections towards the first superheater stage.

The water received in the separators will be re-circulated to the economizer inlet via 1x100% startup water re-circulation pump. At higher loads the re-circulation pump will not be in operation and the entire flow from the evaporator is directed to the superheater. It will also be possible to start the steam generator without the re-circulation pump.

The superheater and reheater will be designed to maintain superheat and reheat steam temperatures at superheater and reheater outlet over the entire steam temperature control range.

The attemperators are to be of spray type fitted with an inner removable lining. RH temperature control is by means of damper control of the flue gases or gas recirculation.

The economizer will be of non-steaming and bare tube type. The tube banks will be of inline arrangement.

TECHNICAL DATA OF STEAM GENERATOR

The typical data of steam generator & auxiliaries is given below:

Particulars	Unit	Parameters
Super heater outlet steam flow	tph	2600
Steam pressure at SH outlet (minimum)	Kg/cm² (a)	256
Steam temperature at SH outlet	°C	565
Reheat steam flow	tph	2052
Steam temp. at RH inlet	°C	350
Steam temp. at RH outlet	°C	593
Steam pressure at RH inlet (minimum)	kg/cm² (a)	61
Steam pressure at RH outlet	Kg/cm² (a)	59
Feed water temperature entering Economiser	°C	307
Excess air (at 100% MCR)	%	20
Superheat temp control	-	By spray attemperation between stages of super heaters
Reheat temperature control	-	By burner tilt/flue gas

Particulars	Unit	Parameters
		recirculation and emergency spray attemperators
FD Fans	Nos./Type	2 Nos. axial reaction type, blade pitch control
PA Fans	Nos./Type	2 Nos. axial reaction type, blade pitch control
ID Fans	Nos./Type	2 Nos. axial reaction type, blade pitch control
Soot blower	-	Wall blowers, retractable blowers, rotary blowers and APH blower as per requirement
Regenerative air pre-heaters	-	2 Nos. trisector APH or four bisector APH 2 Nos. steam heated air pre heater
Ambient air temperature for design	°C	45
Burners		Low NOx pulverized coal burners

2.9.1.2 AUXILIARY BOILER

One number outdoor installation type, natural circulation, single / bi-drum, pressurized furnace, water tube Boiler suitable for firing LDO and having required steaming capacity but not less than 60 T/hr (Excluding steam requirement of Auxiliary Boiler) with operating steam parameters of 19 kg/sq.cm(g) pressure & 250 deg. C temperature at super-heater outlet. Output steam of the auxiliary boiler shall be connected to the low temperature station header.

2.9.2 STEAM TURBINE AND AUXILIARIES

2.9.2.1 STEAM TURBINE

The turbine component and its auxiliaries will be designed and selected to meet the stringent requirements in respect of superior thermal performance, excellent product reliability & operational flexibility.

The turbine will be designed based on modular design approach that divides the turbine into three main parts:

- High-pressure (HP) section
- Intermediate-pressure (IP) section and
- Low-pressure (LP) section

The turbine will have one single flow HP, one double flow IP and two double flow low-pressure cylinders exhausting downwards into condensers. All components will be selected based on long-proven records and standardized modules. The turbines will be of the tandem compound design. The individual shafts of the cylinders and the generator rotor shaft will be coupled rigidly together.

Typical Technical data of Steam Turbine

Description	Unit	Parameter
Type	-	Tandem Compound
Number of cylinders	-	Four (4)
Type of governing	-	Digital electro hydraulic
Speed	RPM	3000
Rated output (continuous)	kW	800000
Steam pressure before emergency stop valve HP	$Kg/cm^2(a)$	242
Steam temperature before emergency stop valve	^0C	565
Reheat steam inlet pressure	$Kg/cm^2(a)$	56
Reheat steam temperature	^0C	593
SH Steam flow required with 0% make-up and 0.098 at a back pressure	tph	2427
Reheat steam flow	tph	1995
Rated pressure at exhaust of LP turbine	$Kg/cm^2(a)$	0.1
Maximum temperature rise of circulating water	^0C	9

2.9.2.2 CONDENSING SYSTEM

The function of the condenser is to condense the steam exhausted from the LP cylinders and to produce and maintain as high a vacuum as possible in order to increase the enthalpy drop, which can be utilised in the turbine.

Twin condensers will be provided per unit with cooling water side of condenser in series. Condenser will be of box type construction with divided water box design which facilitates the operation of one half of condenser while the other half is under maintenance. The steam space will be of rectangular construction. Air and non-condensable gas from the condenser are drawn out with the help of air evacuation equipment.

Condenser tube will be of cupronickel or stainless steel. The layout of the tube will be of modular type having properly sized tube bundles.

2.9.2.3 AIR EXTRACTION

The unit will comprise of (2x100%) vacuum pumps for each condenser along with all accessories and instrumentation for condenser air evacuation. The vacuum pumps and accessories will be used to create vacuum by removing air and non-condensate gases from steam condenser during plant operation.

2.9.2.4 CONDENSATE EXTRACTION PUMPS

Each unit will have 3x50% capacity motor driven condensate extraction pumps (two operating and one standby). The condensate pumps will be vertical barrel type, multistage, double section, diffuser pumps, centrifugal type designed for condensate extraction service having low suction head requirement.

2.9.2.5 REGENERATIVE FEED HEATING CYCLE

Regenerative feed heating cycle will consist of LP heaters, drain cooler, deaerator and a parallel bank of HP heaters. The number

of LP & HP heaters will however be based on the optimization of feed heating cycle.

Feed water will be heated by uncontrolled turbine extraction steam from turbine inter-stage tap-offs and cold reheat line in feed water heaters.

Spray-cum-tray type deaerator will consist of integral vent condenser, deaerating header and feed storage tank. The deaerator will be capable of deaerating the dissolved oxygen and carbon dioxide in condensate & HP Heater drains.

2.9.2.6 BOILER FEED PUMPS (BFP)

The unit will comprise of 2x50% turbine driven boiler feed pumps and 1x50% electric motor driven boiler feed pump per unit with boiler feed booster pumps mounted on the common shaft. The boiler feed booster pump will be double volute casing, vertical split, casing type. The discharge line of the booster pump will be connected to suction boiler feed pump. Each boiler feed pump will be designed to give parameters to suit the steam generator requirements; such that motor driven feed pump will be used for start-up of unit and will also act as standby BFP.

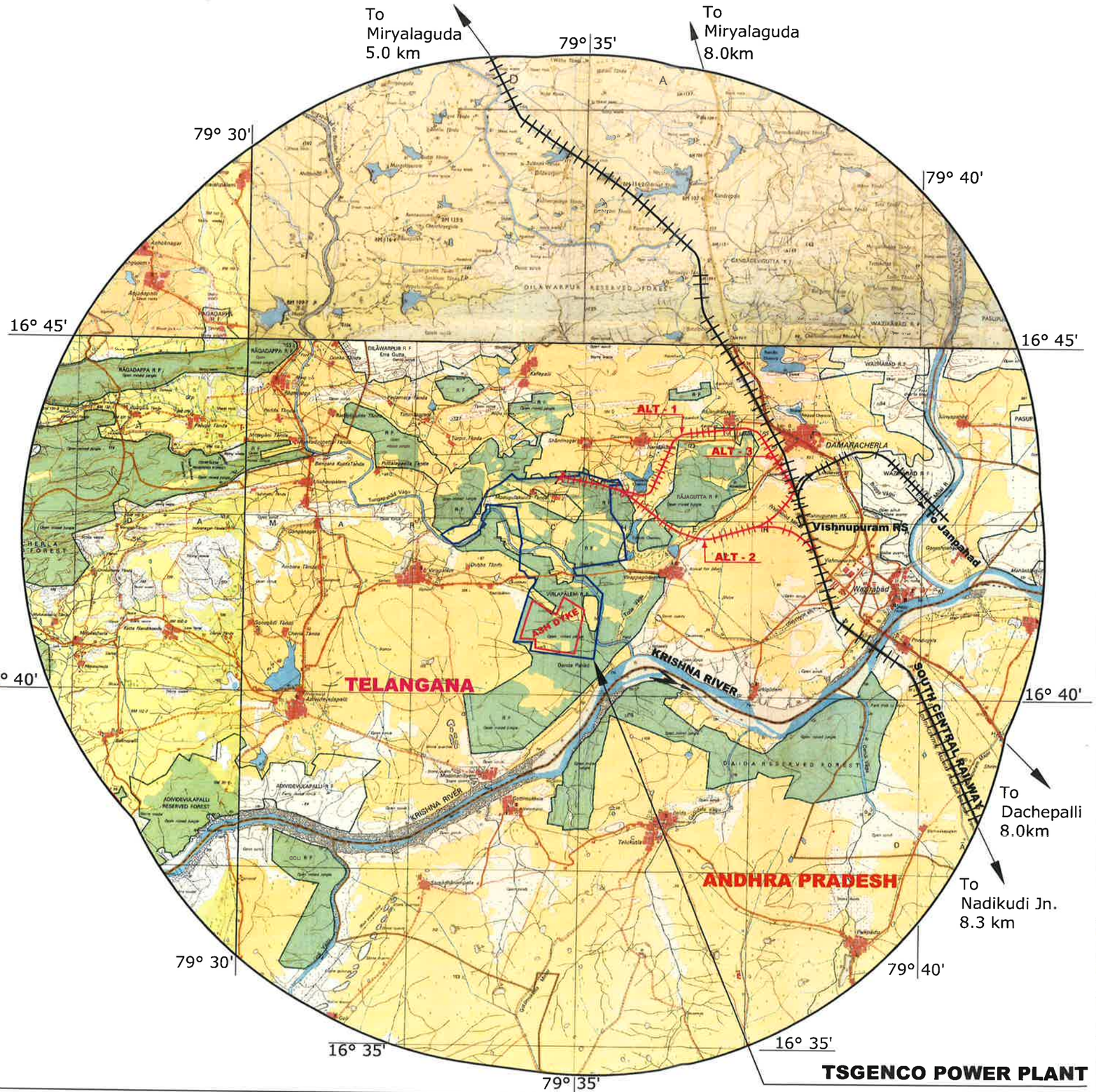
2.10 DESCRIPTION OF MAJOR SYSTEMS

2.10.1 COAL TRANSPORTATION, UNLOADING FACILITIES AND HANDLING PLANT

Indigenous coal received will be transported from SCCL Mines using the Rail network. Imported coal will be received by ships at Krishnapatnam/Kakinada/Visakhapatnam Ports. From the Ports, coal will be transported by Indian Railways to the plant site.

A Railway Line is proposed from Vishnupuram Railway station on Bibinagar-Nadikudi Main line of South Central Railway. The distance from Vishnupuram railway station to plant is about 8 Km.

The proposed of Railway Line is shown in **Fig – 2.10.**



N

LEGEND

- DISTRICT BOUNDARY AND INTER STATE BOUNDARY TELANGANA - ANDHRA PRADESH
- ASH DYKE
- TSGENCO POWER PLANT

REFER TO THIS MAP AS:- 1:50,000
SHEET 56 P / 10 FIRST EDITION

Published under the direction of
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SCALE
0 3 6km

FIG - 2.10

CLIENT: **M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED**

PROJECT: 4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

TITLE: **PROPOSED RAILWAY LINE TO YTPS PLANT SITE**

PREPARED BY:
B.S.ENVI-TECH (P) LTD.,
SECUNDERABAD

Letters obtained from Port and Railway Authorities for adequacy of facilities for coal handling is enclosed as **Annexure – 2G.**

The coal handling plant (CHP) will be designed to operate throughout the year with coal with average gross, calorific value of 5115 kcal/kg. The following is the coal requirement considered by BHEL based on Gross Station Heat Rate of 2109.4 kcal/kwh.

COAL REQUIREMENT

Fuel		**5x800 MW (4000 MW)** @ 85 % PLF
Blend Coal (50% Indigenous Coal and 50% Imported Coal)	MTPA	12.28
Or		
Imported Coal (100%)	MTPA	11.02
MTPA – million tonnes per annum		

Source: **TSGENCO**

2.10.2 COAL HANDLING PLANT (CHP)

Two independent CHPs are envisaged designated as CHP I & II. CHP-I caters to the fuel requirements for Unit-1/2 and CHP-II for Unit- 3/4/5. The Wagon Tippler Complex (each with two (2) Crescent type Wagon Tipplers) are proposed for CHP-I as well as for CHP-II. Track Hopper Complex # THC-1A & THC-1B are provided for CHP-I & CHP-II respectively. Capacity of each track hopper shall be 7200 Tonnes. Suitable number of rail tracks appropriately interconnected with each other will be laid ahead & prior to the track hoppers/wagon tipplers for handling/return of empty rakes. Necessary line side equipment and signaling arrangement for rake movement shall be provided.

The Wagon Tippler Complex is proposed so that stock building and rake unloading operations can be carried out expeditiously. The Track Hopper Complex is proposed so that during emergency situation, rakes with bottom discharge wagons can be unloaded in sufficient numbers.

CHP-I & CHP-II are interconnected so that coal can be transferred from CHP-I to CHP-II & vice versa. Each of CHP- I /II is composed of two (2) streams (1W + 1S) operating at guaranteed capacity of 2156 tph each. However, both streams of CHP-I /II shall be designed to operate simultaneously in case of emergency.

Minimum four (4) Diesel Locomotives having minimum 800HP rating shall be provided for local shunting/ hauling purpose etc of rakes within the railway marshalling yard.

Stockpile		
S. No.	**Item Description**	**CHP-I / II**
1.	Coal Consumption per day, tonne	39657.6 [Value for Unit-1/2 + Value for Unit-3/4/5]
2.	Capacity of stock for days storage	756257 (19 days)
3.	No. of Stockpiles provided for crushed coal	Six (6) [Designation: CCS-1/2/3/4/5/6]
4.	Type of cross section of stockpile	Trapezoidal
5.	Length of each stockpile, m	442
6.	Height of each stockpile, m	10
7.	Width at base, m	50
8.	Width at top, m	23.46
9.	Number of stock piles	6
10.	Machine Used for stockpile formation [Stockpile#CCS-1/2/3/4/5/6]	3 sets of stacker machine with capacity of 2000/2200 TPH used to form 6 stockpiles each 2 No.s on both sides. The boom length of each stacker is 41M approximate and track rail gauge 8.2M minimum (Not less than 20% of boom length)(as per design basis report)
11	Machine Used for Reclaiming Crushed Coal From Stockpile [Stockpile# CCS-1/2/3/4/5/6]	3 sets of reclaimer with capacity of 2000/2200 TPH used for reclaiming 6 stockpiles each 2 No.s on both sides of reclaimer. The travel speed for both backward and forward motion(15M/min & 27.5M/min)and the lifting machine of boom is by hydraulic with slewing

Stockpile		
S. No.	**Item Description**	**CHP-I / II**
		range(+/-) 105 degrees from the centre line of truck conveyor (as per design basis report). ii) Bull dozer for dozing crushed coal from stockpile#ccs-1/6 into emergency reclaim hoppers of Reclaim hoppers #ERH-1/2 capacity of 60 T each(as per design basis report).

2.10.3 ASH HANDLING SYSTEM

Ash handling system of each unit will include bottom ash handling system, coarse ash system, wet fly ash handling system, dry fly ash handling system, ash disposal system and ash water recovery system. The details of ash handling at various locations is given below including design margins

Coal consumption at BMCR per unit	-	330 TPH
Ash content in coal @ 22.50 % (50% Indian + 50% Imported) per unit	-	74.25 TPH
Bottom ash hopper generated @ 25%	-	18.56 TPH
Ash generated in Eco hoppers @ 5 %	-	3.71 TPH
Ash generated in APH hoppers @ 5 %	-	3.71 TPH
Ash generated in Duct hoppers @ 5%	-	3.71 TPH
Fly ash in ESP hoppers @ 90 %	-	66.82 TPH

SYSTEM DESCRIPTION

Ash formed due to combustion of pulverized coal in the steam generator will be collected either as bottom ash in the bottom ash hopper; coarse ash in economizer hoppers, air pre heater hoppers, duct hoppers and fly ash ESP hoppers.

Bottom ash of each unit will be collected in a W-shaped water impounded hopper and conveyed to ash slurry sump through jet pumps once in a shift of eight hours. The ash slurry will further be conveyed to ash disposal area by means of Ash disposal pumps.

Ash collected in the economizer hoppers of each unit will be extracted continuously by means of flushing apparatus located below each economizer hopper and conveyed to bottom ash hopper. The ash slurry collected in the bottom ash hopper will further be conveyed to the ash slurry sump along with bottom ash slurry for further disposal to ash disposal area.

Ash collected in the air pre heater and duct hoppers of each unit will be extracted intermittently by means of feeder ejectors located below each APH & Duct hoppers and conveyed to coarse ash tank. The slurry collected in the coarse ash tank will be conveyed to the ash slurry sump through jet pumps.

The fly ash collected in Electrostatic Precipitator hoppers of each unit will be extracted through vacuum and conveyed to buffer hoppers and thereafter to fly ash silos through pressure conveying system. Fly ash stored in fly ash silos will be disposed in dry form through closed trucks; in conditioned form in open trucks through ash conditioner.

BOTTOM ASH HANDLING SYSTEM

Bottom Ash System of each unit will consist of 'W-shaped' water impounded, storage type, water-cooled refractory lined bottom ash hopper located directly below the bottom water wall header of boiler. Bottom ash will be collected continuously from the boiler furnace. Bottom ash hopper will be designed for an effective storage capacity of 8 hours collection of bottom ash and coarse ash from Economizer hoppers generated during worst coal firing.

The bottom ash hopper will have the shape to ensure free flow of bottom ash. BA hopper of each unit will consists of two sections; each section of the hopper will have two outlets provided with two clinker grinders installed directly below the feed gate assembly to limit the size of clinkers to maximum 25 mm. Jet pumps will be provided below each clinker grinder for conveying the ash slurry to

the ash slurry pump house for further transportation to ash disposal area. Out of two clinker grinders and two jet pumps provided for each "V" section, one grinder and jet pump will operate while other will be standby.

Bottom Ash Hopper overflow will be routed through overflow seal box to Bottom Ash overflow sump for onward disposal to AHP clarifier for re-use. Two adequately sized BA Overflow pumps (1W+1S) will be provided for each unit to pump contents of BA overflow sump to ash slurry sump or to AHP clarifier. Seal trough overflow will also be led to the BA overflow sump.

Ash collected in Economizer hoppers will be automatically extracted and conveyed to the flushing apparatus located below each economizer hopper. Necessary vacuum/momentum required for extracting ash from the hoppers will be created by the flushing apparatus. The ash slurry thus produced will be routed to bottom ash hopper by gravity. The ash slurry collected continuously along with bottom ash slurry in the bottom ash hopper will be conveyed to the ash slurry sump by Jet pumps from clinker grinders.

FLY ASH HANDLING SYSTEM

Fly ash collected in various ESP hoppers of each unit will be extracted and conveyed to buffer hoppers automatically and sequentially by means of vacuum generated by mechanical exhausters and will be transported to fly ash silos by means of pressure conveying system. Adequately rated oil free rotary screw type Conveying Air Compressors will be provided to supply compressed air required for conveying fly ash from buffer hoppers to fly ash silos. One (1) buffer hopper will be provided for each vacuum stream. Adequately sized bag filters will be mounted on buffer hopper. Four (4) fly ash conveying streams will be provided for each unit to convey dry fly ash to fly ash silos.

Five (5) Fly Ash Silos each of 1600 T capacity will be provided, each fly ash silo having an effective storage capacity to store 16 hours fly ash generation of one unit while firing worst coal. Each Fly ash silo will be provided with four outlets; two for

unloading ash in dry form into closed trucks through telescopic chute; one for unloading ash in conditioned form into open trucks through ash conditioner; and one outlet will be blind flanged for future use. Each fly ash silo will be provided with adequately sized vent filter with fan over silo roof. Each outlet (except blind flange) will be provided with rotary feeder for discharging regulated quantity of ash.

FLY ASH HANDLING SYSTEM

Fly ash collected in ESP hoppers of each unit alternatively will be automatically and sequentially extracted and pneumatically conveyed in dry form to the proposed collector tanks through vacuum created by Mechanical Exhausters. Dry fly ash while routed to the collector tank will pass through wetting head where water will be mixed with the dry fly ash and resultant ash slurry will be discharged in to the collector tank. One air washer will be provided on each collector tank to clean the air passing to mechanical exhauster. Flow of air to the Mechanical Exhausters will contain negligible dust. Air washer drain will be connected to collector tank discharge pipe. Adequately sized jetting nozzles will be provided below each collector tank to further convey the slurry to the ash slurry sump

ASH DISPOSAL SYSTEM

Ash slurry disposal system: One slurry pump house with independent ash slurry sump is proposed.

Bottom ash, coarse ash and fly ash slurry of each unit collected in the ash slurry sump will be pumped to ash pond through ash disposal pump series and pipe lines.

ASH WATER RECOVERY SYSTEM

Decanted water from the ash pond will be recovered by establishing ash water recovery system and reused for various purposes in the plant.

PROCESS DRESCPTION

1. The water from the stilling pond shall be let out to recovery water sump through the collecting well.
2. The effluent outflow from these collecting wells shall be pumped through a discharge pipe with an isolation valve to the clarifier via flash mixer. The Clarifier shall be located partially above ground.
3. The clarified water from the Clarifier shall be led into a clear water tank by gravity through open channel located above ground. The clear water tank shall be located below ground. There shall be two (2) no. of recovery water pumps (1W+1S) and recovery water pipeline, adequate for the flow rate of ash water recovered from the ash pond.

ASH WATER RECOVERY SYSTEM

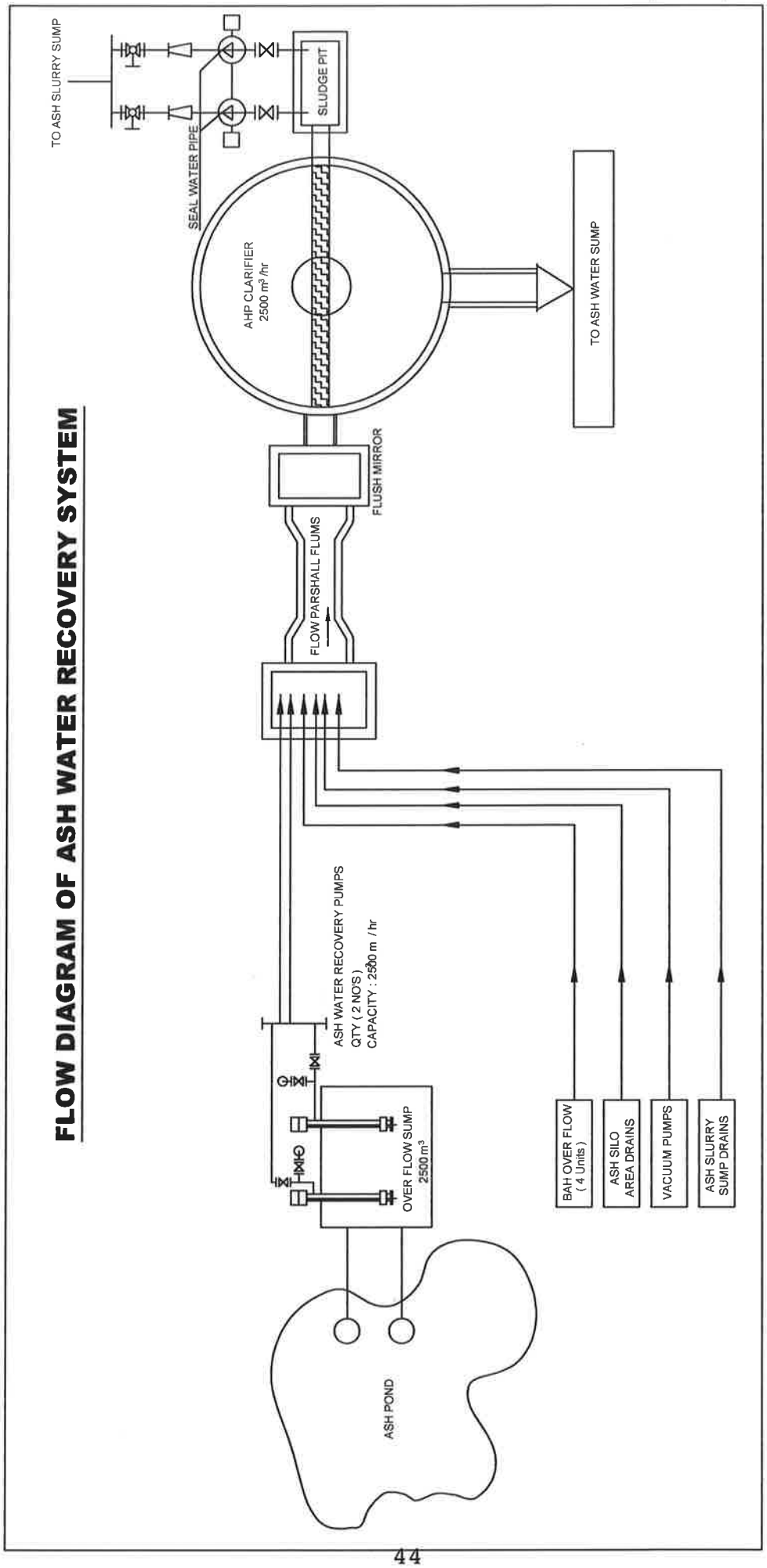
a) Two (2) Nos. (1W+1S) of Horizontal centrifugal pumps for pumping the water from recovered water sump to clarifier.
b) Recovered water pipe from ash pond to clarifier.
c) One (1) No. Clarifier.
d) Two (2) nos. (1W+1S) of horizontal centrifugal pumps to pump clear water from clear water sump to ash tank.
e) One (1) lot of clear water sump / tank accessories like drain connection, over flow connection.
f) One (1) lot of coagulant dosing pumps with drives, piping.
g) One (1) lot of acid / alkali dosing pumps with drives, piping.
h) Two (2) Nos. (1W+1S) of sludge pumps & piping to pump the ash sludge into Ash Pond.
i) The approximate quantity of water 3310 m^3/hr (for 5 units) will be recovered from ash water recovery system.

A typical Ash Water Recovery System Single Line Diagram is shown in **Fig – 2.11.**

ASH DISPOSAL AREA

Ministry of Environment and Forests (MoEF) Notification dated 3rd November, 2009 stipulate that “new coal and, or lignite based

FIG - 2.11


FLOW DIAGRAM OF ASH WATER RECOVERY SYSTEM
TO ASH SLURRY SUMP
SEAL WATER PIPE
SLUDGE PIT
AHP CLARIFIER
2500 m³ /hr
TO ASH WATER SUMP
FLUSH MIRROR
FLOW PARSHALL FLUMS
ASH WATER RECOVERY PUMPS
QTY (2 NO'S)
CAPACITY : 2500 m /hr
OVER FLOW SUMP
2500 m³
BAH OVER FLOW
(4 Units)
ASH SILO
AREA DRAINS
VACUUM PUMPS
ASH SLURRY
SUMP DRAINS
ASH POND

thermal power stations and, or expansion units commissioned after this notification to achieve 100 % utilization of ash within four year from the date of commissioning of the unit".

However, in line with CEA guideline and considering the ash utilization potential around Project site, the optimized land area of 400 acres with 15 m height (max) is proposed for ash dyke. This land will be earmarked for disposing the wet ash generated from all the 5 units. The ash water recovery system from the ash pond with clarification plant etc. will be provided for reuse of recovered water in ash disposal system. Ash disposal area in 400 acres is proposed at 2.28 km from Power plant within the project site.

Details of Land requirement for ash pond are given in **Annexure – 2H**. The ash pond will be lined with HDPE impervious liner.

2.10.4 PLANT WATER SYSTEM

RAW WATER

Consumptive water requirement of five units of 800 MW will be made available by pumping from Krishna river to Plant Raw Water reservoir of capacity 10,80,000 m^3, which is sufficient for 5 days consumptive water requirement. Water is required in a thermal power station for:

a) Cooling Tower make-up.
b) Auxiliary cooling water system - Water for bearing cooling and other auxiliary systems through closed loop circulation
c) Boiler make-up.
d) Potable water for plant/colony.
e) Plant services
f) Fire fighting
g) Ash handling

The consumptive water requirement of 5 x 800 MW units is worked out as follows:

WATER REQUIREMENT

Unit		**Requirement, m^3/hr**
COOLING WATER		8250 (recycled water-385)
NON COOLING WATER		
Boiler make-up		235
DM Regeneration		30
Condensate Polishing Unit		10
Flue Gas Desulphurisation		620
Ash and Coal Handling		685
Service Water	MRS	40
	AHP Seal Water	150
	HVAC	275
	Service water	25
Domestic use	Plant	10
	Colony	40
Mixed Bed Filter & Clarifier		15
Total		**10385**
RO permeate recycled as fresh water		**385**
Net Freshwater requirement		**10000**

PRETREATMENT SYSTEM

Raw water drawn from in plant water storage reservoir will be filtered through 40 (36W + 4S) 335 m^3/hr capacity ultra / micro filtration units along with back wash arrangement. Chlorine will be dozed in raw water reservoir to avoid micro–biological growth. The filter water with SDI<3 and turbidity of 0.5 NTU will be stored in filter water storage of capacity 32,000 cu.m. The reject of ultra / micro filtration units will be transferred to Central Monitoring Basin or Ash Pond.

FILTER WATER SYSTEM

Filter water will be distributed to various areas of the plant through dedicated pump sets

CONDENSER COOLING WATER SYSTEM

Closed cycle condenser cooling is envisaged with Natural Draught Cooling tower. Make-up water will be pumped to the circulating water (CW) sump through two (2) no. 100% capacity buried steel pipe. One CW sump will be provided with 5 nos. (4W + 1S) CW pump sets and other CW sump will be provided with 7 (6W + 1S) CW pump sets for pumping water to condenser of two & three units and will discharge back to Natural Draught Cooling Tower having cooling range of 10°C and maintaining a Cycle of Concentration of 5. The recooled water from cooling tower will be channeled to each CW sump. Suitable arrangement for chlorine or chlorine dioxide dosing to curb organic growth and chemical dosing for maintaining Cycle of concentration (COC) of 5 will be made.

BEARING COOLING WATER SYSTEM

Demineralized water in a closed cycle is envisaged for all auxiliary equipment cooling of the power plant. This will be recooled by water, circulating on the secondary side of the plate heat exchangers.

DEMINERALIZATION PLANT

A fully automatic DCS based Demineralizing plant having four (4) (3W+1S) – 80 m^3/hr capacity streams (3 normally operating) will be provided to have mixed bed outlet quality as follows:

Silica	:	< 10 ppb
pH	:	6.8 – 7.2
Conductivity	:	≤ 0.1 µS/cm
TOC	:	< 200 ppb

The filtered water will be pumped to DM plant through cation exchangers, degassifiers, anion exchangers and mixed beds all installed within the DM plant building. The DM water will be stored in five (5)- 1500 m^3 each capacity steel plate fabricated vertical cylindrical DM water storage tanks along with proper

breathers and floating PVC balls arrangement to prevent absorption of atmospheric gases.

DM water from storage tank will be transported to five (5) 1000 m^3 capacity Condensate Storage Tanks (CST), DM water will be used for heat cycle makeup, chemical feed system, DMCW make up, etc.

CONDENSATE POLISHING UNIT (CPU)

To maintain the purity of the boiler feed water, condensate polishing unit (CPU) will be provided in the condensate water cycle at the downstream of condensate extraction pumps. The purpose of the condensate polishing unit shall be to polish the condensate effluent from the condenser by removal of suspended solids and dissolved solids to reduce corrosion and depositions in steam water cycle.

The condensate polishing unit shall be full flow, 3x50% Pre filters and 4 (3W+1S) x 50% capacity mixed bed units. The resins used shall Strong Acid Cation and Strong Base Anion type of resin appropriate for the influent water analysis. The resins shall be externally regenerated by transferring it to the dedicated regeneration station. The regeneration waste generated from the CPU unit shall be collected in the Neutralization pit and shall be neutralized before its disposal to the guard pond.

2.10.5 HYDROGEN GENERATION PLANT

Three (3) (2Working + 1Standby) unit of hydrogen generation plant with 15 Nm^3/Hr each stream, 3.2 MPa will be provided to meet the requirement 5 x 800 MW Unit.

The hydrogen shall be generated by the electrolysis of a suitable mixture of DM water & soda or Potash lye or Bipolar Proton Exchange Membrane. The hydrogen will be utilized for rotor cooling of the generators.

2.10.6 FLUE GAS TREATMENT SYSTEM

Flue gas cleaning system comprising High Efficiency ESPs for control of Particulate Matter, Flue Gas Desulphurisation for control of Sulphur dioxide and Selective Catalytic Reduction for control of NOx are proposed.

2.10.7 STACKS

One single flue stack and two bi flue stacks are proposed to exhaust the flue gases. The stack height will be 275m as per environmental norms.

2.10.8 WASTE WATER MANAGEMENT SYSTEM

The plant is based on "Zero Discharge" concept. The sources of waste water generation from the power plant along with are given below:

DETAILS OF WASTEWATER GENERATION (m^3/hr)

		Waste Water
Cooling Tower Blowdown		1640
DM plant Regeneration		30
Condensate Polishing Unit		10
Service Water		10
Flue Gas Desulphurisation		60
Mixed Bed Filter & Clarifier		15
Domestic use	Plant	8
	Colony	32
Total Wastewater		**1805**

The wastewater will be collected, treated and then reused within the plant as detailed in Chapter - 4.

2.10.9 AIR-CONDITIONING SYSTEM

Various control rooms of the plant having a group of sophisticated and precision control and protection devices; as well as computer rooms will be air-conditioned to have controlled environment for proper functioning of the equipment and operating personnel comfort. Centralized air-conditioning system, package / split air-

conditioning units & window AC etc. as per requirement of the area will be provided. The air conditioning system will be common for all the units.

Packaged air-conditioners will also be provided at following areas:

1. Administrative building
2. Switchyard control & relay room
3. Coal handling control room
4. Ash handling control room
5. DM plant control room
6. Any other control rooms, if required

Split AC units will be provided for office and meeting rooms areas.

2.10.10 VENTILATION SYSTEM

Adequate ventilation system will be provided for the TG building, ESP control building (non-air conditioned areas) and other areas such as DG set room, air compressor room, A/C plant room, DM plant building, battery rooms and various pump houses such as fuel oil pump-house, DM water pump house etc to achieve:

i) Dust free comfortable working environment.
ii) Scavenging out structural heat gain and heat load of various equipment, hot pipes, lighting etc.

POWER PLANT MACHINE ROOM BUILDING

Supply air system will be provided with evaporative cooling plant by a set of air washers of 2x50% capacity with cooling water coils (water supplied from an independent source).

ESP CONTROL BUILDING

For ventilation of this building, ambient air will be drawn through Unitary Air filtration unit comprising fresh air intake louver, dry type filter and cooling coils conveying water [supplied from an

independent source] and supplied to the space by means of centrifugal fans through ducting, grilles etc.

The supplied air will be exhausted through wall mounted gravity operated dampers to maintain higher over pressure (measurable) in mm water column to reduce dust and fine sand.

OTHER BUILDINGS

Ambient air ventilation system will be proposed for all the other areas which are not air-conditioned such as:

i) CW pump house
ii) Service building
iii) Air compressor room
iv) AC plant room
v) DG set room
vi) Battery and battery charger room
vii) All MCC rooms & cable vaults
viii) All toilets
ix) Stores
x) Fuel oil pump house
xi) Ash water and ash pump house
xii) Compressor/vacuum pump house (AHP)
xiii) Clarified water pump house
xiv) Switchgear room

Elevator machine rooms will be provided with pressurized ventilation to avoid ingress dust from boiler & mill area. The elevator shaft of boiler will be covered on all sides with CGI sheets or perforated corrugated metal cladding.

2.10.11 COMPRESSED AIR SYSTEM

To cater for the plant requirements it is proposed to install required number of instrument air compressors and service air compressors of adequate capacity for the compressed air at 8.4 $kg/cm^2(g)$. The instrument air compressors will be oil free type, complete with desiccant type dryers and individual air receivers to absorb pressure pulsations and for acting as reserve supply of compressed air to permit continued operation following failure of

the operating compressor until the standby one is put into service. The instrument and service air headers will be interconnected in a manner that in case of emergency the service air be used for the plant instrument air.

2.10.12 FIRE PROTECTION SYSTEM

For protection against fire, all yard equipment and plant equipment will be protected by a combination of hydrant system; automatic sprinkler spray system (emulsifier system); fixed foam system for oil handling areas; automatic high velocity and medium velocity sprinkler spray system; auto-modular inert gas based system for control rooms apart from portable and mobile fire extinguishers located at strategic areas of plant buildings and adequate Passive Fire Protection measures. The systems will be designed as per the recommendations of NFPA or approved equals in accordance with the Tariff Advisory Committee (TAC) of the Insurance Association of India stipulations.

- In view of vulnerability to fire and its importance in the running of the power station, effective measures will be taken to tackle fire in the susceptible areas such as cable galleries; fuel oil handling areas; coal handling plant areas including transfer points, crusher houses and tunnels, etc.
- For containment of fire and preventing it from spreading in cable galleries, unit wise fire barriers with self-closing fire doors will be provided. In addition, all cable entries/openings in the cable galleries, tunnels, floors will be sealed with non-/fire resistant sealing materials to prevent fire propagation for at least three (3) hours. Fire protection cable coating compound over cables at switchgear entry points, power station building entry points and trays will be provided to prevent damage from fire for at least thirty (30) minutes.

Adequate distances will be maintained between different process blocks and hazardous equipment. To prevent fire from spreading through ventilation & air conditioning ducts, dampers with auto closing arrangements will be provided at appropriate locations.

Dedicated fire water pumps will be installed in the clarified water pump house. In the clarified water storage tank about 4000 m3 water will be stored as dedicated dead storage for meeting fire water requirement in exigencies. The details of system are as follows:

- Three (3) electric motor driven fire water pump sets of 410 m^3/hr capacity having 88 MWC head along with two (2) identical capacity & head diesel engine driven backup fire water pumps will provided for hydrant and sprinkler system in addition to two (2) Jockey pump sets having capacity of 25 m^3/hr and 88 MWC which would be brought to operation automatically when hydrant pressure drop indications are received. In addition to these pump sets, other auxiliaries for the fire protection system such as hydro-pneumatic tanks, compressors, pipe work, valves etc will be provided as required.
- Hydrant system will feed pressurized water to hydrant valves located throughout the plant and also at strategic locations within the powerhouse.
- High velocity water spray system (HVWS) will be provided for Generator transformers; Unit auxiliary transformers, station transformers, turbine oil storage tanks, boiler burner zone and generator seal oil system.
- Medium Velocity Water Spray System (MVWS) will be provided for
    - Cable galleries, cable valets, cable vaults, cable spreader room, cable riser/shaft in main plant, switchyard, ESP, AHP control room & CHP control room, coal conveyers & transfer points etc.
    - Fuel oil area.
    - Compressor room & DG set room.

Adequate arrangement for detection of fire and smoke will be provided at different locations of vital installations. Laser based fiber optic type LHS fire detection and alarm system will be provided for coal conveyors and cable galleries. IRD system with sprinkles will also be provided for coal conveyors. Centralized control panel indicating zone of fire will be located at central control room. Fire alarms will be distributed throughout the plant

and important location so that security gate/fire station persons and control room get immediate information.

The ventilation system provided in cable galleries will be so interlocked with the fire alarm system that in the event of a fire, the ventilation system would be automatically switched-off.
Automatic high velocity spray system will be used for protection of burner zone of each of the boilers.

- Fuel oil tanks in the fuel oil farm area will be provided with MVWS system as well as fixed foam mechanical system to extinguish accidental fires in tanks as well as outside the dyke. Water for foam system will be drawn from the plant hydrant system. Adequate numbers of hydrant points will be distributed near the oil tanks farm area. Fire hoses fitted with couplings and nozzles will be located suitably at the oil unloading station and kept in hose boxes.
- Automatic inert gas based flooding type extinguishing system will be provided for unit control room, areas independently apart from the provision of detection and fire alarm system in that area.
- Adequate number of fire hydrant points will be distributed throughout the plant building, service building, coal handling plant, ash handling plant and other areas along with fire hoses fitted with couplings and nozzles and kept in the hose boxes.

In addition to the above facilities, adequate number of manual call points; (MCP) as well as portable and mobile (wheel mounted) fire extinguishers of soda acid type; foam type; chemical type; and carbon-dioxide type will be provided at strategic locations throughout the plant area to meet National Fire Protection Association (NFPA) and Loss Preventive Association (LPA) codes, Tariff Advisory Committee (TAC) stipulation etc. These extinguishers may be used during the early stages of fire to prevent the fire from spreading.

Two (2) nos. of fire tenders will be provided which will be kept in readiness complete with all accessories at fire station located close to fire control room.

2.10.13 FUEL OIL SYSTEM

a) A fuel oil system for boiler start-up as well as for flame stabilization during low load operation will be provided. Light diesel oil for furnace light up and boiler start-up and HFO for flame stabilizing of furnace flame will be used.
b) Fuel oil will be brought to power plant by road/rail tankers and unloaded by fuel oil unloading pump sets located in the fuel oil pump house. The unloading pump sets will transfer the fuel oil to storage tanks from oil header provided with plug valves, flexible hoses etc.
c) The station oil system mainly will consist of three (2) HFO storage tanks having a capacity of 4000 cum each, unloading/transfer pump sets, two (2) light diesel oil storage tanks of 1000 cum capacity.
d) Pressuring units, heating system for FO heating and associated steam & condensate pipe work, oil pipe work, steam and thermal insulation, valves, fittings, local/remote instrumentation etc. will be provided.

2.10.14 CHEMICAL LABORATORY

A chemical laboratory will be provided for the day-to-day testing of fuel samples, water quality, steam quality, blow down etc.

2.10.15 MECHANICAL WORKSHOP

A mechanical workshop for the regular maintenance work will be provided with necessary equipment.

2.11 MITIGATION MEASURES INCORPORATED IN THE PROJECT TO COMPLY WITH ENVIRONMENTAL STANDARDS

2.11.1 AIR POLLUTION

The latest Government Gazette Norms, dated 07.12.2015, stipulates the following stack emission levels for the boilers which will be installed after 01.01.2017:

ESP outlet dust concentration	: 30 mg/Nm^3
SOx	: 100 mg/Nm^3
NOx	: 100 mg/Nm^3
Mercury	: 0.03 ppm

TSGENCO proposes to implement the following measures to comply with the above stringent norms at an estimated additional cost of Rs. 0.9 crores/MW.

High Efficiency ESPs

For control of Particulate emissions, high efficiency electrostatic precipitators are proposed having collection efficiency of 99.96% will limit the outlet dust emission to 30 mg/Nm^3 at ESP outlet with 10 fields in series along the gas path in service while the boiler is operating at its BMCR, firing worst coal having maximum ash content in coal.

Flue Gas Desulphurization (FGD)

For control of Sulphur dioxide emissions, Flue Gas Desulphurization (FGD) technology with wet limestone process is considered for implementation.

Selective Catalytic Reduction Unit (SCR)

For control of NOx emissions, SCR is proposed which will be located between the economizer outlet and APH inlet.

2.11.2 NOISE POLLUTION

The steam turbine generators will be provided with acoustic enclosures. The steam turbines would be located in a closed building which considerably reduces the noise outside the turbine hall.

All operations and maintenance personnel working near noise prone areas would be provided with earmuffs & earplugs. Stand-alone noise proof cabins will be provided to operators.

The layout is designed to cover 100 m width greenbelt all along the project boundary which acts as noise barrier.

2.11.3 WATER POLLUTION

The project is designed to comply with the proposed new norm of 2.5 m^3/MWhr and Zero wastewater discharge.

The layout is designed considering protection of Tungapahad Vagu which is passing through project area. A minimum distance of 500 m will be maintained as barrier zone between ash pond and Tungapahad Vagu to prevent contamination. Additionally, a barrier of 100 m width on either side of banks of the vagu will be developed under greenbelt.

2.11.4 SOLID WASTE MANAGEMENT

The solid waste generation from the project is mainly Ash from Boilers.

Ash pond is designed to store unutilized flyash (generated in first four years) and bottom ash generated in 25 years. A detailed solid waste management plan is considered for handling the solid waste generated from the above areas.

2.12 ASSESSMENT OF NEW & UNTESTED TECHNOLOGY FOR THE RISK OF TECHNOLOGICAL FAILURE

The power project is based on supercritical boiler technology which is proven technology which employs higher temperature and pressure resulting in better efficiency, reduced fuel and less greenhouse gas emissions. This technology is proven and is widely used since the 1950s. Based on the information available, over 600 super critical units from 300 to 1,200 MW size are in operation around the world. TSGENCO has awarded the EPC contract to BHEL to implement the Yadadri Thermal Power Station. BHEL is India's leading Maharatna Public Sector

Company and largest Power Plant Equipment Manufacturer. BHEL has to its credit implementation of 2 X 800 MW Yeramus Supercritical coal based power plant in Raichur District, Karnataka.

CHAPTER - 3

DESCRIPTION OF ENVIRONMENT

CHAPTER-3: DESCRIPTION OF ENVIRONMENT

3.1 STUDY AREA

The study area covers 10 km radius around the project boundary of proposed 4000 MW Yadadri Thermal Power Station at Veerlapalem Village, Damercherla Mandal, Nalgonda (Dist), Telangana state.

3.1.1 STUDY PERIOD

Baseline data was collected during study period of Winter season covering the months of December, 2015, January, 2016 and February, 2016 by M/s. Bhagavathi Ana Labs Pvt. Ltd. (BALL) (a Bureau Veritas Group Company), Hyderabad.

MoEF&CC, Expert Appraisal Committee permitted use of baseline data collected during winter, 2015-16 for the Revised EIA Report which is presented in this report.

Additionally, Baseline data was collected by B. S. Envi-Tech (P) Ltd for one month during October, 2016 (Post Monsoon 2016).

The following data sets have been used in preparation of this Revised EIA Report

- Site Specific Meteorological data and AAQ of Winter Season collected by BALL.

- Site Specific Meteorological data, AAQ, Noise levels, Water Quality and Soil Quality of Post Monsoon Season collected by BSET

3.2 METHODOLOGY OF EIA STUDY

The various steps involved in Environmental Impact Assessment study of this proposed power project are divided into the following phases.

- Collection of fresh data for Post monsoon, 2016 (October, 2016).
- Presentation of Baseline data for winter season 2015-2016 and Post Monsoon 2016 (October, 2016).
- Identification of significant environmental parameters and assessed to study the existing status within the impact zone with respect to air, water, noise, soil and socio-economic components of environment.
- Study of various activities of the proposed power project to identify the area's leading to impact/change in environmental quality.
- Identification and Prediction of cumulative impacts for the identified activities of the proposed power project along with the industries located within 15 km radius on various environmental components.
- Evaluation of impacts by superimposing the predicted scenario on the existing scenario and comparing with standards.
- Formulation of Environmental Management Plan for implementation in the proposed power project.
- Risk Assessment Study and formulation of Disaster Management Plan

3.2.1 COLLECTION OF BASELINE STATUS

MICRO METEOROLOGY

Site specific micro meteorological parameters like Wind speed, Wind direction, temperature, and relative humidity collected on hourly basis during Winter, 2015-16 and Post monsoon, (October, 2016) have been used for interpretation of the existing Ambient Air Quality status and for estimation of impacts due to the subject power project and cumulative impacts due to various sources in 15 km radius.

Wind speed, wind direction data recorded during the study period was used for computation of relative percentage frequencies of different wind directions.

AMBIENT AIR QUALITY

The scenario of the existing ambient air quality in the study region has been assessed through a network of ten ambient air quality

stations within 10 km radius around the proposed power project area for Winter season, 2015-16 and Post Monsoon, 2016 (October).

The existing Ambient Air Quality (AAQ) status has been monitored for PM_{10}, $PM_{2.5}$, SO_2, NO_X, CO and Hg as per Terms of Reference granted by MOEF & CC. PM_{10} & $PM_{2.5}$ at ten stations have been monitored on 24 hourly basis. CO was monitored on 8 hourly basis. One set of samples from all stations were analyzed for Mercury.

Pre-calibrated Respirable dust samplers have been used for monitoring of the existing AAQ status. Methodologies adopted for sampling and analysis were, as per the approved methods of Central Pollution Control Board (CPCB). Maximum, minimum, average and percentile values have been computed from the raw data collected at all individual sampling stations to represent the ambient air quality status of the study area.

NOISE ENVIRONMENT

Noise monitoring has been carried out at ten locations to identify the impact due to the existing sources on the surroundings in the study area. Noise levels were recorded during the day and night times.

WATER ENVIRONMENT

Ten ground water samples and ten surface water samples (six samples from River Krishna and four samples from Tungapahad Stream) were collected within 10 km radius during Post monsoon, (October, 2016). For assessment of the existing physico-chemical and bacteriological quality, the data of both winter season and Post monsoon season has been considered.

Methodologies adopted for sampling and analysis were according to the IS methods. Field parameters such as pH, Temperature and Dissolved Oxygen were monitored on site. The parameters thus analyzed were compared with IS 10500. The activities surrounding

the source during sampling were taken into consideration in the interpretation of the water quality of that particular source.

LAND ENVIRONMENT

Landuse and land cover data of the study area has been updated using Satellite Imagery of 18th May, 2016 using Remote sensing techniques.

Representative soil samples were collected from ten locations during study period within 10 km radius for analysis of the physico chemical characteristics. Standard procedures were followed for sampling and analysis. The samples collected were also analysed to check the suitability for growth of native species in and around the proposed project.

Flora and Fauna in the study area has been incorporated as part of the Ecological survey.

TRAFFIC STUDY

Traffic study has been conducted (by M/s. Bhagavathi Ana Labs Pvt. Ltd. (BALL) (a Bureau Veritas Group Company), Hyderabad) on the road connecting Project Site and State Highway -2 and on the State Highway -2 connecting Narkatpally - Addanki to assess the present traffic and to project the future traffic due to the project.

SOCIO – ECONOMIC ENVIRONMENT

A socio economic assessment of the likely impacts due to the establishment of the Power Project was conducted alongwith other studies. As part of EIA study, Social Impact Assessment has been carriedout. The implementation of the Project will result in displacement of 173 Families and 411 land losers for which a detailed R & R has been formulated as per LA RR ACT, 2013

The detailed CSR plan has been formulated based on need based assessment, demands, preferences of the people in the study area.

3.2.2 STUDY OF VARIOUS ACTIVITIES

Various operations involved in the project have been studied in detail to identify areas having impact on various environmental components. The study is based on primary survey and secondary source of information.

3.2.3 QUANTIFICATION/PREDICTION OF IMPACTS

The identified impacts based on the above study are quantified on EPA approved AERMOD model for air quality.

In case of water, land, biological and socio-economic environments the quantification/predictions have been made based on standard methodology, scientific knowledge and experience.

3.2.4 EVALUATION OF IMPACTS

The quantified incremental impacts are superimposed on the baseline status of various environmental components to have an overall scenario. The overall scenario estimated has been checked for compliance with various statutory requirements/standards.

The Cumulative Impact Assessment study covering radius of 15 km radius has been conducted taking into account the presence of various industries.

3.2.5 FORMULATION OF AN ENVIRONMENTAL MANAGEMENT PLAN

Based on the environmental status & quantified impacts, a detailed Environmental Management Plan has been formulated for implementation during the construction and operational phase of power project. A detailed environmental monitoring programme has been drawn for implementation.

3.3 BASELINE ENVIRONMENT

3.3.1 MICRO METEOROLOGY

3.3.1.1 REGIONAL METEOROLOGY

The region experiences hot and dry summer throughout the year except during the South West Monsoon season. The year may broadly be divided into four seasons. It experiences cold season from December to mid-February, summer season from mid-February to first week of June. South West monsoon season from June to September and retreating monsoon or the post monsoon season during October to November.

Cold season extending from December to February is followed by summer when both day and night temperatures increase sharply. May being the hottest month, the mean daily maximum temperature is about 40^{o}C and the mean daily minimum is about 28^{o}C and sometimes the day temperature crosses 44^{o}C during this period. On some days, afternoon thundershowers come as a blessing and though temporarily they bring relief from the oppressive summer heat. By about the beginning of October, day temperature decreases steadily signaling the withdrawl of monsoon. Day and night temperature decreases rapidly during November. December is the coldest month with the mean daily maximum and minimum temperatures being 35^{o}C and 20^{o}C respectively. Sometimes during the cold season, night temperature may drop down to about 10^{o}C. The skies are generally clear or lightly clouded throughout the year except during south west monsoon season when heavy clouds cast the skies.

Source: http://nalgonda.nic.in

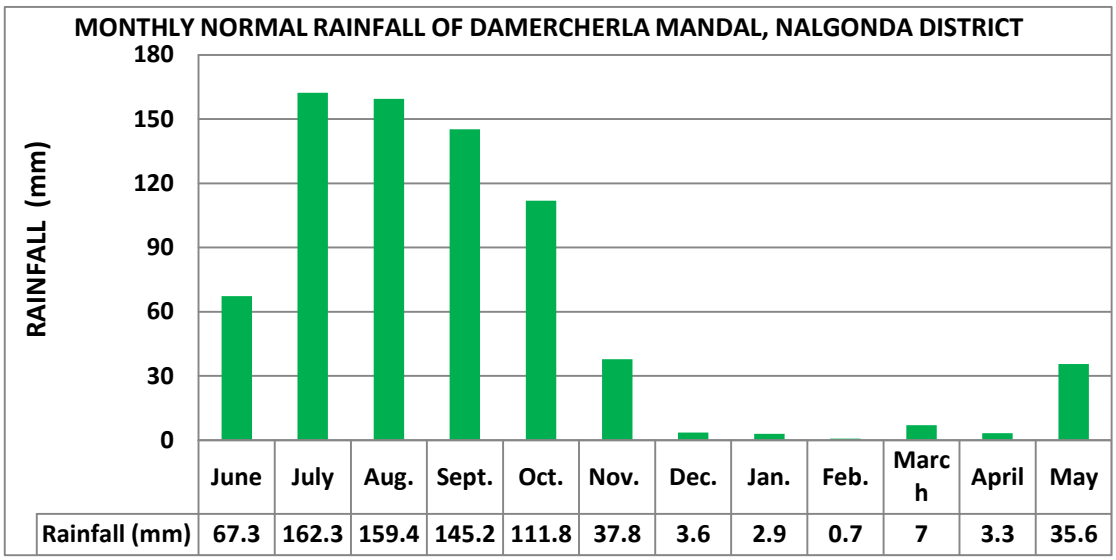
RAINFALL

Meteorological observatory maintained by the India Meteorology Department (IMD) Station is at District Headquarters Nalgonda. State Government maintains rain gauge stations in each Mandal Headquarters. The normal rainfall of the district is 753 mm.

Rainfall is distributed unevenly over 46 days annually. It increases from South to North-East, from 525 mm to about 900 mm. Rainfall during the South-West monsoon increases from South to North, from 500 mm to 700 mm and contributes about 70% of annual rain fall; while during north-East monsoon the rainfall increases from 100 mm to 175 mm and contributes 18% of annual rainfall. September is the rainiest month contributing 23% of total annual rainfall.

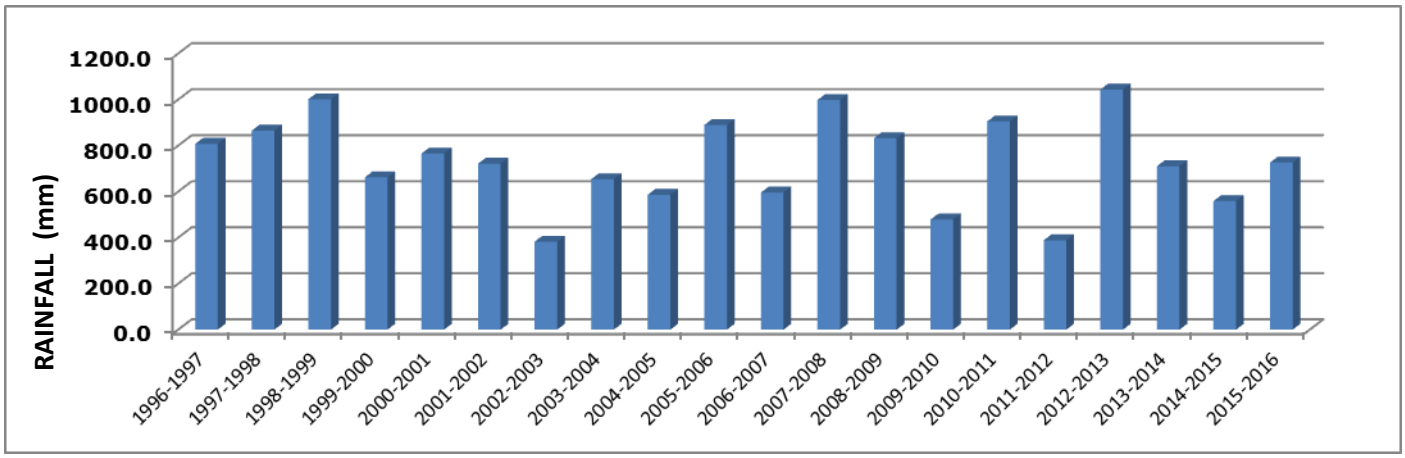
The normal rain fall of Damercherla is 736.9 mm. From the Rain fall records from 1996-1997 to 2015-2016 of Damercherla, the highest rain fall of 1043.2 mm was in the year 2012-2013 and the lowest was 382.5 mm in the year 2002-2003. In the last 20 years above normal rain fall was received in 10 years and during the 10 years the percentage deviation of the annual rain fall varied from -1.4 to - 48.1. Drought and near drought conditions prevailed over 5 years.

The monthly normal rain fall for and the total annual rain fall from 1996-1997 to 2015-2016 during this period is shown below:



	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May
Rainfall (mm)	67.3	162.3	159.4	145.2	111.8	37.8	3.6	2.9	0.7	7	3.3	35.6

Annual rain fall from 1996-1997 to 2015-2016 of Damercherla Mandal, Nalgonda District



Source: Mandal Office, Damercherla Mandal

3.3.1.2 MICRO METEOROLOGY OF THE SITE

An auto weather monitoring station was installed near the Pylon of TSGENCO to record micro meteorological parameters for October, 2016 on hourly basis to understand the wind pattern, Temperature variation, relative humidity etc.

Site Specific Micro meteorological data of Winter season '15-16 has been used along with the data of Post Monsoon 2016 (October 2016)

Percentage frequencies of wind in 16 directions have been computed from the recorded data during the study period for 8 hourly (01-08hrs, 09-16 hrs and 17-24 hrs) and 24 hours (00-24hrs) intervals to plot wind roses. **Fig – 3.1 and Fig - 3.2** represents the wind pattern of the study period during winter 2015-16 and Post monsoon, 2016.

WIND PATTERN

WINTER SEASON, 2015-16

The predominant wind directions during this period were from ESE-SE-SSE sector accounting to about 39.92% of the total time.

FIG - 3.1
WINDROSE DIAGRAM

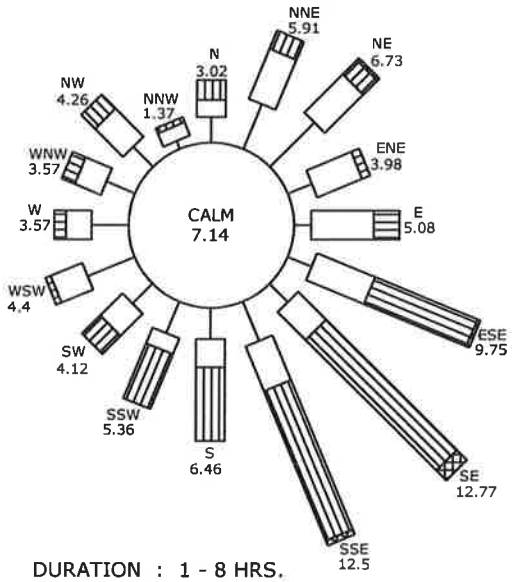
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CLIENT : M/s. TELANGANA STATE POWER GENERATION COPORATION LIMITED (TSGENCO)

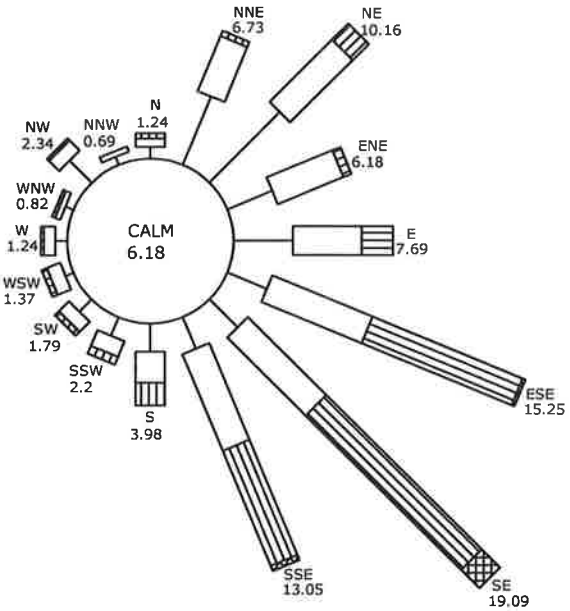
PROJECT : 4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)

PERIOD : WINTER - 2015-2016

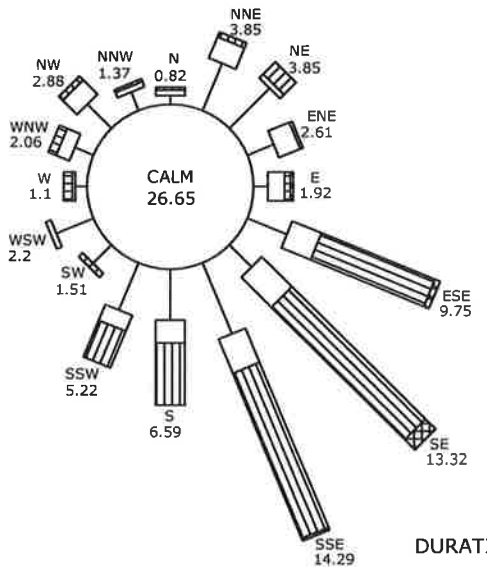
LOCATION : Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana.



DURATION : 1 - 8 HRS.



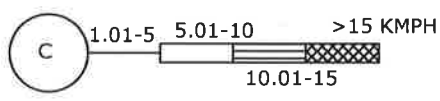
DURATION : 9 - 16 HRS.



DURATION : 17 - 24 HRS.

NOTE : All readings are in percentage occurance of wind

LEGEND



C = Calm Conditions in Percentage

SCALE



FIG - 3.1 (Contd.,)
WINDROSE DIAGRAM

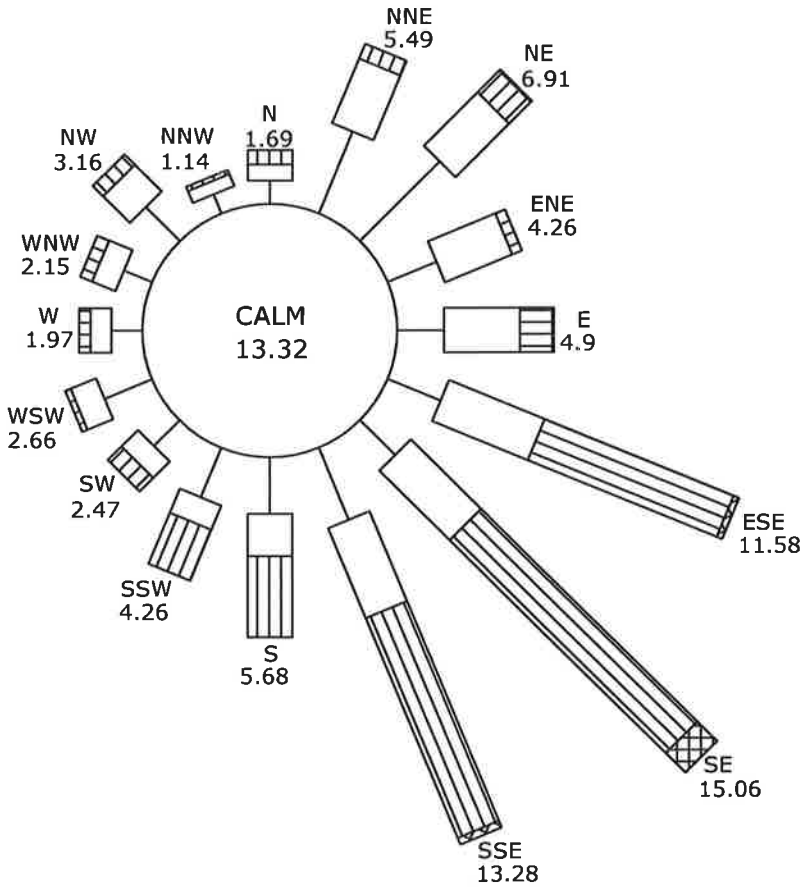
CLIENT : M/s. TELANGANA STATE POWER GENERATION COPORATION LIMITED (TSGENCO)

PROJECT : 4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)

PERIOD : WINTER - 2015-2016

LOCATION : Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

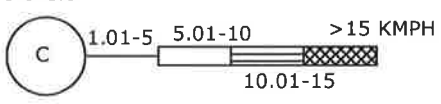
N



DURATION : 1 - 24 HRS.

NOTE : All readings are in percentage occurance of wind

LEGEND



C = Calm Conditions in Percentage

SCALE



FIG - 3.2
WINDROSE DIAGRAM

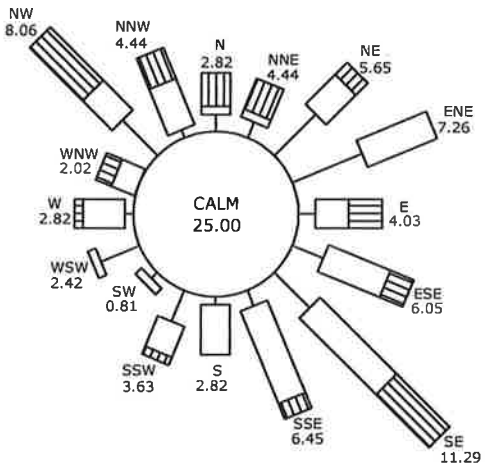
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CLIENT : M/s. TELANGANA STATE POWER GENERATION COPORATION LIMITED (TSGENCO)

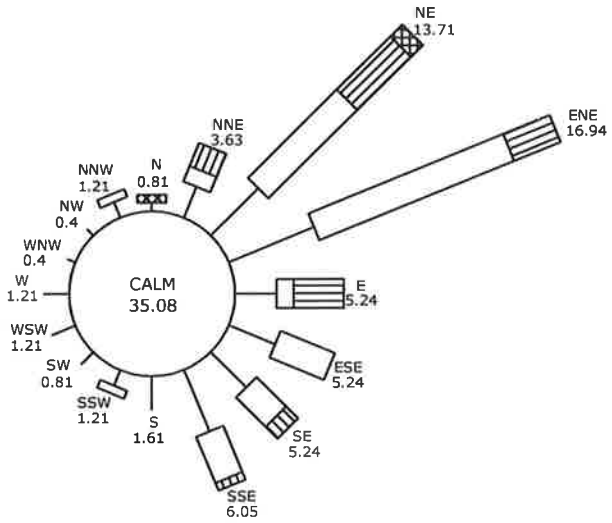
PROJECT : 4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)

LOCATION : Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana.

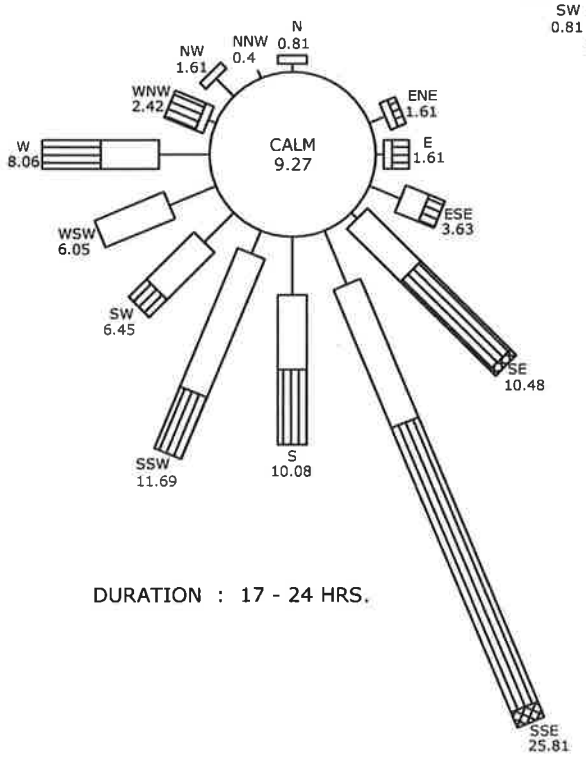
PERIOD : OCTOBER- 2016



DURATION : 1 - 8 HRS.



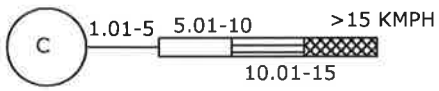
DURATION : 9 - 16 HRS.



DURATION : 17 - 24 HRS.

NOTE : All readings are in percentage occurance of wind

LEGEND



C = Calm Conditions in Percentage

SCALE

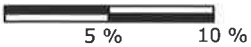


FIG - 3.2 (Contd.,)
WINDROSE DIAGRAM

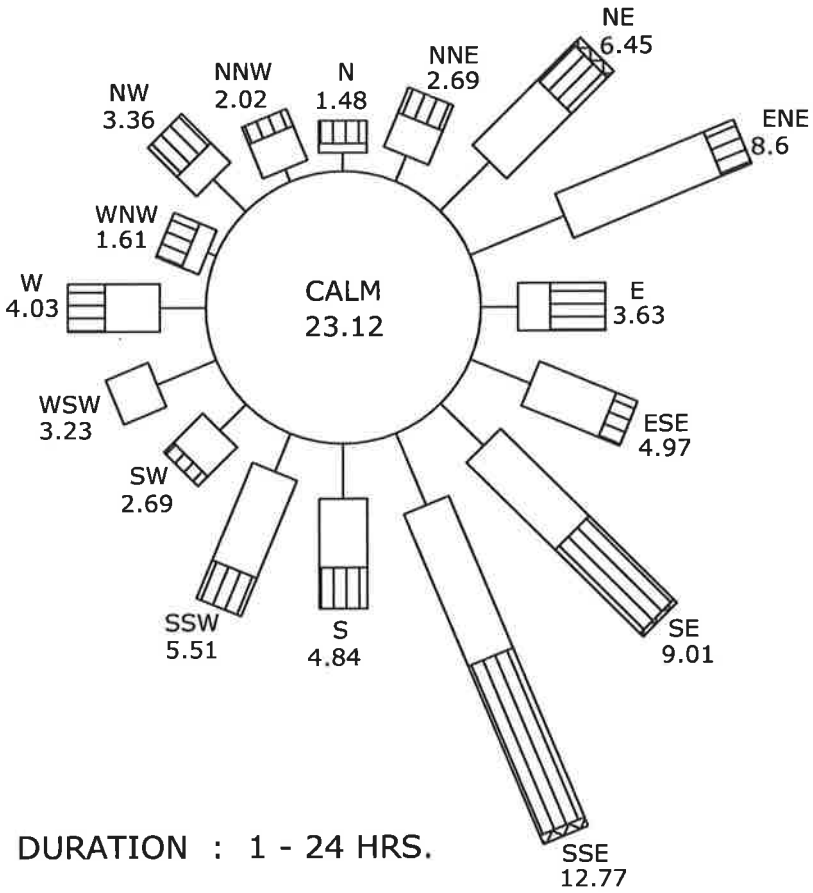
CLIENT : M/s. TELANGANA STATE POWER GENERATION COPORATION LIMITED (TSGENCO)

PROJECT : 4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)

LOCATION : Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana.

PERIOD : OCTOBER- 2016

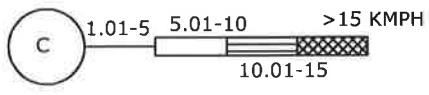
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DURATION : 1 - 24 HRS.

NOTE : All readings are in percentage occurance of wind

LEGEND



C = Calm Conditions in Percentage

SCALE



Average wind speeds during this period were varying between 1-15 kmph and during sometime the wind speeds were more than 15 kmph. The wind speeds of less than 1.0 kmph was treated as calm and about 13.32% of the time the winds were under calm condition.

Source: EIA Report of M/s Bhagavathi Ana Labs Pvt. Ltd.

POST MONSOON, 2016 (OCTOBER, 2016)

The predominant wind directions during this period were from SE-SSE sector accounting to about 21.78% of the total time. Average wind speeds during this period were varying between 1-15 kmph and during sometimes the wind was more than 15 kmph. The wind of less than 1.0 kmph was treated as calm, about 23.12% of the time the winds were under calm condition.

TABLE- 3.1
SUMMARY OF THE WIND PATTERN

Duration [Hrs]	Predominant Wind Direction	Wind Rose Enclosed As
***WINTER '15-16**		
01:00 – 08:00	ESE-SE-SSE	**FIG – 3.1**
09:00 – 16:00	ESE-SE-SSE	
17:00 – 24:00	ESE-SE-SSE	
01:00 – 24:00	ESE-SE-SSE	
POST MONSOON '16 (OCTOBER '16)		
01:00 – 08:00	ESE-SE-SSE	**FIG – 3.2**
09:00 – 16:00	NE-ENE	
17:00 – 24:00	SE-SSE-S-SSW	
01:00 – 24:00	SE-SSE	

**** Source: Final EIA Report of M/s Bhagavathi Ana Labs Pvt. Ltd.***

3.3.2 AMBIENT AIR QUALITY

IDENTIFICATION OF AMBIENT AIR QUALITY MONITORING STATIONS:

The following industries are present in the 10 km radius of the Project site, which are responsible for the background air quality.

- The India Cements Limited - 4.8 km – E

- ❖ Krishna Godavari Power Utilities Limited - 4.5 km – SE (Not commissioned)
- ❖ Parasakti Cement Industries Limited - 8.0 km – SW
- ❖ Penna Cement Industries Limited - 9.6 km – ENE

Ambient air quality of the study area has been assessed through a network of 10 ambient air quality locations. The locations of ambient air quality stations are presented in **Table-3.2.**

TABLE – 3.2
AMBIENT AIR QUALITY MONITORING STATIONS

Station Code	Locations	w.r.t Project Site		Representation	
		Distance [Km]	Direction		
				Winter'15-16	Post monsoon '16
A1	Project Site	-	-	-	-
A2	Veerppagudem	0.9	SE	Cross wind	Up wind
A3	Wazirabad	7.0	ESE	Cross wind	Up wind
A4	Daida	4.4	SSE	Up wind	Up wind
A5	Gottimukkala	3.8	S	Cross wind	Down wind
A6	Adividevulapalli	5.4	SW	Down wind	Down wind
A7	Veerlapalem	1.0	WSW	Down wind	Down wind
A8	Ragadappa	5.9	WNW	Down wind	Down wind
A9	Kallepalli	2.4	N	Cross wind	Down wind
A10	Damercherla	4.4	ENE	Up wind	Up wind

Fig – 3.3 shows the location of Ambient Air Quality Monitoring Stations in the study area.

3.3.2.1 ANALYSIS OF AAQ BASELINE CONCENTRATIONS

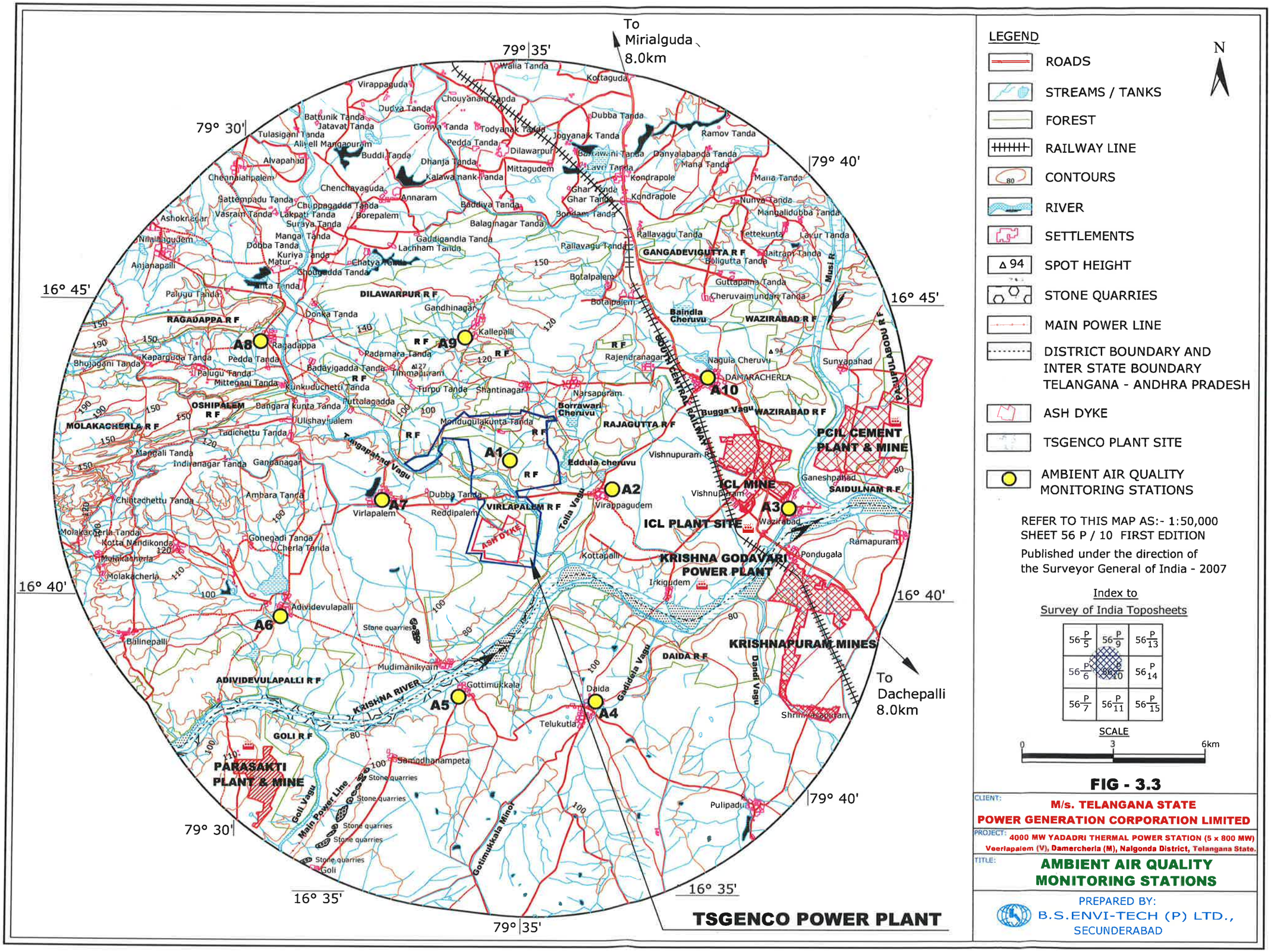
A. PARTICULATE MATTER – PM10

WINTER '15-16

PM_{10} values monitored at 10 locations showed 98th percentile values in the range of 31.9 – 66.4 µg/m^3. The values of PM_{10} monitored in the study area are well within the limits of NAAQ standards.

POST MONSOON '16 (October)

PM_{10} values monitored at 10 locations showed 98th percentile values in the range of 35.3 – 64.2 µg/m^3. The values of PM_{10}



LEGEND

- ROADS
- STREAMS / TANKS
- FOREST
- RAILWAY LINE
- CONTOURS
- RIVER
- SETTLEMENTS
- SPOT HEIGHT
- STONE QUARRIES
- MAIN POWER LINE
- DISTRICT BOUNDARY AND INTER STATE BOUNDARY TELANGANA - ANDHRA PRADESH
- ASH DYKE
- TSGENCO PLANT SITE
- AMBIENT AIR QUALITY MONITORING STATIONS

N

REFER TO THIS MAP AS:- 1:50,000
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56 P/7	56 P/11	56 P/15

SCALE

0 3 6km

FIG - 3.3

CLIENT: **M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED**

PROJECT: 4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

TITLE: **AMBIENT AIR QUALITY MONITORING STATIONS**

PREPARED BY:
B.S.ENVI-TECH (P) LTD.,
SECUNDERABAD

monitored in the study area are well within the limits of NAAQ standards.

B. PARTICULATE MATTER – PM2.5

WINTER '15-16

$PM_{2.5}$ values monitored at 10 locations showed 98th percentile values in the range of 11.6 – 31.6 µg/m^3. The values of $PM_{2.5}$ monitored in the study area are well within the limits of NAAQ standards.

POST MONSOON '16

$PM_{2.5}$ values monitored at 10 locations showed 98th percentile values in the range of 11.6-28.3 µg/m^3. The values of $PM_{2.5}$ monitored in the study area are well within the limits of NAAQ standards.

C. SULPHURDIOXIDE - SO_2

WINTER '15-16

98th percentile value of Sulphur dioxide in the study area from the monitored data was in the range of 8.7 – 24.6 µg/m^3. The values of SO_2 monitored in the study area are well within the limits of NAAQ standards.

POST MONSOON '16

98th percentile value of Sulphur dioxide in the study area from the monitored data was in the range of 8.3-14.1 µg/m^3. The values of SO_2 monitored in the study area are well within the limits of NAAQ standards.

D. OXIDES OF NITROGEN - NOx

WINTER '15-16

Ambient air quality status monitored for nitrogen oxides in the study area were in the range with 98th percentile values between

11.6 – 28.1 μg/m^3. NO_X monitored in the study area are well within the limits of NAAQ standards.

POST MONSOON '16

Ambient air quality status monitored for nitrogen oxides in the study area were in the range with 98th percentile values between 10.3-16.2 μg/m^3. NO_X monitored in the study area are well within the limits of NAAQ standards.

E. CARBON MONOXIDE - CO

WINTER '15-16

CO concentration at all the locations was found to be in the range 1.1 – 1.8 mg/m^3.

POST MONSOON '16

CO concentration at all the locations was found to be to be less than 1 mg/m^3.

F. MERCURY - Hg

POST MONSOON '16

Hg concentration at all the locations was found to be less than 0.1 ng/m^3.

3.3.2.2 SUMMARY OF AMBIENT AIR QUALITY

Summary of AAQ monitoring at each location is given in **Table – 3.3** and date wise ambient air quality data is enclosed in **Annexure – 3A**.

TABLE – 3.3

SUMMARY OF AMBIENT AIR QUALITY

Station Code	Locations	98th Percentile values					
		PM_{10}	$Pm_{2.5}$	SO_2	NOx	Hg	CO
*Winter '15-16		μg/m³				ng/m³	mg/m³
A1	Project Site	66.4	31.6	23.7	26.1	-	1.5
A2	Veerppagudem	41.7	13.5	10.2	11.6	-	1.8
A3	Wazirabad	63.8	29.5	17.2	18.2	-	1.3
A4	Daida	37.6	11.5	8.7	13.6	-	1.3
A5	Gottimukkala	31.9	19.3	13.4	18.0	-	1.2
A6	Adividevulapalli	37.1	11.8	9.0	20.3	-	1.1
A7	Veerlapalem	42.1	18.8	10.7	13.8	-	1.4
A8	Ragadappa	32.6	11.1	10.6	13.2	-	1.3
A9	Kallepalli	38.4	12.5	9.8	16.3	-	1.3
A10	Damercherla	63.4	30.0	24.6	28.1	-	1.2
Post Monsoon '16 (October-16)							
A1	Project Site	50.9	15.3	9.6	10.8	<0.1	<1
A2	Veerppagudem	40.4	12.6	10.1	11.4	<0.1	<1
A3	Wazirabad	61.5	26.7	14.1	16.2	<0.1	<1
A4	Daida	35.3	11.6	8.3	10.5	<0.1	<1
A5	Gottimukkala	48.6	20.2	11.3	13.1	<0.1	<1
A6	Adividevulapalli	41.2	15.5	10.1	12.6	<0.1	<1
A7	Veerlapalem	40.7	14.2	9.4	11.2	<0.1	<1
A8	Ragadappa	39.8	11.9	8.7	10.3	<0.1	<1
A9	Kallepalli	42.6	16.7	10.1	12.2	<0.1	<1
A10	Dameracherla	64.2	28.3	12.5	14.8	<0.1	<1
NAAQ Standards for Industrial, Residential, Rural and Other Areas		**100**	**60**	**80**	**80**	**Not specified**	**02 (8hourly)**

**Source: M/s Bhagavathi Ana Labs Pvt. Ltd.*

3.3.3 NOISE ENVIRONMENT

In order to know the baseline noise levels, in and around the Project site. Noise levels were measured at 10 villages in the study area.

Details of noise monitoring stations are given in **Table – 3.4**.

TABLE-3.4

NOISE MONITORING STATIONS

Code	Locations	w.r.t Project site	
		Distance [km]	Direction
N1	Project Site	-	-
N2	Veerppagudem	0.9	SE
N3	Wazirabad	7.0	ESE
N4	Daida	4.4	SSE
N5	Gottimukkala	3.8	S
N6	Adividevulapalli	5.4	SW
N7	Veerlapalem	1.0	WSW
N8	Ragadappa	5.9	WNW
N9	Kallepalli	2.4	N
N10	Damercherla	4.4	ENE

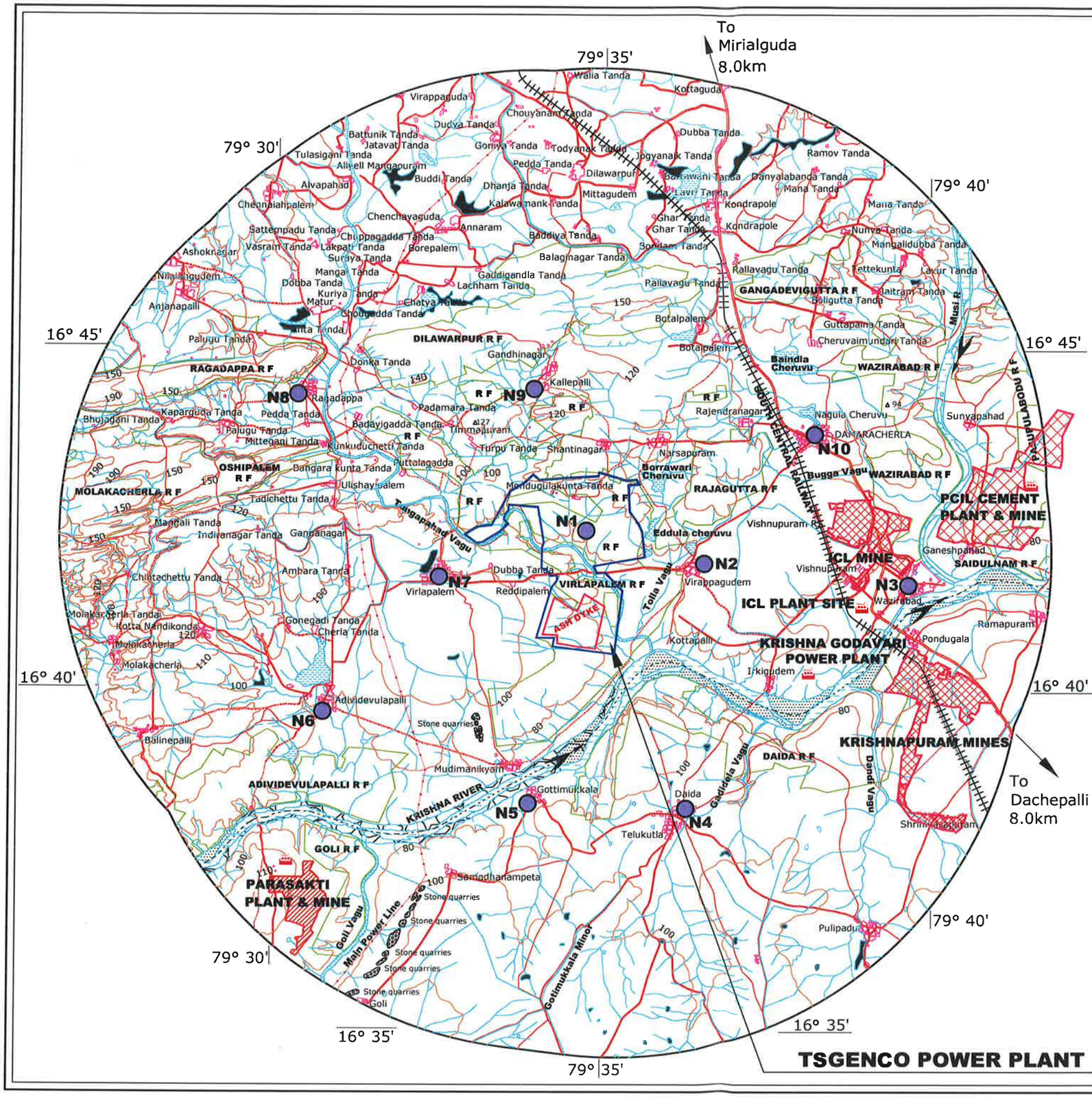
The noise recording stations are shown in **Fig - 3.4** and the summary of the day – equivalent and night - equivalent values recorded at various locations in the study area is given in **Table – 3.5**.

The day equivalent noise levels were found to be moderately higher due to local activities in the villages. Noise levels recorded in the night time were found to be less. Noise levels recorded during the day and night time were found to be less than 50.3 dB (A).

TABLE - 3.5

EQUIVALENT NOISE LEVELS IN THE STUDY AREA (10 KM RADIUS)

Code	Location	Noise Levels dB (A)	
		Day Equivalent	Night Equivalent
N1	Project Site	41.2	30.2
N2	Veerppagudem	44.7	34.2
N3	Wazirabad	49.5	30.8
N4	Daida	43.8	31.9
N5	Gottimukkala	42.9	31.6
N6	Adividevulapalli	44.5	34.3
N7	Veerlapalem	45.3	33.7
N8	Ragadappa	42.6	31.2
N9	Kallepalli	47.8	37.8
N10	Dameracherla	50.3	47.5
NAAQ Standards with Respect to Noise for Residential Areas		**55.0**	**45.0**



LEGEND

- ROADS
- STREAMS / TANKS
- FOREST
- RAILWAY LINE
- CONTOURS
- RIVER
- SETTLEMENTS
- SPOT HEIGHT
- STONE QUARRIES
- MAIN POWER LINE
- DISTRICT BOUNDARY AND INTER STATE BOUNDARY TELANGANA - ANDHRA PRADESH
- ASH DYKE
- TSGENCO PLANT SITE
- NOISE LEVEL MONITORING STATIONS

N

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SCALE
0 3 6km

FIG - 3.4

CLIENT: **M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED**

PROJECT: 4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

TITLE: **NOISE LEVEL MONITORING STATIONS**

PREPARED BY:
B.S.ENVI-TECH (P) LTD.,
SECUNDERABAD

3.3.4 WATER ENVIRONMENT

Assessment of baseline data on Water environment includes and

- Hydrology Study of surface water resources in study area
- Hydrogeological studies of ground water resources (Presented under Land Environment)
- Assessment of water quality for physico-chemical Biological parameters.

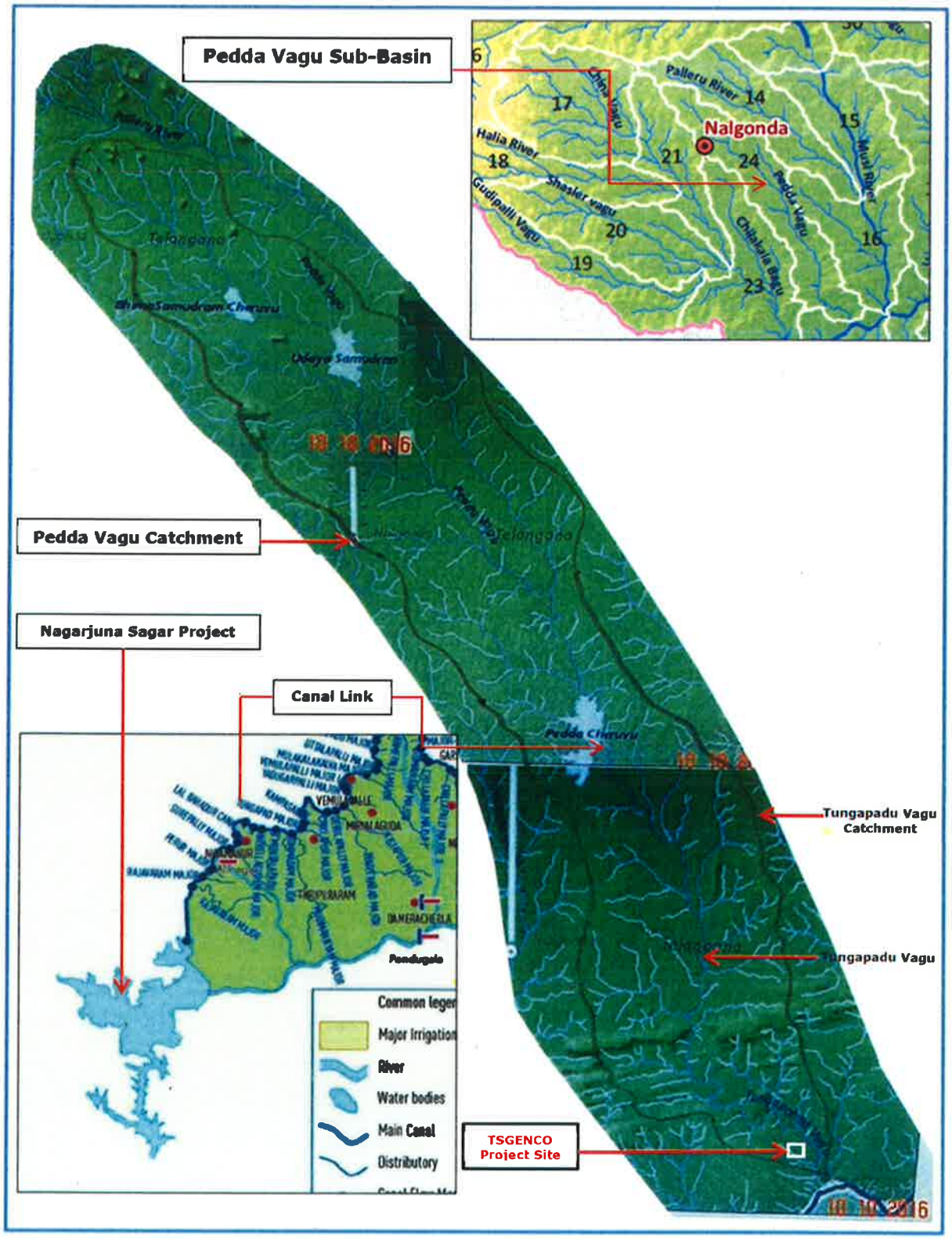
3.3.4.1 HYDROLOGY

The Nalgonda District is drained by river Krishna along with tributaries Musi, Paleru, Dindi, Halia and Peddavagu rivers. Krishna River forms the southern boundary of the district and enters the south western part of the district and flows along the southern boundary. The Musi River is the main tributary of river Krishna. The Paleru river drains eastern part of the district. The directions of all the three river courses are controlled by two major lineaments in east-west and northwest-southeast directions. All other lower order streams and nallas are controlled by minor lineaments. The major river Krishna is perennial and all other rivers are seasonal and ephemeral. The overall drainage pattern in the district is dendritic to sub-dendritic and rectangular.

Project site falls in the Pedda Vagu Sub Basin of Lower part of the Krishna River Basin, occurring between Northern Musi River Sub Basin and Southern Halia River Sub Basin as per Central Water Commission. Tungapahad Vagu is the lowest watershed part of the Pedda Vagu Sub Basin as shown in **Fig-3.5**. Pedda Vagu and the lower Tungapahad Vagu is a single drainage Sub Basin having its catchment extending from South of Gopalapally village, originating at an elevation of 305 m AMSL between hills 335 and 365 m AMSL, very close to Narketpally. The course descends in South- South- East direction and its rainfall run off is harvested at village Cherlapally in Bhimasamudram cheruvu (237 m AMSL), in Panagal Reservoir near Nalgonda (214 m AMSL). It ends in the present Peddadevulapally Cheruvu at village Duggepally (145 m AMSL). Nagarjuna Sagar Left Canal which is an irrigation water

Figure – 3.5

Pedda Vagu Sub-Basin – Tungapadu Vagu and Tungapadu Vagu Major Canal Link



source is supplied through Tungapahad Vagu major canal as shown in the **Fig-3.5**.

The name Tungapahad Vagu is after the village Tungapahad where the stream passes close to the village in Tripuraram Mandal (Headquarters) and Miryalaguda town. It is also called Bandam Vagu in the middle part and Tungapahad Vagu in the lower reaches.

Tungapahad major an irrigation canal starts from Pedda Cheruvu at Pedddevulapally and follows the natural drainage gradient of the stream course and canal water is being supplied from its take-off up-to the tail end close to the River Krishna.

Thus the Pedda Vagu Sub Basin is divided into two sub units the upper one beyond Duggepalli as overland run-off stream network, the lower Tungapahad Vagu as a major irrigation canal surface water supply course, in addition to carrying the rainfall run off of it's down-stream catchment area and also irrigation waste and return recharge received from the upper canal ayacut area.

The total length of the Pedda Vagu from its origin up-to the river Krishna confluence is about 76 km (crow fly) with total elevation difference of about 160 m at a gradient of 2 m in a km. Tungapahad Vagu course length from Duggepalli to the River Krishna is about 28 km (crow fly) with elevation difference of about 94 m at surface gradient of 3.5 m in a km.

The drainage pattern of the Pedda Vagu part has articulate to sub parallel character with shallow depth over the Granitic terrain covered by red sandy and black clayey soils. Tungapahad Vagu part of drainage courses are articulate, angular and sub-parallel over granitic and meta sedimentary terrain covered by sandy soils and rocky pediment and possess moderate depth. Tungapahad drainage course is more sinuous and angular in the meta sedimentary region passing through hard quartzitic and soft shaly terrain.

3.3.4.2 TUNGAPAHAD VAGU

3.3.4.2.1 TUNGAPAHAD VAGU WATERSHED TOPOGRAPHY:

Tungapahad Vagu is also known as Bandam Vagu watershed in the lowest level segment of the Pedda Vagu drainage basin of the major River Krishna basin. Continuity of the Tungapahad Vagu watershed drainage part is got separated from the main drainage Sub Basin of the Pedda Vagu, after construction of Nagarjuna Sagar Multi-Purpose Irrigation Project and formation of left bank Lal Bahadur canal and surface water storage reservoir called Peddacheruvu at Peddadevulapalli Village across the Pedda Vagu stream course by impounding stream flow along with the storage of irrigation water released from Sagar.

In addition, the Tungapahad stream is being utilised as major irrigation water supply canal from Peddacheruvu reservoir through its available natural gravity flow facility. The topographical map of the watershed is shown in the **Fig-3.6**.

The highest surface elevation at Peddacheruvu is 158 meters above Mean Sea Level (m AMSL). Lowest surface level of the watershed at it does out-fall into the major River Krishna is about 50 m AMSL. The surface gradient over a distance of 27 km is 3.5 m / km.

Area has undulating terrain with surface slope from NW to SE in the western part and NE to SW in the Eastern part to meet central low land Tungapahad Vagu flowing from North to South.

Northern part of watershed extending up to Motur Village BM 109.1 m AMSL (Topo-56 P/9) has raised grounds and small ridges with sheet rocks and rocky pediments. Important topographical features in the eastern part are isolated ridge of stony waste at Venkadadripalem Tanda, N-S trending linear ridge of about 3 km length of Tungapahad RF with maximum elevation of Δ 210 (m AMSL) located to the south of Srinivasapuram irrigation tank. Eastern part (Topo 56 P/5) has gently sloping ground with the absence of rock out crops.

TOPOGRAPHICAL MAP OF THUNGAPADU VAGU WATERSHED AREA, NALGONDA DISTRICT, TELANGANA.

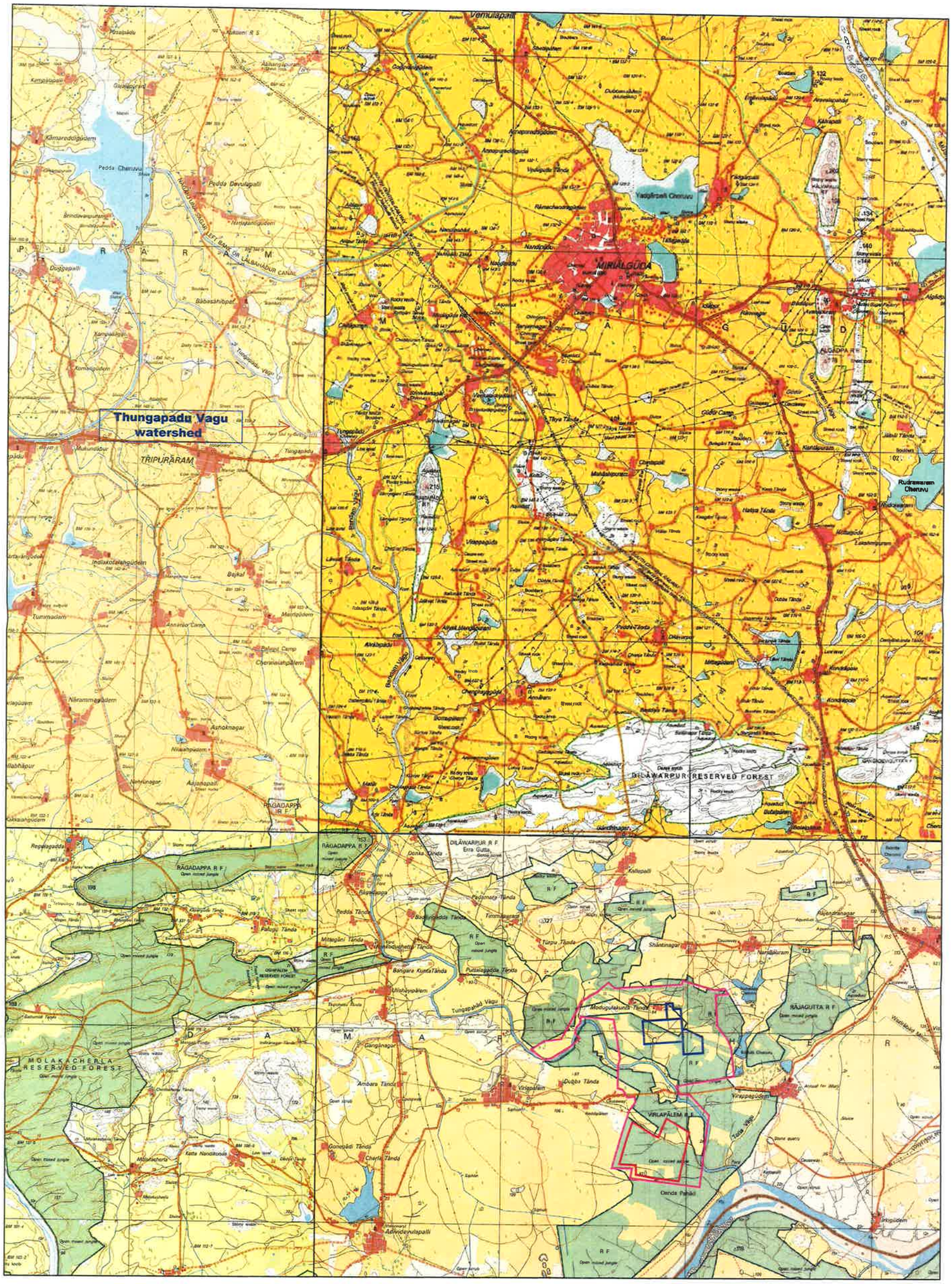


FIG - 3.6

Southern part of the watershed beyond Motur village has East-West trending rocky ridges mostly occupied by Reserved Forests. Ridges and hills are extending in almost East-West direction and they remain parallel to each other. There are agricultural fields and habitations in the low grounds between the ridges.

The important ridges in the southern part are Ragadappa R F 153 m AMSL, Ulshayipalem R F 142 (m AMSL) both located to the west of Tungapahad Vagu extending in East West direction. Erragutta Dilwarpur R F 140 (m AMSL) has about 3 km in length extend in East- West direction located to the East of Tungapahad Vagu other linear parallel ridges are at Timmapuram Δ 127 (m AMSL) Modugulakunta Tanda RF and Rajagutta R F 100 (m AMSL), all located to the east of Tungapahad Vagu to the down south of watershed.

3.3.4.2.2 TUNGAPAHAD VAGU WATERSHED DRAINAGE FEATURES

Tungapahad Vagu watershed boundary in the north is the Peddacheruvu reservoir of NSLBC at Peddadevulapalli. Eastern boundary is an elevated region remaining parallel to the Damercherla branch irrigation canal having connection from NSLBC Lal Bahadur Canal. Irrigation water is being supplied to the surface water storage tanks of various dimensions of more than 16 in numbers occurring between the canal and Tungapahad Vagu.

First order natural drainage courses originating in the upland region in the east are joining in the minor irrigation tanks located at lower elevation in the west and some of the natural drainage courses are being used for water supply network. Drainage courses originate in NE and descend from upper elevated surface to travel in SW direction following the land gradient; ultimately they join the Tungapahad Vagu at several places. They are sub-dendritic and sub parallel.

Similarly there is one more big irrigation branch canal following the western watershed boundary for supply of irrigation water through network of canals. The drainage courses originating on

the western elevated region travel from NW to SE to join Tungapahad Vagu. There are large irrigation tanks at Tripuraram and Motur Villages and small ponds near Anjanapalli, Bejkal, Marrigudem and Veerlapalem village in the Western part of Tungapahad Vagu.

All the stream courses are ephemeral in origin and carry large volumes of storm water during monsoon for short duration and remain dry and most part of the year. During canal water release period, the streams receive irrigation waste water from the upland ayacut areas. Some of the natural streams also function as irrigation network canals to supply adjacent low land areas.

While all the streams are seasonal in nature and possess water depending upon on the monsoon rains and canal water releases Tungapahad main stream is likely to possess base flow of return recharge of applied water for irrigation, irrigation waste water from the ayacut area, un-utilised surplus water released from the NSLBC Peddacheruvu reservoir and subsurface delayed run off of non- monsoon rainfall and monsoon overland storm rain fall run-off from the watershed region.

Thus Tungapahad Vagu is likely to have flow of water in its course towards the out flow region near the Project Site received from the above mentioned sources even during dry periods.

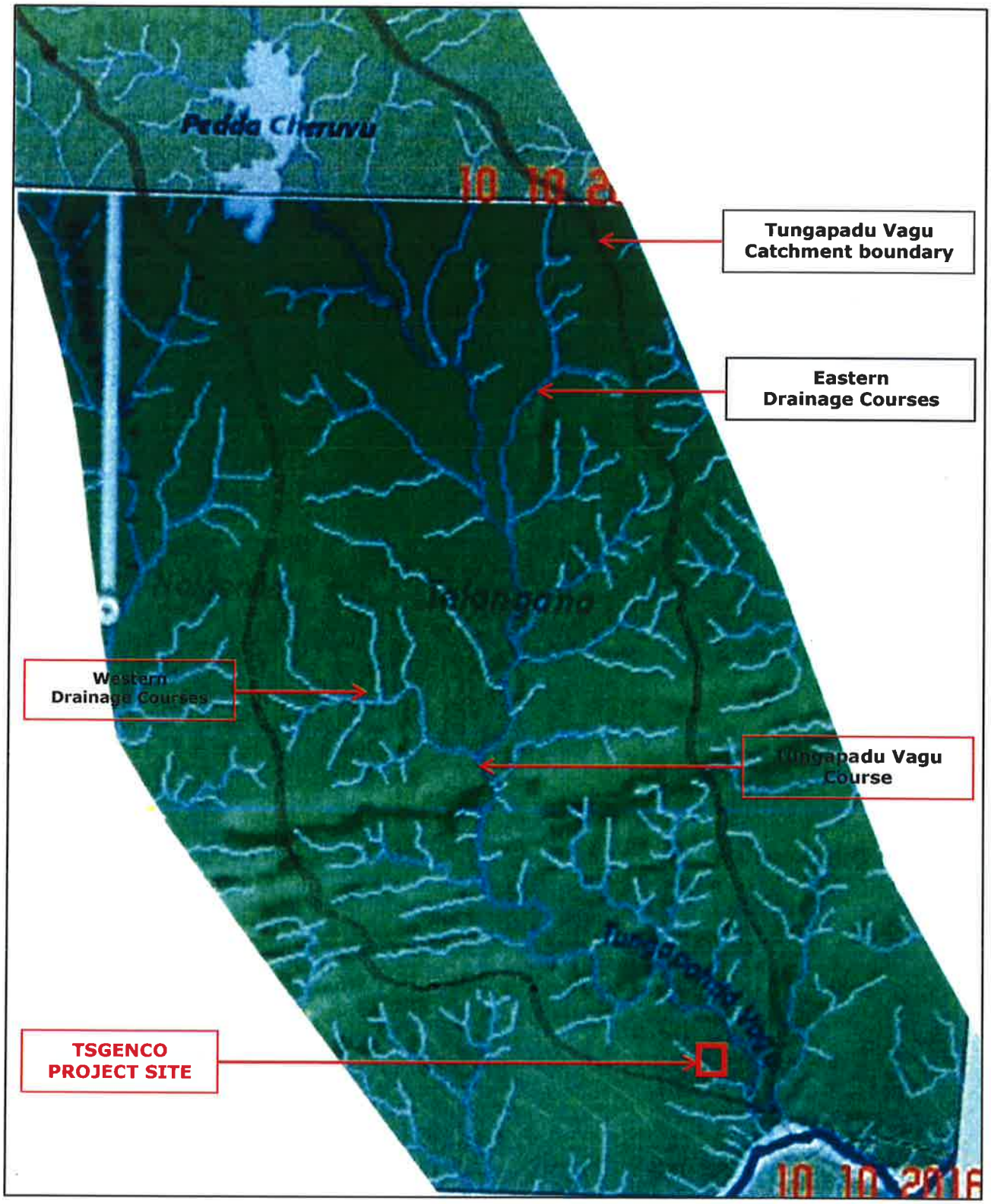
The drainage pattern of the Watershed area is shown in the **Fig-3.7**.

3.3.4.2.3 TUNGAPAHAD VAGU WATER FLOW REGIME:

Tungapahad Vagu surface water flow regime is as shown in the Photographs. Source is NSLBC water as shown in the first two photographs. It maintains flows as shown in the 3, 4, 5 & 6 Photographs at places along its course.

Figure-3.7

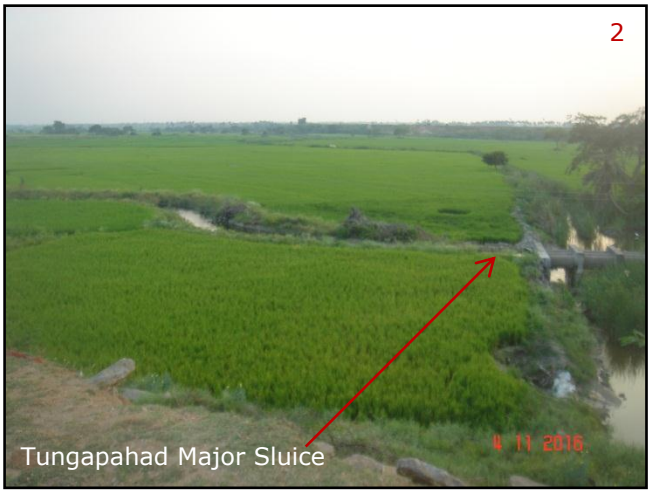
Drainage Net-Work of Tungapadu Vagu Catchment



TUNGAPAHAD VAGU SURFACE WATER FLOW REGIME

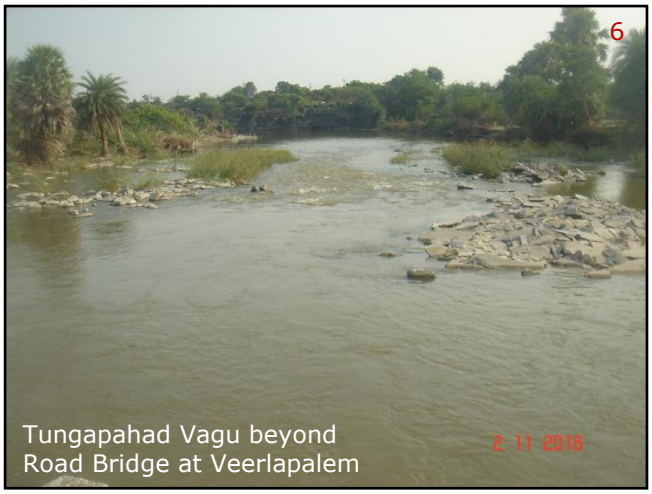












Salient aspects of Tungaphad Vagu are given below alongwith Photographs:

- ❖ Large tracts of watershed area are under intense paddy cultivation generally during two crop periods.
- ❖ Paddy cultivation is also from surface water as well as from ground water as supplemental resource in tail end areas.
- ❖ In addition to the water released from the Reservoir in the Tungapahad Vagu, it also receives rain fall run-off water received from the total watershed area.
- ❖ Tungapahad Vagu water is being lifted by the farmers by a large number of agricultural pump- sets.
- ❖ There is a Lift irrigation Scheme on Tungapahad Vagu to provide irrigation facility for the up- land areas.
- ❖ There is a protected water supply scheme close to the Project Site to provide Drinking Water requirements to villages.
- ❖ Tungapahad Vagu being at lower elevation canal and storages over flows, irrigation waste water descends in to the stream course following surface slope.
- ❖ Tungapahad Vagu receives rejected recharge of applied water, infiltrated rainfall water from either side of the watershed as unseen lateral flow following the gradient as shown in the **Fig-3.8**, in two Ground Water seepage cross sections.



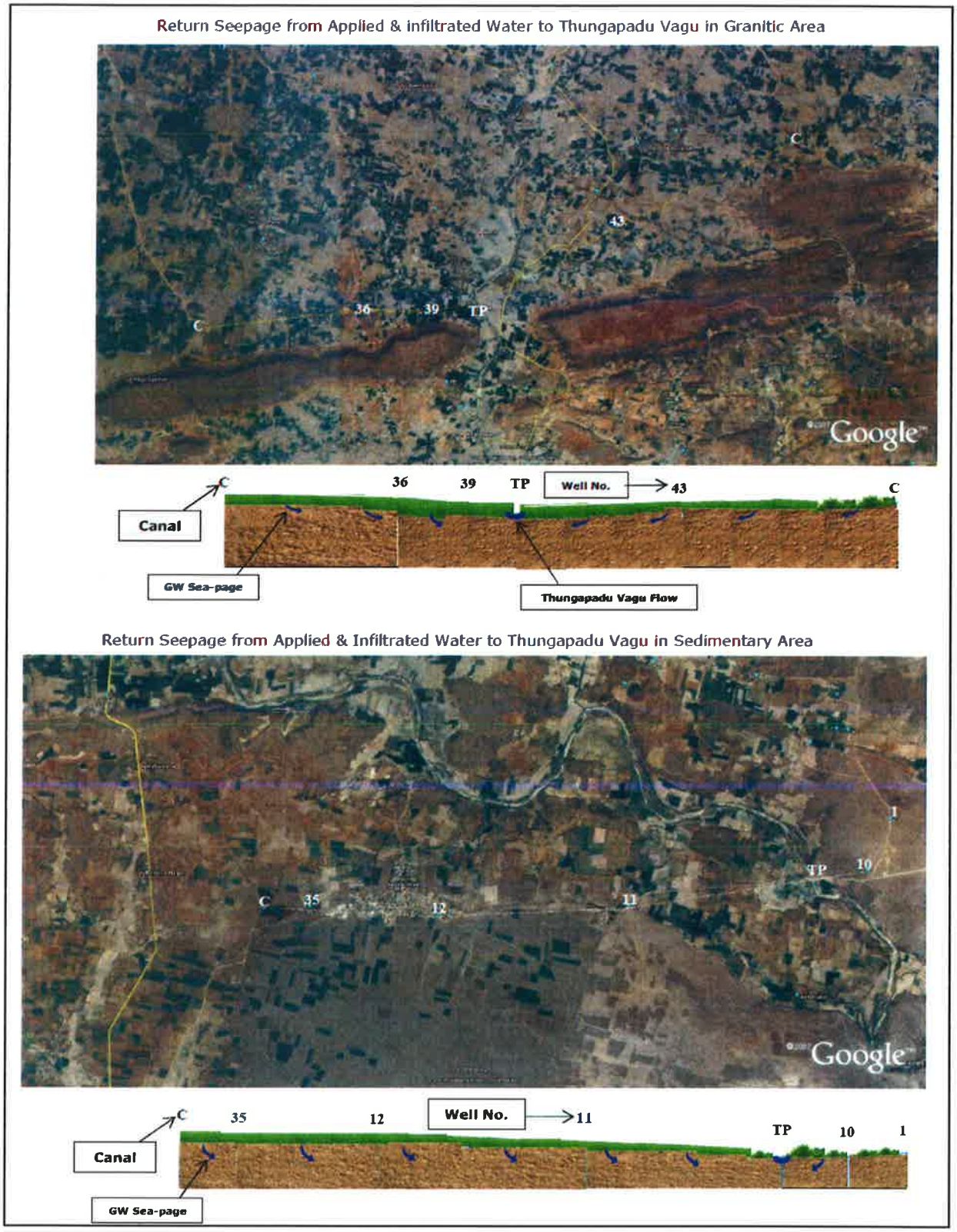
Paddy Cultivation in Center of Watershed

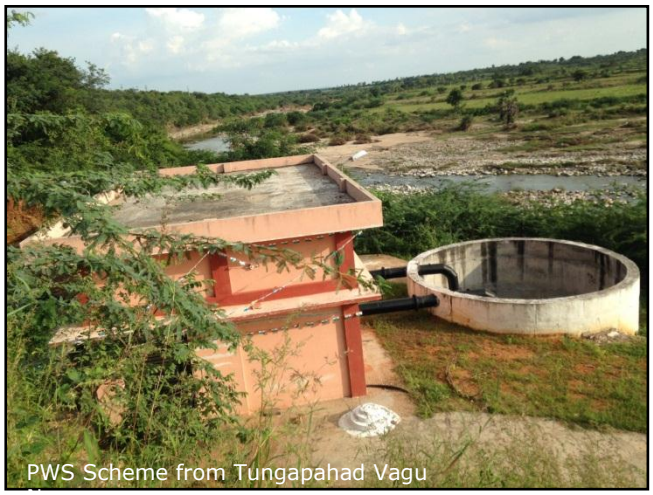


Paddy Cultivation in Watershed Uplands

Fig – 3.8

Return Seepage from Applied and Infiltration Water to Tungapahad Vagu in Granitic Area




PWS Scheme from Tungapahad Vagu


Lift Irrigation Scheme

3.3.4.3 PROJECT SITE DRAINAGE PATTERN

The Total area acquired by TSGENCO is included in more than four micro watersheds. The top left part of the Project Site is included in the Timmapuram micro watershed area of about 300 ha. Project site area is situated in the elevated region of the micro watershed and is earmarked for the greenbelt area.

The Central region is included in the Modugulakunta Tanda micro watershed. The project site area is situated to the upper elevated regions of the watershed area traversed by first and second order streams proposed for Thermal Power Plant and Greenbelt purposes.

The eastern part of the project site is included in the Tolla Vagu micro watershed which is mainly covering the Green belt development.

The southernmost part of the project site falls in the Reddipalem micro watershed comprising Veerlapalem RF. The South-Western elevated region of the micro watershed traversed by the first and second order seasonal streams is reserved for the Ash Pond and Green Belt development.

Tungapahad Vagu passes through the larger Southern bottom block of the Project Site periphery and is away from the Plant Site and the Ash pond location.

The present drainage pattern in the project area is shown in **Fig - 3.9.**

3.3.4.4 RIVER KRISHNA – WATER FLOWS

The flows of River Krishna i.e discharge data maintained by CWC at Pondugala GD site and Wadenapalli for the period 1976-2007 and 1985-2015 are considered as the data is not available at the proposed project site.

3.3.4.4.1 RIVER KRISHNA – WATER FLOWS FROM GUAGING STATION AT PONDUGALA

The discharge data of River Krishna at Pondugala available for the period 1976-2007 is given in **Table – 3.6**. The locations of the Gauge/Discharge point at Pondugala and project area are shown in **Fig – 3.10.**

3.3.4.4.2 RIVER KRISHNA – WATER FLOWS FROM GUAGING STATION AT WADENAPALLI

The discharge data of River Krishna at Wadenapalli available for the period 1985-2015 is given in **Table – 3.7**. The locations of the Gauge/Discharge point at Wadenapalli and project area are shown in **Fig – 3.10**.

3.3.4.5 WATER QUALITY OF THE STUDY AREA

Assessment of water quality in the study area includes the quality assessment of parameters as per the Indian standard IS 10500 (Drinking Water standard). Ten Ground water samples and ten Surface water samples from various locations in and around the Project site within 10 km radius were collected for assessment of the physico-chemical and bacteriological quality during Post Monsoon, '16

The locations of water sampling are shown in **Fig – 3.11.** Details of water sampling locations are given in **Table-3.8**.

FIG - 3.9

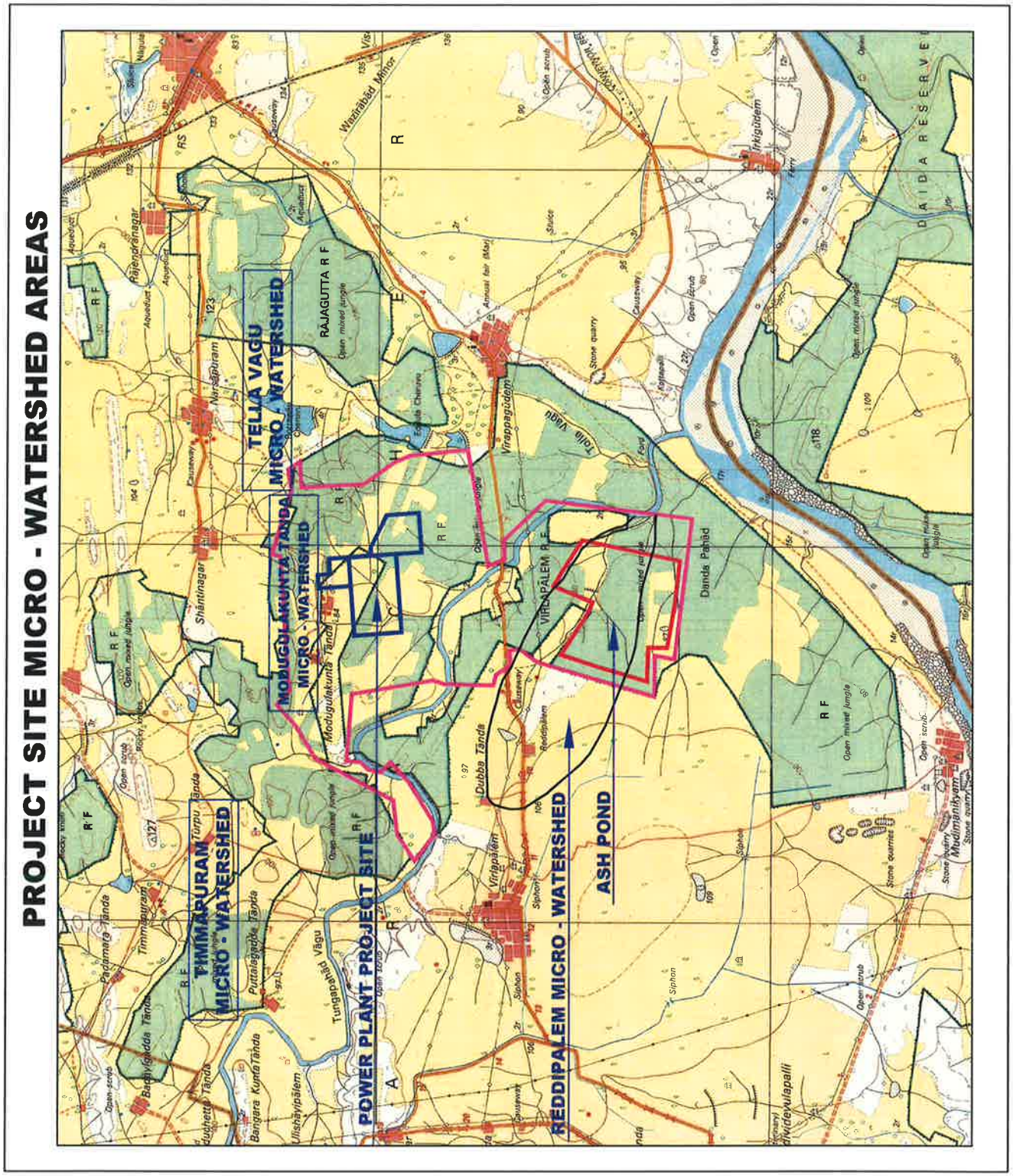

PROJECT SITE MICRO - WATERSHED AREAS
TIMMARURAM MICRO - WATERSHED
MODUGULAKUNTA TANDA MICRO - WATERSHED
TELLA VAGU MICRO - WATERSHED
POWER PLANT PROJECT SITE
REDDIPALEM MICRO - WATERSHED
ASH POND
RAJAGUTTA R F
VIRIYALAM R F
DAIDA RESERVE
Danda Pahad
Timmaruram
Modugulakunta Tanda
Dubba Tanda
Viriyalam
Reddipalem
Virappagudem
Tella Vagu
Padameta Tanda
Puttalagadda Tanda
Tungapahad Vagu
Bangara Kunta Tanda
Ullashvipalem
Shantinagar
Narsapuram
Rajendranagar
Wazirabad Minor
Inkigudem
Mudunuruvari Gudem
Open mixed jungle
Open scrub
Stone quarry
Stone crusher
Causeway
Aqueduct
Siphon
Ford
Ferry
R F

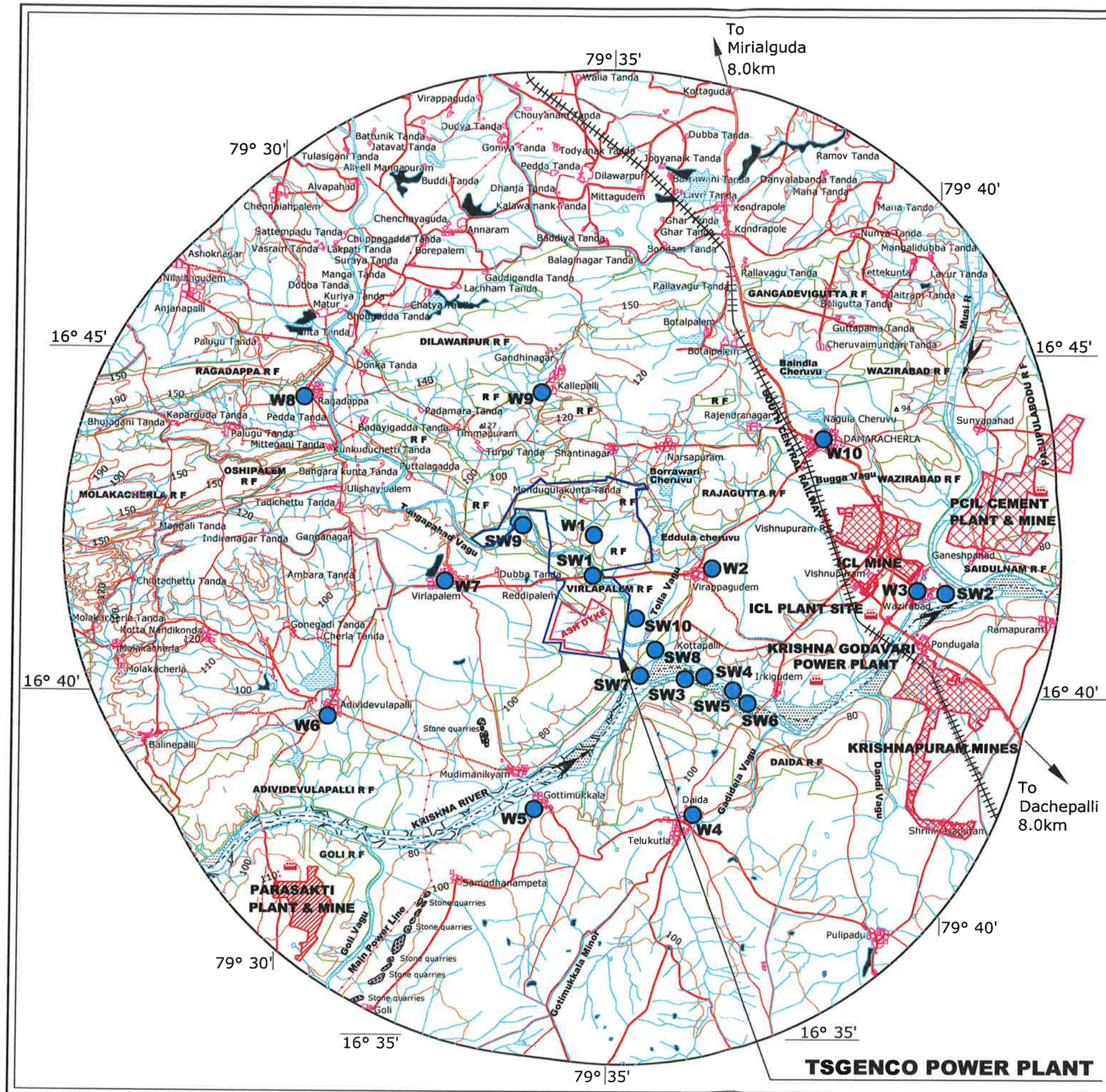
Fig – 3.10

LOCATION OF THE GAUGE/DISCHARGE POINT ON KRISHNA RIVER AT PONDUGALA



LOCATION OF THE GAUGE/DISCHARGE POINT AT WADENAPALLI AND PROJECT AREA





LEGEND

N

- ROADS
- STREAMS / TANKS
- FOREST
- RAILWAY LINE
- CONTOURS
- RIVER
- SETTLEMENTS
- SPOT HEIGHT
- STONE QUARRIES
- MAIN POWER LINE
- DISTRICT BOUNDARY AND INTER STATE BOUNDARY TELANGANA - ANDHRA PRADESH
- ASH DYKE
- TSGENCO PLANT SITE
- WATER QUALITY MONITORING STATIONS

REFER TO THIS MAP AS:- 1:50,000
SHEET 56 P / 10 FIRST EDITION

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56 P/6	56 P/10	56 P/14
56 P/7	56 P/11	56 P/15

SCALE

0 3 6km

FIG - 3.11

CLIENT: **M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED**

PROJECT: **4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)**
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

TITLE: **WATER QUALITY MONITORING STATIONS**

PREPARED BY:
B.S.ENVI-TECH (P) LTD.,
SECUNDERABAD

TABLE-3.8

WATER SAMPLING LOCATIONS

Code	Locations	Source	w.r.t Project site	
			Distance [km]	Direction
Ground Water				
W1	Project Site (Modugulakunta)	Borewell	-	-
W2	Veerappagudem	Borewell	0.9	SE
W3	Wazirabad	Borewell	7.0	ESE
W4	Daida	Borewell	4.4	SSE
W5	Gottimukkula	Borewell	3.8	S
W6	Adividevulapalli	Borewell	5.4	SW
W7	Veerlapalem	Borewell	1.0	WSW
W8	Ragadappa	Borewell	5.9	WNW
W9	Kallepalli	Borewell	2.4	N
W10	Damercherla	Borewell	4.4	ENE
Surface Water				
SW1	Tungapahad Vagu & Bandam Vagu – passing inside the plant site	Surface water	---	---
SW2	River Krishna (at Wadepalli temple) Wazirabad	Surface water	9.0	E
Additional Surface Water Samples collected during Post Monsoon '16				
SW3	River Krishna (near to irkigudem village)	Upstream-1	1.8	ESE
SW4	River Krishna (near to irkigudem village)	Downstream-1	1.88	ESE
SW5	River Krishna(near to irkigudem village)	Upstream-2	3.1	ESE
SW6	River Krishna (near to irkigudem village)	Downstream-2	3.18	ESE
SW7	River Krishna (at plant site)	Surface water	0.7	SE
SW8	Tungapahad vagu & Krishna River (near to Kothapalle village)	Merging point	1.0	E
SW9	Tungapahad Vagu (near to kappur thanda)	Upstream	0.1*	S
SW10	Tungapahad Vagu (near to kothaplle village)	Downstream	Adjacent to plant site	E

*** w.r.t NW block of the plant site**

Annexure – 3B represents the water quality data of Post monsoon '16 at the above locations.

Summary of Water Quality of Post monsoon Season '16 is given below

3.3.4.5.1 GROUND WATER QUALITY

Summary of Ground Water Quality of Post monsoon Season '16 is given below

- It is observed that the pH of the ground water samples is in the range of 6.90 – 7.38.
- Total dissolved solids in the samples were in the range between 554 - 1436 mg/l.
- Total hardness of the groundwater samples was found to vary between 328 – 591 mg/l.
- Chlorides concentration was found to vary between 68 – 362 mg/l.
- Sulphates concentration was found to vary between 36 – 213 mg/l.
- Fluorides concentration was found to vary between 1.03 – 1.32 mg/l.
- Escherichia coli content in all ground water samples was found to be absent.

Ground water samples collected from ten locations within the study area showed compliance of all parameters with the Drinking Water standard of IS 10500 except for fluoride content.

3.3.4.5.2 SURFACE WATER QUALITY

Summary of Surface Water Quality of Post monsoon Season '16 is given below

- It is observed that the pH of the Surface water samples is in the range of 7.92 – 8.10.
- Total dissolved solids in the samples were in the range between 408 - 702 mg/l.
- Total hardness of the groundwater samples was found to vary between 177 - 323 mg/l.
- Chlorides concentration was found to vary between 60 - 118 mg/l.
- Sulphates concentration was found to vary between 54 –133 mg/l.

- ❖ Fluoride concentration was found to vary between 0.60 - 0.88 mg/l.
- ❖ Escherichia coli content in all surface water samples was found to be 116 – 230 Cfu/100ml.

Surface water samples collected from different locations within the study area showed compliance of all parameters with the Drinking Water standard of IS 10500 except for fluoride and bacteriological content.

3.4 LAND ENVIRONMENT

3.4.1 PHYSIOGRAPHY

The altitude of the study area varies from 72 m in west to 93 m above MSL in the south eastern part of the study area. The overall altitude of study area range from 40 to 190 above MSL. The study area drains towards south east and is characterized by scattered hill ranges with intervening valleys and plains.

The project area forms part of Northwestern plateau, locally referred as Deccan plateau in Hyderabad area which attains an average elevation of about 82 m above m.s.l. and is a non-descript, monotonous plains interspersed with granite tors and isolated sedimentary hillocks/residual hills largely underlain by Archaean rocks.

3.4.2 GEOLOGY & GEOLOGICAL STRUCTURE

3.4.2.1 GEOLOGY

The Southern part of the Watershed was a part of major fresh water sedimentary basin in which a thick pile of argillaceous, arenaceous and calcareous sediments were deposited in the Geological past. Later they were compacted metamorphosed and underwent major tectonic disturbances.

This is an extension of total repository of major Cuddapah Basin, where a sequence of rock formations distinguished as Cuddapah Super-Group and Kurnool Group of formations of Lower and Upper Protero-zoic ages respectively were deposited.

This is part of structurally disturbed North-Eastern margin of the Cuddapah basin locally identified as Palnad sub-basin. The Geological succession of the rock types occurring in the Project Site and its watershed area is shown below in the table an aerial distribution is shown in the **Fig- 3.12**.

GEOLOGICAL SUCCESSION

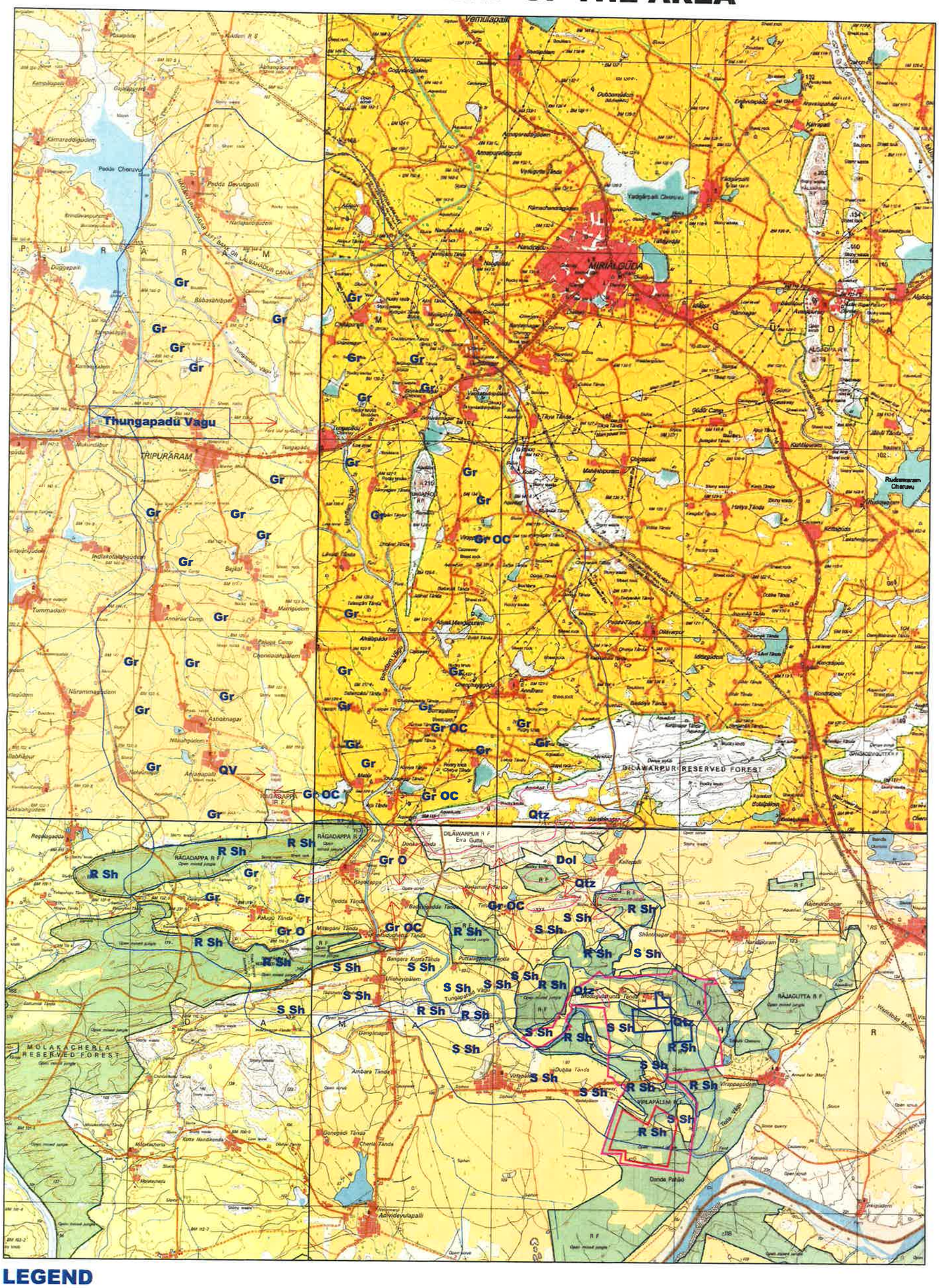
KURNOOL GROUP (Upper Proterozoic)	Narji Limestone Formation	Limestone/ Shales
	Banaganapalle Quartzite	Shales and Quartzites
----------UNCONFIRMITY----------		
Archaean	Granites, Gneisses, Migmatite Dolerite Dykes – Quartz Intrusives Un-Classified Crystallines	

The oldest rock formations are Granites Granite-Gneisses, with Acid and basic Intrusives of Archaean Group (No life period) which are of Igneous in origin. They formed basement rocks on which the sediments were got deposited and later metamorphosed. Metamorphosed sedimentary rock formations comprise Quartzites, Sandstones, Shales and Limestones.

In the Palnad Sub-Basin part of the area oldest unit of Kurnool Group, the Quartzite formations occur un-conformably over the Granites and Granite Gneiss formations. Quartzites are conformably succeeded by the purple and green Shales. They are conformably overlain by Limestones.

Lime stones present in the adjoining areas are referred as equivalents to Narji Limestones of Jammalamadugu formation of

GEOLOGICAL MAP OF THE AREA



LEGEND

Gr = Granite

Gr OC = Granite Out - crop

Dol = Dolerite

Qv = Quartz Vein

Qtz = Quartzite

R Sh = Hard Massive Red Shale

S Sh = Thinly Layered Soft Shale

FIG - 3.12

Kurnool Group. Siliceous Lime stones occur as small out crop close to the Toll Vagu in the Project Site.

3.4.2.2 GEOLOGICAL STRUCTURE

The meta- sedimentary rock formations occurring in the area are mutually conformable bedded deposits. The beds have a sub-horizontal disposition. The reversal in dips is due to broad warps.

Top red Shales are traversed by two sets of widely spaced joints, strike and dip joints. The strike joint is very prominent. The dip joints are mostly vertical. These joints are spaced at distances of 0.5 to 1.5 m on the surface and are partly covered by soil, and they exhibit patchy nature.

The Soft Shales are thinly bedded and are also traversed by closely spaced joints. Granites are very hard and mostly massive. Widely spaced vertical joints have left Sheet rock boulders in the eastern part of the Watershed.

Tunga Pahad ridge occurring towards the center of the watershed may be due to North –South trending weak zone with in the massive Granites


Granite Sheet Rock


Granite Jointed









3.4.3 HYDROGEOLOGY

Hydro-Geosurvey Consultants Pvt. Ltd., Jodhpur (HCPL) carried out the comprehensive hydrogeological assessment of the core and buffer zones and determined the present baseline status of ground water development. Present baseline status of Hydrogeology as per the study conducted by HCPL is presented below

HCPL conducted the assessment studies by collecting hydrogeological data of key wells by visiting them in the field, studying the present ground water conditions, estimating the long term ground water recharge, present ground water withdrawal and status of ground water development. The pre-monsoon and post monsoon hydrological data from 30 key wells was collected for the year 2015-16. The fluctuation of water levels in the surrounding area of plant as recorded through monitoring wells was interpreted

in relation to ground water recharge. Although, the entire Nalgonda District lies in the safe zone and has surplus ground water potential for future ground water development, a rain water harvesting program has been designed for the plant area so that there is no depletion of static ground water reserves during the drought years or due to extensive ground water exploitation for irrigation and industrial use in future.

3.4.3.1 HYDROGEOLOGY OF STUDY AREA

The geology of the core and major part of the buffer zones is occupied by limestone of Late Proterozoic tapped by both dug wells and bore wells. The northern part of the buffer zone comes under the Archaean granite and gneisses.

The consolidated meta-sedimentary rocks of Kurnool system comprising limestone, quartzite and shale occupy most of the buffer zone specifically in the southern part. The crystalline rocks (granites) are inherently devoid of primary porosity. However, subsequently, with dynamic process of weathering, the rocks undergo fracturing and fissuring and joints over a period of time, lead to the development of secondary porosity, which forms the repository for ground water. The ground water occurs under water table conditions in weathered zone and semi-confined and confined conditions in fractured zone

3.4.3.1.1 NATURE OF OCCURRENCE OF GROUND WATER

Ground water occurs under water table conditions in limestone and granite and is transmitted in granite through the weathered rock, joints and fractures. In the limestone formation, the ground water occurs along bedding plains, joints, weathered zones and also in solution cavities etc.

Both the limestone and granite are impervious in nature and have developed secondary porosity or fracture porosity. The secondary porosity decreases with depth due to overlying weight of the rocks which reduces the secondary openings.

The depth to water table in power plant area ranges from 14 to 35 metres below land surface during pre-monsoon period and 8 to 26 metres during post-monsoon period. The depth to water as observed in the buffer zone ranges from 1.10 to 32.2 m b.g.l. during post-monsoon period while it is deeper ranging from 3.50 to 36.61 m b.g.l during pre-monsoon. However, the water levels are shallow near streams, ponds and low lying areas in buffer zone where it ranges from 0.5 to 3 metres.

Fig - 3.13 shows Hydrogeological map of Study area

3.4.3.1.2 MOVEMENT OF GROUND WATER

Ground water movement is controlled mainly by the hydraulic conductivity of the aquifers and hydraulic gradient. The ground water movement in limestone and granite is mainly through the joint and fractures.

Based on the topography and drainage pattern in the major part of the project area and its buffer zone, the general slope of the area is towards south and south east i.e. river Krishna. The ground water flow in the study area is towards south and south east with hydraulic gradient as 5.88 m/km. (**Fig-3.14(A)**) during pre-monsoon and 6.05 m/km (**Fig-3.14(B)**) during post monsoon as calculated from the monitoring of wells of the area.

3.4.3.1.3 NATURE OF HYDRAULIC CONDUCTIVITY

The principal aquifers of the area are composed of limestone and granite in the north which both being hard in character have low hydraulic conductivity mainly developed due to secondary openings like fractures and joints. General depth of wells ranges from 8 to 20 metres.

Although, there are large number of irrigation wells mostly bore wells driven by electric motors in the area, pump tests to find out hydraulic conductivity had not been conducted. However, a pump test carried out in nearby area on a bore well has indicated

HYDROGEOLOGICAL MAP OF STUDY AREA

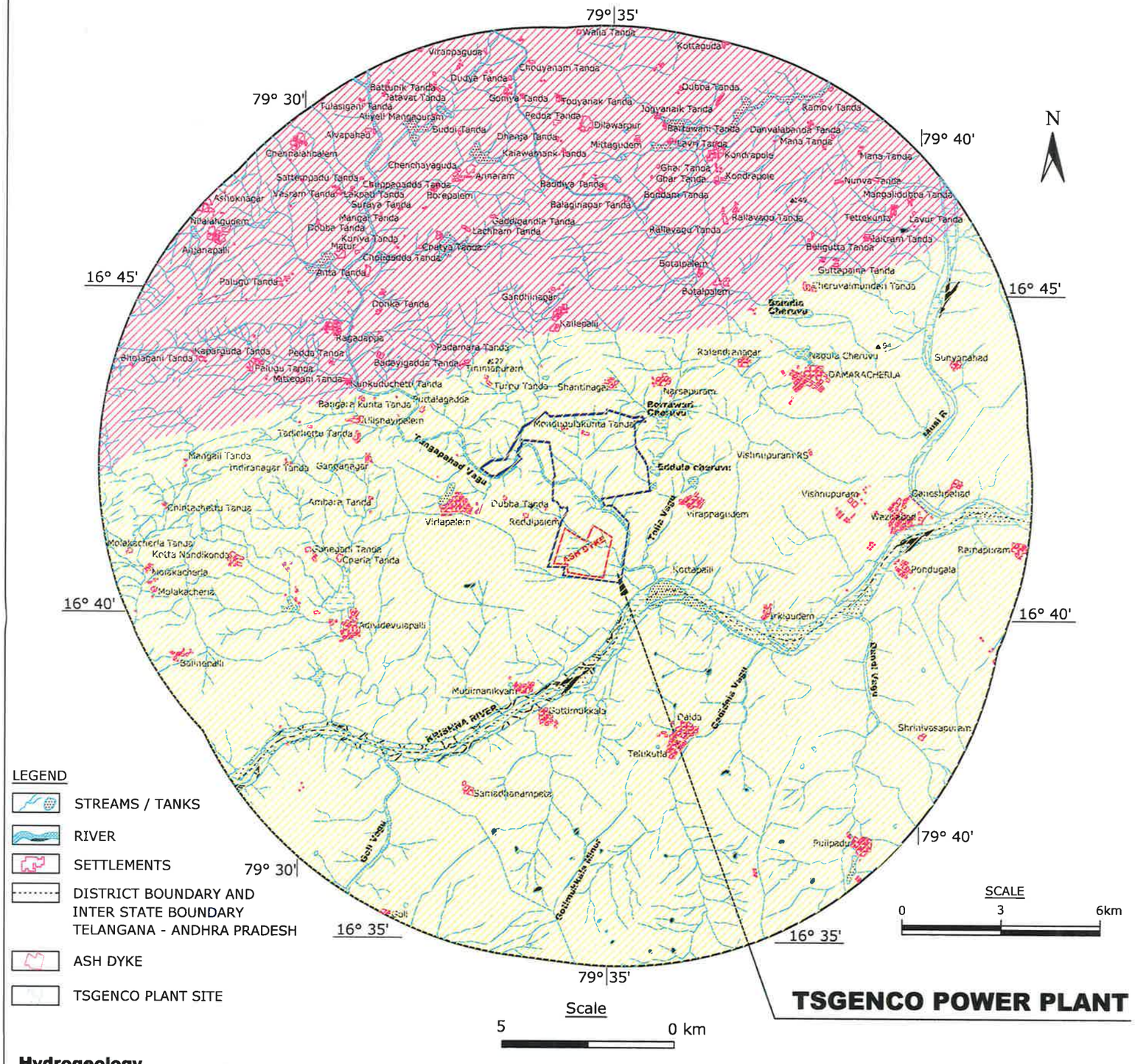

79° 35'
79° 30'
79° 40'
16° 45'
16° 40'
16° 35'
N
Scale
5 0 km
SCALE
0 3 6km
TSGENCO POWER PLANT
ASH DYKE
Ramagundam
Kottapalli
Pondugala
Vishnupuram
Virappagudem
Dubba Tanda
Reddipalem
Virlapalem
Mutharnankyam
Gattimukkala
Telikunta
Dalda
Shrinivasapuram
Pulipadu
Samadhanampeta
Ankireddipalli
Molakacherla
Molakacherla Tanda
Kotta Nandikonda
Ucheria Tanda
Chintacheltu Tanda
Mangali Tanda
Indiranagar Tanda
Ganganagar
Ambara Tanda
Tadicheltu Tanda
Vishnupuram RS
Ganeshpalli
Ramapuram
Sunyanahad
DAMARACHERLA
Narsapuram
Shantinagar
Turiru Tanda
Tiniminpuram
Padamara Tanda
Ragadappa
Donka Tanda
Gandhinagar
Kallepalli
Botalpalem
Cheruvalmundem Tanda
Suttapalli Tanda
Tettekunta
Layur Tanda
Nunna Tanda
Mangalidubba Tanda
Kondrapole
Ghar Tanda
Bandam Tanda
Rallavagu Tanda
Balaginapur Tanda
Baddya Tanda
Aimaram
Chenchayaguda
Chennalahalem
Alwapahad
Mittagudem
Dhanja Tanda
Pedda Tanda
Gomya Tanda
Dudya Tanda
Choyyanam Tanda
Viranpaguda
Walia Tanda
Kottapuda
Dubba Tanda
Jogyanaik Tanda
Kamoy Tanda
Danyalabanda Tanda
Mana Tanda
Mana Tanda
Ashoknagar
Nilalahgudem
Anjanapalli
Palugu Tanda
Bhojagani Tanda
Kaparguda Tanda
Pedda Tanda
Mittegani Tanda
Kunkuduchetti Tanda
Ralendlanagar
Nagula Cheruvu
Bommavari Cheruvu
Erudla cheruvu
Thangapahad Vagu
Jaggi R
Thalla Vagu
Gaddiganda Tanda
Lachiram Tanda
Kuriya Tanda
Chatya Tanda
Cheligonda Tanda
Anita Tanda
Matur
Kaikaparthy Tanda
Sattempadu Tanda
Chimpagadda Tanda
Lakpati Tanda
Surlya Tanda
Maingai Tanda
Doba Tanda
Vasram Tanda
Borepalem
Tulasigani Tanda
Atiyeli Mangaurani
Birdol Tanda
Batkunik Tanda
Jatavat Tanda
Kaiawamank Tanda
Baitawani Tanda
Lavri Tanda
Ghar Tanda
Rallavagu Tanda
Baligutta Tanda
Saikram Tanda
Layur Tanda
Mutharnankyam
Gattimukkala
Gattimukkala Minor
Gaddiganda Vagu
Gollavagu
Gollavagu
Gollav

FIGURE - 3.14 (A)

GROUND WATER CONTOUR MAP OF BUFFER ZONE OF PLANT AREA (PRE - MONSOON PERIOD)

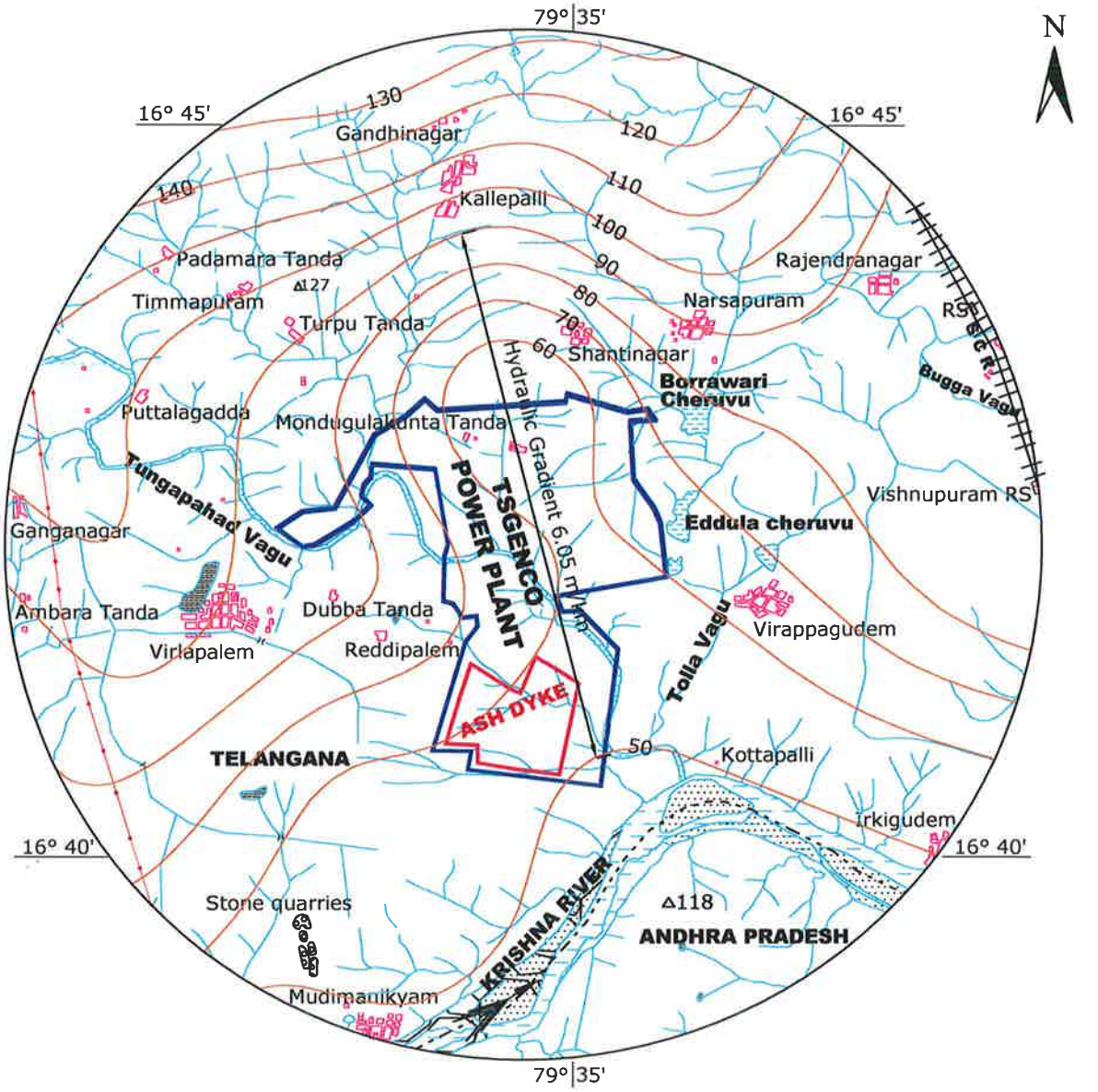
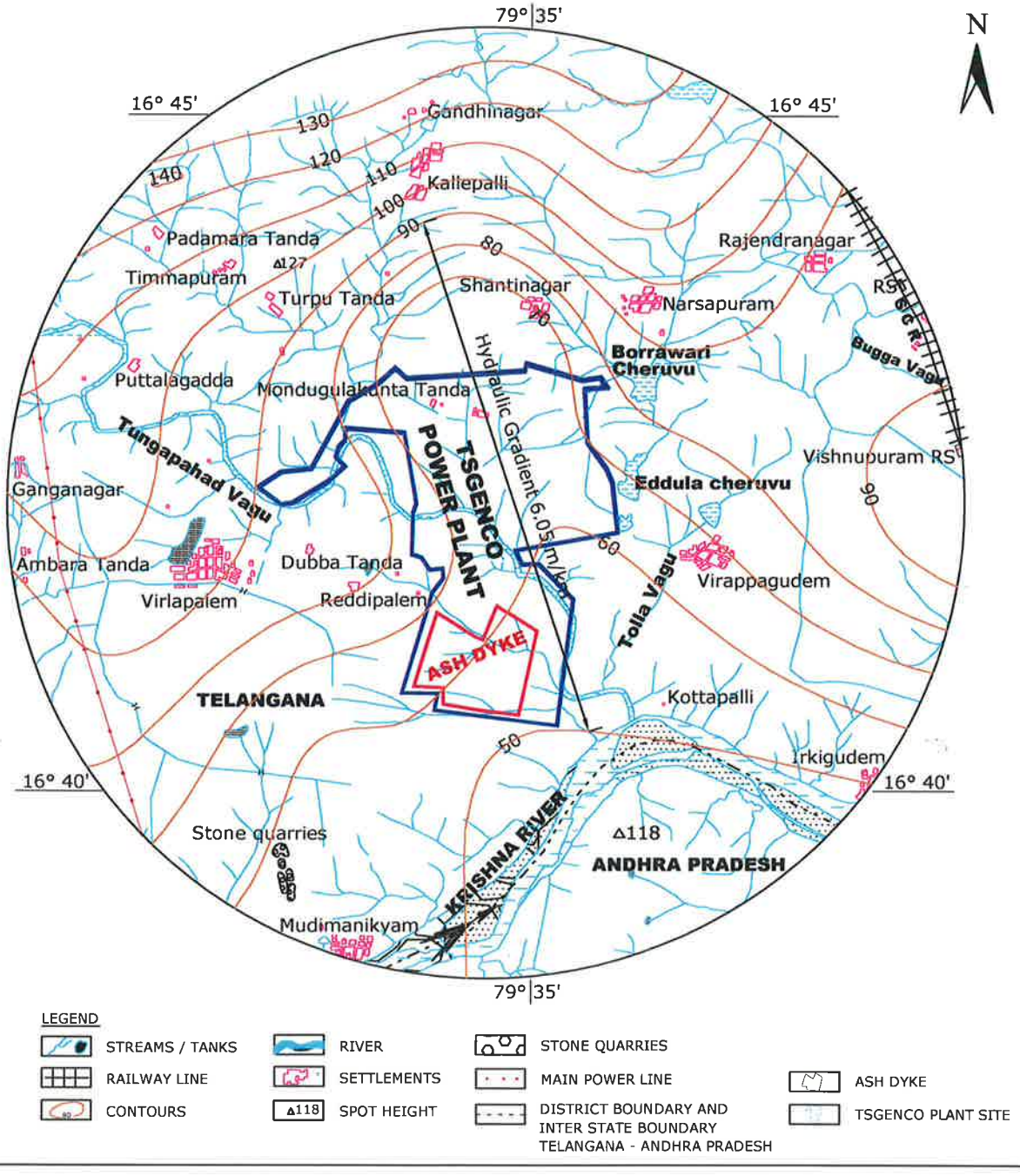


FIGURE - 3.14 (B)

GROUND WATER CONTOUR MAP OF BUFFER ZONE OF PLANT AREA (POST - MONSOON PERIOD)



hydraulic conductivity (K) of 0.5 to 0.80 m/day which can be classified as very low.

3.4.3.1.4 YIELD OF WELLS

There are large number of bore wells and open dug wells in the buffer zone tapping limestone and granite aquifers for irrigation and hand pumps mostly used for drinking purpose in villages. Hand pumps have been constructed by the Govt. by deploying DTH rigs. The yield of such hand pumps is not much and is just sufficient to meet the Drinking Water requirement. The yield of such hand pumps range from 500-1,000 litres per hour of potable quality of water.

Open wells are generally 8-20 m deep and are operated mostly by electrically driven centrifugal pumps or by diesel engines and do not sustain pumping and go dry after few hours of pumping. Average yield of open wells with pump tapping in limestone and granite has been observed as 60-100 m^3/day. Bore wells tapping in limestone yield 4-12 m^3/hr.

3.4.3.1.5 GROUND WATER RECHARGE

The main source of ground water recharge is by the direct percolation of rainfall to the zone of saturation. As already indicated, there is well developed drainage in the area due to moderate rainfall and loamy soils. A significant part of the rainfall is lost as runoff from the area while a limited percentage of rainfall therefore reaches zone of saturation and becomes the part of ground water storage after meeting the evaporation and evapo-transpiration losses. There is also ground water recharge from the return flow of irrigation water pumped from bore wells and dug wells operated by the cultivators. The ground water recharge from return flow of irrigation is normally taken as 20% of the total water applied for irrigation and this percentage has been suggested by the Ground Water Estimation Committee for ground water assessment for this part of the state.

3.4.3.1.6 GROUND WATER RECHARGE OF PROJECT AREA (CORE ZONE)

The project area covers 2800 acres including the ash pond, mostly composed of thin alluvium cover underlain by limestone. There are few bore wells being operated in the area for irrigation by the cultivators.

The recharge from rainfall infiltration as per the guidelines of the Ground Water Estimation Committee, Govt. of India (1997) has also been calculated for counter check.

3.4.3.1.7 INCREMENT IN GROUND WATER STORAGE

Increment in the ground water storage in the project area and very close to the project area (total – 2897 acres) was determined by recording the water levels in the wells during pre and post-monsoon periods of 2015. Average rise of water level in the limestone due to rainfall was found as 3.86 m. taking the specific yield value of 3% for the limestone, the ground water recharge is estimated as under:

11.73 ×1,000×1,000×0.03×3.86 = 1.36 mcm (Million cubic metres)

This ground water recharge has taken place due to rainfall of 624.2 mm for the year 2015 but when normalized to average annual rainfall of 683 mm, it amounts to 1.48 mcm.

3.4.3.1.8 GROUND WATER RECHARGE OF BUFFER ZONE (STUDY AREA)

Buffer zone has limestone and granite as water bearing formations. The total area of the buffer zone is 486.27 km^2 (498 – 11.73 km^2 of plant area) and falls in Damercherla taluka of Nalgonda district. There is canal irrigation in almost 9 % the buffer zone but major part of the cultivable area is irrigated by bore wells and open wells.

The ground water fluctuation of water table during pre and post-monsoon periods were recorded for the year 2015 from the 30 key wells **(Annexure - 3C)** as per the guidelines of the Ministry of Environment & Forests and taking specific yield values of 3% for limestone and 1.5% for granite, the ground water recharge by rain fall has been calculated as under.

3.4.3.1.9 INCREMENT IN GROUND WATER STORAGE

Ground water recharge from rainfall for the year 2015, which was almost the average rainfall year for the area, has been calculated by measuring the rise of water levels in the key wells of the 486.27 km^2 area of buffer zone. The water levels were recorded during pre-monsoon period and again during post monsoon period of the year 2015. The rise of water level indicates the quantity of water percolated to zone of saturation due to recharge from rainfall.

The aerial rise of water has been computed by contour method for different water bearing formations and rise was noted as 4.28 m in limestone and 2.88 m in granite respectively. Such a high value of rise of water level is due to low fracture porosity of rocks. Taking specific yield value of 3% for limestone, 1.5% for granites, the ground water recharge has been calculated for the area covered by different water bearing formations. The limestone covers an area of 344.97 km^2(excluding core zone) while granite covers 142.30 km^2.

344.97×1,000×1,000×0.03×4.28 = 44.29 mcm (for limestone)

142.30×1,000×1,000×0.015×2.88 = 6.15 mcm (for granite)

The total ground water recharge of the buffer zone has been calculated as 50.44 mcm against the rainfall of 624.2 mm recorded during the year 2015-16 which when normalized for average rainfall of 683 mm amounts to 55.18 mcm.

3.4.3.1.10 RETURN FLOW OF IRRIGATION

The norms prescribed by the Estimate Committee for return seepage from the irrigation fields for loamy soils has been

suggested as 20% of the total water applied for the irrigation. There are a number of open wells and bore wells in the buffer zone being operated for irrigation. In addition, 9% (4,300 hectares) of land is being irrigated by canals, providing 10.5 mcm of water during the year 2015-16. Taking 20% as return flow to saturation zone, ground water recharge by seepage amounts to 5.11 mcm.

(10.5+15.06)×0.20 = 5.11 mcm

(Surface water + Ground water) × Return flow = recharge

The total ground water recharge therefore amounts to 55.55 mcm after including recharge from return flow of irrigation water.

3.4.3.1.11 GROUND WATER WITHDRAWAL

CORE ZONE

At present, there are around 15 bore wells in the plant area being operated for irrigation.

BUFFER ZONE

The ground water withdrawal from bore wells and open dug wells is mainly for irrigation.

There are 35 open wells tapping limestone along with 1065 bore wells. Granite is being tapped by 38 open wells with pumps along with 426 bore wells. Average yield of open wells with pump tapping limestone has been taken as 80 m^3/day while tapping granite are yielding 40 m^3/day. Bore wells tapping limestone yield 90 m^3/day while those tapping granite yield 60 m^3/day. Taking these values the discharge from each zone is estimated as under.

35×80×120 = 0.336 mcm (Open wells with pumps tapping limestone)

No.of wells × average yield/day × Rabi irrigation = Withdrawal

1065×90×120 = 11.50 mcm (Bore wells tapping limestone) No. of B/ws ×average yield/day ×Rabi irrigation = Withdrawal

38×40×120 = 0.168 mcm (Open wells with pumps tapping granite) No. of wells ×average yield/day × Rabi irrigation = withdrawal

426×60×120 = 3.06 mcm (Bore wells tapping granite)

No.of B/ws×average yield/day×Rabi irrigation = Withdrawal

In addition, the drinking and livestock water requirement of around 35 villages is met by bore wells, open dug wells and hand pumps and is around 1.1 mcm, the total ground water discharge therefore amounts to 16.16 mcm.

3.4.3.1.12 PRESENT STATUS OF GROUND WATER DEVELOPMENT

The present study reveals that against the total ground water recharge of 55.55 mcm, including recharge from return flow of irrigation water, the ground water discharge is 16.16 mcm indicating the status of ground water development of buffer zone as 29.09%. The buffer zone therefore appears to be safe. As the core zone will not be exploited for ground water, the area will further advance into safe category.

3.4.4 LAND USE PATTERN

Landuse pattern of the study area has been updated through Remote Sensing methodology using LIS IV MX geocoded images dated 18th May 2016. **Fig – 3.15** shows the satellite imagery of 10 km radius around the plant. Level – I landuse/ landcover categories identified in the area are built-up, agricultural land, wasteland, forest, and water bodies. The land use pattern of the study area is presented below.

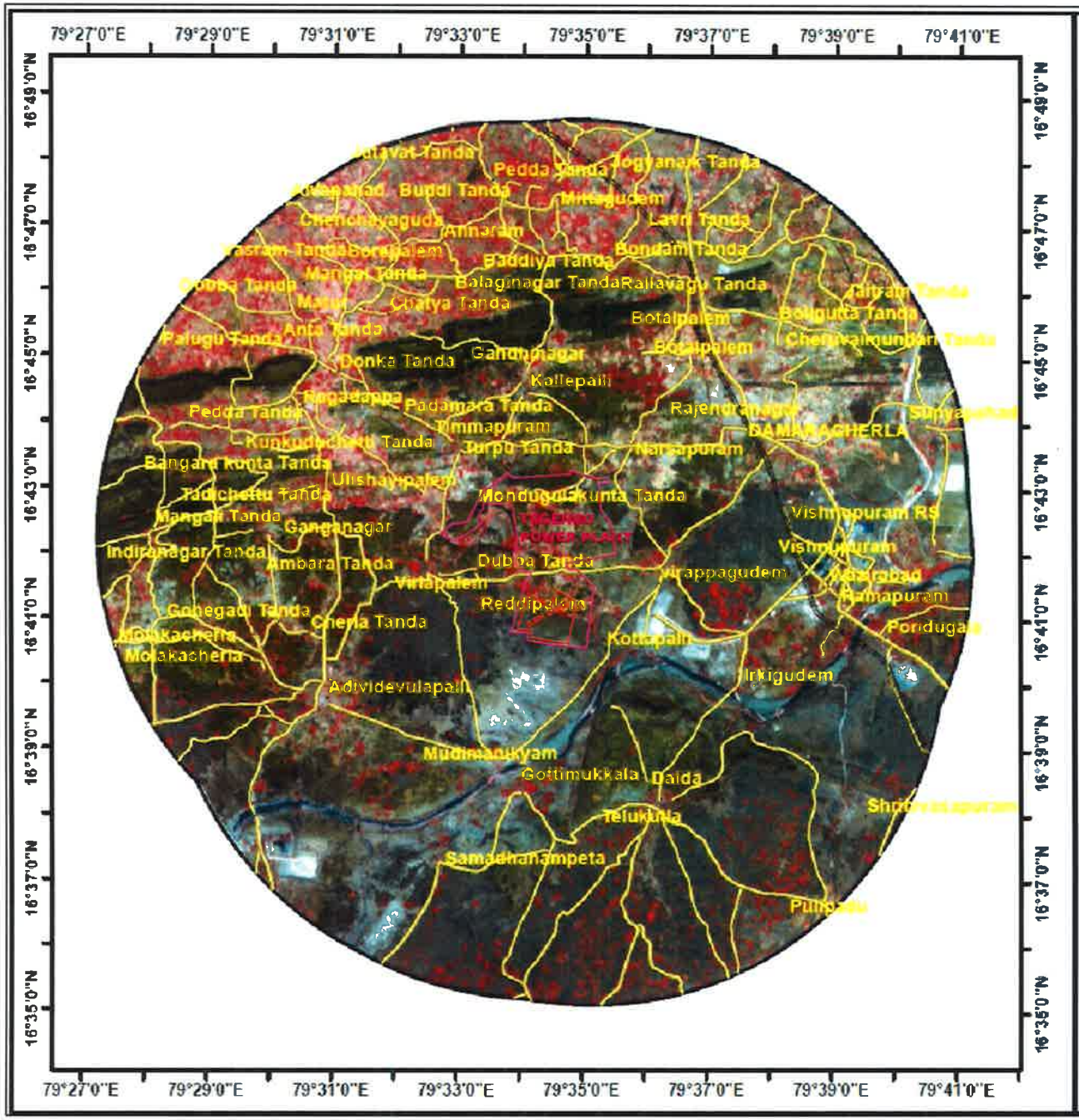

79°27'0"E
79°29'0"E
79°31'0"E
79°33'0"E
79°35'0"E
79°37'0"E
79°39'0"E
79°41'0"E
16°49'0"N
16°47'0"N
16°45'0"N
16°43'0"N
16°41'0"N
16°39'0"N
16°37'0"N
16°35'0"N
Pedda Tanda
Budi Tanda
Mittagudem
Lavni Tanda
Annaram
Chenchaiyaguda
Bandam Tanda
Paddiya Tanda
Balaginagar Tanda
Rallavagu Tanda
Botalpalem
Boggula Tanda
Cheruvaigunjari Tanda
Donka Tanda
Gandhinagar
Kallepalli
Padamara Tanda
Timmapuram
Rajendranagar
DAMARACHERLA
Kunkudubeeti Tanda
Purpo Tanda
Narsapuram
Bangaru Kunta Tanda
Ulishayyapalem
Mondugulakunta Tanda
Vishnupuram RS
Vishnupuram
Ganganagar
Indiranagar Tanda
Ambara Tanda
Dubba Tanda
Virappagudem
Nazarabad
Ramapuram
Reddipalem
Cherla Tanda
Kottapalli
Poridugadu
Irkigudem
Adividevulapalli
Mudimanukyam
Gottimukkala
Daida
Telukunta
Samadhanampeta
Pulipalu
N
S
E
W
SATELLITE IMAGERY
10km BUFFER
RAIL
ROAD
SATELLITE IMAGERY SOURCE DETAILS
SATELLITE : LIS IV MX
PATH/ROW : 101/61
DATE OF PASS : 18 MAY 2016
Kilometers
00.51 2
CLIENT:
M/s. TELANGANA STATE
POWER GENERATION CORPORATION LTD
PROJECT:
4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana.
TITLE:
SATELLITE IMAGERY
PREPARED BY
B.S.ENVI-TECH (P) LTD.,
Secunderabad

FIG - 3.15

TABLE-3.9

SPATIAL DISTRIBUTION OF LEVEL-II LAND USE / LAND COVER CLASSES WITH IN 10KM RADIUS AREA

S.NO.	LAND USE	AREA IN KM²	PERCENTAGE
1.	Built Up Land	7.82	1.61
2.	Waterbodies	12.36	2.55
3.	Forest Land	87.56	18.07
4.	Agricultural Land		
	Plantation	50.29	10.38
	Other Agriculture Land/Single Crop	125.23	23.78
	Fallow Land	157.61	32.53
5.	Wasteland		
	Land with/without scrub/ Rocky/Stony/Barren Land	48.49	10.01
	Quarry/Mining Land	5.16	1.01
TOTAL		**494.52**	**100**

DESCRIPTION OF LAND USE/LAND COVER CLASSES

BUILT-UP LAND

It is defined as an area of human habitation developed due to non-agricultural activities. It comprises dwellings, roads, vacant land, etc. In the study area the built-up land consists of settlements like Damercherla, Veerppagudem, Veerlapalem, Modugulakunta Tanda, Potlagadda Tanda, Bodayigadda Tanda, Timmapur etc.,

The total area estimated in this category is 782.41 Ha. or 1.61 % of the study area.

AGRICULTURAL LAND

It is defined as the land primarily used for cultivation of agricultural crops. The Agricultural land in the study area accounts for 33314.5 Ha. or 66.69 % of the total study area.

Agriculture is main stay of the people in the area. Larger part of the watershed is covered by NSLBC irrigation canal command

area. The supply depends on the monsoon rains and storage available in the Reservoir. Depending on the storage available in the Nagarjuna Sagar water supply shall be made available to irrigate the command area. Generally canal supply is to irrigate in both khariff and Rabi seasons. Within the Command area and also in the tail end areas dug wells and bore wells have been constructed to utilse ground water source as an alternative or to supplement surface water source. There are bore wells constructed on the upland areas with no canal water supply source.

Paddy is main crop under canal command area. Both during Khariff and Rabi seasons, Paddy is being cultivated regularly. Cotton and Chillies are major crops in the upland regions both under canal ayacut and under bore wells. Paddy is mainly grown in the low lands under Bore Wells of assured water supply.

WASTELAND

These are the lands, which are lying un-utilised and can be brought under good vegetative cover. This category is mainly observed on the fringes of the forest areas which predominantly consist of shrubs and stony waste. This category is observed in patches in the entire study area. It occupies an area of 5366.84 Ha. or 11.02 % of the total area.

WATER BODIES: RIVER/STREAM

These classes comprise areas of surface water either impounded in the form of ponds, lakes and flowing streams etc. The water bodies account for 1236.52 Ha. or 2.55 % of the total study area.

FOREST LAND

The Forest land in the study area accounts 8756.44 Ha. or 18.07 % of the total study area.

Fig – 3.16 shows the Landuse and Landcover map of 10 km radius.

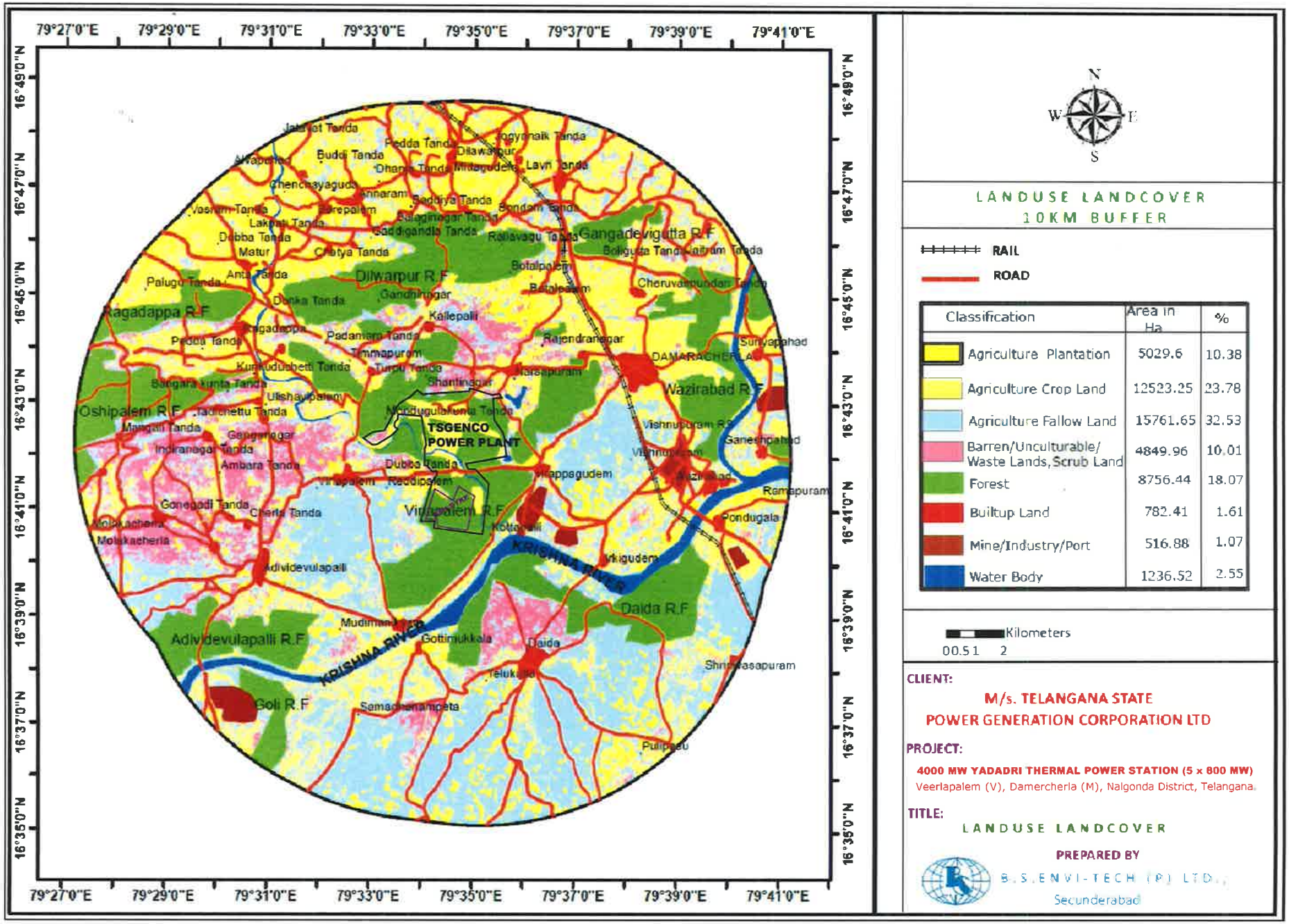

79°27'0"E
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79°33'0"E
79°35'0"E
79°37'0"E
79°39'0"E
79°41'0"E
16°49'0"N
16°47'0"N
16°45'0"N
16°43'0"N
16°41'0"N
16°39'0"N
16°37'0"N
16°35'0"N
TSGENCO POWER PLANT
Dilwarpur R.F
Gangadevigutta R.F
Ragadappa R.F
Oshipalem R.F
Wazirabad R.F
Vinjamuru R.F
Adividevulapalli R.F
Daida R.F
Boli R.F
KRISHNA RIVER
Pedda Tanda
Budi Tanda
Chenchayaguda
Lakpati Tanda
Dabba Tanda
Matur
Chetya Tanda
Palugu Tanda
Anti Tanda
Donka Tanda
Gandhinagar
Kallepalli
Padamtara Tanda
Timmapuram
Turpu Tanda
Shantinagar
Marsapuram
Rajendranagar
Suryapahad
Ganeshpahad
Ramapuram
Pondugala
Vishnupuram R.S
Vishnupuram
Vinjamuru
Vkigudem
Kottagalli
Reddipalem
Dubba Tanda
Ambara Tanda
Indiranagar Tanda
Gangarnagar
Mangali Tanda
Ulishavipalem
Gonegadi Tanda
Cherla Tanda
Motukacherla
Adividevulapalli
Mudimanikya
Gottimukkala
Daida
Telukunta
Samadhanampeta
Shrinivasapuram
Pulipaku
Botalpalem
Cheruvupudari Tanda
Kothapalem
Kamram Tanda
Bolligutta Tanda
Ravavagu Tanda
Gaddigandla Tanda
Balaginagar Tanda
Bandiya Tanda
Annaram
Errepalem
Vasram Tanda
Jogyanaik Tanda
Dhanya Tanda
Lavri Tanda
Nidagudem
Dilawarpur
Jatharot Tanda
N
S
E
W
LANDUSE LANDCOVER
10KM BUFFER
RAIL
ROAD
Classification
Area in Ha
%
Agriculture Plantation
5029.6
10.38
Agriculture Crop Land
12523.25
23.78
Agriculture Fallow Land
15761.65
32.53
Barren/Unculturable/ Waste Lands,Scrub Land
4849.96
10.01
Forest
8756.44
18.07
Builtup Land
782.41
1.61
Mine/Industry/Port
516.88
1.07
Water Body
1236.52
2.55
Kilometers
0 0.5 1 2
CLIENT:
M/s. TELANGANA STATE
POWER GENERATION CORPORATION LTD
PROJECT:
4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana.
TITLE:
LANDUSE LANDCOVER
PREPARED BY
B.S.ENVI-TECH (P) LTD.,
Secunderabad

FIG - 3.16

3.4.5 SOILS

The Soils in the area are mostly consisting of clay sand with Rock Strata. The fertile black cotton soil forms only 9% and occurs on the banks of Krishna and isolated patches here and there. Among the red soils 47% is dubba soil (Loamy sands), which has a very low moisture retaining capacity, and the rest is chalka soil, forming 44%.

3.4.6 SOIL QUALITY

Soil samples were collected from ten locations within an area of 10 km radius around the Project site for analysis of the physico-chemical characteristics of the soil quality during Post Monsoon season '16. **Fig - 3.17** and **Table- 3.10** shows the location of soil sampling stations.

TABLE-3.10
SOIL SAMPLING STATION

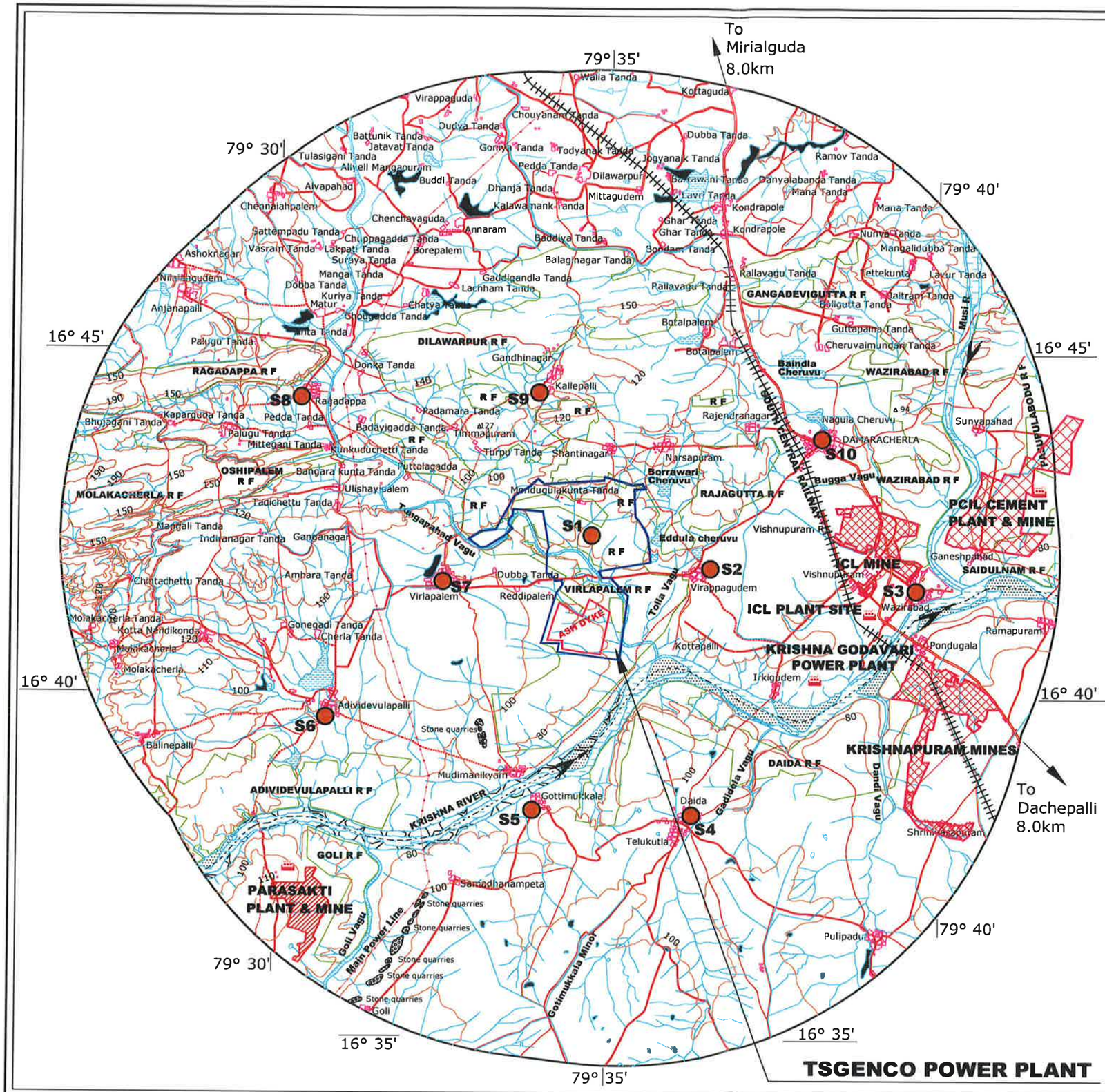
Code	Locations	w.r.t Project site	
		Distance[km]	Direction
S1	Project Site	-	-
S2	Veerppagudem	0.9	SE
S3	Wazirabad	7.0	ESE
S4	Daida	4.4	SSE
S5	Gottimukkala	3.8	S
S6	Adividevulapalli	5.4	SW
S7	Veerlapalem	1.0	WSW
S8	Ragadappa	5.9	WNW
S9	Kallepalli	2.4	N
S10	Dameracherla	4.4	ENE

Summary of the soil quality of the project area and study area is givenbelow

3.4.6.1 PROJECT AREA

Summary of the soil quality of the project area is given below

- pH of the soil sample was found to be 7.79
- Total Organic Carbon of the soil samples was about 0.59%



LEGEND

- ROADS
- STREAMS / TANKS
- FOREST
- RAILWAY LINE
- CONTOURS
- RIVER
- SETTLEMENTS
- SPOT HEIGHT
- STONE QUARRIES
- MAIN POWER LINE
- DISTRICT BOUNDARY AND INTER STATE BOUNDARY TELANGANA - ANDHRA PRADESH
- ASH DYKE
- TSGENCO PLANT SITE
- SOIL QUALITY MONITORING STATIONS

N

REFER TO THIS MAP AS:- 1:50,000
SHEET 56 P / 10 FIRST EDITION

Published under the direction of the Surveyor General of India - 2007

Index to
Survey of India Toposheets

56 P/5	56 P/9	56 P/13
56 P/6	56 P/10	56 P/14
56 P/7	56 P/11	56 P/15

SCALE
0 3 6km

FIG - 3.17

CLIENT: **M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED**

PROJECT: 4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

TITLE: **SOIL QUALITY MONITORING STATIONS**

PREPARED BY:
B.S.ENVI-TECH (P) LTD.,
SECUNDERABAD

- ❖ Soil in the area was found to be Sandy Loam in texture with sand percentage in the range of 80 %, silt of 9%, and Clay 11 %.
- ❖ Chloride content of the soil samples was about 60 mg/kg.

3.4.6.2 STUDY AREA

Summary of the soil quality of the study area is givenbelow

- ❖ pH of the all soil samples was found to be 6.95 – 8.05.
- ❖ Total Organic Carbon of the soil samples was found in the range of 0.28 – 0.92 %
- ❖ Soils in the area were found to be Sandy Loam & Sandy Clay in texture with sand percentage in the range between 45-89 %, silt between 5-23 % and Clay 6-32 %.
- ❖ Chloride content of the soil samples were in the range of 35-126 mg/kg.

Results of soil sampling analysis are given in **Annexure – 3D**.

3.5 ECOLOGICAL ENVIRONMENT

The data pertaining to Ecology was retained from the Earlier Final EIA report. A counter check of the Ecological data has been done by primary survey and the findings have been incorporated. 18 % of the study area is covered by degraded forests. The Reserved forests falling within the study area belong to the following categories

- ❖ Southern Dry Mixed Deciduous Forest
- ❖ Southern Tropical Thorn Forest

Various reserved forests within the study area are given below in **Table-3.11**

TABLE-3.11

RESERVED FORESTS WITHIN THE STUDY AREA

S. No.	Details Forests	Area (Ha)	w.r.t. Project Boundary	
			Distance (in Km)	Direction
1	Veerlapalem R F	2719.8	-	-
2	Wazirabad RF	898.19	6.4	E
3	Rajagutta RF	510.17	0.3	E
4	Daida RF	1290.8	1.2	SE
5	Goli RF	328.26	7.2	SW
6	Adividevulapalli RF	838.56	4.7	SW
7	Oshipalem RF	220.22	4.0	NW
8	Molakacherla RF	726.63	6.8	WNW
9	Ragadappa RF	490.96	6.5	NW
10	Dilawarapur RF	1665.7	2.9	N
11	Gangadevigutta RF	282.74	5.7	NNE
12	Pasupulabodu R F	100	8.9	ENE
13	Saidulnam R F	55.33	9.3	E
Total RF area in Buffer zone 10127.27				

3.5.1 FLORA – STUDY AREA

3.5.1.1 CROPLAND ECOSYSTEM

The common crops in the study area are *Oryzha sativa (*Rice*), Zea mays (*Maize*) Gossypium sp. (*Cotton) which is mainly dependent on rainwater during monsoon season and also through ground water source, tube wells and open wells during non-monsoon season. In this crop land ecosystem in addition to the crop raised, a number of weeds like *Cynodon dactylon, Euphorbia hirta, Cyperus rotundus, Digetaria sp* and *Alyscicarpus sp* also contributing to the primary production. Apart from the commercial crops like *gossypium* and several vegetable red chillies, brinjal, and leafy vegetable crops are also grown in the study area.

The list of staple crops and commercial crops in study area are presented in **Annexure-3E.**

Cropland Ecosystem in study area




3.5.1.2 TERRESTRIAL FLORA

The general terrain of the site is rolling with stony exposures, supporting rock out crops. The major tree species found in the area include *Acacia latronum, Acacia leucophloea Zizyphus mauritiana and Bauchinia recemosa.* The area has 20-25% shrub cover with bushes. The major species occurring are shrubs in the study area. The grass cover is sparse as there is heavy intensity of grazing by local cattle on the ground vegetation. However, it was observed that weeds of *Cassia tora, Adathoda vasica and Sida sp.* are occurring. Constant grazing has resulted in in loss of soil fertility. The regeneration status in the area is far below appreciable levels due to heavy biotic pressures on the area. The list of natural vegetation in study area is presented in **Annexure – 3E.**

Vegetation along the banks of rivers / canals

Bamboo (*Bambusa arundanecea*) plantation is seen in small patches along the River Krishna. To check soil erosion and promote soil binding, canal plantations were undertaken by the Social Forestry Division along major Rivers in the study area such as River Krishna, Musi, and also Tungapahad. Notable among the species afforested along the canals include *Cassia Siamea, Dalbergia sisoo, Borassus flabellifera* and *Terminalia arjuna.*

The banks of River Krishna are disturbed and bear no tree cover. Bushes and rickets dominated the entire area with scanty grass cover and few herbs. Fuel wood species such as, *Prosphis juliflora* was seen growing abundantly along the banks of River Krishna. A few water weeds such as *Eichornia* and *Pistia* along with Phytoplankton were observed floating near the banks of River Krishna. The list of bryophytes and pteridophytes in study area are presented in **Annexure - 3E.**

Vegetation along road side (avenue) and habitations

Road side species are mainly Gulmohar (*Delonix regia*), White gulmohar (*Delonix sp.*), *Peltophorum ferrugineum & Millingtonia hortensis.*

In habitation areas, coconut (*Cocos nucifera*), Tadi (*Borassus flabellifer*) and Neem (*Azadirachta indica*) were commonly found.

Floristic Species in Study Area

A list of plant species representing trees, shrubs, herbs and Aquatic Plants is given in **Annexure – 3E.** 216 plant species were recorded during floristic survey in the study area. The names of the family and the local names (wherever possible) are also given.

3.5.1.2.1 PHYTOSOCIOLOGICAL STUDIES

Phytosociological studies were carried out by using least count quadrate method at following five locations. Trees and shrubs were sampled by taking quadrates of 20 X 20 m and in case of herbaceous vegetation of 1 m^2 distributed randomly. Their girths (GBH at 132 cm from the ground) were recorded. The data obtained was used to estimate Relative Frequency, Relative Density, Relative Basal area and calculated Importance Value Index (IVI).

Fig - 3.18 shows the Phytosociological locations of the study area

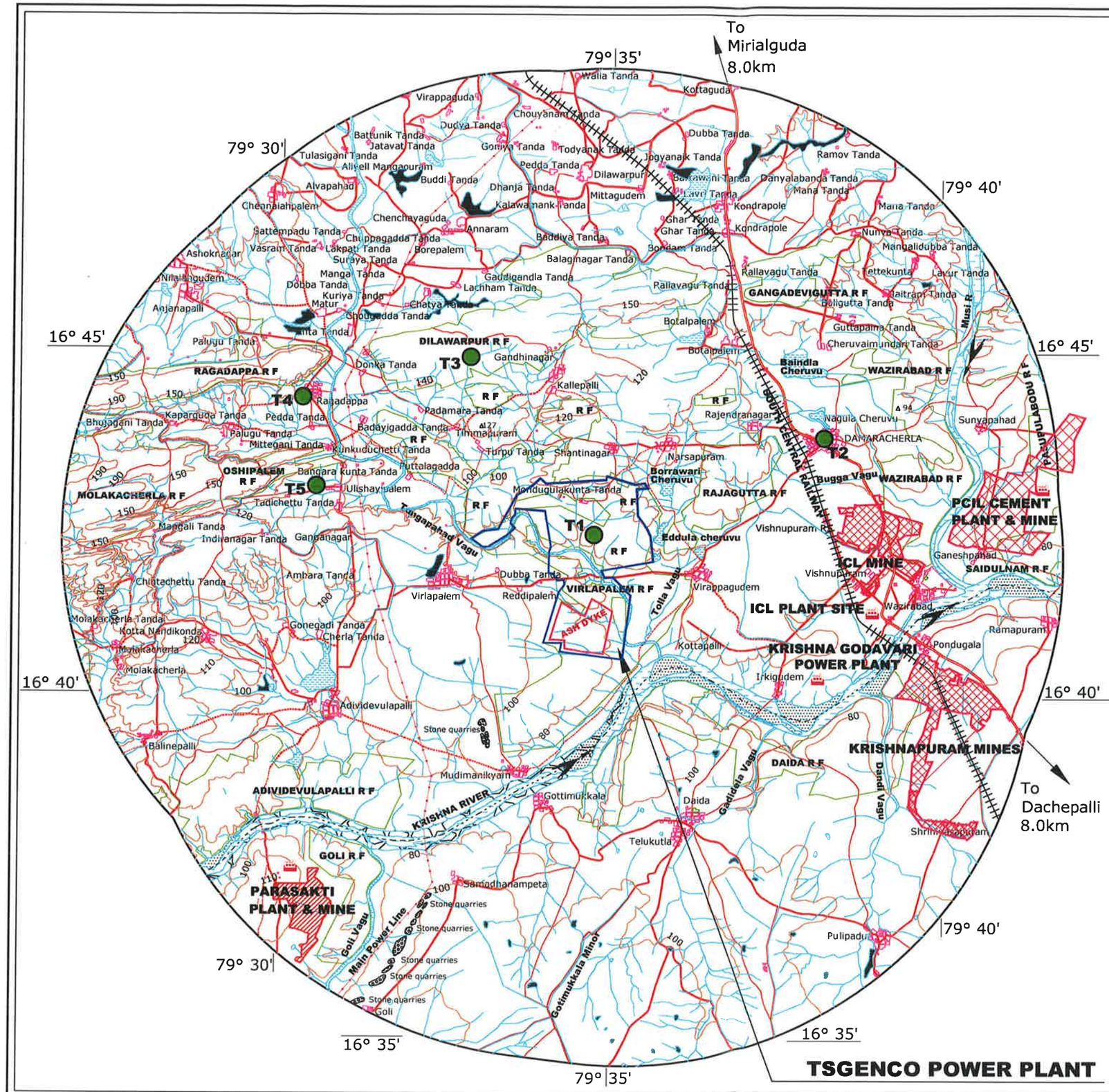


FIG - 3.18

CLIENT: **M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED**

PROJECT: 4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

TITLE: **PHYTOSOCIOLOGICAL MONITORING STATIONS**

PREPARED BY:
B.S.ENVI-TECH (P) LTD.,
SECUNDERABAD

TABLE – 3.12

SAMPLING LOCATIONS FOR PHYTOSOCIOLOGICAL SURVEY IN STUDY AREA

S. No.	Location Code	Name of the location	Distance from Project Site (in km)	Direction wrt Project Site
1	T-1	Plant site	---	---
2	T-2	Near village Damacherla	7.6	E
3	T-3	Near village Dilawarpur	4.0	N
4	T-4	Near Ragadappa	6.1	NW
5	T-5	Near Ulishayipalem	6.5	WNW
Note: At each sampling location the protocol adopted to collect primary data were trees - 10 quadrates of 20 X 20 m, Shrubs – 10 Quadrates 5 X 5 and herbs -10 quadrates of 1 m X1 m.				

IMPORTANCE VALUE INDEX

The Importance Value Index (IVI) is a statistical quantity which gives an overall picture of the importance of the species in the vegetative community. It considers the relative values of density, frequency and basal area of every species in given area. The dominant plant species observed in all sampling locations are *Borassus flabellifera Parthernium hysterophorus, Tridax procumbens, Tephrosia purpuraia Cassia occidentalis.* The highest Importance value index of studied plants in study area recorded in location of T-2 (29.52) for herbaceous vegetation and lowest IVI recorded in location of T-1 (1.71) during study period. The details of IVI are presented in Table.

TABLE -3.13

DETAILS OF IMPORTANCE VALUE INDEX IN STUDY AREA

Code	Location	Range of IVI	Highest IVI	Lowest IVI
T-1	Plant site	1.71 - 19.60	*Borassus flabellifera*	Vernonia cineraria
T-2	Near village Damacherla	1.93 - 29.52	*Tephrosia purpuria*	Terminalia catapa
T-3	Near village Dilawarpur	2.29 - 26.12	*Ficus relisiosa*	Ailanthes excelsa
T-4	Near Ragadappa	1.87 - 27.19	*Tamarindus indica*	Zizuphus jujube
T-5	Near Ulishayipalem	2.56 - 21.37	*Parthenium hysterophorus*	Azadirachta indica

PLANT DIVERSITY

Diversity means variety or variability. Species diversity therefore refers to the variation that exists among the different living forms. The species diversity is varying between 1.13 and 2.10 in studied population and highest was recorded in T-2 (Near village Damacherla) and lowest in T-1(Plant site). The species diversity indices for five sampling locations are presented in Table.

TABLE – 3.14
SPECIES DIVERSITY INDICES IN STUDY AREA

Code	Location	Diversity Index
T-1	Plant site	1.13
T-2	Near village Damacherla	2.10
T-3	Near village Dilawarpur	1.96
T-4	Near Ragadappa	1.61
T-5	Near Ulishayipalem	1.31

3.5.1.3 RARE, ENDANGERED AND ENDEMIC PLANTS IN STUDY AREA

On the basis of literature survey, from Red data books of Indian plants, detailed list rare and endangered plant genera reveals that there are no endangered, threatened, rare plant species observed or recorded during study period.

3.5.2 TERRESTRIAL – FAUNA – STUDY AREA

Due to the scanty vegetation and openness of the area, there was no evidence of wild animals existence. However, it was reported that small mammals such as hare (*lepus negricolis*), wild Pig (*Sus scrofa*), and Mungoose (*Herpestes edwardsi*) occur in very small numbers in the adjoining reserve forest areas.

The broken terrain with absence of fruit yielding trees and roosting sites, supports mostly ground nesting birds. The other commonly observed birds are Red Vented Bulbul, Babblers, kingfishers, Common Crow and kite.

It was reported that reptiles such as Monitor lizard (*Varanus sp.*) along with snakes occur in the area. However, they were not spotted during the study period. The most commonly occurring non-poisonous snake in the area is Rat snake. Poisonous snake such as Cobra krait is spotted rare in the area.

3.5.2.1 PRESENCE OF PROTECTED AREAS AS PER WILDLIFE PROTECTION ACT, 1972 IN STUDY AREA

As per Ministry of Environment and forests and Forest department of Government of Telangana notifications reveal that there are no wild life sanctuaries, national parks, elephant/tiger reserves within 10km radius of the study area. Amrabad Tiger Reserve is located at a distance of 14.03 km from project site.

3.5.2.2 FAUNA

Primary field monitoring studies were carried out through physical observations and also collected data from elderly persons of the area and forest officials.

Collecting Secondary and Primary Data





3.5.2.2.1 AVI FAUNA IN STUDY AREA

Avi Fauna was observed during active period of the day between 5.30 hrs to 8.30 hrs and 15.30 hrs to 18.30 hrs. The list of avifauna observed in study area is presented in the **Table – 3.15**

TABLE – 3.15
LIST OF AVIFAUNA/BIRDS OBSERVED IN STUDY AREA

S. No.	Scientific name	Common name	Telugu name	IUCN Status	IW(P)A, 1972, Schedule
1	*Phalacrocorax niger*	Little Cormorant	Cheruvukkai	Least Concern	IV
2	*Ardeola bacchus*	Pond Heron	Konga	LC	IV
3	*Egretta garetta*	Little Egret	Karchi Eagle	LC	IV
4	*Amauromis phoenicurus*	Water hen	Neeti kodi	LC	IV
5	*Pseudibis papilosa*	Black Ibis	Kala Baz	LC	IV
6	*Milvus migrans*	Black Kite	Black Kite	LC	IV
7	*Pavo cristatus*	Indian Peafowl	Nemali	LC	I
8	*Centrpus sinesis*	Crow pheasant	Mohka	LC	IV
9	*Cuculus varus*	Cuckoo	Kokila	LC	IV
10	*Columbia livia*	Blue Rock Pigeon	Kabuther	LC	IV
11	*Treron pheoenicoptera,*	Green Pigeon	Pavuramu	LC	IV
12	*Streptopelia decactao*	Ring Dove	Kapothamu	LC	IV
13	*Streptopelia Chinensis*	Spotted Dove	Kapothamu	LC	IV
14	*Psittacula eupatria*	Alexandrine Parakeet	Ramachiluka	LC	IV
15	*Psittacula krameri*	Rose-ringed Parakeet	Ramachiluka	LC	IV
16	*Eudvnamvs scolopacea*	Asian Koel	Kokila	LC	IV
17	*Athene brama*	Spotted Owl	Gudlaguba	LC	IV
18	*Apus affinis*	House Swift	Babila	LC	IV
19	*Cypsiurus balasiensis*	Asian Palm-Swift	Babila	LC	IV
20	*Lonchura malabarica*	White-Throated Munia	Sar munia	LC	IV
21	*Merops philippinus*	Blue-tailed Bee-eater		LC	IV
22	*Merops orientals*	Green Bee-eater		LC	IV
23	*Coracias benghalensis*	Indian Roller	Palapitta	LC	IV
24	*Hirando rustica*	Common Swallow	Babil or Vanakovela	LC	IV
25	*Acridotheres fuscus*	Jungle Myna	Goruvanka	LC	IV
26	*Acridothers trists*	Common Myna	Saada goruvanka	LC	IV
27	*Corvus splendens*	Common Crow	Kaaki	LC	V
28	*Corvus macrohyuchos*	Jungle Crow	Advikaki	LC	IV

S. No.	Scientific name	Common name	Telugu name	IUCN Status	IW(P)A, 1972, Schedule
29	*Dicrurus macrocercus*	Black Drongo		LC	IV
30	*Pycnonotus cafef*	Red-vented Bulbul		LC	IV
31	*Prinia socialis*	Ashy Prinia		LC	IV
32	*Passer domesticus*	House Sparrow	Pichuka	LC	IV
33	*Ploceus philippinus*	Common Weaver Bird	Baya	LC	IV
34	*Lonchura striata*	Spotted Munia	Tetai Munia	LC	IV
35	*Saxicoloides fulicata*	Indian Robin	Kalchuri	LC	IV
36	*Lonchura malacca*	Black-headed Munia		LC	IV
37	*Lonchura punctulataik*	Scaly-breasted Munia		LC	IV
38	*Galuciddum radiatuum*	Owlet Barred Jungle	Adavi gudlaguba	LC	IV
39	*Francolinus pondicerianus*	Grey Partridge	Chakoramu or Kouju	LC	IV

3.5.2.2.2 MAMMALS

The commonly observed/reported mammals in the study area are presented in **Table - 3.16**.

TABLE – 3.16
LIST OF MAMMALS OBSERVED IN STUDY AREA

S. No.	Scientific name	Common name	Telugu name	IUCN Status	IW(P)A, 1972, Schedule
1	*Pteropus giganteus*	Indian flying fox	Gabbilam	LC	IV
2	*Macaca mulatta*	Monkey	Kothi	LC	II
3	*Vulpes bengalensis*	Indin Fox	Nakka	LC	II
4	*Herpestes edwardsii*	Common Mongoose	Mungisa	LC	II
5	*Sus scroffa*	Wild boar	Adivi pandi	LC	III
6	*Axis axis*	Spotted Deer	Chukkajinka	LC	III
7	*Funambulus palmarum*	Three striped squirrel	Ground squirrel	LC	IV
8	*Bandicota indica*	Greater Bandicoot	Pandikokku	LC	IV
9	*Mus muscuius*	House rat	Yeluka	LC	V
10	*Mus booduga*	Indian field rat	Yeluka	LC	V
11	*Bandicota bengalensis*	Lesser Bandicoot	Pandikokku	LC	IV
12	*Lepus nigricollis*	Indian hare	Kundelu	LC	IV

3.5.2.2.3 HERPETO FAUNA

Amphibians were noticed mainly in fresh water and marshy places. Frogs and toads were present in this area. **Table – 3.17** gives the details of different amphibians like Lizards, turtles and reptiles in the study area

TABLE – 3.17

LIST OF REPTILES AND AMPHIBIANS OBSERVED IN STUDY AREA

S. No.	Scientific name	Common name	Telugu name	IUCN Status	IW(P)A, 1972, Schedule
Reptiles					
1	*Eryx johni*	Sand boa	Rendu pamu	LC	IV
2	*Python molurus*	Indian Rock Python	Konda Chiluva	Near Threatened	I
3	*Ptyas mucosus*	Rat snake	Jerripothu	LC	II
4	*Bungarus caeruleus*	Krait	Katla pamu	LC	IV
5	*Naja naja*	Common Cobra	Nagupamu	LC	II
6	*Vipera russseli*	Russell's viper	Raktha pinjari	LC	IV
7	*Echis carinatus*	Saw scaled viper	Moddu pinjari	LC	IV
8	*Dryphis sp.*	Tree Snake	Chettu pamu	LC	IV
9	*Typholops sp.*	Blind Snake	Guddi pamu	LC	IV
	Lizards				
1	*Hemidactylus brookii*	House Lizard	Balli	LC	IV
2	*Hemidactylus reticulatus*	Rock Gecko	Balli	LC	IV
3	*Hemidactylus flaviviridis*	Wall lizard	Balli	LC	IV
4	*Caloductyloides aureus*	Golden Gecko	Nallikeechu	LC	IV
5	*Calotes versicolor*	Garden lizard	Tonda	LC	IV
6	*Mabuya carinata*	Common Skink	Palabindhey	LC	IV
7	*Varanus bengalensis*	Common Monitor Lizard	Udumu	LC	I
8	*Chameleon zeylanicus*	Chameleon	Usaravilli	LC	IV
Turtle					
1	*Trionyx gangeticus*	Ganges Soft-shelled Turtle	Neetitabelu	VU	I
2	*Testudo elegans*	Indian star tortoise	Mettatabelu	LC	IV
Amphibians					
1	*Duttaphrynus melanostictus*	Common Indain Toad	Kappa	LC	IV
2	*Duttaphrynus scaber*	Ferguson's Toad	Chettu kappa	LC	IV
3	*Euphlyctis hexadactylus*	Indian Pond Frog	Godrukuppa	LC	IV
4	*Sphaerotheca rolandae*	Indian Burrowing Frog	Burada kappa	LC	IV
5	*Fejervarya limnocharis*	Indian Cricket Frog	Kappa	LC	IV
6	*Euphlyctis cyanophlyctis*	Skittering Frog	Kappa	LC	IV

3.5.2.2.4 BUTTERFLIES

Butterflies spotted in the study area were identified as per Butterflies of India. The list of butterflies in the study area are presented in **Table-3.18.**

TABLE- 3.18
LIST OF BUTTERFLIES OBSERVED IN STUDY AREA

S. No.	Scientific name	Common name	IUCN Status	IW(P)A, 1972, Schedule
1	*Castalius rosimon*	Common Pierrot	LC	IV
2	*Tarucus nara*	Rounded Pierrot	LC	IV
3	*Catochrysops strabo strabo*	Forget-me-not	LC	IV
4	*Chilades lajus lajus*	Indian Lime Blue	LC	IV
5	*Phalanta phalantha phalantha*	Common Leopard	LC	IV
6	*Danaus chrysippus chrysippus*	Plain Tiger	LC	IV
7	*Euploea core core*	Common Crow	LC	IV
8	*Junonia almana almana*	Peacock Pansy	LC	IV
9	*Junonia hierta hierta*	Yellow Pansy	LC	IV

3.5.2.3 RARE AND ENDANGERED ANIMALS

As per Wild Life (Protection) Act, 1972, the following four schedules – I species are present in the study. However these Schedule – I species are not falling in the endangered category. As per IUCN (International Union for Conservation of Nature), the vulnerable and threatened species present in the study area are presented in the **Table – 3.19**.

TABLE – 3.19
SHEDULE – I AND THREATENED SPECIES PRESENT IN THE STUDY AREA

S. No.	Scientific Name	Common name	As per WL(P)A, 1972	IUCN Status
1	*Pavo cristatus*	Indian Peafowl	Schedule - I	Least Concern
2	*Python molurus**	Indian python	Schedule - I	Near Threatened
3	*Varanus bengalensis*	Monitor lizard	Schedule - I	Least Concern
4	*Nilssonia gangetica**	Indian softshell turtle	Schedule - I	Vulnerable

data collected through interactions with local elderly people and forest officials of respective forest ranges

Conservation plan prepared for Schedule – I species is presented in Chapter – 4

The recorded or observed list of wild animals and their conservation status as per Wildlife (Protection) Act, 1972 are presented in **Annexure - 3E**.

Presence of Spawning, Breeding, Nesting or Nursery of Turtles and or other Aquatic animals in study area

Based on the secondary data, Soft Shell Turtle (Fresh Water Turtle) is reported to have been spotted in River Krishna in the year 1962 - 1963. However the villagers have not confirmed its presence.

On the basis of field observations and interactions with elderly people of the area and literature survey reveals that there are no other aquatic animals in the study area.

3.5.3 FLORISTIC SPECIES IN THE PROJECT AREA

The list of flora species recorded or observed in project area and in 10 km radius of the study area are presented in **Annexure – 3E.**

3.5.4 FAUNAL SPECIES IN THE PROJECT AREA

The list of Fauna species recorded/observed in project area and in 10 km radius along with their conservations status as per Wildlife (Protection) Act, 1972 are presented in **Annexure – 3E.**

3.5.5 AQUATIC ECOSYSTEM

3.5.5.1 PLANKTONIC STUDIES

Biological assessment studies were conducted by collecting plankton samples from the surface waters to assess the primary productivity of the water ecosystem. The details of Planktonic sampling locations are presented in **Table – 3.20** given below:

TABLE – 3.20
AQUATIC ECOLOGICAL LOCATIONS IN STUDY AREA

S.No	Name of the water body	Distance from Project Site	Direction wrt Project Site
AS-1	Near Wazirabad village	8.7	E
AS-2	Near Veerppagudem village	0.7	E
AS-3	Near Mudimanikyam	3.8	SSW

Fresh water planktonic are mostly dominated by phytoplankton particularly by *Bacillariophycean* members followed by *Chlorophyceae, Dinophyceae* and *Cyanophyceae* species. About 31 algal species and 17 zooplankton species are recorded from all the sampling locations. The list of recorded planktonic flora from study area and zooplankton is presented in the Table.

TABLE – 3.21
AQUATIC PLANTS REPORTED FROM THE STUDY AREA

S. No.	Scientific Name	Family	Distribution Status
1	*Alternanthera philoxeroides*	Solanaceae	Predominant
2	*Aponogeton natans*	Aponogetonaceae	Common
3	*Azolla pinnata*	Azollaceae	Scattered and common
4	*Brachiaria mutica*	Poaceae	Sporadic
5	*Carex cruciata*	Cyperaceae	Occasional
6	*Centella asiatica*	Apiaceae	In localized patches
7	*Chrysopogon aciculatus*	Poaceae	Occasional
8	*Colocassia esculenta*	Araceae	Occasional
9	*Cynodon dactylon*	Poaceae	Extensive and widespread
10	*Cyperus arenarius*	Cyperaceae	Locally abundant
11	*Cyperus exaltatus*	Cyperaceae	Locally abundant
12	*Echinochloa colona*	Poaceae	Occasional
13	*Echinochloa stagnina*	Poaceae	Occasional
14	*Eichhornia crassipes*	Pontederiaceae	Extensive and widespread
15	*Hydrilla verticillata*	Hydrocharitaceae	Prevalent
16	*Ipomoea aquatica*	Convolvulaceae	Extensive and widespread
17	*Ludwigia perennis*	Onagraceae	Occasional
18	*Marsilia quadrifoliata*	Marsiliaceae	Very common Pteridophyte

S. No.	Scientific Name	Family	Distribution Status
19	*Nelumbo nucifera*	Nelumbiaceae	Very common
20	*Nymphaea nauchali*	Nympheaceae	Widely scattered
21	*Nymphoides hydrophylla*	Nympheaceae	Scattered
22	*Nymphoides indica*	Nympheaceae	Scattered
23	*Ottelia alismoides*	Hydrocharitaceace	Widely scattered
24	*Oxalis corniculata*	Oxalidaceae	Occasional
25	*Paspalidium geminatum*	Poaceae	Common
26	*Phragmites karka*	Cyperaceae	Dominant along boundaries
27	*Pistia stratoides*	Araceae	Widespread
28	*Salvinia auriculata*	Salviniaceae	Widespread
29	*Salvinia cucullata*	Salviniaceae	Common
30	*Typha angustata*	Typhaceae	Extensive and widespread
31	*Vallisneria spiralis*	Hydrocharitaceae	Widespread

data collected through interactions with local elderly personnel and forest officials of respective forest ranges

3.5.5.2 FISHES IN KRISHNA RIVER

The list of fishes found in Krishna River stretch within 10 km radius are givenbelow:

TABLE – 3.22

LIST OF FISHES REPORTED IN STUDY AREA

S. No.	Common name	Latin name	IUCN Status	IW(P)A, 1972, Schedule
1	Catla catla	Catla	LC	IV
2	Labeo rohita	Rohu	LC	IV
3	Channa striatus	Murrel	LC	IV
4	Channa punctatus	Murrel	LC	IV
5	Wallago attu	Wallago	LC	IV
6	Mastecembalus armatus	Spiny eel	LC	IV
7	Macrobrachium rosenberghii	Prawn	LC	IV
8	Macrobrachium malcolmsonii	Prawn	LC	IV
9	Silonia silonia	Silonia	LC	IV
10	Etroplus suratensis	Pearl spot	LC	IV
11	Glossogobius giuris	Gobids	LC	IV
12	Platycephalus sp.	Gobids	LC	IV
13	Mystus vittatus	Cat fish	LC	IV
14	Hetyeropneustes fossilis	Cat fish	LC	IV

3.6 SOCIO ECONOMIC ENVIRONMENT

A detailed Primary Survey and Focus Group Discussions (FGD) was carriedout by Centre for Management and Social Research Development (CMSRD), Hyderabad. BSET has toured the villages and collected specific socio economic aspects by conducting FGD.

3.6.1 PRIMARY SURVEY

The primary survey conducted by Centre for Management and Social Research Development, Hyderabad is presented below:

- To generate a baseline profile of the villages neighboring the project site and detailing the existing community infrastructure facility;
- To generate a profile of accessibility and availability of basic amenities such as schools, colleges, ITI, Polytechnics, health facility, water facility, transport facility, roads, recreation facility etc in the identified villages;
- To generate a baseline skill profile of the local population;
- To provide details of income generation and employment programmes and schemes implemented locally by the concerned administrative setup;
- To generate a baseline of skill upgradation and training programmes implemented locally;
- To generate a baseline of institutions that provide the skill development and training for income generation;
- To verify the presence of vulnerable groups such as widows, SC/ST, disabled, women headed etc., among the affected land owners;

The study covered 41 habitations falling under 2 Mandals (Damercherla and Tripuraram) and 18 Gram Panchayats within the vicinity of the project site located in the core zone area, that is, within 10 km radius of the plant. The list of villages was finalized after a preliminary field visit and consultations with the local people and the Executive Engineer. An average sample of 10 households with the actual sample depending on the size of the habitation was selected from each location for the socio-economic

household survey. Thus a total of 405 households were covered under this study.

Multistage stratified random sampling method was adopted in selecting the households for the socio-economic survey. The selection of the households was based on criteria such as large farmers (high income households), medium farmers (middle income households) and low income households (BPL Households) and social status such as SC/ST/OBC.

3.6.1.1 RECONNAISSANCE FIELD VISIT

The study team of CMSRD made a preliminary visit to the plant site and the surrounding locations on March 25th 2016. The preliminary field visit was aimed at familiarizing with the study locations, to interact with the local community members, to identify the villages falling within the 10 kms radius of the plant, to inform and prepare the local public for the field survey to be launched soon.

The secondary purpose of the site visit was to get a sense of basic socio-economic conditions of the villages in the core zone that would be helpful in preparing the study instruments (such as questionnaires and checklists) and plan survey logistics. The following villages have been selected based on our field visits and consultations with the communities and the client.

Coverage:

Gram Panchayats	**Hamlets**
Damercherla Mandal	
Damercherla	Rajagattu, Veerabhadrapuram
Veerlapalem	Sath Thanda, Dubba Thanda
Verrappagudem Erikagudem	
Adavidevulapalli	Vadderagudem
Mudimanikyam Narsapuram	
Thimmapuram	Putlagadda, Padamata Thanda, Thurpu Thanda
Kallepalli Bothapalem	

Gram Panchayats	Hamlets
Ulshaipalem	Bangarugadda, Kalava Katta, Indira Nagar, Gandhi Nagar
Vadapalli Dilawarpur	
Kondrapol	Rallavagu Thanda
Champla Thanda	Jilakarakunta Thanda, Gonia Thanda, Banjara Thanda
Tripuraram Mandal	
Appallamma Gudem	Lokia Thanda, Sitya Thanda,
Donka Thanda	Badaigadda
Ragadapa	Kunkudichettu Thanda, Pedda Thanda, Meetia Thanda

3.6.2 OVERVIEW OF THE SURVEY AREA

Dameracherla is a Mandal in Nalgonda District of Telangana State, India. Dameracherla Mandal Head Quarters is at Damercherla town. It belongs to Telangana region. It is located 62 KM towards East from District head quarters, Nalgonda.

Dameracherla Mandal is bounded by Miryalaguda Mandal towards North, Nereducherla Mandal towards North, Dachepalle Mandal towards South, Gurazala Mandal towards South. Miryalaguda City, Macherla City, Suryapet City, Kodad City are the nearby Cities to Dameracherla.

Dameracherla consists of 90 Villages and 24 Panchayats. Irkigudem is the smallest Village and Dameracherla is the biggest Village. It is in the 91 m elevation (altitude). This Place is in the border of the Nalgonda District and Guntur District. Guntur District Gurazala is South towards this place. It is near to the Andhra Pradesh State Border.

The nearest town is Miryalaguda which is about 20 km from the site. The nearest railway station is Vishnupuram which is 5 km away from the plant. Nearest airport is Hyderabad which is about 135 km away from site. Water requirement for this project is planned to be drawn from Krishna river which is located at a distance of about 3 km.

The proposed Thermal Plant is situated in Veerlapalem village, Dameracherla mandal, Nalgonda district. The study area is surrounded by Adavidevulapalli (10 km), Appalammagudem (8 km), Badaigadda Thanda (7 Km), Bangarigadda Thanda (8 Km), Banjara Thanda (7 km), Bottalapalem (8 Km), Champala Thanda (8 km), Damercherla (6 km), Dilawarpur (10 km), Donka Thanda (4 km), Irikagudem (4 km), Gandhi Nagar (6 km), Gonya Thanda (7 km), Indira Nagar (10 km), Jilakarakunta Thanda (8 km), Kallepalli (5 km), Kalvakatta (6 km), Kondrapole (9 km), Kunkuduchettu Thanda (9 km), Lokya Thanda (9 km), Malabandu (7 km), Mudhimanikyam (5 km), Narsapuram (3 km), Padamati Thanda(6 km), Pedda Thanda (8 km), Pittalagadda Thanda (5 km), Ragadapa (9 km), Rajagattu (5 km), Rallavagu Thanda (9 km), Sath Thanda (2 km), Sithya Thanda (8 km), Shanthi Nagar (3 km), Veerappagudem (2 km), Timmapuram (6.5 km), Toorpu Thanda (5 km), TV Gudem (2 km), Ulshaipalem (8 km), Vadapalli (8 km), Vadderagudem (8 km), Veerlapalem(3 km). All the villages of survey area fall under two mandals namely Damercherla and Tripuraram.

The survey area consists of 41 habitations within 10 km around the YTPS. Most of the villages are connected by roads with Miryalaguda Mandal head quarter, the most preferred town which has an Area Hospital, urban market and various educational institutions. The study area is also connected with railway station at Miryalaguda.

The habitations of these relatively thinly populated areas are well-connected with roads and government transport, especially those located on the roadside; but the approach roads leading to a couple of villages are unpaved (kutcha).

The area is predominantly inhabited by the Scheduled Tribes and Schedule Castes apart from Backward Castes and Other Castes. The local economy is predominantly agricultural with irrigated farming being the norm; and most farmers are small land holders. 80% of the labour force depends on the agriculture with a daily wages of Rs. 150-200 for females and Rs.200-300 for males. During the lean period people tend to go to NREGA works for

about two months. With little diversification into non-farm activities, casual and regular work in the nearby towns, auto driving and construction work are the most important form of non-farm activities supplementing land-based activities. Women mostly work as agriculture laborers.

Agriculture in this zone is very low due to un-assured irrigation; in most villages farmers cultivate their lands under rain fed conditions. Only few thandas have irrigation facility from Tungapahad vagu. Two villages are cultivating their lands through lift irrigation from Krishna River. Therefore the area is predominantly sown under Non- irrigated conditions with high-value crops such as Paddy, Green Gram, Black Gram, Pigeon Pea, Cotton and *Mirchi* in two seasons. Major agriculture season is Khariff in the study area.

However, the integration of the area with the mainstream economy has picked up momentum over the past few years or so owing to improvements in infrastructure (state high way), industrialization, private transport (auto rickshaws and two-wheelers), an increasing number of government welfare schemes and communications (cell phones). However, in terms of Infrastructural facilities such as internal roads, Drinking Water, education, sanitation and health facilities the study area needs to be developed a lot. The area is lagging behind in terms of technical education and employment opportunities.

3.6.3 FOCUS GROUP DISCUSSIONS (FGD)

Extensive consultations were held by Centre for Management and Social Research Development, Hyderabad with the local communities and other stakeholders in an effort to identify community needs and priorities for designing and implementing CSR initiatives. The participatory stakeholder consultative processes involved tools such as village level open meetings, Focussed Group Discussions (FGDs), key informant interviews (KIIs) and transact walks and visits to personally ascertain the status of infrastructure and other facilities that are available in each of the villages in the project area. Other stakeholders whom

the study team consulted both at the village and Mandal levels are: elected representatives, government officials, teachers and other government and semi-government functionaries working in the area such as Auxiliary Nurse Midwife (ANM)s, Asha workers and Anganwadi teachers. The following sections provide village wise key community development priorities that have been identified through a consultative process.

3.6.4 VILLAGE WISE PRIMARY SURVEY

3.6.4.1 VEERLAPALEM & HAMLETS: DUBBA THANDA AND SATH THANDA



Veerlapalem is a Gram Panchayat village and it has two hamlets. 1. Dubba Thanda and 2. Sath Thanda. It is situated approximately 3 km from the proposed YTPS by road.

The demographic profile of village is given below.

S.No	Name of the village	No of house holds	Total population	Male population	Female population	Caste prevalent
1	Veerlapalem	1094	4600	2400	2200	ST, SC, BC & OC
2	Dubba Thanda	60	300	160	140	ST community only
3	Satha Thanda	64	286	156	130	ST community only

Activity:

- Main economic activity of the population is agriculture.
- The secondary activity is farm wage labor for about 9 months.

- The normal daily wage rates for farm work are Rs 200-250 for women Rs. 300-350 for men during the season.
- During the local lean season, around 50% of the workers have MGNREGS job cards and work in the MGNREGS in their proximity for 100 days.

Cropping Pattern:

- Paddy and Chilly during Rabi season and Cotton, Green Gram, Black Gram and Pigeon pea during the Kharif season.
- Crops are grown under both Rabi and Kharif farming seasons.
- Main source of irrigation is through rain fed conditions.
- In Dubba Thanda the main source of irrigation is through Tungapahad Bandham vague.

Drinking Water





S .No	Name of village	Source	No.s		Usage	Availabilty	
			Hand Pumps	Tanks		Season	Lean season
1	Veerlapalem	Borewells handpumps & tanks	18	6	Drinking & washing	Adequate	scarcity
2	Dumpa Thanda	Borewells handpumps & tanks	5	1	Drinking & washing	Adequate	scarcity
3	Sath Thanda	Borewells handpumps & tanks	2	1	Drinking & washing	Adequate	scarcity

In Veerlapalem 90% of the houses are connected with electricity. In Dubba Thanda out of 60 houses 45 houses have electricity

supply. In Sath Thanda all the 48 houses have electricity connection. Street lights are available in all parts of the village.

In Veerlapelm village has *kutcha* approach road without proper side drains. 85% of Internal roads in the village are unpaved and *kutcha.* In Dubba Thanda approach road is *kutcha* but internal roads are CC. Sath Thanda has 100 mtrs CC approach road. There is no drainage system.



Shared autos and RTC buses are major source of transport for the villagers. There is access of RTC buses to reach this village from Damercherla. But it was observed that there is no RTC bus stop and shelter.

With regard to sanitation, Veerlapalem has 20% of villagers are having individual toilets. There are no community toilets. Dubba Thanda and Sath Thanda have no individual toilets. In Dubba Thanda, side drains are available on one side of the road. Drainage system is not available in these Thandas. People in these two Thandas tend to go for open defecation.





In Veerlapelm there are three Anganwadi centres functioning out of which, 2 are mini centers and one is major centre. Anganwadi centre has no own building and it has been functioning in rented building. In both the Thandas, mini Anganwadi centers are functioning in rented houses.

There is no health sub-centre functioning in the villages but Auxiliary Nurse Midwifery (ANM) visits the village once in a week.

For major treatments villagers go to private and government health facilities at Miryalaguda.
Health checkups are organized once a month by 104 mobile health facilities in Dubba Thanda and Sath Thanda and they feel that there is no shortage of medicines. It was reported that 108 ambulance facilities is also available within half an hour in case of any medical emergency. The common diseases prevailing in the Veerlapalem village are typhoid, malaria, joint pains and diabetic and heart problems. In Dubba Thanda, common diseases are dengue, malaria and typhoid. In Sath Thanda common disease are blood pressure, malaria, typhoid, jaundice and platelets. There is a veterinary hospital in the Veerlapalem village.

There are 96 Self Help Groups in Veerlapalem village, 8 in Dubba Thanda and 7 in Sath Thanda. Their activities are small savings, group lending and using for crops purpose. The borrowed money is mostly used for purchasing livestock and agriculture purpose.

All the government welfare schemes such as Indiramma housing scheme, widow pensions, old age pensions, physically handicapped(PHC) pensions and MGNREGS are being utilized by the villagers

Name of The Village	Aged	PHC	Widows
Veerlapalem	264	57	202
Dubba Thanda	7	6	10
Sath Thanda	30	2	7

Most of the unemployed youth go to agriculture labour and stone cutting work. The highest educational qualification in the village is MA BEd.





There are two primary schools and ZP High School functions in one compound. ZP high schools offers education from 6th up to 10th standard and the two Primary schools offers education upto 5th standard in Veerlapalem village. The school has a compound wall on three sides. Basic facilities such as benches, Drinking Water and toilets are found adequate. There are no schools in both Dubba Thanda and Sath Thanda.

3.6.4.1.1 *NEEDS & DEVELOPMENT PRIORITIES - VEERLAPALEM*

- Drinking Water facility by providing water purifying plant
- Community Hall
- Hospital/Primary Health Center
- Provision for individual toilets
- Construction of Library Building
- Renovation of street lights
- Internal CC road 3 to 4 KM with drainage.
- Anganwadi building repair.
- School compound wall 200 mtrs, toilets for boys and girls
- Racks, tables, chairs and computers (20 Nos) for school
- Tree gaurds 15 Nos
- Playground and playing material for the children.
- 6 chairs and 15 benches for one primary school
- 20 benches, 10 chairs and lunch plates 100 and water glasses 100 no.s

3.6.4.1.2 *NEEDS & DEVELOPMENT PRIORITIES - DUBBA THANDA*

- BT road 500 mtrs from PWD road to Dubba Thanda
- Internal CC roads 2.5 kms
- Drinking Water facility
- Construction of temple
- Construction of Primary School building
- Bus stop at PWD road
- PHC and Veterinary hospital building
- Street lights on both sides of the road (10 Nos)

3.6.4.1.3 *NEEDS & DEVELOPMENT PRIORITIES - SATH THANDA*

- Drinking Water facility
- Internal CC roads 3 kms
- Street lights (10 Nos)
- Construction of primary school building
- Temple construction
- Individual toilets

PHOTOGRAPHS OF CONSULTATIONS HELD



Consultations with Community in Dubba Thanda



Consultations with Community in Sath Thanda




Consultations with Community in Veerlapalem Panchayat Office

3.6.4.2 MUDIMANIKYAM



Mudimanikayam is Gram Panchayat (GP) village and it has no hamlets and is approximately 7km from the proposed YTPS site by road.

The demographic profile of village is given below.

Name of the village	No of house holds	Total population	Male population	Female population	Caste prevalent
Mudimanikayam	535	1879	961	918	BC, SC, and OC

Activity:

- ❖ The main economic activity is agriculture.
- ❖ The second important source of income is farm wage labor and stone cutting supporting the workers.
- ❖ The normal daily agriculture wage rates for farm work are Rs 200-250 for men and Rs 100-150 for women during the season.
- ❖ During the local lean season, all the agriculture wage laborers work in the Mahatma Gandhi National Rural Employment Gurantee scheme (MGNREGS) in their proximity for 100 days.

Cropping Pattern:



Most of the farmers grow cotton, pigeon pea, Chilly, black gram, jowar during the Kharif which is the main farming season for this village.

Drinking Water

Name of village	Source	No.s Hand Pumps	Usage	Availabilty	
				Season	Lean season
Mudimanikayam	Borewells handpumps	4	Drinking &washing	Adequate	Scarcity





80% of the houses are electrified. Working Street lights are available in all parts of the village. The village has BT approach road for 500 meters without any side drains. At five places, Internal roads are CC and remaining places roads are unpaved and *Kutcha.*

Autos are major source of transport for the villagers. RTC buses do not cover this village.



With regard to sanitation, only 15 houses have individual toilets and there are no community toilets. Drainage is not available in the village. People tend to go for open defecation. There are two

Anganwadi centres functioning in the village. One of the Anganwadi center has own building. There is no health sub-centre functioning in the village but ANM visits the village once in a month.Villagers are to visit Miryalaguda or Hyderabad for any casuality .

Health checkups are organized once in a month by 104 mobile health facility and medicines are provided. 108 ambulance facilities are readily available in case of any medical emergency. As no veterinary hospital is there in the village, Adavidulapalli veterinary hospital is resorted.

There are 32 active women's self-help groups (SHGs) existing in the village. Their activities are small savings, in-group lending and using for crops purpose. The borrowed money is mostly used for purchasing household and agriculture purpose.

Name Of The Village	Aged	PHC	Widows
Mudimanikayam	96	22	32

520 people are benifited by MGNREGS . Unemployed youth are around 450 who go to farm wage labor and non-farm wage labour work (stone cutting). Post Graduation is the highest educational qualification acquired in the village.

There is a primary school up to 7th standard. The school has no compound wall and facilities such as benches, Drinking Water and toilets are found inadequate. For higher studies, students go to ZPHS Adavidevulapalli.

3.6.4.2.1 NEEDS & DEVELOPMENT PRIORITIES - MUDIMANIKYAM

- Drinking Water facility (Mineral Water Plant)
- Internal CC road 4 to 5 KM with drainage facility
- BT road from Mudimanikaym to TV Gudem (5 km)
- Hospital (PHC)
- Veterinary Hospital
- Temple consultation
- Community hall

- Basic facilities in school (Compound wall, benches (50), tables (6), Chairs (20), fans (6) stationery and books (600 Nos), Computer s 2, projector 1, Drinking Water, toilets, etc.
- Training on Income Generation Activity for local youth and women
- Library
- Individual toilets (400)
- Compound wall for GP office
- Burial ground
- Repairing of the road from Mudimanikyam to Adavidevalupalli village

PHOTOGRAPHS OF CONSULTATIONS HELD













3.6.4.3 ADAVI DEVULA PALLI



Adavi devula palli is a GP villages and is 8km from proposed YTPS by road.

The demographic profile of village is given below.

Name of the village	No of house holds	Total population	Male population	Female population	Caste prevalent
Adavi Devula Palli	2146	8226	4221	4005	SC, BC & OC

Activity:

- The main economic activity of the population is agriculture and agriculture labor.
- The other important source of income is business.
- The normal daily wage rates for farm work are Rs 150 for women and Rs 200-250 for men during the season.

- During the local lean season most of the wage laborers (120 groups) work in the MGNREGS in their proximity for 100 days.

Cropping Pattern

- Most of the farmers grow Paddy, Cotton and Chilly in Rabi and Kharif seasons.
- Main source of irrigation is Krishna river





Drinking Water

Name of village	Source	No.s Hand Pumps	Usage	Availabilty	
				Season	Lean season
Adavi devula Palli	Borewells, Krishna River	30	Drinking &washing	Adequate	Scarcity

All the houses are electrified. Street lights are available in all parts of the village. The village has BT approach road for 500 meters without any side drains. Internal roads are unpaved and Kutcha.

RTC buses and autos meet the transport requirement of villagers to reach upto Miryalaguda.

About 650 households have individual toilets and there are no community toilets. Drainage lacks maintenance,. People tend to go for open defecation. There are 5 Anganwadi centres and a health sub-centre functioning in the village and only ANM visits the village daily.

Health checkups are organized once in a quarter by 104 mobile health facilityand provide with the medicines. It was reported that 108 ambulance facility is also readily available. The common diseases prevailing in the village are Malaria, dengue, platelets, cough, asthma and joint pains. There is a veterinary hospital in the village.

There are 80 active women Self-Help Groups (SHGs) existing in the village. Their activities are small savings, tailoring, in-group lending and using for crops purpose..
Unemployed youth are around 2000 who are going to farm wage and non-farm wage labor work (Stone cutting).

Name Of The Village	Aged	PHC	Widows
Adavi devula Palli	326	58	216

There is a High school upto 10th standard with adequate facilities.

3.6.4.3.1 NEED & DEVELOPMENT PRIORITIES - ADAVI DEVULA PALLI

- Drinking Water for entire village (Mineral Water Plant)
- CC roads 10 km
- Individual toilets
- Computer training center for youth
- Library
- Income Generation Activity for 800 unemployed youth
- Construction of toilets and Drinking Water at bus stop.
- Building for junior college and ITI
- Primary Health Care Centre
- Construction of Temple
- Trycycles for 100 numbers of Physically handicapped persons
- SC Colony
- Community Hall
- CC roads with drainage 500 mtrs.
- Tricycles for Handicapped 20 persons
- Burial ground
- Home for old age people

PHOTOGRAPHS OF CONSULTATIONS HELD IN ADAVI DEVULA PALLI








3.6.4.4 IRKIGUDEM

Irkigudem is a GP village and it is situated approximately 4 km from YTPS by road.

S.No	Name of the village	No of house holds	Total population	Male population	Female population	Caste prevalent
1	Irkigudem	557	1760	863	897	ST, SC, BC & OC

Activity:

- The main economic activity of the village is agriculture and agriculture labour
- Another important source of income is non-farm wage labour in India Cement Limited.
- The normal daily wage rates for farm work are Rs 250-300 for men and Rs 150-200 for women during the season.
- During the local lean season, around 52 groups work in the MGNREGS for 100 days. Per day about Rs 70 – 80 income is generated to MGNREGS.

Cropping Pattern:

- Most of the farmers grow Paddy and Chilly
- During Rabi season, Chilly and vegetables are cultivated and during Kharif, Paddy and Chilly are cultivated.
- Main source of irrigation is through Lift Irrigation from Krishna River.





Drinking Water

Name of village	Source	No.s		Usage	Availability	
		Hand Pumps	Tanks		Season	Lean season
Irkigudem	Krishna River &tanks	0	1	Drinking &washing	Adequate	scarcity

All the houses are electrified. Street lights are available in all parts of the village (90%). The village has a very good BT approach road.

Internal roads are also CC roads in all the parts of the village (80%).

RTC buses reach to Miryalaguda from this village. There is no RTC bus shelter in the village.



With regard to sanitation, 30% of households have individual toilets and there are no community toilets. Drainage system is not available in the village. People tend to go for open defecation. There are two Anganwadi centres functioning in the village. . ANM visits the village 15 days in a month. For major treatments villagers go to Miryalaguda, Damercherla, Guntur and Hyderabad.

108 ambulance facility is provided. The common diseases prevailing in the village are Malaria, Typhoid, and fever.



There are 42 active women's Self-Help Groups (SHGs) existing in the village. Their activities are small savings, tailoring, in-group lending and using for crops purpose.

All the government welfare schemes such as Indiramma housing scheme, widow pensions (80), old age pensions (100), physically handicapped pensions (13) and MGNREGS (52 groups) are being utilized by the villagers. Unemployed youth are around 176 who are going to labor work with highest education qualification in Post Graduation.

There is a High school upto 8th standard with all facilities

CASE STUDIES OF SOME OF THE SELF HELP GROUP MEMBERS WHO ARE DOING PETTY BUSINESS IN IRKI GUDEM



Kanakam Venkataramana, W/O Adinarayana, Age 45. Running kirana store with the financial assistance from SHGs. Earning Rs 300-400 per day.



L. Amaralingamma, D/O China Nagaiah, Age 25 yrs. Handicapped. Running a Kirana Store with the financial assistance from SHGs. Earning Rs 300-400 per day.



L Samrajyam, W/o Ramaiah, Age 50. Running a Kirana Store with the financial assistance from 2 years. Earning Rs 300-400 per day.



Puramchetty Lakshmi, W/O Venkateshwarlu, Age 35. Running a Kirana, Cloth and Tailoring for the last one and half years. Earning Rs 200-300 per day.

3.6.4.4.1 *NEEDS & DEVELOPMENT PRIORITIES - IRKIGUDEM*

- Mineral water plant (RO) for drinking purpose
- Individual toilets for 250 houses
- Hospital/Primary Health Center
- CC roads with drainages 2 Km
- Community hall
- Library building
- Training on Income Generation Activity for local youth around 150 persons.
- Drainage 2 kms
- Gravel road to reach farm fields from Gagamma Temple to Drinking Water pump house (750 mts)
- Gravel road Kamatam Shekar to Lift Irrigation Pump house 1 km
- Gravel road from Potla Nageshwar rao house to Muthavarapu Nageshwar rao farm field 2 kms
- Gravel road from Gram Panchayat's RWS road to Bayya Basavaiha farm field 2.5 km.
- Gravel road from Gollavani Kunta to Kanakam Gopaiah's farm field 1 km
- Gravel road from Gollavani Kunta to Kotika Kistaiah's farm field 500 mtrs
- Gravel road from Dakshineni Venkateshwarlu farm field to Bhadavasala Kalava 1 km
- Gravel road from Gunda Veera Raghava Rao farm field to Kotika Kondaiah's farm field 1 km
- Gravel road from Golla Kunta to Degala Managalagiriah's farm field 1 km
- Construction of Temple
- Renovation of dais in the village
- Renovation of Mutyalamma Temple
- Construction of veterinary hospital

PHOTOGRAPHS OF CONSULTATIONS IN IRKIGUDEM VILLAGE









3.6.4.5 VEERAPPAGUDEM

Veerappagudem is a GP village of Damercherla Mandal it is adjacent to proposed YTPS.

S.No	Name of the village	No of house holds	Total population	Male	Female	Caste prevalent
1	Veerappagudem	721	2526	1291	1231	ST, SC, BC & OC

Activity:

- The main economic activity of the population is agriculture, agriculture labor and Taddy.
- The normal daily wage rates for farm work are Rs 300 for men and Rs 200 for women during the season.

- ❖ During the local lean season, around 50 groups of wage laborers work in the MGNREGS in their proximity for 100 days.
- ❖ Through MGNREGS the earnings of this labour will be Rs.70-80 perday.

Cropping Pattern:

- ❖ Most of the farmers grow Cotton and Chilly.
- ❖ Kharif is the farming season. Main source of irrigation is rain.

Drinking Water

Name of village	Source	No.s		Usage	Availability	
		Hand Pumps	Tanks		Season	Lean season
Veerappagudem	Borewells handpumps &tanks	8	1	Drinking &washing	Adequate	scarcity

All the houses are connected with electricity, and with street lights. The village has BT road approach without any side drains. Internal roads are unpaved and *Kutcha*. Only 30% of the internal roads are CC and paved.

RTC buses and Autos reach to Miryalaguda and Damercherla from this village. .

With regard to sanitation, 100 numbers of households not have individual toilets and there are no community toilets. Drainage is not available in the village. People tend to go for open defecation. There are three Anganwadi centres functioning in the village. There is no health sub-centre functioning in the village but ANM visits the village once in a month. For major treatments villagers go to private and government hospitals in Miryalaguda.

Health checkups are organized once a month by 104 mobile health facilities and provide medicines. 108 ambulance facilities are also readily available. The common diseases prevailing in the village are

Malaria, Typhoid and Platelets etc.They take animals to Damercherla veterinary hospital (5km)

There are 45 active women's Self-Help Groups (SHGs) existing in the village. Their activities are small savings, in-group lending and using for crops purpose.

All the government welfare schemes such as Indiramma housing scheme (300), widow pensions (98), old age pensions (155), physically handicapped pensions (47) and MGNREGS (50 groups) are being utilized by the villagers. Unemployed youth are around 250 who are going to farm wage and non-farm wage labor work. Having highest education qualifications is Post Graduation.

There is a high school up to 8th standard with all facilities. After 8th students go to ZPHS Damercherla.. For higher education students go to Miryalaguda.

3.6.4.5.1 NEED & PRIORITIES - VEERAPPAGUDEM

- Drinking Water through RO plant
- Individual Toilets 500
- CC roads with drainages 4 kms
- Training on Income Generation Activity for local youth and women
- Veterinary hospital
- Lift Irrigation facility from Krishna River
- Construction of Temple
- Provision of Health cards to avail medical treatment in YTPS hospital
- Construction of Library building
- Financial assistance for poor and widows
- CC Retention wall to prevent from floods Irkigudem road to Ura Cheruvu
- Mini water tanks (5 Nos)
- Renovation of electrical lines and provision of 3 phase transformer
- Burial grounds for BC and SC community
- Construction of metal road 3 kms

3.6.4.6 KALLEPALLI & HAMLET: SHANTINAGAR



Kallepalli is a GP village which comes under Damercherla Mandal and it is 5km from YTPS by road. It has one hamlet namely Shantinagar.

Name of the village	No of house holds	Total population	Male population	Female population	Caste prevalent
Kallepalli & Hamlet	772	2942	1507	1435	ST, SC, BC

Activity:

- The main economic activity of the population is agriculture labour.
- The normal daily wage rates for farm work are Rs 250 for men and Rs 150 for women during the season.
- During the local lean season, all the wage laborers work in the MGNREGS (56 groups) in their proximity for 60 days. Earnings will be Rs 100-200 per day.

Cropping Pattern:

- Most of the farmers grow Cotton, Paddy, Chilly and Pigeon pea.
- Main source of irrigation is through rains.

Drinking Water

Name of village	Source	Nos		Usage	Availability	
		Hand Pumps	Tanks		Season	Lean season
Kallepalli & Hamlet	RO plant Borewells handpumps & tanks	47	5	Drinking & washing	Adequate	scarcity



80% of the houses are connected with electricity with street lights also .The village has CC approach without any side drains. Some Internal roads are unpaved and *Kutcha* roads. Only 20% of the internal road is CC.

RTC buses reach to Miryalaguda from this village.

With regard to sanitation, 30 numbers of households have individual toilets and there are no community toilets. Drainage is not available in the village. People tend to go for open defecation. There are two Anganwadi centres functioning in the village. ANM visits the village daily. For major treatments villagers go to private and government hospitals in Miryalaguda.



Health checkups are organized once in three months by 104 mobile health facility with medicines. 108 ambulance facility is also readily available. The common diseases prevailing in the village are Malaria, typhoid, platelets, etc. There are 56 Groups of active women's self-help groups (SHGs) existing in the village. Their activities are small savings, in-group lending and using for crops purpose. The borrowed money is mostly used for household needs and agriculture purpose.

All the government welfare schemes such as Indiramma housing scheme, widow pensions (42), old age pensions (92), physically handicapped pensions (16) and MGNREGS (56) are being utilized by the villagers. Unemployed youth are around 250 who go to labor work. The highest education qualification in the village is M.Tech.

There is one primary schools and one high school in the village. With all facilities. For higher education students go to Miryalaguda, Guntur and Hyderabad.



3.6.4.6.1 *NEEDS & DEVELOPMENT PRIORITIES - KALLEPALLI*

- Internal CC roads with side drains 3 km
- Drinking Water through RO plants
- Community hall
- Individual toilets
- Library
- Construction of Temple

Development Priorities Identified In Shantinagar Hamlet Of Kallepalli

- CC roads with drainage 2km
- Compound wall for Ramalayam temple
- RO plant for Drinking Water
- Individual toilets (25)
- Old age pensions (10)

PHOTOGRAPHS OF CONSULTATIONS IN KALEPALLI VILLAGE









3.6.4.7 BOTHALAPALEM

Bothalapalem is a GP village under Damercherla mandal. It is situated approximately 8 kms from proposed YTPS by road.

Name of the village	No of house holds	Total population	Male	Female	Caste prevalent
Bothalapalem	482	1888	954	934	ST, SC, BC & OC

Activity:

- The main economic activity of the population is agriculture and agriculture labor.
- The normal daily wage rates for farm work are Rs 200-300 for men and Rs 200 for women during the season.
- During the local lean season, around 53 groups of wage laborers work in the MGNREGS in their proximity for 60 days.

Cropping Pattern:

- Paddy under Rabi season and Mandarin(*Bathai)* in Kharif season
- The main source of Irrigation is sagar canal water and bore wells

Drinking Water

S .No	Name of village	Source	No.s Hand Pumps	Usage	Availabilty	
					Season	Lean season
1	Bothalapalem	Krishna River Borewells handpumps	9	Drinking & washing	Adequate	scarcity

All the houses are connected with electricity with streetlights the village has BT approach road without proper side drains. 50% of the internal roads are CC.

RTC buses and autos reach to Miryalaguda and to SH2 road.

With regard to sanitation, 50% of households have individual toilets and there are no community toilets with no proper drainage system. There are two Anganwadi centres functioning in the village. ANM visits the village daily. For major treatments villagers go to private and government hospitals in Miryalaguda.

Health checkups are organized twice a month by 104 mobile health facility and they feel that there is no shortage of medicines. It was reported that 108 ambulance facilities is also available within a 20 minutes in case of any medical emergency. The common diseases prevailing in the village are Fevers like Dengue, and Joint Pains etc.

There are 48 active women Self-Help Groups (SHGs). Their activities are small savings, in-group lending and using for crops purpose.

All the government welfare schemes such as Indiramma housing scheme (250), widow pensions (108), old age pensions (72), physically handicapped pensions (46) and MGNREGS (53) are being utilized by the villagers. Unemployed youth are around 200 who are going to agriculture labor work. The highest education qualification in the village is M.Tech.

There is a Primary school in this village which offers education upto 7th standard. And for high school education students go to Damercherla ZPHS. For higher education students go to Miryalaguda and Hyderabad.

3.6.4.7.1 NEEDS & DEVELOPMENT PRIORITIES - BOTHALAPALEM

- CC roads with drainages 4 kms
- Drinking Water
- Compound wall to the existing school, benches (20), chairs (10), Tables (5 Nos), TV (1) Computers (3) and Projector (1)
- Training on Income Generation Activity for local youth and women
- Veterinary hospital
- Compound wall to GP office
- Plantation and Tree Guards (20)
- Construction of Temple
- Provision of play ground

PHOTOGRAPHS OF CONSULTATIONS IN BOTHALAPALEM VILLAGE





3.6.4.8 DILAWARPUR



Dilawarpur is a GP village which comes under Damercherla Mandal and it is approximately 10km from proposed YTPS by road.

Name of the village	No of house holds	Total population	Male	Female	Caste prevalent
Dilawarpur	861	2232	1154	1078	ST, SC, BC & OC

Activity:

- The main economic activity of the population is agriculture.
- The second important source of income is agriculture labor.
- The normal daily wage rates for farm work are Rs 250 for men and Rs 200 for women during the season.
- During the local lean season, around 100% wage laborers work in the MGNREGS in their proximity for 100 days. Through MGNREGS laborers earn Rs. 80-90 per day.

Cropping Pattern:

- Most of the farmers grow Paddy under rainfed conditions during Kharif season
- During Rabi paddy is cultivated with the support of bore well water.

Drinking Water

Name of village	Source	No.s Hand Pumps	Usage	Availabilty	
				Season	Lean season
Dilawarpur	Borewells handpumps	10	Drinking & washing	Adequate	scarcity





All the houses are connected with electricity. Street lights are available in some parts of the village. The village has BT road approach without any side drains. Most of the internal roads are Unpaved and *Kutcha*.

RTC buses and shared Autos reach to Miryalaguda.



With regard to sanitation, around 100 numbers of houses have individual toilets and there are no community toilets with no proper drainage system. There is no health sub-centre but ANM visits the village once in a week. For major treatments villagers go to private and government hospitals in Miryalaguda, Narketpalli and Hyderbad. There is a veterinary hospital existing in the village.

Health checkups are organized once a month by 104 mobile health facility with medicines. 108 ambulance facilities is also readily available. The common diseases prevailing in the village are joint pains, fever, dengue, malaria, typhoid, hernia, etc.



There is a ZPH school up to 10th standard.with good facilities. There are 400 active women's Self-Help Groups (SHGs) in the village. Their activities are identical to nearby villages All the government welfare schemes such as Indiramma housing scheme, widow pensions (30), old age pensions (30), physically handicapped pensions (20) and MGNREGS (70 groups) are being utilized by the villagers. Unemployed youth are around 185 who are going to labor work.

The highest education qualification observed in the village is Post Graduation.

3.6.4.8.1 NEED & PRIORITIES - DILAWARPUR

- CC roads with side drains 2.5 kms
- Drinking Water through RO Plant
- Individual toilets for 300 Nos
- Construction of Anganwadi buildings 2 Nos
- Community hall
- Construction of Temple
- Hospital/Primary health center
- Construction of Market centre
- Training on Income Generation Activity for local youth and women
- Burial ground
- Electricity poles – 100 Nos

PHOTOGRAPHS OF CONSULTATIONS IN DILAWARPUR VILLAGE





3.6.4.9 DAMERACHERLA & HAMLETS: RAJAGATTU AND VEERBHADRAPURAM



Dameracherla is a GP and Mandal Head Quarters and it is at 7km from proposed YTPS by road. It is adjacent to the NAM SH-2 road. It has two hamlets namely; Rajaguttu and Veerabhadrapuram.

The demographic profile of village is given below.

Name of the village	No of house holds	Total population	Male	Female	Caste prevalent
Dameracherla & Hamlets	3291	13663	6841	6822	ST, SC, BC & OC

Activity:

- The main economic activity of the population is agriculture, agriculture labor, non-farm wager labour in The India Cements limited and business.
- The normal daily wage rates for farm work are Rs 300-350 for men and Rs 150-200 for women during the season.
- During the local lean season, around 100% wage laborers work in the MGNREGS (180 groups) in their proximity for 100 days. Earning per day is Rs.70-80.

Cropping Pattern:

- Most of the farmers grow Paddy, Mirchi, Pigeon Pea and Cotton during the Kharif season.
- During Rabi vegetables like tomato and watermelon is cultivated. Main source of irrigation is Krishna water

Drinking Water

Name of village	Source	No.s		Usage	Availabilty	
		Hand Pumps	Tanks		Season	Lean season
Dameracherla & Hamlets	Borewells handpumps &tanks	35	1	Drinking &washing	Adequate	scarcity

80% of the houses are connected with electricity with street lights. The village has BT approach road. 80% of the internal roads are Unpaved and *Kutcha*.

RTC buses reach to Miryalaguda



20% of households have individual toilets and there are no community toilets. There are four Anganwadi centers functioning in the village. . There is primary health center functioning in the village. ANM visits the village regularly. For major treatments villagers go to private and government health facilities in Miryalaguda, Guntur and Hyderabad.

108 ambulance facilities is also available on call. There is a veterinary hospital in the village.

There are 122 active women Self-Help Groups (SHGs) existing in the village. Their activities are similar to other villages.

All the government welfare schemes such as Indiramma housing scheme (450), widow pensions (426), old age pensions (470), physically handicapped pensions (56) and MGNREGS (180 groups) are being utilized by the villagers. Unemployed youth are around 1000 who are going to labor work. Highest education qualification among the youth is Post Graduation.

There is a high school upto 10th Standard with all facilities.

3.6.4.9.1 NEEDS & DEVELOPMENT PRIORITIES - DAMERACHERLA & VEERABHADRAPURAM

- Lift irrigation facility
- Training on Income Generation Activity for local youth and women through Skill Development Center
- Drinking Water facility
- CC road with drainage 6 kms
- Electricity lines
- Individual toilets – 800 Nos
- Construction of temples

- ❖ Construction of health facility
- ❖ Community Hall/Marriage hall
- ❖ Free medical camps twice in a year and distribution of medicines.
- ❖ Development of Veerlapalem road

3.6.4.9.2 NEEDS & DEVELOPMENT PRIORITIES - RAJAGATTU HAMLET

- ❖ Re-construction of existing school building
- ❖ CC road with drainage 2 kms
- ❖ Drinking Water facility
- ❖ Construction of primary health center
- ❖ Play ground
- ❖ Construction of Temple
- ❖ Individual toilets – 100 Nos
- ❖ Construction of Community Hall
- ❖ Training on Income Generation Activity for local youth and women - 120 Nos

3.6.4.9.3 NEEDS & DEVELOPMENT PRIORITIES - KGR COLONY

- ❖ CC road with drainage 3 kms
- ❖ RO Plants 3 Nos
- ❖ Community Halls – 4 Nos

PHOTOGRAPHS OF CONSULTATIONS IN DAMERACHERLA VILLAGE





3.6.4.10 CHAMPLA THANDA & HAMLETS: JILAKARAKUNTA THANDA, GONIA THANDA AND BANJARA THANDA.



Champla Thanda is a GP village which comes under Damercherla Mandal. It has three hamlets namely; Jilakarakunta Thanda, Gonia Thanda, Banjara Thanda.It is situated

The demographic profile of village is given below.

Name of the village	No of house holds	Total population	Male population	Female population	Caste prevalent
Champla Thanda & Hamlets	756	2692	1386	1306	ST, BC & OC

Activity:



The main economic activity of the population is agriculture. The second important source of income is agriculture labor. The normal daily wage rates for farm work are Rs 250-300 for men and Rs 100-200 for women during the season. During the local lean season, around 100% wage laborers work in the MGNREGS (50 Groups) in their proximity for 100 days. Per day the earnings will be Rs. 100-110 per day.

Cropping Pattern:

- Most of the farmers grow Paddy, Cotton and Mirch.
- Kharif is the main farming season.
- Main source of irrigation is through bore wells and wells.
- During Rabi season groundnut, greengram, black gram, etc is cultivated.

Drinking Water

Name of village	Source	Usage	Availabilty	
			Season	Lean season
Champla Thanda & Hamlets	Borewells	Drinking &washing	Adequate	scarcity



The main source of Drinking Water is bore wells in the village.

All the houses are connected with electricity in all the three villages with Street lights . In all the three villages there is BT approach road. In all the three villages 40% of the internal roads are Unpaved and *Kutcha*.



RTC buses reach to Miryalaguda None of households have individual toilets and there are no community toilets and no proper drainage. People tend to go for open defecation. There are Anganwadi centre functioning in the each village. There is no health sub-centre and ANM visits the village once in a week. For major treatments villagers go to private and government health facilities in Miryalaguda.



108 ambulance facilities are available on call. The common diseases prevailing in the village are malaria, typhoid and diabetes. There is no veterinary hospital in the village.

There are 20 active women's Self-Help Groups (SHGs) existing in the village. Their activities are small savings, tailoring, in-group lending and using for crops purpose.

All the government welfare schemes such as widow pensions (22), old age pensions (28), physically handicapped pensions (23) and MGNREGS are being utilized by the villagers. Unemployed youth are around 255 who are going to labor work. B.Tech is the highest educational qualification acquired in the village.

There is a primary school upto to 5th standard with no facilities. . Students go to Miryalaguda and Hyderabad for higher education.

3.6.4.10.1 NEEDS & DEVELOPMENT PRIORITIES - CHAMPLA THANDA & JILAKARAGUNTA THANDA:

- School building in Jilakaragunta Thanda
- Mineral water plant
- CC roads with drainages 2 km
- Water tank with a capacity of 60,000 ltrs with taps in Gonia Thanda
- Training on Income Generation Activity for local youth and women - 160
- Street lights – 5 Nos
- Library
- Bore wells – 6 Nos
- Bus stand
- Individual toilets – 400
- Godowns for storage – 3 Nos
- CC Roads upto lake – 200 mtrs

3.6.4.10.2 NEEDS & DEVELOPMENT PRIORITIES - BANJARA THANDA

- Drinking Water facility
- CC road with drainage – 2 kms
- Individual toilets
- Community Hall
- Street lights – 5 Nos
- Temple construction
- Anganwadi Building

PHOTOGRAPHS OF CONSULTATIONS IN CHAMPALA THANDA VILLAGE





3.6.4.11 NARSAPURAM VILLAGE



Narsapuram is a GP village which comes under Damercherla Mandal and it is at 5km from YTPS by road.

The demographic profile of village is given below.

Name of the village	No of house holds	Total population	Male population	Female population	Caste prevalent
Narsapuram	602	1763	865	898	ST, SC, BC & OC

Activity:

- ❖ The main economic activity of the population is agriculture.
- ❖ The second important source of income is agriculture labor. The normal daily wage rates for farm work are Rs 300-400 for men and Rs 200-300 for women during the season.
- ❖ During the local lean season, around 100% wage laborers work in the MGNREGS (60 groups) in their proximity for 100 days.

Cropping Pattern:

- ❖ Most of the farmers grow Cotton, Chilly and Paddy.
- ❖ Kharif is the main farming season. During Rabi season if bore wells are working paddy will be cultivated.
- ❖ Main source of irrigation is bore wells and rain.



Drinking Water

Name of village	Source	Usage	Availabilty	
			Season	Lean season
Veerlapalem	handpumps &tanks	Drinking & washing	Adequate	scarcity

All the houses are connected with electricity with street lights. The village has BT approach road. 60% of the internal roads are Unpaved and *Kutcha*.



Only shared Autos facility is available.

100 numbers of households have individual toilets and there are no community toilets. Drainage is not available in the village.

There is one Anganwadicentre and ANM visits the village once in month. For major treatments villagers go to private and government health facilities in Miryalaguda and Damercherla.

108 ambulance facilities is available within half an hour in case of any medical emergency. The common diseases prevailing in the village are fevers such as typhoid and Malaria.

There are 45 active women's Self-Help Groups (SHGs) existing in the village. Their activities are small savings, tailoring, in-group lending and using for crops purpose. The borrowed money is mostly used for purchasing live stock, children's education and agriculture purpose.

All the government welfare schemes such as Indiramma housing scheme (250), widow pensions(47), old age pensions (62), physically handicapped pensions(18) and MGNREGS (60 groups) are being utilized by the villagers. Unemployed youth are around 700 who are going to labor work. Highest education qualification is Post Graduation in the village.

There is Upper Primary school upto 7th standard with inadequate facilities.

3.6.4.11.1 *NEEDS & DEVELOPMENT PRIORITIES - NARSAPURAM*

- Drinking Water facility
- CC road with side drains 3 kms
- Training on Income Generation Activity for local youth and women
- Construction of temple
- Construction of Library building
- Renovation of GP office
- Veterinary Hospital
- Individual toilets – 300
- Health Facility
- Street lights – 10 Nos
- Road toward Peddamma Temple

PHOTOGRAPHS OF CONSULTATIONS IN NARSAPURAM VILLAGE





3.6.4.12 WADAPALLI (VAZIRABAD)



Wadapalli is a GP village which comes under Damercherla Mandal and it is 8km from YTPS by road.

The demographic profile of village is given below.

Name of the village	No of house holds	Total population	Male	Female	Caste prevalent
Wadapalli	2112	6952	3492	3460	ST, SC, BC & OC

Activity:

- The main economic activity of the population is agriculture and agriculture labour.
- Another important source of income for around 1000 members is casual labour in India Cements Limited.
- The normal daily wage rates for farm work are Rs 300-350 for men and Rs 150-200 for women during the season.
- During the local lean season, around 100% wage laborers work in the MGNREGS (58 groups) in their proximity for 100 days and earn Rs. 90 – 100 per day.

Cropping Pattern:

- Most of the farmers grow Cotton and Chilly during Kharif season.
- During Rabi only cotton is cultivated under rainfed conditions.

Drinking Water

Name of village	Source	No.s		Usage	Availabilty	
		Hand Pumps	Tanks		Season	Lean season
Wadapalli	Krishna River Borewells handpumps &tanks	2	1	Drinking &washing	Adequate	scarcity





All the houses are connected with electricity. Street lights are available in all parts of the village. The village has *Kutcha* approach road. New BT road is being constructed. 80% of internal roads are *pucca* CC roads

RTC buses and shared autos ply to reach Miryalaguda. 60% of households have individual toilets and there are no community toilets. Drainage is not available in the village. People tend to go for open defecation. There are five Anganwadi centre functioning in the village. Three Anganwadi centers have own buildings. There is a health sub-centre and ANM visits the village regularly. For major treatments villagers go to private and government health facilities in Miryalaguda, Narketpalli, Vazirabad and Dachepalli.

Health checkups are organized once a month by 104 mobile health facility, providing medicines. 108 ambulance facilities are also

available readily. The common diseases prevailing in the village are Typhoid, Malaria, TB, Platelets and Skin diseases.

There are 120 active women's Self-Help Groups (SHGs) existing in the village. Their activities are small savings, tailoring, in-group lending and using for crops purpose.

All the government welfare schemes such as Indiramma housing scheme (389), widow pensions (296), old age pensions(332), physically handicapped pensions (22) and MGNREGS (58 groups) are being utilized by the villagers. Unemployed youth are around 500 who are going to agriculture and non-farm wage labor work. The highest education qualification in the village is Post Graduation

There is one primary and high schools functioning in this village. For higher education students go to Miryalaguda, Hyderabad, Suryapet and Kodad.

3.6.4.12.1 NEED & DEVELOPMENT PRIORITIES - WADAPALLI (WAZIRABAD):

- Drinking Water facility with pipe line 2 km
- RO water plant
- Individual toilets-600
- Internal CC roads with side drains 4 km
- Veterinary hospital
- Training on Income Generation Activity for local youth and women-500
- Lift irrigation
- Temple compound wall (Lakshminarasimha Swamy temple)
- Renovation of Hanuman Temple
- Compound wall to PHC
- Burial ground
- Compound wall for minorities burial ground
- Marriage hall for Minorities
- Metal road – 2 km
- Construction of walls in Batist Churst and CSI church in SC colony

CONSULTATIONS IN WADAPALLI VILLAGE





3.6.4.13 KONDRAPOLU & HAMLET: RALLAVAGU THANDA



Kondrapolu is a GP village which comes under Damercherla Thanda and it is 9km from YTPS by road. This GP has Rallavagu Thanda.

Name of the village	No of house holds	Total population	Male population	Female population	Caste prevalent
Kondrapolu	550	2672	1351	1321	ST, SC, BC & OC

Activity:

- The main economic activity of the population is agriculture. The second important source of income is agriculture labor.
- The normal daily wage rates for farm work are Rs 300 for men and Rs 250 for women during the season.
- During the local lean season, around 100% wage laborers work in the MGNREGS (120 groups) in their proximity for 100 days and their wage rates will be Rs. 70-80 per day.

Cropping Pattern:

- Most of the farmers grow Paddy during Kharif and Rabi seasons.
- Main source of irrigation is through Sagar water canal and lake.

Drinking Water

Name of village	Source	No.s		Usage	Availabilty	
		Hand Pumps	Tanks		Season	Lean season
Kondrapolu	Borewells handpumps & tanks	60	1	Drinking &washing	Adequate	scarcity





All the houses are connected with electricity with Street lights. The village has BT approach road without any side drains. 65% of the Internal roads are unpaved and *Kutcha*.

RTC and shared autos are available to reach to Miryalaguda and other places from this village.

With regard to sanitation, 25% of households have individual toilets and there are no community toilets. Drainage facility is not available in the village. People tend to go for open defecation. There are three Anganwadi centres, one in Kondrapole and other two in Rallavagu Thanda which is functioning in school building. There is a health sub-centre functioning in the village and ANM visits the



village regularly. For major treatments villagers go to private and government health facilities in Miryalaguda and Hyderabad.

It was reported that 108 ambulance facilities is also available within 15 minutes. The common diseases prevailing in the village are Typhoid and Malaria.



There are 90 active women's Self-Help Groups (SHGs) existing in the village. Their activities are small savings, tailoring, in-group lending and using for crops purpose

All the government welfare schemes such as Indiramma housing scheme , widow pensions (302), old age pensions (342), physically handicapped pensions (56) and MGNREGS are being utilized by the villagers. Unemployed youth are around 250 who are going to labor work. The highest education qualification achieved in the village is Post Graduation.

There is a high school upto 10th Standard with all facilities.

3.6.4.13.1 *NEED & DEVELOPMENT PRIORITIES - KONDRAPOLU & RALLA VAGU THANDA*

- Drinking Water facility for 400 houses
- CC roads with drainages 4 kms.
- Training on Income Generation Activity for local youth and women
- Hostel building for high school students
- Library facility
- Bus shelter
- Individual toilets for 100 houses

3.6.4.14 THIMMAPURAM (PUTLAGADDA, PADAMATA THANDA, THOORPU THANDA)



Thimmapuram is a GP village which comes under Damercherla Mandal and it is 6.5 km from proposed YTPS by road.

The demographic profile of village is given below.

Name of the village	No of house holds	Total population	Male population	Female population	Caste prevalent
Thimmapuram	608	2286	1162	1124	ST, SC, BC & OC

Activity:

- The main economic activity of the population is agriculture.
- The second important source of income is agriculture labor.
- The normal daily wage rates for farm work are Rs 200-250 for men and Rs 100-120 for women during the season.
- During the local lean season, around 100% wage of laborers work in the MGNREGS (52 groups) in their proximity for 100 days and their wage rate is Rs. 60-100 per day.

Cropping Pattern:

- Most of the farmers grow Paddy and Cotton during the Kharif season.
- During Rabi season Chilly crop is being cultivated.
- Main source of irrigation is through lift irrigation from Tungapahad Bandham canal.





Drinking Water

S .No	Name of village	Source	No.s		Usage	Availabilty	
			Hand Pumps	Tanks		Season	Lean season
1	Thimmapuram	Borewells handpumps	4	0	Drinking &washing	Adequate	scarcity
2	Padamata Thanda	Borewells handpumps &tanks	4	1	Drinking &washing	Adequate	scarcity
3	Thoorpu Thanda	Borewells handpumps &tanks	8	1	Drinking &washing	Adequate	scarcity
4	Potlagadda	handpumps	6	0	Drinking &washing	Adequate	scarcity



All the houses are connected with electricity and has Street lights .All the four villages has BT approach road. In Thoorpu Thanda there are internal CC roads all over the village. In Padamata Thanda most of the internal roads are unpaved and *Kutcha. O*nly 50 mtrs of the internal CC road is paved. In Potlagadda internal CC roads are available only in one street.



Shared autos are major source of transport in Padamata Thanda. In Thimmapuram, Potlagadda and Thoorupu Thanda RTC buses and shared autos are there.

With regard to sanitation, in all the three villages there are no individual toilets and there are no community toilets. Drainage facility is not available in the village. People tend to go for open defecation.

Anganwadi centres are functioning in all the three villages. There is no health sub-centre functioning in the villages but ANM visits the village once in month in Padamata Thanda and Thimmapuram and once in 15 days in Thoorpu Thanda. For major treatments villagers go to private and government health facilities in Miryalaguda, Damercherla.



108 ambulance facilities is also available within one hour The common diseases prevailing in the villages are Malaria and Typhoid.

There are 50 active women's Self-Help Groups (SHGs) existing in all the four villages. Their activities are small savings, tailoring, in-group lending and using for crops purpose..

All the government welfare schemes such as Indiramma housing scheme (180), widow pensions (38), old age pensions (69), physically handicapped pensions (20) and MGNREGS are being utilized by the villagers. Unemployed youth are around 350 who are going to labor work. The highest educational qualification is B.Tech and Post Graduation in the village.

In Padamata Thanda, Potlagadda and Thoorpu Thanda there is a primary school in each village upto 5th std. with inadequate facilities.



3.6.4.14.1 NEED & DEVELOPMENT PRIORITIES - PUTLAGADDA

- Drinking Water facility
- Internal CC roads with side drains 1.5 km.
- Individual toilets – 150 houses
- Income Generation Training for unemployed youth - 220
- Provision of English medium education.
- New electrical transformer
- Community Hall
- Anganwadi school building
- Ramalayam temple

3.6.4.14.2 *NEED & DEVELOPMENT PRIORITIES - PADAMATA THANDA*

- Drinking Water facility
- Internal CC roads with side drains 600 mtrs
- Anganwadi school building
- Compound wall, benches – 10, Chairs – 5, Tables – 2, toilets and water facility existing primary school
- Individual toilets
- Construction on Rama temple

3.6.4.14.3 *NEED & DEVELOPMENT PRIORITIES - TOORPU THANDA*

- Community Hall
- Veterinary hospital
- Internal CC roads with side drains 1000 mtrs
- Drinking Water facility
- Streetlights – 25 Nos
- English medium school
- Construction of Church and Shiva Temple
- Individual toilets – 300 Nos.



3.6.4.15 ULSHAIPALEM & HAMLETS: BANGARU GADDA, KALUVA KATTA, GANDHI NAGAR, INDIRANAGAR



Ulshaipalem is a GP village and it is 8 km from YTPS by road. This village has four hamlets namely; Bangaru Gadda, Kaluva Katta, Gandhi Nagar, Indira Nagar.

Name of the village	No of house holds	Total population	Male population	Female population	Caste prevalent
Ulshaipalem & Hamlets	592	1986	1024	962	ST, SC, BC & OC

Activity:

- The main economic activity of the population is agriculture.
- The second important source of income is agriculture labor.
- The normal daily wage rates for farm work are Rs 250-300 for men and Rs 100-200 for women during the season.
- During the local lean season, around 100% wage laborers work in the MGNREGS (39 groups) in their proximity for 100 days.

Cropping Pattern:

- Most of the farmers grow Paddy.
- Rabi and Kharif are the farming seasons.
- Main source of irrigation is through bore wells.

Drinking Water

Name of village	Source	No.s		Usage	Availabilty	
		Hand Pumps	Tanks		Season	Lean season
Ulshaipalem & Hamlets	Borewells handpumps &tanks	8	1	Drinking &washing	Adequate	scarcity





All the houses are connected with electricity with Street lights. These villages have BT approach roads without any side drains. Internal roads are unpaved and *Kutcha*. Ulshaipalem has only 10% roads of pucca roads.

RTC buses and Shared autos reach to Miryalaguda from this village.

With regard to sanitation, most of households do not have individual toilets and there are no community toilets and no Drainage is there. People tend to go for open defecation. There is Anganwadi centre in Ulshaipalem and Gandhi Nagar.

ANM visits once in a week. For major treatments villagers go to private and government health facilities in Miryalaguda.

Health checkups are organized once in a month by 104 mobile health facilities in Ulshaipalem and Kalavakatta. 108 ambulance facilities is available readily. The common diseases prevailing in the village are Malaria, Typhoid, Dengue, fever, etc.

There are 54 active women's Self-Help Groups (SHGs) existing in the village. Their activities are small savings, tailoring, in-group lending and using for crops purpose.

All the government welfare schemes such as Indiramma housing scheme, widow pensions (122), old age pensions (156), physically handicapped pensions (39) and MGNREGS are being utilized by the villagers. Unemployed youth are around 350 who are going to labor work. The highest educational qualification is Post Graduation in the village.

There is Primary school only with inadequate facilities.

3.6.4.15.1 NEED & DEVELOPMENT PRIORITIES - ULSHAIPALEM

- Drinking Water – RO Plant
- CC roads with side drains – 1600 mts
- Street lights – 125 Nos
- Check walls for Jalu Canal
- BT road 1 km from Gangadevipeta to Indira Nagar Thanda
- BT Road 2 km from Ulshaipalem to Gandhinagar Thanda
- BT Road 1.5 km from R&B Road to Tungapahad Bandham
- CC road at Gangalamma Temple and platform
- Construction of Temple

- ❖ Training on Income Generation Activity for local youth and women
- ❖ Hand Pumps – 3 Nos

3.6.4.15.2 NEED & DEVELOPMENT PRIORITIES - *KALAVUAKATTA*

- ❖ Drinking Water – RO Plant
- ❖ Cc road with drainage – 300 mtrs
- ❖ Construction of Individual Toilets – 25
- ❖ Anganwadi Center
- ❖ Medical Camp
- ❖ Bus Shelter
- ❖ Community Hall
- ❖ Church
- ❖ Streetlights – 8 Nos
- ❖ Training on Income Generation Activity for local youth and women – 15 Nos
- ❖ Financial Assistance to Widow and Handicapped

MEETING AT ULSHAIPALEM



3.6.4.16 DONKATHANDA & HAMLET: BADAIGADDA



Donka Thanda is a GP village at approximately 8 km from YTPS by road. This GP comes under Tripuram Mandal. It has one hamlet namely Badaigadda.

The demographic profile of village is given below.

Name of the village	No of house holds	Total population	Male population	Female population	Caste prevalent
Donkathanda & Hamlet	522	1750	913	837	ST, SC

Activity:

- The main economic activity of the population is agriculture.
- The second important source of income is agriculture labor.
- The normal daily wage rates for farm work are Rs 300 for men and Rs 150 for women during the season.
- During the local lean season, around 100% wage laborers work in the MGNREGS (47) in their proximity for 100 days.

Cropping Pattern:

- Paddy, Cotton, Pigeon Pea, Blackgram and Groundnut are cultivated during the Khariff season. In Rabi, cotton is being cultivated.
- Main source of irrigation is through Lift irrigation from Tungapahad stream.

DRINKING WATER

Name of village	Source	No.s Hand Pumps	Usage	Availabilty	
				Season	Lean season
Donkathanda & Hamlet	Borewells handpumps	18	Drinking &washing	Adequate	scarcity





All the houses are connected with electricity. Street lights are available in all parts of the village. These villages have BT approach road without any side drains. 80% of the Internal roads are paved and *pucca* CC roads.

Only shared autos and individual bikes are major source of transport for the villagers.



With regard to sanitation, none of the households have individual toilets and there are no community toilets. Drainage is not available in the village. People tend to go for open defecation. Anganwadi center is functioning in the village but none of them have own building. There is no health sub-centre functioning in the villages. ANM visits the Badaigadda village once in 3 months and in Donka Thanda once in a month. For major treatments villagers go to private and government health facilities in Miryalaguda.

Health checkups are not being organized by 104 mobile health facility in both the villages. It was reported that 108 ambulance facilities is also available within half an hour in case of any medical emergency. The common diseases prevailing in the village are Typhoid, Malaria, Jaundice and Dengue.

There are 30 active women's Self-Help Groups (SHGs) existing in the village. The borrowed money is mostly used for purchasing live stock, children's education purpose and agriculture purpose.

All the government welfare schemes such as Indiramma housing scheme, widow pensions (18), old age pensions (32), physically handicapped pensions (7) and MGNREGS are being utilized by the villagers. Unemployed youth are around 150 who are going to labor work.

In both the villages there is Primary school functioning which offers education upto 5th Students go to Ulshaipalem village for high school studies.

3.6.4.16.1 NEED & DEVELOPMENT PRIORITIES - BADAI GADDA

- Drinking Water Facility
- Internal CC roads with drainages 2 km
- Training on Income Generation Activity for local youth and women - 100
- Anganwadi building
- Financial assistance to vulnerable – 60 Nos
- Street lights and poles - 100
- Individual toilets – 370
- Construction of Gram Panchayat Building
- Health Facility

3.6.4.16.2 NEED & DEVELOPMENT PRIORITIES - *DONKA THANDA*

- Drinking Water Facility
- Borewell in Indira Colony
- Drainage
- Individual toilets – 100 Nos
- Training on Income Generation Activity for local youth and women - 200
- Construction of Temple (Ramalayam)
- Community hall

CONSULTATION WITH WOMEN, MPTC& SARPANCH AT DONKATHANDA



3.6.4.17 APPALAMMAGUDEM & HAMLETS: LOKIYA THANDA AND SEETHYA THANDA



Appalammagudem is a GP village comes under Tripuraram Mandal and is 9 km from YTPS by road. This GP has two hamlets namely; Lokiya Thanda and Seethya Thanda.

Name of the village	No of house holds	Total population	Male	Female	Caste prevalent
Appalammagudem & Hamlets	352	1626	839	787	ST, SC, BC

Activity:

- The primary economic activity of the population is agriculture.
- The second important source of income is agriculture labour. The normal daily wage rates for farm work are Rs 300 for men and Rs 200 for women during the season.
- During the local lean season, all wage laborers work in the MGNREGS (40 groups) in their proximity for 100 days.

Cropping Pattern:

- Most of the farmers grow Paddy and Cotton during Kharif season.
- Main source of irrigation is through Sagar Canal Vazirabad R-7.

DRINKING WATER

Name of village	Source	No.s		Usage	Availabilty	
		Hand Pumps	Tanks		Season	Lean season
Appalamma gudem & Hamlets	RO Plant Borewells handpumps &tanks	20	1	Drinking &washing	Adequate	scarcity

All the houses are connected with electricity. Street lights are available in all parts of the village and are working. The village has BT approach road without any side drains. Most of the Internal roads (80%) are unpaved and *Kutcha*.



Shared autos are major source of transport for the villagers. There is no access to RTC buses to reach Miryalaguda from this village.



With regard to sanitation, 20% of households have individual toilets and there are no community toilets. Drainage is not available in the village. People tend to go for open defecation. There are three Anganwadi centres and none of them have own building. ANM visits the village once in a week. For major treatments villagers go to private and government health facilities in Miryalagudem and Hyderabad.

Health checkups are organized twice a month by 104 mobile health facility providing medicines. 108 ambulance facilities is also available within 15 mins for any casuality. The common diseases prevailing in the village are malaria and typhoid. It was also reported that there is no veterinary hospital in the village.

There are 25 active women's Self-Help Groups (SHGs) existing in the village.

All the government welfare schemes such as Indiramma housing scheme, widow pensions (15), old age pensions (30); physically handicapped pensions (8) and MGNREGS are being utilized by the villagers. Unemployed youth who have completed education between 10th and Post Graduation are around 750 who are going to labor work. The highest educational qualification observed in the village is Post Graduation.

There are primary schools in all the three villages upto 5th Standard with adequate facilities. Students go to Miryalayaguda school for higher studies.

3.6.4.17.1 NEED & DEVELOPMENT PRIORITIES - PALAMMAGUDEM AND ITS HAMLETS

- Drinking Water for entire village
- CC roads with drainages 3 km
- Training on Income Generation Activity for local youth and women – 500
- Renovation of electrical poles
- Veterinary hospital
- Individual toilets - 300

CONSULTATION WITH VILLAGERS OF APPALAMMA GUDEM



3.6.4.18 RAGADAPA & HAMLETS: KUNKUDUCHETTU THANDA AND PEDDA THANDA



Ragadapa is a GP village which comes under Tripuraram Mandal. It has two hamlets namely; Kunkuduchettu Thanda and Pedda Thanda. It is 9km from YTPS by road.

Name of the village	No of house holds	Total population	Male population	Female population	Caste prevalent
Ragadapa & Hamlets	386	1695	861	834	ST, SC, BC

Activity:

- The main economic activity of the population is agriculture.
- The second important source of income is agriculture labor. The normal daily wage rates for farm work are Rs 200-300 for men and Rs 200 for women during the season.
- During the local lean season, around 100% wage laborers work in the MGNREGS (52 groups) in their proximity for 100 days.

Cropping Pattern:

- Most of the farmers grow Paddy and Cotton during Kharif season.
- During Rabi cotton and Pigeon pea is cultivated.
- Main source of irrigation is from Tungapahad Vagu and left canal of Nagarjunasagar.

Drinking Water

Name of village	Source	No.s		Usage	Availabilty	
		Hand Pumps	Tanks		Season	Lean season
Veerlapalem	Krishana River Borewells handpumps	20	0	Drinking &washing	Adequate	scarcity

All the houses are connected with electricity. Street lights are not available in all parts of the village. The village has BT approach road without any side drains. Internal roads are unpaved and *Kutcha* roads.



10% of households have individual toilets and there are no community toilets and no proper drainage is there. People tend to go for open defecation. Three Anganwadi centres are there. . ANM visits the village once in a week. For major treatments villagers go to private and government health facilities in Miryalaguda, Hyderabad and Guntur.



Health checkups are organized weekly once by 104 mobile health facility providing medicines. 108 ambulance facility is also available within an hour in case of any medical emergency. The common diseases prevailing in the village are Malaraia, Typhoid and Dengue. There is no veterinary hospital in the village.

There are 56 active women's Self-Help Groups (SHGs) existing in the village.

All the government welfare schemes such as Indiramma housing scheme, widow pensions (56), old age pensions (99), physically handicapped pensions (25) and MGNREGS are being utilized by the villagers. Unemployed youth are around 300 who are going to labor work. Having highest education qualification is Degree.

There is a Primary school which offers education upto 5th Standard.

3.6.4.18.1 NEED & DEVELOPMENT PRIORITIES - RAGADAPA

- Drinking Water for villagers
- Internal CC Roads with drainages 2 km.
- Training on Income Generation Activity for local youth and women
- Primary Health care Centre
- Individual toilets – 300
- Veterinary hospital
- Anganwadi buildings – 3
- Construction of Temple
- Electricity poles
- Mini lift irrigation facility
- Community hall
- Play ground
- Green belt development

3.6.4.19 GANDHINAGAR



Gandhinagar is a hamlet which comes under Balajinagar GP. This comes under Damercherla Mandal. It is around 6 km from YTPS.

The demographic profile of village is given below.

Name of the village	No of house holds	Total population	Male population	Female population	Caste prevalent
Gandhinagar	179	679	393	286	BC (Gouds)

Population of this village has migrated from Nagarjunasagar during the construction of Dam. These villagers are resettled in this village since 1968. Each family was compensated with 4-5 acres of agriculture land.

Activity:

- The main economic activity of the population is agriculture, agriculture labor and Taddy.
- The normal daily wage rates for farm work are Rs 200 for men and Rs 120-150 for women during the season.
- During the local lean season, around 12 groups of wage laborers work in the MGNREGS in their proximity for 100 days.
- Through MGNREGS the earnings of these labours will be Rs.50-60 per day.

Cropping Pattern:

- Most of the farmers grow Cotton and Paddy under rain fed conditions.
- Kharif is the farming season. There is no source of irrigation in this village.

Drinking Water

Name of village	Source	No.s		Usage	Availabilty	
		Hand Pumps	Tanks		Season	Lean season
Gandhinagar	Borewells handpumps &tanks	8	1	Drinking &washing	Adequate	scarcity





All the houses are connected with electricity. Street lights are available in all parts of the village all are working. The village has metal approach road without any side drains. Around 8 Internal roads are unpaved and *Kutcha*. Only two roads are CC and pucca.

Autos are major source of transport for the villagers. There is no access of RTC to reach Miryalaguda and Damercherla from this village.

With regard to sanitation, 15 numbers of households have individual toilets and there are no community toilets. Drainage is not available in the village. People tend to go for open defecation. There is one Anganwadi centre functioning in the village in own building. ANM visits the village once in 15 days. For major treatments villagers go to private and government hospitals in Miryalaguda.

Presently no health checkups are being organized by 104 mobile health facilities with medicines. 108 ambulance facility is also available. The common diseases prevailing in the village are Fever, Dengue, Malaria and Typhoid. It was also reported that there is no veterinary hospital in the village

There are 11 active women's Self-Help Groups (SHGs) existing in the village. The borrowed money is mostly used for agriculture and live stock specifically milch cattle.

All the government welfare schemes such as Indiramma housing scheme (45), widow pensions (45), old age pensions (22), physically handicapped pensions (5) and MGNREGS (12 groups) are being utilized by the villagers. Unemployed youth are around 100 who are going to farm wage and non-farm wage labor work. Post Graduation is the highest educational qualification acquired in the village.

There is a primary school with inadequate facilities which offers education up to 5th standard. After 5th Standard, students go to ZPHS Damercherla. For higher education, students go to Miryalaguda and Damercherla.

3.6.4.19.1 NEED & DEVELOPMENT PRIORITIES - GANDHINAGAR:

- Drinking Water through RO plant
- Individual Toilets 100
- CC roads with drainages 2 kms
- Training on Income Generation Activity for local youth and women-120
- Veterinary hospital
- Construction of Temple
- Construction of Community Hall
- Construction of Health Facility
- Construction of Tank (Water)
- Play ground

CONSULTATIONS WITH VILLAGERS AND WOMEN AT GANDHINAGAR



3.6.5 SUMMARY OF DEVELOPMENT PRIORITIES IDENTIFIED

The following table summarizes the development priorities of the study area that have been identified through community consultations.

Summary of Development Priorities Identified in the Villages	
S.No	**Summary of Priorities**
1	Safe and reliable supply of Drinking Water since the quality and taste of the ground water in some of the surveyed villages is not good. There are two options in this regard, which are NOT necessarily mutually exclusive: (1) Installation of Mineral water plants; (2) Laying of pipelines and construction of OH Tanks for supply and storage of water from bore wells.

Summary of Development Priorities Identified in the Villages	
S.No	**Summary of Priorities**
2	Internal CC roads in the villages with drainage
3	Toilets: Financial support to households to build toilets of their own
4	Provision of street lights and poles
5	Assistance to Panchayats for providing Drinking Water and maintenance of toilets in schools
6	Regular conduct of health camps in the village with specialist doctors or well-equipped hospital that is accessible from the village (in or near the village);
7	Rehabilitation of physically challenged land losers
8	New or additional overhead water tank in the villages to augment water supply; public tap system and additional bore wells in some villages
9	Improvements and facilities to the existing schools such as furniture (benches for pupils), compound wall; library; sports equipment and material; toilets; new or additional water source.
10	Skills training or vocational or job-oriented training for Women and youth
11	All-weather approach road to the villages (where applicable)
12	Resurfacing of WBM roads
13	Training and financial support or facilitation for members of women's self-help groups to start income-generating enterprises
14	Plantations: avenue as well as in open spaces. Supply of tree guard and maintenance of the trees.
15	Provision of hand pumps
16	Construction of building for Anganwadi centres and schools
17	Construction of building for Veterinary Hospital
18	Extension of water pipe line in some of the colonies identified
19	Development of Playground and park for children
20	Laying of BT roads
21	Awareness campaigns for sexually transmitted diseases such as HIV/AIDS, Waterborne diseases, Sanitation and Hygiene, etc.
22	Construction of boundary walls for schools and Anganwadi centres
23	Construction of toilets in Anganwadi centres (where applicable)
24	Development of school building and construction of additional class rooms
25	Provision of bore well in school
26	Construction of buildings for PHC/health sub-centres

Summary of Development Priorities Identified in the Villages	
S.No	**Summary of Priorities**
27	Burial ground development and providing necessary infrastructure
28	Street lights (where applicable)
29	Fencing and bore well for burial ground
30	Provision of English medium education

3.7 TRAFFIC DENSITY

M/s Bhagavathi Ana Labs has carriedout the traffic studies to know the prevailing traffic volumes on the existing roads. The same has been retained and presented below

(*Source: Final EIA Report of M/s Bhagavathi Ana Labs Pvt. Ltd.)*

It is essential to consider these details for assessing the anticipated future traffic volumes as a part of overall impacts assessment for the plant.

The variations of traffic densities depend upon the working days and time and also vary in day and night times. In order to assess the prevailing traffic volumes on the roads, the survey was conducted during normal working days of the week by avoiding local holidays or abnormal situations to reflect the true picture of the traffic densities. The traffic study was conducted at two locations for 24 hours.

3.7.1 VEHICLE COUNT

The vehicles passing through the road (in both ways) were counted separately for 24 hours at the two selected locations continuously. Category-wise vehicle counting has been done continuously and recorded in the traffic volume count on hourly basis under respective categories.

3.7.2 CATEGORIZATION OF TRAFFIC

The vehicles plying in both the directions were counted continuously for 24 hours simultaneously. The vehicles were counted every hour and recorded under respective category. The

vehicles were categorized under various heads like 2 & 3 Wheeler, 4-Wheeler (LMV), HMV Single Axial, HMV Multi Axial and Others. The categorization of the vehicles is necessary because the speed and the emission factors vary with type of the vehicle.

3.7.3 SAMPLING LOCATIONS

The two traffic locations are represented in below Table.

DETAILS OF TRAFFIC MONITORING LOCATIONS

Location Code	Location Details
T-1	On SH-2 road towards Miryalaguda
T-2	On SH-2 road towards Guntur

3.7.4 TRAFFIC DATA

The vehicular traffic densities details are presented below in **Table – 3.23**.

TABLE – 3.23

TRAFFIC DENSITY

S. No.	Locations	2-Wheeler	3-Wheeler	4-Wheeler (LMV)	HMV Single Axial	HMV Multi Axial	Others	Total PCUs
T1	On SH-2 road towards Miryalaguda	700	225	838	223	65	18	**2174**
T2	On SH-2 road towards Guntur	650	250	742	186	66	16	**1956**

PCU- Passenger Car Units (2/3 Wheeler: 0.5, 4-Wheeler: 1, HMV: 3, Others: 0.5)

TABLE- 3.6
MONTHLY OBSERVED DISCHARGE AT PONDUGALA G& D SITE
(YEAR 1976-2007 in Million m^3 Per Month)

Year	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Annual
1976-77	572.92	7714.05	17252.25	4854.76	1519.40	417.70	232.11	386.19	380.62	466.88	268.57	64.52	34129.37
1977-78	809.81	3373.94	9172.26	6548.44	4483.09	362.42	300.63	363.99	378.58	579.10	416.76	397.50	27186.51
1978-79	441.78	7018.81	21516.32	13817.51	8113.75	1969.85	2609.60	1643.40	503.21	405.22	368.59	276.60	58684.64
1979-80	803.39	1841.39	11659.50	9809.43	6532.60	940.04	967.14	496.46	451.69	461.76	552.91	598.97	35115.28
1980-81	883.83	9030.76	20081.35	5947.40	2825.72	936.00	646.42	442.88	441.08	449.16	332.72	--	42017.31
1981-82	821.29	1541.70	13686.92	14741.05	5906.07	1203.66	1053.41	809.46	709.30	889.16	853.31	600.04	42815.36
1982-83	648.97	1283.09	6829.29	3109.38	1542.53	1129.99	832.14	754.05	726.45	789.96	811.97	783.67	19241.47
1983-84	622.17	1162.79	15353.64	11555.02	5474.27	716.96	533.56	618.61	568.49	568.44	588.31	546.97	38309.22
1984-85	937.53	1427.28	5482.75	1546.44	1149.92	901.67	914.50	534.06	745.68	1010.75	824.77	729.76	16205.12
1985-86	590.41	1210.51	1264.02	1354.33	832.30	546.54	352.61	339.15	341.12	484.24	694.77	621.78	8631.78
1986-87	676.38	984.70	1042.42	963.34	951.77	568.20	550.89	522.50	517.50	647.55	190.46	88.97	7704.69
1987-88	422.37	940.80	764.24	646.33	492.51	641.95	385.68	530.83	491.05	1148.59	800.19	819.03	8083.58
1988-89	627.96	614.26	6443.72	16477.72	4713.37	587.38	461.61	522.82	584.60	1091.85	1095.93	566.84	33788.03
1989-90	702.16	1199.52	1565.06	4296.98	5227.68	606.93	506.17	591.17	698.47	759.59	679.10	830.78	17663.59
1990-91	619.64	1241.80	13358.68	4071.25	3440.01	1208.82	636.87	708.13	1306.33	1699.70	1188.64	536.81	30016.67
1991-92	977.05	6033.25	17336.67	3284.48	1577.86	705.89	727.17	541.00	922.32	1225.99	1214.36	718.59	35264.64
1992-93	434.13	830.23	1500.24	3686.52	1302.52	874.96	893.93	1020.76	1154.85	1152.11	1106.43	778.19	14734.86
1993-94	596.61	1466.30	1962.64	2310.86	9477.54	1416.11	905.29	1222.00	1834.29	2509.48	1146.51	678.89	25526.52
1994-95	447.53	11412.79	7089.60	12504.99	2384.53	1238.25	834.96	647.94	1280.33	1412.76	457.41	266.85	39977.95
1995-96	344.90	624.89	1153.15	815.26	1186.94	709.53	909.26	519.68	420.86	481.57	615.35	459.21	8240.60
1996-97	517.38	609.24	1045.84	1934.37	10564.45	1057.35	632.77	608.10	884.40	1590.27	1048.21	508.85	21001.22
1997-98	494.25	1167.85	9392.74	5348.73	1443.41	623.46	383.18	633.71	669.12	1150.11	1121.27	608.44	23036.27
1998-99	587.18	1062.28	1205.88	6810.16	24103.38	1058.52	560.23	641.34	701.78	1167.27	1080.36	399.53	39377.93
1999-00	604.86	1324.11	5160.51	2036.54	1074.14	982.39	668.17	674.13	639.46	1668.67	1829.35	575.32	17237.64
2000-01	712.26	1349.69	1853.66	1311.85	1139.31	868.93	583.14	579.78	777.91	1361.11	796.24	414.13	11748.01
2001-02	514.42	928.17	947.13	1846.36	827.66	799.50	415.98	415.70	331.42	1003.02	1085.64	271.85	9386.85
2002-03	295.99	1174.65	1066.14	1198.67	1400.61	1004.51	326.15	160.45	115.73	82.64	166.77	148.90	7141.21
2003-04	55.08	29.67	55.38	260.33	341.11	344.09	216.03	197.56	167.09	184.36	85.88	52.13	1988.71
2004-05	30.61	36.14	357.45	630.30	428.43	362.23	307.99	180.80	83.83	52.44	39.64	60.71	2570.57
2005-06	25.72	226.29	16377.05	12646.03	4750.57	991.57	222.04	295.03	262.30	291.10	210.54	55.59	36353.83
2006-07	151.46	562.47	23262.83	2996.99	2234.79	248.65	237.20	276.64	253.26	286.17	250.38	--	--

TABLE-3.7
MONTHLY OBSERVED DISCHARGE AT WADENAPALLI CWC STATION
(YEAR 1985-2015 Million m^3 Per Month)

Year	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Annual
1985-86	540.21	1621.94	2076.16	1879.76	1222.74	887.01	374.75	352.58	271.95	376.22	582.26	597.70	10783.28
1986-87	741.74	1607.14	1904.14	1683.09	1416.75	805.66	564.46	615.24	508.60	646.27	235.36	63.01	10791.46
1987-88	379.63	1405.96	1019.19	1013.46	848.06	1085.15	328.30	485.13	419.52	954.17	647.02	722.95	9308.54
1988-89	598.78	1097.68	6480.72	16309.14	5246.52	1176.31	566.45	639.64	662.41	1154.82	1048.69	383.64	35364.8
1989-90	558.35	2502.78	2185.11	4719.29	5373.99	1171.66	1220.86	941.94	894.47	882.45	728.60	1102.23	22281.73
1990-91	788.05	1618.71	16077.89	5381.88	4456.33	1875.58	1296.90	1379.62	1641.38	1790.88	1357.53	399.73	38064.48
1991-92	862.27	5223.41	17075.77	3713.07	1543.20	1084.71	1169.23	708.72	1004.58	1301.13	1195.83	707.44	35589.36
1992-93	294.08	845.10	1743.80	4086.95	1596.22	1379.25	1084.37	1225.24	1286.85	1240.80	1062.67	683.53	16528.86
1993-94	339.14	1369.70	2064.06	2545.19	9683.27	1911.85	1322.13	1635.30	1856.35	2279.60	1087.41	572.95	26666.95
1994-95	377.58	10848.02	7399.76	13269.03	3447.42	2718.29	2053.79	1521.95	1518.87	1502.26	568.85	297.90	45523.72
1995-96	309.07	634.93	1117.67	810.41	1663.93	996.67	1059.50	528.78	403.33	443.77	456.31	347.58	8771.95
1996-97	396.64	576.68	866.11	1804.26	9618.74	1465.42	1182.85	960.50	1009.29	1472.72	1083.23	349.81	20786.25
1997-98	376.13	1023.03	8395.47	5641.82	1547.67	864.36	389.00	739.24	693.88	824.32	721.86	402.61	21619.39
1998-99	417.05	913.46	1295.56	6727.50	19803.33	1303.94	699.48	1018.91	918.66	1152.99	937.64	246.62	35435.14
1999-00	357.38	1306.66	4740.97	1848.28	1093.44	1106.03	641.18	699.21	646.67	907.52	868.94	435.81	14652.09
2000-01	571.54	1054.41	1773.70	1006.35	1047.12	874.24	485.41	563.56	680.20	718.96	474.30	263.47	9513.26
2001-02	311.78	625.45	706.31	1019.67	919.07	810.61	476.85	445.09	366.43	672.74	603.50	179.92	7137.42
2002-03	180.98	582.53	809.24	853.31	594.61	493.63	170.46	93.98	76.98	63.33	132.27	125.69	4177.01
2003-01	46.43	45.33	112.19	274.32	414.31	591.84	375.03	154.63	109.86	157.92	87.54	59.62	2429.02
2004-05	34.20	42.09	378.50	945.29	927.91	730.50	526.91	237.48	113.41	96.97	86.42	145.05	4264.73
2005-06	27.84	517.01	15044.59	12823.19	5305.59	1608.40	397.25	602.62	500.92	543.89	400.22	84.09	37855.61
2006-07	167.80	999.34	24472.06	4019.52	2542.46	626.65	477.28	764.63	690.06	738.51	312.72	68.57	35879.6
2007-08	276.05	4140.22	11542.50	14911.95	3387.04	856.67	474.78	838.18	637.90	819.81	283.27	60.61	38228.98
2008-09	104.86	774.81	1609.16	6885.13	1986.44	1165.55	445.89	700.83	778.42	436.56	371.17	151.60	15410.42
2009-00	61.71	740.14	1227.44	1491.90	16796.40	1304.44	557.29	687.11	676.71	789.84	421.49	91.78	24846.25
2010-11	63.19	334.90	793.49	7039.00	4194.95	1969.16	517.94	599.83	525.82	565.38	402.41	112.05	17118.12
2011-12	79.26	692.66	1435.78	7619.78	1502.16	1124.58	360.97	224.73	150.10	265.96	100.52	29.66	13586.16
2012-13	93.35	158.10	42.20	178.93	482.66	589.61	420.46	276.84	181.61	60.30	227.68	49.18	2760.92
2013-14	64.17	60.75	3707.30	4658.31	4031.64	756.54	429.55	597.51	438.73	680.35	316.78	95.47	15837.1
2014-15	65.93	253.96	730.49	2975.70	1636.52	696.08	323.40	310.82	230.12	285.64	187.19	--	7717.61

CHAPTER - 4

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

CHAPTER-4: ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The proposed project will have influence in two distinct phases i.e during construction phase for short duration and during operation phase for long duration.

The environmental impacts due to the implementation of the proposed project are discussed for the construction and operation phase of the power project along with detailed Environmental Management Plan to mitigate the impacts.

4.1 CONSTRUCTION PHASE

During the construction phase, the activities which are likely to contribute to impact on various environmental components which are temporary in nature are site clearing, leveling, construction of various structures of power plant and ash pond, laying of internal roads, erection of various equipment etc

The construction activities will be confined within the project area of 2800 acres. The construction is expected to take about 36-48 months from the date of notice to proceed to the EPC contractor.

The environmental impacts and management plan during construction phase are detailed below.

- The construction of power project would result in increase of Particulate Matter/dust concentrations due to fugitive dust. Frequent water sprinkling in the vicinity of the construction sites would be undertaken. It will be ensured that both gasoline and diesel powered vehicles are properly maintained to comply with exhaust emission requirements.

- Noise levels generated during construction activity sometimes may be high. Onsite workers working in noise prone areas would be provided with earmuffs & ear plugs.

- Water for construction will be met from River Krishna. The location of the proposed water intake structure is about at 1.0 km distance which is on upstream side of confluence point of Tungapahad Vagu & Krishna river. Pipeline will be laid prior to commencement of construction. Raw water reservoir which is proposed for storage of water in the operational phase will be constructed initially during the construction phase to store the river water for meeting the requirement during construction.

- Construction camps will be setup with full fledged drinking water supply and sanitation facilities. These facilities would be connected to a septic tank and maintained to ensure minimum impact on the environment. It will be ensured that there will be no discharge of any wastewater into River Krishna or Tungapahad Vagu. The facilities will be designed to meet the construction manpower of 5000 people.

- Existing roads will be utilized for initial construction needs. TSGENCO will strengthen the approach road to the project site.

- Measures will be taken to ensure least inconvenience to the local people by restricting speed (speed breakers will be built by the Company).

- The project development will involve cut and fill quantities for achieving the required grades as per the layout design. Quantity of cutting is estimated about 80,00,000 m^3 and the quantity of filling required is about 66,00,000 m^3. The fill quantity required is less than the cut quantity. Hence, the material obtained from cutting will be used for filling low lying areas. No material will be required from outside the project area for grading.

- Top soil excavated during development of the project which is fertile will be preserved and utilized for the development of green belt.

- A senior Environment and Safety Officer belonging to the EPC contractor will coordinate the Safety and Environmental aspects in consultation with TSGENCOs Station Level Environmental Group

- A 24 Hr Medical Aid Room with qualified para-medical staff and fully equipped Ambulance will be made available at site.

- TSGENCO will tie up with nearby Hospitals in Nalgonda to provide timely medical help and treatment in case of medical emergency. In addition, proper co-ordination will be made with neighboring industries so as to ensure that emergency medical aid is extended in the least time.

- Adequate number of fire tenders with trained personnel will be made available to handle any fire accident at site.

- The manpower working will be given training on Occupational Safety and Health during construction.

4.2 OPERATIONAL PHASE

The major activities which are likely to result in impact on various environmental components during the operation phase are as follows:

a) Emissions from boilers due to combustion of coal
b) Dust emission from coal stock pile
c) Noise from various noise generating sources
d) Water consumption and wastewater generation
e) Ash generation and other solid waste generation

The changes over the existing baseline quality due to the proposed activities of the power project during operation have been predicted using suitable air quality models coupled with qualitative and quantitative predictive techniques. After evaluations of the changes in relevant parameters, the overall impacts on the environment have been worked out based on which a detailed environmental Management Plan has been formulated. The following paragraphs detail the environmental impacts due to the proposed power project on various environmental components and Management Plan for implementation during the operational phase for implementation by TSGENCO.

4.2.1 AIR ENVIRONMENT

The proposed power project will result in emission of Particulate Matter, Sulphur Dioxide and Oxides of Nitrogen due to combustion of coal in the boilers.

Coal storage and coal handling will result in fugitive dust emissions.

Cumulative impact on air environment has been assessed considering the emissions from the existing and proposed sources located within 15 km radius of the proposed Yadadri Thermal Power Station.

4.2.1.1 EMISSION DETAILS

The emission details of the proposed project and emissions details of the existing and proposed sources located within 15 km radius are detailed below:

A. 4000 MW YADADRI THERMAL POWER STATION - TSGENCO

The steam requirement of the plant will be met from five boilers each of 2600 tph capacity. Major pollutants emitted from coal burning are Particulate matter, SO_2 and NOx.

TSGENCO proposes to implement flue gas treatment system to comply with new emission norms of MOEF & CC stipulated for Thermal Power Plants as per the Gazette Notification S.O. 3305 (E) dated 07.12.2015. These norms will be applicable for the projects commissioned after the year 2017.

ESP outlet dust concentration	: 30 mg/Nm^3
SOx	: 100 mg/Nm^3
NOx	: 100 mg/Nm^3
Mercury	: 0.03 ppm

Details of the flue gas treatment system are given under para 4.2.1.9 under Air pollution control measures. The emission details of the proposed power project after flue gas treatment system are given below in **Table - 4.1**.

TABLE - 4.1
EMISSION DETAILS of 5 X 800 MW

	IMPORTED COAL		**BLEND COAL (50 % Indigenous coal and 50 % imported coal)**
No. of units	5		5
Coal Consumption (t/hr/unit)	296		330
Sulphur content (%)	0.80		0.61
*Volume of Flue gas, Nm^3/sec	698.6		749.5
No of Flues	5		5
No. Of stacks	3 (2 biflue stacks and 1 single flue)		3 (2 biflue stacks and 1 single flue)
Height of stack, m	275		275
*Diameter of each flue(m)	7.6	**OR**	7.6
*Temperature of flue gas (^oC)	86.3		85.0
*Velocity of flue gas (m/s)	24.3		24.3
Particulate matter at the inlet of the stack (gm/sec/flue) (based on 30 mg/Nm^3 at outlet)	27.9		27.9
Sulphur dioxide emission (gm/sec/flue) (based on 100 mg/Nm^3 at outlet)	93.0		93.0
Oxides of Nitrogen (gm/sec/flue) (based on 100 mg/Nm^3 at outlet)	93.0		93.0

Source: BHEL

Fugitive Dust Emissions: Material handling areas which will result in Fugitive dust emission are given below:

- Coal Storage yard
- Ash Pond
- Limestone handling & storage
- Gypsum handling & Storage

- Coal storage is proposed in open yard for storage of 15 days coal requirement of the plant. Six stock piles are proposed. Emission due to wind erosion from the coal stock piles has been computed considering the effective area of 365 X 447 m.

- Ash Pond is proposed for storage of Bottom Ash and Unutilised Fly Ash during first four years of Units commissioning. Bottom ash will be crushed and conveyed to the ash pond by slurry system. Due to wet disposal system, no fugitive dust emission is anticipated.

- Limestone Handling and Storage: Limestone of 250 mm size will be unloaded and stored in covered shed. No fugitive emissions are anticipated from limestone storage area due to handling of limestone in boulders.

- The stored limestone is crushed to <25mm size in crusher and is conveyed till the inlet of Limestone storage silo hoppers (3 no's). The emissions from limestone handling are mainly from crusher. Emissions from crusher are considered as non-fugitive emission source as emissions are from enclosed unit provided with the Bag Filter at discharge end.

- Gypsum Handling and storage; Gypsum generation from the flue gas handling plant is mainly in slurry form. Gypsum generated is dewatered and the Cake generated will be discharged through a Hopper to a Belt conveyor. The Belt Conveyor will transport the Gypsum to the Gypsum storage shed. No fugitive emissions are anticipated from Gypsum handling or storage area.

  Fugitive emissions from coal storage area and point source emission from Limestone crusher considered for estimation of ground level concentrations are given in **Table – 4.2**.

TABLE - 4.2

EMISSIONS FROM LIMESTONE CRUSHER AND COAL STORAGE AREA

Source	Stack Ht	Diameter	Velocity	Temp	Emission, gm/sec
	M	M	M/sec	K	PM
Limestone Crusher (Point Source)	30	0.8	10	313	0.143
Emissions From Coal Storage (Area Source) due to Wind erosion Effective Coal Storage area : 365 X 447 m – 16.31 Ha Emission of Dust (PM10) due to Wind Erosion : 0.20 kg/Ha/Hr (NPI Emission Factor) 0.0000055 gm/m^2/sec					

B. EMISSIONS FROM INDUSTRIES LOCATED IN 15 KM

Information on operating and proposed industries within 15 km radius was collected for estimation of cumulative ground level concentrations. The details of the surrounding industries considered are given in **Table – 4.3**.

TABLE – 4.3

OPERATING AND PROPOSED INDUSTRIES WITHIN 15 KM RADIUS

	Distance (km)	Direction	Capacity		
			Cement Plant (MTPA)	Captive Power plant (MW)	Captive Limestone Mine (MTPA)
Operating Industries in 15 km radius					
India Cements Limited	4.8	E	4.275	55	3 mines Mine-1:1.4 Mine-2:1.4 Mine-3:1.85
Parasakti Cements	8.0	SW	2.26		3.5
Penna Cements	9.6	ENE	1.00	77	1.50
Deccan Cements	11.3	E	1.5	15	2.3
Andhra Cements	11.7	SE	2.31	30	3.0
Proposed Industries in 15 km radius					
TSGENCO	0	0	-	4000 MW	-
Krishna Godavari Power Plant (Not commissioned)	4.5	SE	-	60 MW (Independent Power Plant)	
My Home Industries Ltd Plant (Green field project)	11.9	ESE	2.5	-	4.0

Fig – 4.1 shows the location of the above industries in 15 km radius of the proposed project site

The coordinates of the emission sources considered along with emission details are given in **Table – 4.4.** The information on the emissions from each Industry has been provided by TSGENCO which was obtained upon a request letter addressed to each Industry.

100 % of the Particulate Emission is considered as PM10 due to absence of particle size characterization of emissions from power plant, cement plant and limestone mines

4.2.1.2 MODEL EMPLOYED

AERMOD Model version 9.1.0 (EPA recommended) with the following options has been employed to estimate the ground level concentrations and cumulative ground level concentrations due to emissions from the proposed power project and other proposed and operating industries respectively.

a. Area being rural, rural dispersion parameters is considered.
b. Ground level concentrations have been carried out to estimate concentration values over radial distance of 15 km around the sources.
c. Polar receptor network has been considered.
d. The terrain of 15 km radial extent of the project boundary being undulated with altitude ranging from 230 - 40 m amsl, elevated terrain has been considered.
e. Emission rates from the point sources, line sources and area sources were considered as constant during the entire period.
f. The ground level concentrations computed were as is basis without any consideration of decay coefficient.
g. Calm winds recorded during the study period were also taken into consideration.
h. Hourly meteorological data as per guidelines of CPCB was considered for Post monsoon season (October, 2016) for estimation of ground level concentration.


To
Mirialguda
4.0km
79° 35'
79° 30'
79° 40'
16° 45'
16° 40'
16° 35'
TUNGAPADU R F
DILAWARPUR R F
RAGADAPPA R F
OSHIPALEM R F
MOLAKACHERLA R F
VIRLAPALEM R F
ALGATAPA R F
GANGADEVIGUTTA R F
WAZIRABAD R F
RAJAGUTTA R F
RAVIPAHAD RF
SAIDULNAM R F
MADINAPADU EXTENSION R F
GAMALAPADU RF
MADINAPADU RF
MANGALBODU RF
KRISHNAPURAM MINES
DAIDA R F
ADIVIDEVULAPALLI R F
GOLI R F
NAGARJUNASAGAR-SRISAILAM TIGER RESERVE
TELANGANA & ANDHRA PRADESH
TELANGANA
ANDHRA PRADESH
KRISHNA GODAVARI POWER PLANT
ICL PLANT SITE
ICL MINE
PCIL CEMENT PLANT & MINE
DCIL MINES & PLANT
PARASAKTI PLANT & MINE
MY HOME INDUSTRIES PLANT
(GREEN FIELD PROJECT NEAR GAMALAPADU)
To
Dachepalli
3.25km
12.0km
TSGENCO POWER PLANT
Krishna River
Musi River
Bugga Vagu
Dandi Vagu
Gollamukkala Vagu
Main Power Line
Stone quarries
Tungapahad Vagu
Bandam Vagu
Tolla Vagu
Daida Vagu
Gudur Camp
Botegani Tanda
Chintapalli
Kishtapuram
Rudrawaram Cheruvu
Rudrawaram
Kash Tanda
Hatiya Tanda
Walia Tanda
Kottaguda
Lakshmipuram
Mulkalapalli
Singavaram
Yellapuram
Keshwapuram
Ramov Tanda
Mana Tanda
Kondrapole
Sanjepur
Pode Tanda
Komahikunta
Jampahad Tanda
Kotta Tanda
Sunyapahad
Ravipahad
Vishnupuram
Eddula cheruvu
Nagula Cheruvu
Borrawari Cheruvu
Baindla Cheruvu
Rajendranagar
Nallavagu Tanda
Botalpalem
Gandhinagar
Kallepalli
Ramachandra Tanda
Timmapuram
Tiruvu Tanda
Shantinagar
Narsapuram
Mandugulakunta Tanda
Virlapalem
Reddipalem
Dubba Tanda
Gonegadi Tanda
Cherla Tanda
Molakacherla
Kotta Nandikonda
Chintachettu Tanda
Ambara Tanda
Indiranagar Tanda
Ganganagar
Mangali Tanda
Gattumidi Tanda
Tadichettu Tanda
Ilishayipalem
Bangara Tanda
Putalagadda
Mukkudichettu Tanda
Pedda Tanda
Kapanguda Tanda
Bhimagani Tanda
Moova Tanda
Sitala Tanda
Vallabhapur
Ramarao Camp
Kakkalagudem
Regulagadda
Dharisoni Tanda
Tallapaluga Tanda
Netapur
Nilalahgudem
Nehrunagar
Anjanapalli
Ashoknagar
Vasram Tanda
Lakpati Tanda
Suraya Tanda
Mangal Tanda
Kuriya Tanda
Matur
Dobba Tanda
Chenchayaguda
Annaram
Gorepalem
Balaghagar Tanda
Gadiligandla Tanda
Lachham Tanda
Chatya Tanda
Bodduguda Tanda
Palugu Tanda
Pedda Tanda
Badavilgadda Tanda
Palugu Tanda
Jillelagadi Tanda
Chennaiahpalem
Palugu Camp
Alvapahad
Buddi Tanda
Dhanja Tanda
Kalawanank Tanda
Mittagudem
Lavri Tanda
Ghar Tanda
Bandawani Tanda
Joyyanaik Tanda
Dilawarpur
Pedda Tanda
Todyanak Tanda
Chouravanm Tanda
Dudya Tanda
Goniya Tanda
Batunik Tanda
Datavat Tanda
Alivell Mangapuram
Tulasigani Tanda
Marriguda
Annaram Camp
Bejkal
Hangamma Camp
Lavadi Tanda
Samyaganl Tanda
Simgani Tanda
Virappaguda
Kothur
Bhuvanagiri
Tungapahad
Srinivas Nagar
Srinivasnagar
Venkatadripalem
Dubba Tanda
Dikya Tanda
Gudur
Jalbai Tanda
Amin Tanda
Mangoshipuram
Dubba Tanda
Todyanak Tanda
Pedda Tanda
Dilawarpur
Mittagudem
Lavri Tanda
Ghar Tanda
Kondrapole
Bandawani Tanda
Joyyanaik Tanda
Ramov Tanda
Mana Tanda
Mangalidubba Tanda
Numa Tanda
Lakur Tanda
Sallapur Tanda

TABLE – 4.4

EMISSION DETAILS CONSIDERED FOR AIR QUALITY MODELING STUDIES

POINT SOURCES

Type	ID	Description	Stack based Elevation	Stack Height	Stack Diameter	Exit Velocity	Exit Temperature	Emission_Rate, gm/sec			Coordinates Of stack (in UTM)		Coordinates Of stack (in Cartesian)	
			[m]	[m]	[m]	[m/s]	[K]	PM	SO_2	NOx	X [m]	Y [m]	X [m]	Y [m]
POINT	ICLSTCK2	U-1Raw mill / Kiln	101.51	70	3	16	378	4.887	0.71		355984.00	1846441.00	-7022.28	1606.96
POINT	ICLSTCK3	U-1Coal Mill- CM-1	97.94	40	0.8	16	338	0.58	-	-	355921.00	1846398.00	-6959.28	1649.96
POINT	ICLSTCK5	U-1Cooler	98.68	30	2.75	13.2	512	1.829			355937.00	1846375.00	-6975.28	1672.96
POINT	ICLSTCK6	U-2Kiln/Raw Mill	99.92	85	4	13.8	393	8.19	0.134		356024.00	1846409.00	-7062.28	1638.96
POINT	ICLSTCK7	U-2Vertical Coal Mill- CM-3	97.48	35	1.5	22	345	2.27	-	-	355974.00	1846331.00	-7012.28	1716.96
POINT	ICLSTCK8	U-2Cooler	99.07	45	3.75	13.9	375	4.14	-	-	355986.00	1846352.00	-7024.28	1695.96
POINT	ICLSTCK9	U-2Cement Mill – CM-1	98.6	35	1.25	13.6	353	0.59	-	-	355876.00	1846579.00	-6914.28	1468.96
POINT	ICLSTCK10	U-2Cement Mill – CM-2	92.45	35	1.25	14.2	353	0.641	-	-	355915.00	1846685.00	-6953.28	1362.96
POINT	ICLSTCK13	U-2Power plant	87.72	90	2	25	423	2.76	91.3		356214.00	1846824.00	-7252.28	1223.96
POINT	PARSTCK1	U-1Crusher	105.92	30	0.6	6.6	309	0.044	-	-	340048.00	1838513.00	8913.72	9534.96
POINT	PARSTCK2	U-1Kiln -1 RABH	103.53	80	2.1	12.58	458	1.304	0.92		340262.00	1838620.00	8699.72	9427.96
POINT	PARSTCK3	U-1Cooler ESP-1	105.51	32.4	2	11.6	503	0.835	-	-	340358.00	1838615.00	8603.72	9432.96
POINT	PARSTCK4	U-1Coal Mill-1	103.27	32.3	0.95	9.3	327	0.103	-	-	340270.00	1838644.00	8691.72	9403.96
POINT	PARSTCK5	U-1Cement mill-1	106.42	23	1	1.88	348	0.142	-	-	340491.00	1838511.00	8470.72	9536.96
POINT	PARSTCK6	U-2Raw mill-2	105.07	36.5	1.4	10.18	338	0.251	-	-	340291.00	1838547.00	8670.72	9500.96
POINT	PARSTCK7	U-2Kiln -2 RABH	104.6	90	3.7	11.12	438	1.84	1.42		340265.00	1838549.00	8696.72	9498.96
POINT	PARSTCK8	U-2Cooler ESP-2	106.33	35	3	10.33	448	1.24	-	-	340357.00	1838557.00	8604.72	9490.96
POINT	PARSTCK9	U-2Coal Mill-2	104.94	38	1.4	6.25	321	0.229	-	-	340294.00	1838556.00	8667.72	9491.96
POINT	PARSTCK10	U-2Cement mill-2	106.35	38	1.25	8.86	351	0.315	-	-	340494.00	1838512.00	8467.72	9535.96
POINT	PCILSTCK1	Crusher	91.9	22	0.65	9.39	312	0.04	-	-	360505.00	1848679.00	-11543.3	-631.04
POINT	PCILSTCK2	Raw mill / Kiln	91.94	87	3.5	11.4	394	2.24	0.8		360731.00	1848806.00	-11769.3	-758.04
POINT	PCILSTCK3	Clinker cooler ESP	91.18	35	3.2	10.5	423	1.55	-	-	360810.00	1848791.00	-11848.3	-743.04
POINT	PCILSTCK4	Coal Mill	91.1	36	1.1	7.31	331	0.07	-	-	360810.00	1848778.00	-11848.3	-730.04
POINT	PCILSTCK5	Cement mill-1	90.95	45	2.1	8.81	330	0.55	-	-	360983.00	1848778.00	-12021.3	-730.04
POINT	PCILSTCK6	Cement mill-2	90.77	45	2.1	9.48	333	0.73	-	-	360996.00	1848778.00	-12034.3	-730.04
POINT	PCILSTCK7	Power Plant	89.76	100	3.2	7.23	408	1.27	4.77		360578.00	1848497.00	-11616.3	-449.04
POINT	DCLSTCK1	Raw mill / Kiln	82.16	100	4.2	8.03	393	4.32	4.77		362572.00	1848076.00	-13610.3	-28.04
POINT	DCLSTCK2	Clinker cooler ESP	80.77	40	4	14	513	2.78	-	-	362617.00	1848167.00	-13655.3	-119.04
POINT	DCLSTCK3	Coal Mill	81.59	50	1.6	10.5	343	1.45	-	-	362578.00	1848154.00	-13616.3	-106.04
POINT	DCLSTCK4	Cement mill-1	82.24	50	1.2	10	343	1.09	-	-	362524.00	1848277.00	-13562.3	-229.04
POINT	DCLSTCK5	Power Plant	77.29	75	1.6	16.7	408	1.22	4.9		362849.00	1848094.00	-13887.3	-46.04
POINT	ACLSTCK1	Crusher	85.97	30	1.1	8.04	308	0.135	-	-	361816.00	1841522.00	-12854.3	6525.96
POINT	ACLSTCK2	Raw mill/ Kiln	96.1	70	5.6	11.07	473	1.89	20		361637.00	1841179.00	-12675.3	6868.96
POINT	ACLSTCK3	Clinker cooler	90.89	41	3.85	7.06	442	0.501	-	-	361719.00	1841193.00	-12757.3	6854.96
POINT	ACLSTCK4	Coal Mill	95.8	45	1.95	10.16	335	0.296	-	-	361630.00	1841104.00	-12668.3	6943.96
POINT	ACLSTCK5	Cement Mill – 1	93.37	45	1.2	9.86	368	0.165	-	-	361578.00	1841201.00	-12616.3	6846.96
POINT	ACLSTCK6	Cement Mill – 2	92.93	45	1.2	8.85	358	0.19	-	-	361573.00	1841203.00	-12611.3	6844.96
POINT	ACLSTCK7	Power plant	92.3	75	2.1	7.34	423	0.574	-	-	361572.00	1840997.00	-12610.3	7050.96
POINT	MHILSTCK1	Crusher	90.59	30	1	10	313	0.37	-	-	361626.00	1840049.00	-12664.3	7998.96
POINT	MHILSTCK2	Raw mill / Kiln	88.86	120	3.5	12	373	4.6	13.14		360480.00	1840400.00	-11518.3	7647.96
POINT	MHILSTCK3	Clinker cooler ESP	91.99	30	2.5	12	593	1.47	-	-	360288.00	1840316.00	-11326.3	7731.96
POINT	MHILSTCK4	Coal Mill	91.04	40	1.2	12	343	0.59	-	-	360254.00	1840237.00	-11292.3	7810.96
POINT	MHILSTCK5	Cement mill-1	93	40	1.5	10	343	0.77	-	-	360833.00	1840059.00	-11871.3	7988.96

Type	ID	Description	Stack based Elevation	Stack Height	Stack Diameter	Exit Velocity	Exit Temperature	Emission_Rate, gm/sec			Coordinates Of stack (in UTM)		Coordinates Of stack (in Cartesian)	
			[m]	[m]	[m]	[m/s]	[K]	PM	SO_2	NOx	X [m]	Y [m]	X [m]	Y [m]
POINT	MHILSTCK6	Cement mill-2	93.22	40	1.5	10	343	0.77	-	-	360768.00	1840029.00	-11806.3	8018.96
POINT	KGPSTCK1	Power Plant	71.38	100	3.5	15	423	8.8	55.6		354799.00	1843853.00	-5837.28	4194.96
POINT	TSGEN1	TSGENCO-1	86.02	275	7.6	24.3	358	27.9	93	93	348426.11	1848062.67	535.61	-14.71
POINT	TSGEN2	TSGENCO-2	86.02	275	7.6	24.3	358	27.9	93	93	348433.71	1848062.67	528.01	-14.71
POINT	TSGEN3	TSGENCO-3	86.68	275	7.6	24.3	358	27.9	93	93	348868.84	1848046.30	92.88	1.66
POINT	TSGEN4	TSGENCO-4	86.77	275	7.6	24.3	358	27.9	93	93	348876.44	1848046.30	85.28	1.66
POINT	TSGEN5	TSGENCO-5	88.88	275	7.6	24.3	358	27.9	93	93	349056.53	1848047.08	-94.81	0.88
POINT	TSGENLSSTCK1	TS Genco - LS stack	90.63	30	0.8	10	313	0.143	-	-	348844.27	1848285.10	117.45	-237.14

AREA SOURCES

Type	ID	Source base elevation	Source Length_X	Source Length_Y	Source Rotation_Angle	Emission_Rate Gm/sc/m2	Coordinates Of stack (in UTM)		Coordinates Of stack (in Cartesian)	
							X1 (UTM)	Y1 (UTM)	X1(CART)	Y1(CART)
AREA	ICLAREA1	83.25	25	25	0	0.0000023	356630.00	1847519.00	-7668.28	528.96
AREA	ICLAREA2	82.28	25	25	0	0.0000023	358323.00	1843385.00	-9361.28	4662.96
AREA	ICLAREA3	82.85	25	25	0	0.0000031	351152.00	1845055.00	-2190.28	2992.96
AREA	PARAREA1	91.51	25	25	0	0.0000058	341274.00	1838116.00	7687.72	9931.96
AREA	PCILAREA1	86.31	25	25	0	0.0000025	359713.00	1849121.00	-10751.3	-1073.04
AREA	DCLAREA1	74.84	25	25	0	0.000002	362067.00	1847851.00	-13105.3	196.96
AREA	ACLAREA1	69.65	25	25	0	0.000006	362031.00	1841943.00	-13069.3	6104.96
AREA	MHILAREA1	80.5	25	25	0	0.0000067	362419.00	1840504.00	-13457.3	7543.96
AREA	TSCOALAREA1	90.02	365	447	-36.57	0.00000055	348213.85	1848406.08	747.87	-358.12

LINE SOURCES

Type	ID	Emission_Rate gm/sec on total length	Source Base_Elev (m)		Start point Line source		End point Line source		Start point Line source		End point Line source	
			X1	Y1	X1 (UTM)	Y1(UTM)	X2(UTM)	Y2(UTM)	X1(CART)	Y1(CART)	X2(CART)	Y2(CART)
					M	M	M	M	M	M	M	M
LINE_VOLUME	ICLLINE1	0.071	83.03	89.20	356621.22	1847518.54	356062.00	1846725.00	-7659.5	529.42	-7100.28	1322.96
LINE_VOLUME	ICLLINE2	0.071	81.26	76.78	358098.00	1843461.00	357790.00	1843873.00	-9136.28	4586.96	-8828.28	4174.96
LINE_VOLUME	PARLINE1	0.021	95.04	106.77	341054.00	1838274.00	340024.00	1838516.00	7907.72	9773.96	8937.72	9531.96
LINE_VOLUME	PCILLINE1	0.076	85.98	91.95	359550.00	1848693.00	360490.00	1848678.00	-10588.3	-645.04	-11528.3	-630.04
LINE_VOLUME	DCLLINE1	0.0225	73.90	84.47	362015.00	1847904.00	362252.00	1848398.00	-13053.3	143.96	-13290.3	-350.04
LINE_VOLUME	ACLLINE1	0.058	80.97	86.17	361988.00	1841728.00	361831.00	1841530.00	-13026.3	6319.96	-12869.3	6517.96
LINE_VOLUME	MHILLINE1	0.082	0.00	0.00	361681.25	1840082.26	361916.07	1839707.42	-12719.5	7965.7	-12954.4	8340.54

i. Estimated ground level concentrations are plotted as isopleths using **SURFER – 8** graphics package.

Map showing sources, receptors network along with terrain considered for modelling studies is shown in **Fig – 4.2**

4.2.1.3 METEOROLOGICAL DATA

The meteorological data recorded at site during Post Monsoon (October, 2016) continuously on hourly basis on wind speed, wind direction & temperature have been processed to extract the data required for simulation. Stability classes computed for each hour is based on wind speed & solar radiation. Mixing heights representative of the region have been taken from the available published literature.

The guidelines of Central Pollution Control Board have been followed for the purpose of modelling. **Annexure – 4A** gives the hourly meteorological data of October, 2016 used for estimation of ground level concentrations.

4.2.1.4 GROUND LEVEL CONCENTRATIONS & CUMULATIVE GROUND LEVEL CONCENTRATIONS

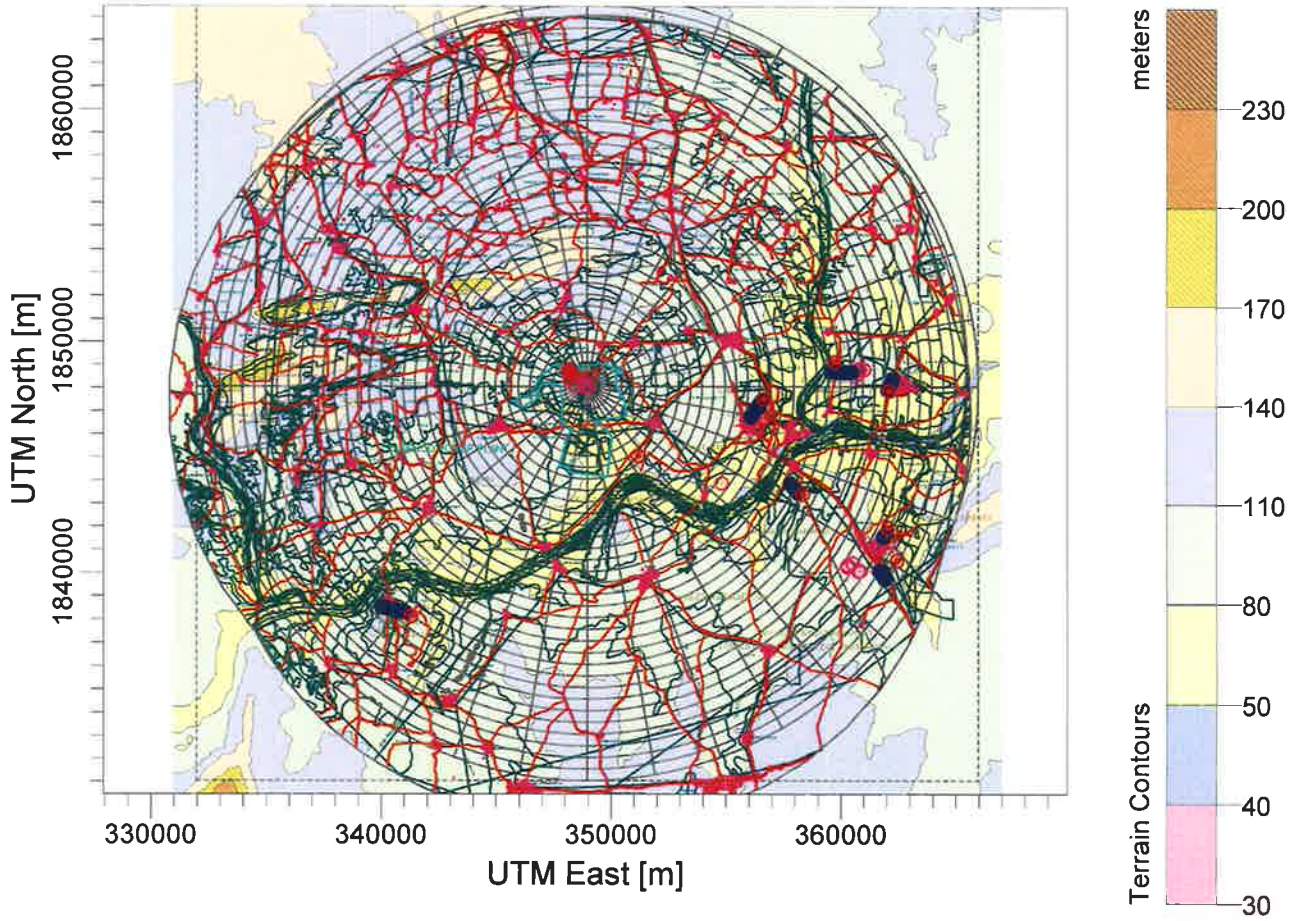
Ground Level concentrations are estimated considering the emissions from proposed power plant and cumulative ground level concentrations are estimated considering the emission details of the existing and proposed sources located within 15 km.

The emissions from the operating industries are reflecting in the baseline monitoring studies carried out during the study period. The additional emissions in 15 km radial extent are from the proposed industries. However, in order to assess the cumulative impact of all the industries within 15 km radius, emissions from all the listed industries (operating and proposed) have been considered for estimation of Cumulative Ground level concentrations of PM_{10}, SO_2 and NOx.

FIG – 4.2

MAP SHOWING DETAILS CONSIDERED FOR AIR QUALITY MODELING STUDIES

Sources : Point (points in pink), Area (box in pink) and Lines (path in blue) sources
Receptors : Placed at every 500 m at 10 deg angle (polar network)
Terrain : Indicated in colour scale (m)



The scenarios considered and ground level concentrations estimated are given in **Table - 4.5**.

TABLE - 4.5
GROUND LEVEL CONCENTRATION, µg/m³

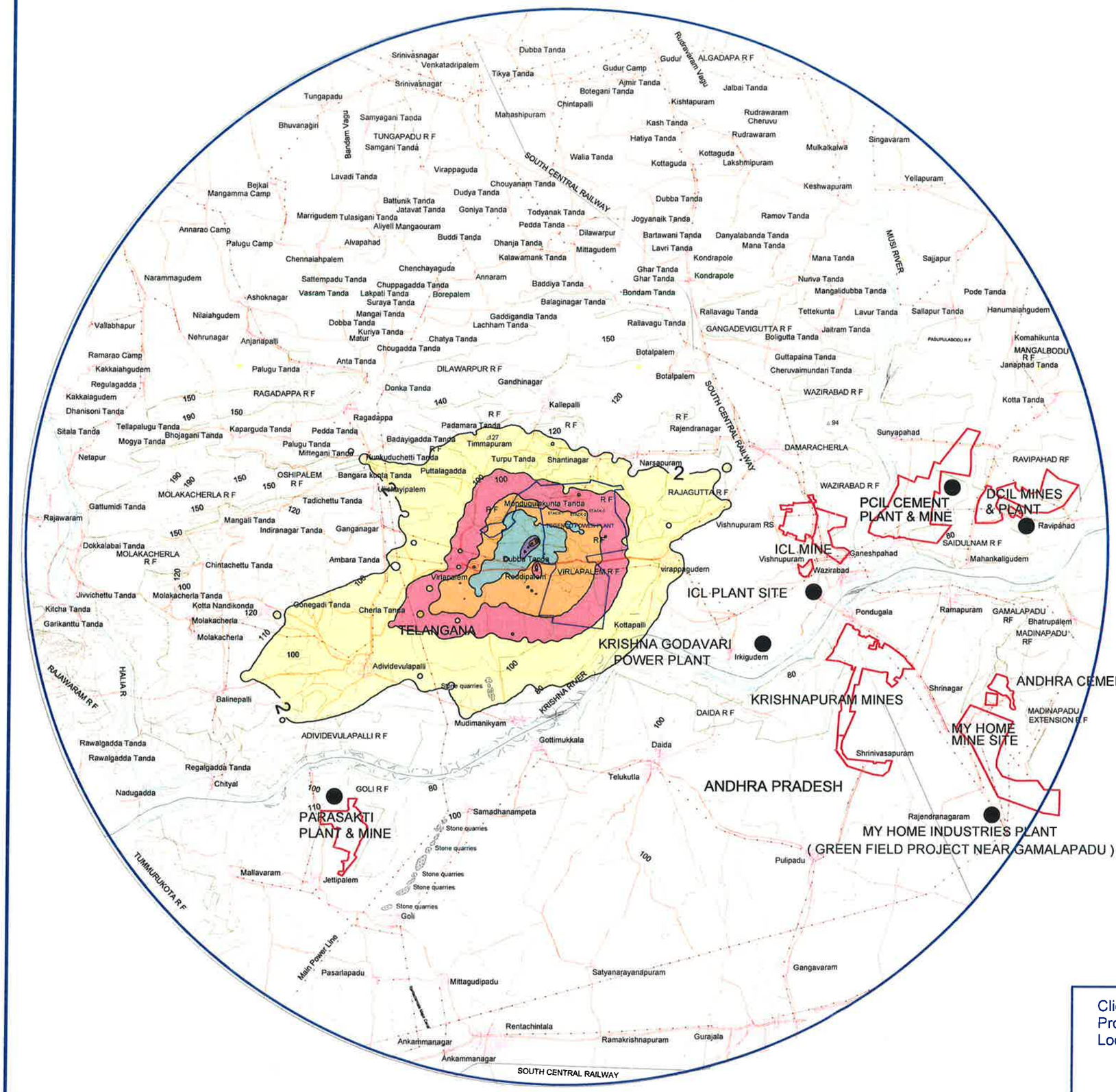
	Source	PM_{10}	SO_2	NOx
Scenario for Ground Level Concentrations				
Scenario – A	4000 MW Yadadri Thermal Power Station (5 x 800 MW)	13.44	18.18	18.18
Scenarios for Cumulative Ground Level Concentrations				
Scenario – B	Considering emissions from proposed industries (4000 MW Yadadri Thermal Power Station (5 x 800 MW), Krishna Godavari Power Plant (Not commissioned) and My Home Industries Ltd Plant (Green field project)	13.56	18.87	18.91
Scenario – C	Considering emissions from proposed and operating industries	13.99	31.76	30.38

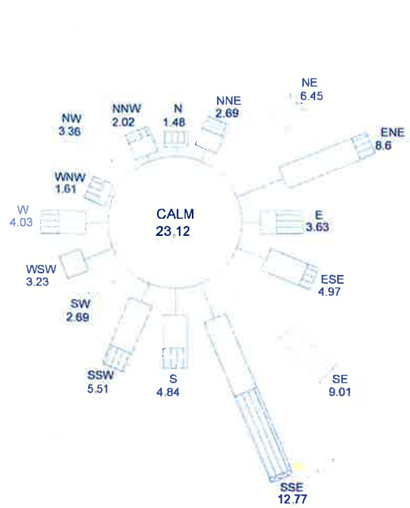
Isopleths showing the distribution of ground level concentrations (Scenario – A) of PM_{10}, SO_2 and NOx in the study area due to emissions from 4000 MW Yadadri Thermal Power Station (5 x 800 MW) are shown in **Fig – 4.3** to **Fig - 4.5**.

GLCs estimated under Scenario – B cover emissions from the proposed industries in 15 km radius **Fig – 4.6 - 4.8**.

Isopleths showing cumulative ground level concentrations for the worst case of Scenario – C (i.e all the proposed and existing operating plants) are shown in **Fig – 4.9 - 4.11.**

Ground level concentrations estimated under Scenario – C reflect the emissions of both proposed and operating industries in 15 km radius.





WINDROSE - POST MONSOON SEASON (OCTOBER), 2016.

ISOPLETH INTERVAL (ug/m3)

12 10 8 5 4 3 2

MAP SCALE (M)

0 5000 10000

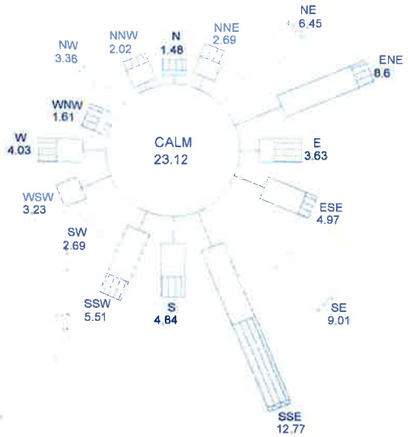
PREDICTED INCREMENTAL GROUNDLEVEL CONCENTRATION OF PARTICULATE MATTER (SCENARIO - A)

SOURCES :
Proposed 4000 MW Power Plant - TSGENCO

FIG-4.3

Client : Telangana State Power Generation Corporation
Project : 4000 MW (5 X 800 MW) Yadadri Thermal Power Station
Location : Veerlapalem Village, Damarcherla Mandal, Nalgonda (Dist), Telangana

PREPARED BY
B.S. ENVI-TECH PVT. LTD., SEC-BAD.



WINDROSE - POST MONSOON SEASON (OCTOBER), 2016.

ISOPLETH INTERVAL (ug/m3)

17 15 13 11 9 7 5

MAP SCALE (M)

0 5000 10000

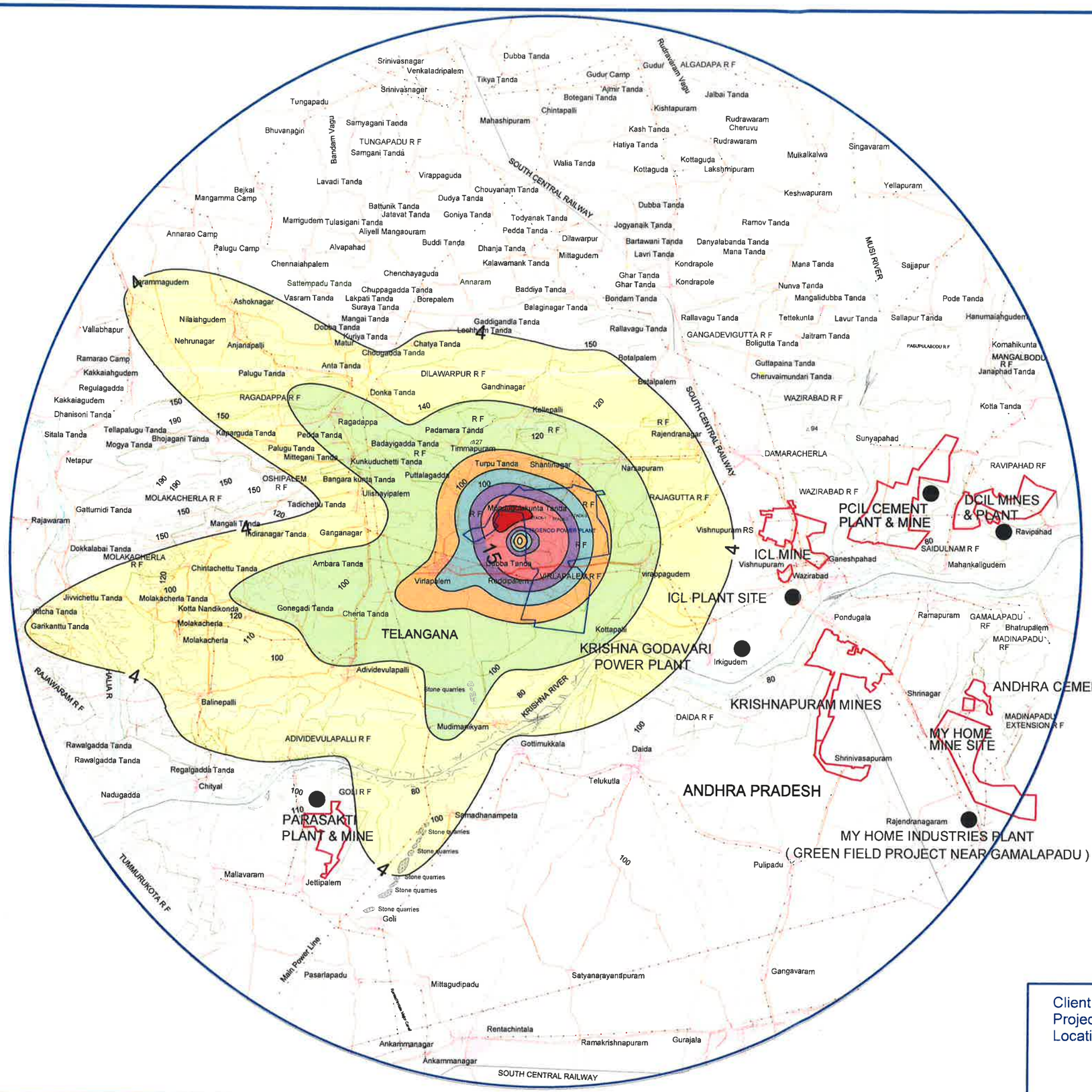
PREDICTED INCREMENTAL GROUNDLEVEL CONCENTRATION OF SULPHUR DIOXIDE (SCENARIO- A)

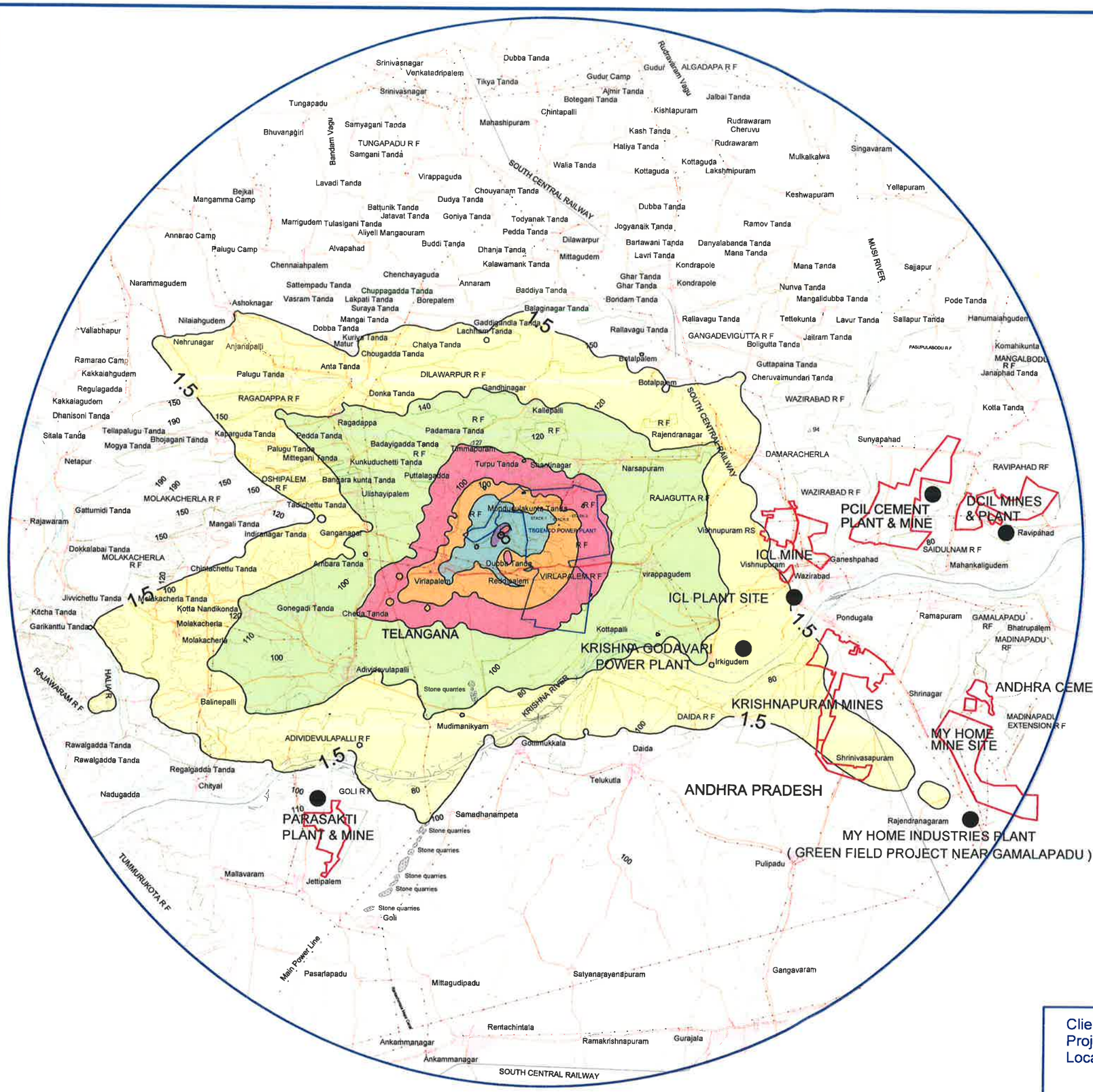
SOURCES :
Proposed 4000 MW Power Plant - TSGENCO

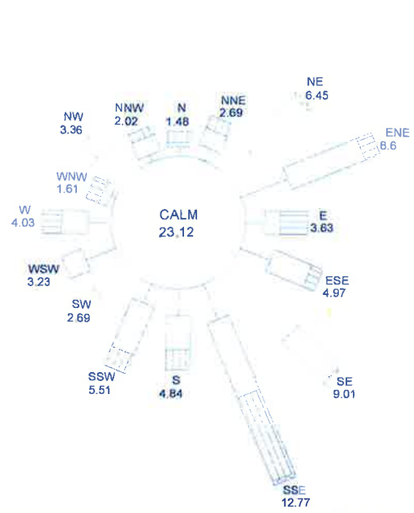
FIG-4.4

Client : Telangana State Power Generation Corporation
Project : 4000 MW (5 X 800 MW) Yadadri Thermal Power Station
Location : Veerlapalem Village, Damarcherla Mandal, Nalgonda (Dist), Telangana

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Srinivasnagar
Venkaladripalem
Srinivasnagar
Tungapadu
Bhuvanagiri
Samyagani Tanda
TUNGAPADU R F
Samgani Tanda
Bandam Vagu
Virappaguda
Lavadi Tanda
Bejkal
Mangamma Camp
Annarao Camp
Palugu Camp
Marrigudem
Tulasigani Tanda
Aliyell Mangaouram
Alvapahad
Chennaiahpalem
Dubba Tanda
Tikya Tanda
Chintapalli
Mahashipuram
Walia Tanda
Chouyanam Tanda
Dudya Tanda
Battunik Tanda
Jatavat Tanda
Goniya Tanda
Pedda Tanda
Buddi Tanda
Dhanja Tanda
Kalawamank Tanda
Annaram
Baddiya Tanda
Balaginagar Tanda
Gaddigandla Tanda
Leehhan Tanda
Chatya Tanda
Botalpalem
Gudur Camp
Gudur
ALGADAPA R F
Ajmir Tanda
Botegani Tanda
Jalbai Tanda
Kishtapuram
Kash Tanda
Hatiya Tanda
Kottaguda
Lakshmipuram
Rudrawaram Cheruvu
Rudrawaram
Mulkalkalwa
Singavaram
Yellapuram
Keshwapuram
Dubba Tanda
Jogyanaik Tanda
Todyanak Tanda
Ramov Tanda
Dilawarpur
Bartawani Tanda
Danyalabanda Tanda
Mana Tanda
Lavri Tanda
Mittagudem
Kondrapole
Ghar Tanda
Kondrapole
Mana Tanda
Sajjapur
Nunva Tanda
Mangalidubba Tanda
Pode Tanda
Bondam Tanda
Rallavagu Tanda
Tettekunta
Lavur Tanda
Sallapur Tanda
Hanumaiahgudem
Rallavagu Tanda
GANGADEVIGUTTA R F
Jaitram Tanda
Boligutta Tanda
Komahikunta
MANGALBODU R F
Janaphad Tanda
Guttapaina Tanda
Cheruvaimundari Tanda
Botalpalem
WAZIRABAD R F
Kotta Tanda
Sunyapahad
DAMARACHERLA
RAVIPAHAD RF
WAZIRABAD R F
PCIL CEMENT PLANT & MINE
DCIL MINES & PLANT
Ravipahad
SAIDULNAM R F
Ganeshpahad
Mahankaligudem
ICL MINE
Vishnupuram
Wazirabad
ICL PLANT SITE
Pondugala
Ramapuram
GAMALAPADU RF
Bhatrupalem
MADINAPADU RF
KRISHNA GODAVARI POWER PLANT
Irkigudem
Kottapalli
TELANGANA
ANDHRA PRADESH
KRISHNAPURAM MINES
Shrinagar
ANDHRA CEMENTS
DAIDA R F
MADINAPADU EXTENSION R F
MY HOME MINE SITE
Shrinivasapuram
Daida
Gottimukkala
Telukutla
Rajendranagaram
MY HOME INDUSTRIES PLANT
(GREEN FIELD PROJECT NEAR GAMALAPADU)
Pulipadu
PAINAMPALLY R F
PAINAMPALLY RS
PAINAMPALLY





WINDROSE - POST MONSOON SEASON (OCTOBER), 2016.

ISOPLETH INTERVAL (ug/m3)

12 10 8 5 4 3 2 1.5

MAP SCALE (M)

0 5000 10000

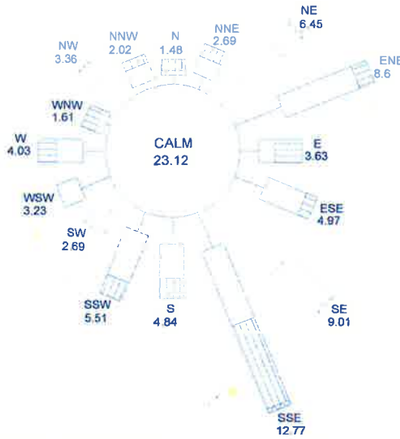
PREDICTED INCREMENTAL GROUNDLEVEL CONCENTRATION OF PARTICULATE MATTER (SCENARIO - B)

SOURCES :
1. Proposed 4000 MW Power Plant - TSGENCO
2. Proposed Power Plant Of KGPUL
3. Proposed Cement Plant And Limestone Mine Of Myhome Cement Industries Ltd

FIG-4.6

Client : Telangana State Power Generation Corporation
Project : 4000 MW (5 X 800 MW) Yadadri Thermal Power Station
Location : Veerlapalem Village, Damarcherla Mandal, Nalgonda (Dist), Telangana

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WINDROSE - POST MONSOON SEASON (OCTOBER), 2016.

ISOPLETH INTERVAL (ug/m3)

18	15	13	11	9	7	5

MAP SCALE (M)

0 5000 10000

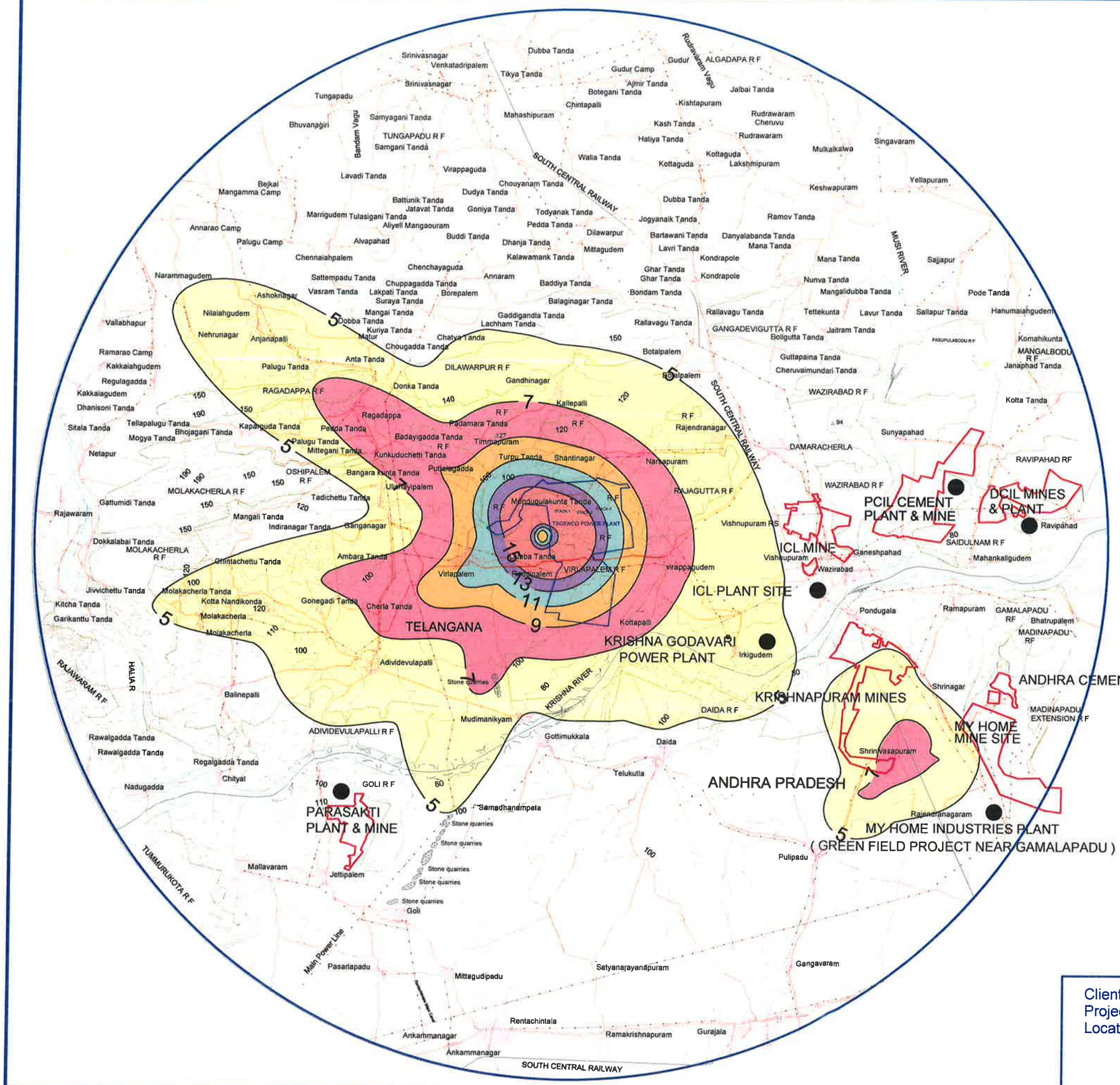
PREDICTED INCREMENTAL GROUNDLEVEL CONCENTRATION OF SULPHUR DIOXIDE (SCENARIO- B)

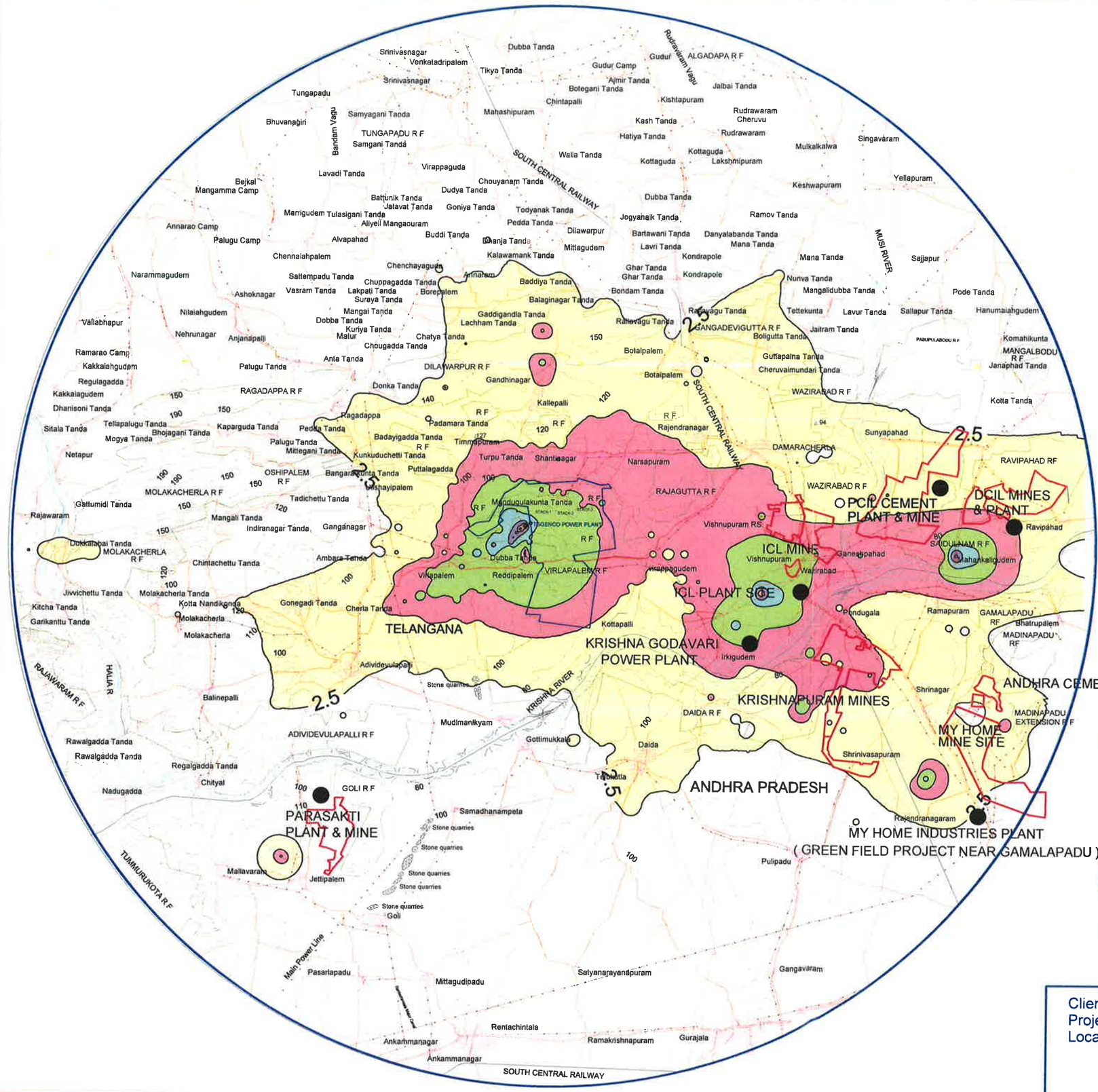
SOURCES :
1. Proposed 4000 MW Power Plant - TSGENCO
2. Proposed Power Plant Of KGPUL
3. Proposed Cement Plant And Limestone Mine Of Myhome Cement Industries Ltd

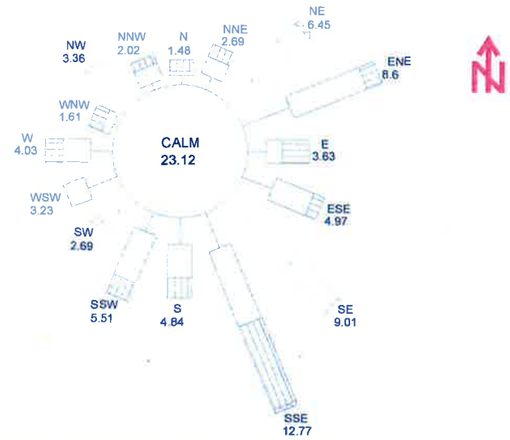
FIG-4.7

Client : Telangana State Power Generation Corporation
Project : 4000 MW (5 X 800 MW) Yadadri Thermal Power Station
Location : Veerlapalem Village, Damarcherla Mandal, Nalgonda (Dist), Telangana

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TUNGAPADU R F
DILAWARPUR R F
RAGADAPPA R F
OSHIPALEM R F
MOLAKACHERLA R F
RAJAGUTTA R F
GANGADEVIGUTTA R F
WAZIRABAD R F
ALGADAPA R F
MANGALBODU R F
SAIDULNAM R F
RAVIPAHAD RF
GAMALAPADU RF
MADINAPADU RF
MADINAPADU EXTENSION R F
ADIVIDEVULAPALLI R F
GOLI R F
TUMMURUKOTA R F
RAJAWARAM R F
DAIDA R F
PASUPULABODU R F
SOUTH CENTRAL RAILWAY
MUSI RIVER
KRISHNA RIVER
Bandam Vagu
Rudravaram Vagu
TELANGANA
ANDHRA PRADESH
ICL PLANT SITE
ICL MINE
PCIL CEMENT PLANT & MINE
DCIL MINES & PLANT
KRISHNAPURAM MINES
ANDHRA CEMENTS
MY HOME MINE SITE
MY HOME INDUSTRIES PLANT
(GREEN FIELD PROJECT NEAR GAMALAPADU)
KRISHNA GODAVARI POWER PLANT
PAIRASAKTI PLANT & MINE
DAMARACHERLA
VISHNUPURAM RS
Vishnupuram
Wazirabad
Ravipahad
Ganeshpahad
Mahankaligudem
Sunyapahad
Narsapuram
Rajendranagar
Shrinagar
Shrinivasapuram
Rajendranagaram
Pondugala
Ramapuram
Bhatrupalem
Irkigudem
Kottapalli
Virlapalem
Virappagudem
Menduqulakunta Tanda
Ambara Tanda
Ganganagar
Indiranagar Tanda
Mittegani Tanda
Kunkuduchetti Tanda
Turpu Tanda
Shantinagar
Bangara Kunta Tanda
Putlewagadda
Ullindlyipalem
Tadichettu Tanda
Mangali Tanda
Ghintachettu Tanda
Molakacherla Tanda
Kotta Nandikonda
Gonegadi Tanda
Cherla Tanda
Adividevulapalli
Stone quarries
Mudimanikyam
Gottimukkala
Daida
Telukutla
Pulipadu
Samadhanampeta
Goli
Jettipalem
Mallavaram
Pasarlapadu
Mittagudipadu
Satyanarayandpuram
Gangavaram
Rentachintala
Ankammanagar
Ramakrishnapuram
Gurajala
Main Power Line
Srinivasnagar
Venkatadripalem
Tikya Tanda
Gudur Camp
Gudur
Ajmir Tanda
Botegani Tanda
Jaibai Tanda
Chintapalli
Kishtapuram
Rudrawaram Cheruvu
Rudrawaram
Kash Tanda
Hatiya Tanda
Singavaram
Mulkalkalwa
Kottaguda
Lakshmipuram
Walia Tanda
Yellapuram
Keshwapuram
Mahashipuram
Samyagani Tanda
Samgani Tanda
Bhuvanagiri
Virappaguda
Lavadi Tanda
Bejkal
Mangamma Camp
Chouyanam Tanda
Dudya Tanda
Battunik Tanda
Jatavat Tanda
Goniya Tanda
Todyanak Tanda
Marrigudem Tulasigani Tanda
Aliyell Mangaouram
Annarao Camp
Palugu Camp
Alvapahad
Buddi Tanda
Dhanja Tanda
Pedda Tanda
Jogyanaik Tanda
Dubba Tanda
Ramov Tanda
Dilawarpur
Bartawani Tanda
Danyalabanda Tanda
Mana Tanda
Mittagudem
Lavri Tanda
Kalawamank Tanda
Kondrapole
Mana Tanda
Sajjapur
Chennaiahpalem
Chenchayaguda
Annaram
Ghar Tanda
Ghar Tanda
Kondrapole
Nunva Tanda
Narammagudem
Sattempadu Tanda
Chuppagadda Tanda
Baddiya Tanda
Bondam Tanda
Mangalidubba Tanda
Pode Tanda
Ashoknagar
Vasram Tanda
Lakpati Tanda
Borepalem
Suraya Tanda
Balaginagar Tanda
Nilaiahgudem
Mangai Tanda
Gaddigandla Tanda
Rallavagu Tanda
Tettekunta
Lavur Tanda
Sallapur Tanda
Hanumaiahgudem
Vallabhapur
Dobba Tanda
Kuriya Tanda
Lachham Tanda
Rallavagu Tanda
Nehrunagar
Matur
Chatya Tanda
Anjanapalli
Chougadda Tanda
Jaitram Tanda
Boligutta Tanda
Komahikunta
Botalpalem
Ramarao Camp
Anta Tanda
Palugu Tanda
Guttapaina Tanda
Janaphad Tanda
Kakkaiahgudem
Donka Tanda
Gandhinagar
Cheruvaimundari Tanda
Regulagadda
Kakkaiagudem
Kallepalli
Kotta Tanda
Dhanisoni Tanda
Ragadappa
Padamara Tanda
Sitala Tanda
Tellapalugu Tanda
Kapanguda Tanda
Pedda Tanda
Bhojagani Tanda
Badayigadda Tanda
Timmapuram
Mogya Tanda
Netapur
Rajawaram
Gattumidi Tanda
Dokkalabai Tanda
Jivvichettu Tanda
Kitcha Tanda
Garikanttu Tanda
Balinepalli
Rawalgadda Tanda
Rawalgadda Tanda
Regalgadda Tanda
Chityal
Nadugadda
Halia R
Stone quarries
Stone quarries
Stone quarries
Stone quarries
Stone quarries
Goli
Ramapuram
Shrinivasapuram
Ramakrishnapuram
Ankammanagar
Gurajala
Rentachintala
Satyanarayandpuram
Mittagudipadu
Pasarlapadu
Mallavaram
Jettipalem
Pulipadu
Gangavaram
Daida
Gottimukkala
Mudimanikyam
Adividevulapalli
Stone quarries
Virlapalem
Virappagudem
Kottapalli
Irkigudem
Vishnupuram
Wazirabad
Ravipahad
Ganeshpahad
Mahankaligudem
Sunyapahad
Narsapuram
Rajendranagar
Shrinagar
Shrinivasapuram
Rajendranagaram
Pondugala
Ramapuram
Bhatrupal





WINDROSE - POST MONSOON SEASON (OCTOBER), 2016.

ISOPLETH INTERVAL (ug/m3)

12.5 10.5 8.5 6.5 4.5 3.5 2.5

MAP SCALE (M)

0 5000 10000

GROUNDLEVEL CONCENTRATIONS OF PARTICULATE MATTER DUE TO EXISTING AND PROPOSED SOURCES (SCENARIO - C)

PROPOSED SOURCES :

1. Proposed 4000 MW Power Plant - TSGENCO
2. Proposed Power Plant Of KGPUL
3. Proposed Cement Plant And Limestone Mine Of Myhome Cement Industries Ltd

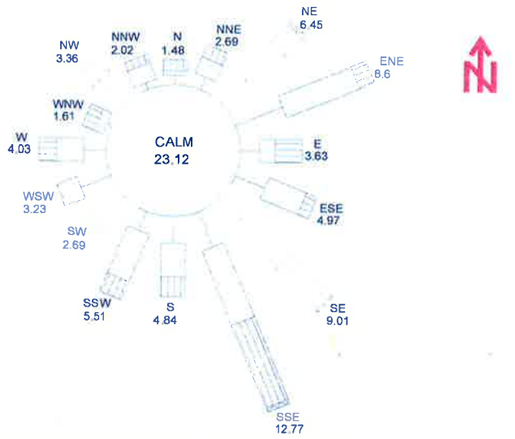
OPERATING SOURCES :

1. India Cements Limited - Cement Plant, Captive Power Plant and Mine
2. Parasakti Cements - Cement Plant and Mine
3. Penna Cements - Cement Plant, Captive Power Plant and Mine
4. Deccan Cements - Cement Plant, Captive Power Plant and Mine
5. Andhra Cements - Cement Plant and Mine

FIG-4.9

Client : Telangana State Power Generation Corporation
Project : 4000 MW (5 X 800 MW) Yadadri Thermal Power Station
Location : Veerlapalem Village, Damarcherla Mandal, Nalgonda (Dist), Telangana

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WINDROSE - POST MONSOON SEASON (OCTOBER), 2016.

ISOPLETH INTERVAL (ug/m3)

30 28 21 16 12 10 8 5

MAP SCALE (M)

0 5000 10000

GROUNDLEVEL CONCENTRATIONS OF SULPHUR DIOXIDE DUE TO EXISTING AND PROPOSED SOURCES (SCENARIO- C)

PROPOSED SOURCES :

1. Proposed 4000 MW Power Plant - TSGENCO
2. Proposed Power Plant Of KGPUL
3. Proposed Cement Plant And Limestone Mine Of Myhome Cement Industries Ltd

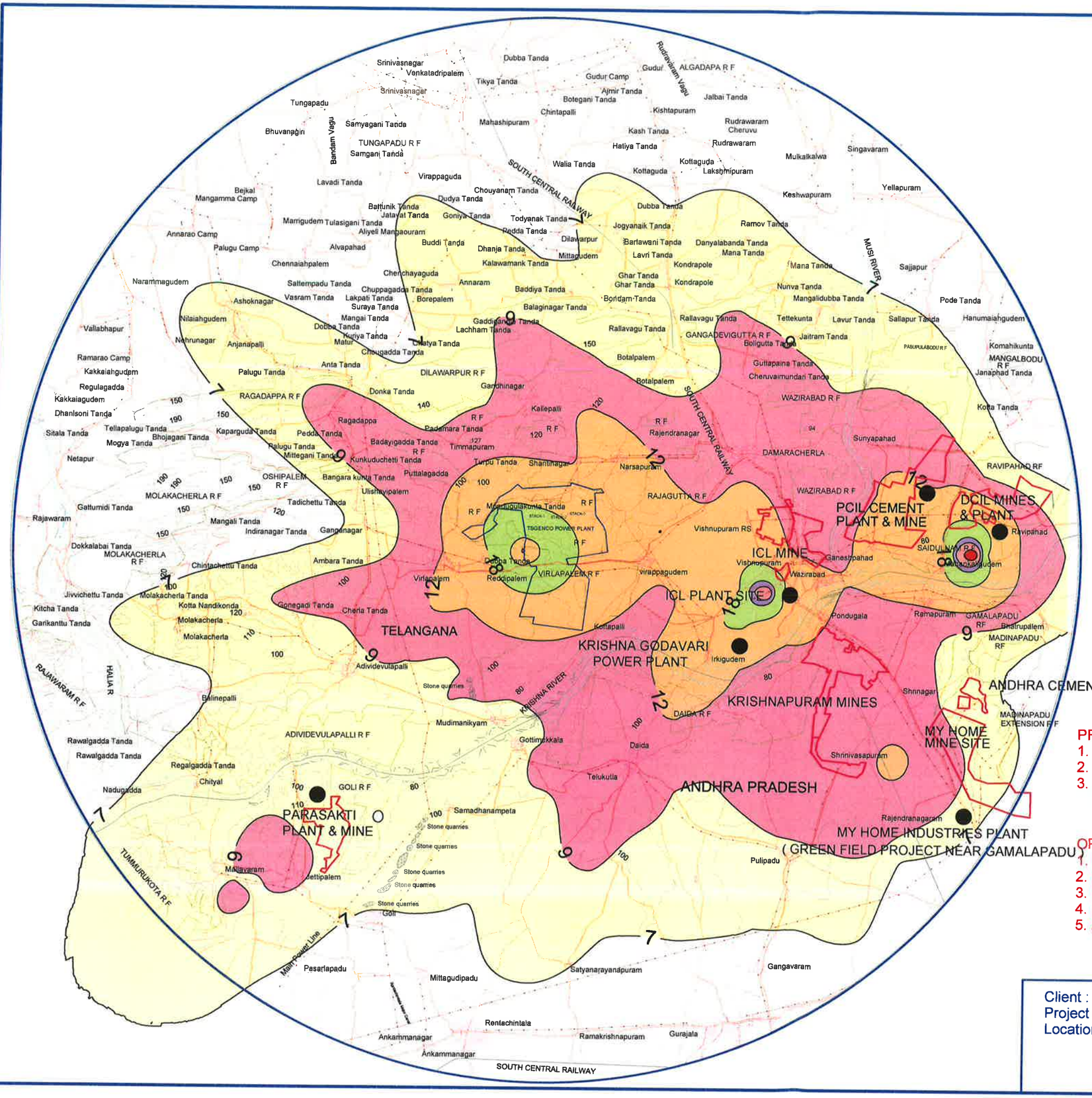
OPERATING SOURCES :

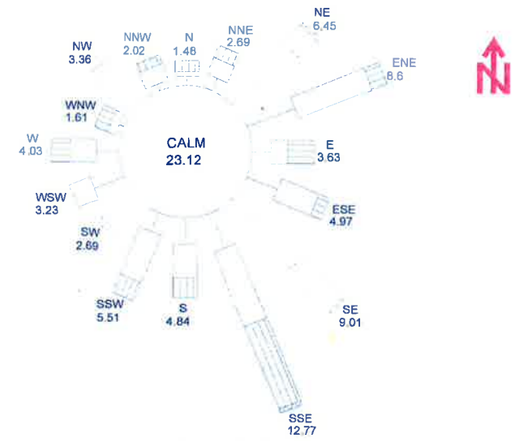
1. India Cements Limited - Cement Plant, Captive Power Plant and Mine
2. Parasakti Cements - Cement Plant and Mine
3. Penna Cements - Cement Plant, Captive Power Plant and Mine
4. Deccan Cements - Cement Plant, Captive Power Plant and Mine
5. Andhra Cements - Cement Plant and Mine

FIG-4.10

Client : Telangana State Power Generation Corporation
Project : 4000 MW (5 X 800 MW) Yadadri Thermal Power Station
Location : Veerlapalem Village, Damarcherla Mandal, Nalgonda (Dist), Telangana

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WINDROSE - POST MONSOON SEASON (OCTOBER), 2016.

ISOPLETH INTERVAL (ug/m3)

28 25 23 18 12 9 7

MAP SCALE (M)

0 5000 10000

GROUNDLEVEL CONCENTRATIONS OF OXIDES OF NITROGEN DUE TO EXISTING AND PROPOSED SOURCES (SCENARIO- C)

PROPOSED SOURCES :

1. Proposed 4000 MW Power Plant - TSGENCO
2. Proposed Power Plant Of KGPUL
3. Proposed Cement Plant And Limestone Mine Of Myhome Cement Industries Ltd

OPERATING SOURCES :

1. India Cements Limited - Cement Plant, Captive Power Plant and Mine
2. Parasakti Cements - Cement Plant and Mine
3. Penna Cements - Cement Plant, Captive Power Plant and Mine
4. Deccan Cements - Cement Plant, Captive Power Plant and Mine
5. Andhra Cements - Cement Plant and Mine

FIG-4.11

Client : Telangana State Power Generation Corporation
Project : 4000 MW (5 X 800 MW) Yadadri Thermal Power Station
Location : Veerlapalem Village, Damarcherla Mandal, Nalgonda (Dist), Telangana

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Cumulative Ground level concentrations computed under Scenario – C shows the overall contribution of existing and proposed industries in an area of 15 km radius. It may be noted that emissions from the operating industries are already covered in the baseline concentrations monitored during the study period.

In order to estimate overall scenario, the incremental cumulative ground level concentration due TO emissions from proposed industries computed under Scenario – B are superimposed on the baseline concentrations (village wise) to estimate the overall post project scenario which would prevail at the post operational phase. The overall scenario of PM_{10}, SO_2 and NOx are given in **Table – 4.6**.

It can be seen from the isopleths plotted for cumulative Scenario - B and Scenario – C, that there is no overlap of concentration of one industry on the other due to inter distance of various industries and position of the emission sources. Also the subject power plant will have release of emission from stacks of 275 m height as compared to other plant stacks located within 15 km radius. The overall scenario is well within the limits of NAAQ standard.

50 high 24-hourly average ground level concentrations of PM_{10}, SO_2 and NOx estimated for Scenario – A, B and C are enclosed as **Annexure – 4B.**

4.2.1.5 AIR POLLUTION CONTROL MEASURES

The power project is a coal based power plant where imported coal or blended coal would be used as fuel. Particulate Matter, SO_2 and NOx are the major pollutants emitted due to combustion of coal containing Sulphur content of 0.61-0.80 % (max).

Air pollution control measures of Power plant have been redesigned at an additional cost, considering ***FLUE GAS TREATMENT SYSTEM*** to comply with the following new emission norms of MoEF & CC stipulated for Thermal Power Plants as per the Gazette Notification S.O. 3305 (E) dated 07.12.2015

TABLE – 4.6

AMBIENT AIR QUALITY - OVERALL SCENARIO

Station Code	Locations	GROUND LEVEL CONCENTRATIONS, UG/M³			NAAQ standard for Industrial, Rural and Residential Areas
		BASELINE CONCENTRATION	INCREMENTAL CUMULATIVE CONCENTRATION	OVERALL CONCEN-TRATION	
PARTICULATE MATTER (PM10)					
A1	Project Site	50.9	5.0	55.9	100
A2	Veerappagudem	40.4	3.0	43.4	
A3	Wazirabad	61.5	<1.5	63.0	
A4	Daida	35.3	<1.5	36.8	
A5	Gottimukkala	48.6	2.0	50.6	
A6	Adividevulapalli	41.2	3.0	44.2	
A7	Veerlapalem	40.7	8.0	48.7	
A8	Ragadappa	39.8	3.0	42.8	
A9	Kallepalli	42.6	3.0	45.6	
A10	Damercherla	64.2	2.0	66.2	
SULPHUR DIOXIDE					
A1	Project Site	9.6	18.0	27.6	80
A2	Veerappagudem	10.1	9.0	19.1	
A3	Wazirabad	14.1	<5	19.1	
A4	Daida	8.3	7.0	15.3	
A5	Gottimukkala	11.3	<5	16.3	
A6	Adividevulapalli	10.1	7.0	17.1	
A7	Veerlapalem	9.4	11.0	20.4	
A8	Ragadappa	8.7	9.0	17.7	
A9	Kallepalli	10.1	7.0	17.1	
A10	Damercherla	12.5	<5	12.5	
OXIDES OF NITROGEN					
A1	Project Site	10.8	20	30.8	80
A2	Veerappagudem	11.4	9.0	20.4	
A3	Wazirabad	16.2	<5	21.2	
A4	Daida	10.5	<5	15.5	
A5	Gottimukkala	13.1	<5	18.1	
A6	Adividevulapalli	12.6	7.0	19.6	
A7	Veerlapalem	11.2	11.0	22.2	
A8	Ragadappa	10.3	9.0	19.3	
A9	Kallepalli	12.2	9.0	21.2	
A10	Damercherla	14.8	<5	19.8	

ESP outlet dust concentration	: 30 mg/Nm^3
SOx	: 100 mg/Nm^3
NOx	: 100 mg/Nm^3
Mercury	: 0.03 ppm

Flue gas treatment system is proposed for:

a. Reduction of Particulate emissions
b. Reduction of SO_2 emissions
c. Reduction of NO_x emissions

A REDUCTION IN PARTICULATE MATTER

ESP design initially considered for implementation for control of particulate matter was redesigned to meet outlet dust concentration of 30 mg/Nm^3. The design of ESP has been revised and reduction in particulate matter emission will be obtained by adding one more field in series along the gas path of the Electrostatic precipitator. Accordingly 10 fields are considered in series along the gas path.

B REDUCTION IN SO_2 BY INSTALLING FGD SYSTEM

The power project is designed to meet the SO_2 limit of 100 mg/Nm^3 by adopting the Flue gas desulphurization system (FGD). Wet Flue Gas Desulphurisation System will be installed for reduction of SO_2.

SO_2 is formed at elevated temperature in furnace combustion and oxidation of sulphur in coal. The power project is based on use of blend coal or imported coal having sulphur content of 0.61 and 0.80 % respectively. SO_2 generation is present in flue gas in the order of 1500-3600 mg/Nm^3 in dry gas at 6% Oxygen for different ranges of coal having specified sulphur content which is higher than limits specified in new emission norm. Hence FGD is proposed for mitigation and control of SO_2 in flue gas to a design value of 100 mg/Nm^3 in dry flue gas at 6% Oxygen. Among the available technology options, Wet Limestone FGD has been

considered as it is most reliable and suitable for large gas volume rates and higher absorption efficiencies.

In the FGD, SO_2 in the flue gas comes in contact with the $CaCO_3$ in the limestone slurry producing $CaSO_3$. The diluted $CaSO_3$ is converted to $CaSO_4$ which is finally crystallized to gypsum.

The absorption of sulphur dioxide in wet desulfurization units is realized in absorption towers. The flue gas generated from power station is de-dusted in electrostatic precipitator. The de-dusted flue gas is pressurized in Boost up Fan (BUF) to compensate for the pressure drop in FGD system. The flue gas is scrubbed in SO_2 absorption towers with the aid of limestone slurry and is discharged through the stack. Simultaneously, the slurry rich in SO_3^{2-} ions is oxidized to SO_4^{2-} in oxidization tank (integrated with the absorber module) and ultimately results in the formation of gypsum, which crystallizes out when given sufficient resident time.

The FGD Plant will consist of Limestone handling system, Limestone slurry preparation system, Absorber System, Gypsum dewatering system, Gypsum handling system & Process water system. Regenerative type Gas-Gas-Heater will be employed to enhance the flue gas temperature at stack inlet to allow natural draft and eliminate the possibility of condensed moist plume at stack outlet. In the proposed design, limestone purity of >90%, Gypsum Purity of 90%, Limestone storage of 5 days and Gypsum storage of 2 days for all 5 units has been considered.

The approximate requirement for Limestone is 15-20 TPH per unit, Gypsum production is 25-30 TPH per unit and make up water consumption is 124 m^3/hr per unit. The flue gas temperature ≥85 deg C has been considered at outlet of FGD Plant at normal plant operation. The FGD Plant will be bypassed during unit startup & low loads due to adverse impact of HFO/LDO in flue gas on FGD System equipment and yield quality of Gypsum. Any partial operation of FGD Plant with simultaneous bypass of flue gas from FGD Bypass damper is not

considered since to meet the stipulated emission limit 100% flue gas treatment is necessary.

FGD System is designed considering the following

- One FGD Absorber system per boiler
- Common Limestone Slurry Preparation System for all the boilers
- Common Gypsum Dewatering System for all the boilers

Sulphur balance of the project considering the FGD is given in **Fig – 4.12**

The overview of FGD system is shown in **Fig – 4.13**

C REDUCTION IN NO_X BY INSTALLING SELECTIVE CATALYTIC REDUCTION

The power project is designed to meet the NOx limit of 100 mg/Nm^3. NOx reduction will be achieved in two stages to attain the NOx level of 100 mg/Nm^3 in these boilers:

Stage - I: Design of Combustion System to meet the NOx level of 300 mg/Nm^3.

Stage – II: Installing SCR (Selective Catalytic Reduction) to meet the NOx level of 100 mg/Nm^3

SCR is proposed to reduce NOx level efficiently to 100 mg/Nm^3. SCR will be located between the economizer outlet and APH inlet.

The SCR-process consists mainly of the anhydrous ammonia supply system including storage plant with filling station for the reduction agent, ammonia circulation pumps, mixing and distribution units, injection and mixing system and the SCR reactor.

The SCR mixing and distribution units will be located close to the ammonia injection system which is placed downstream of the boiler outlet and upstream of the SCR reactor.

FIG - 4.12

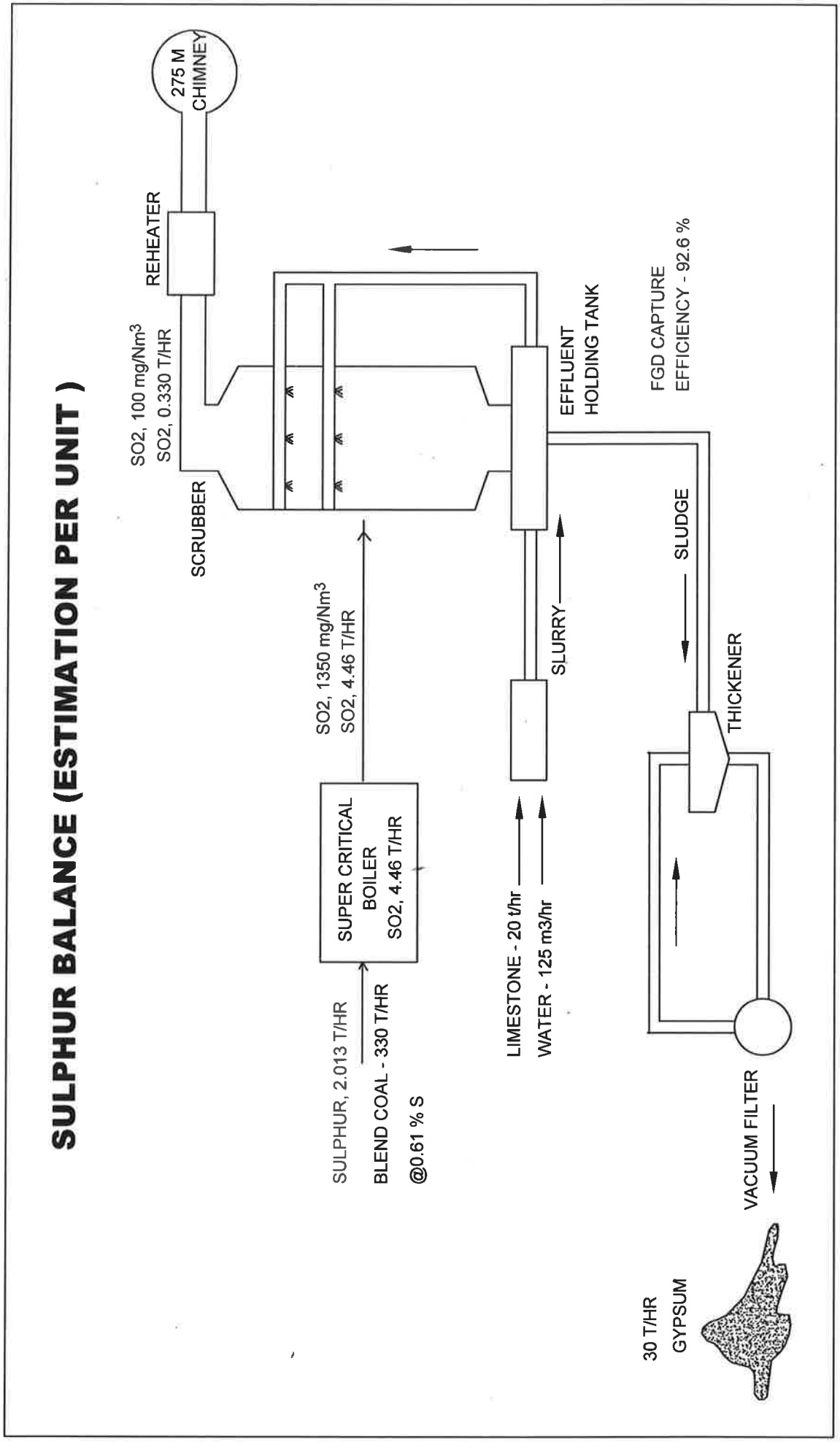
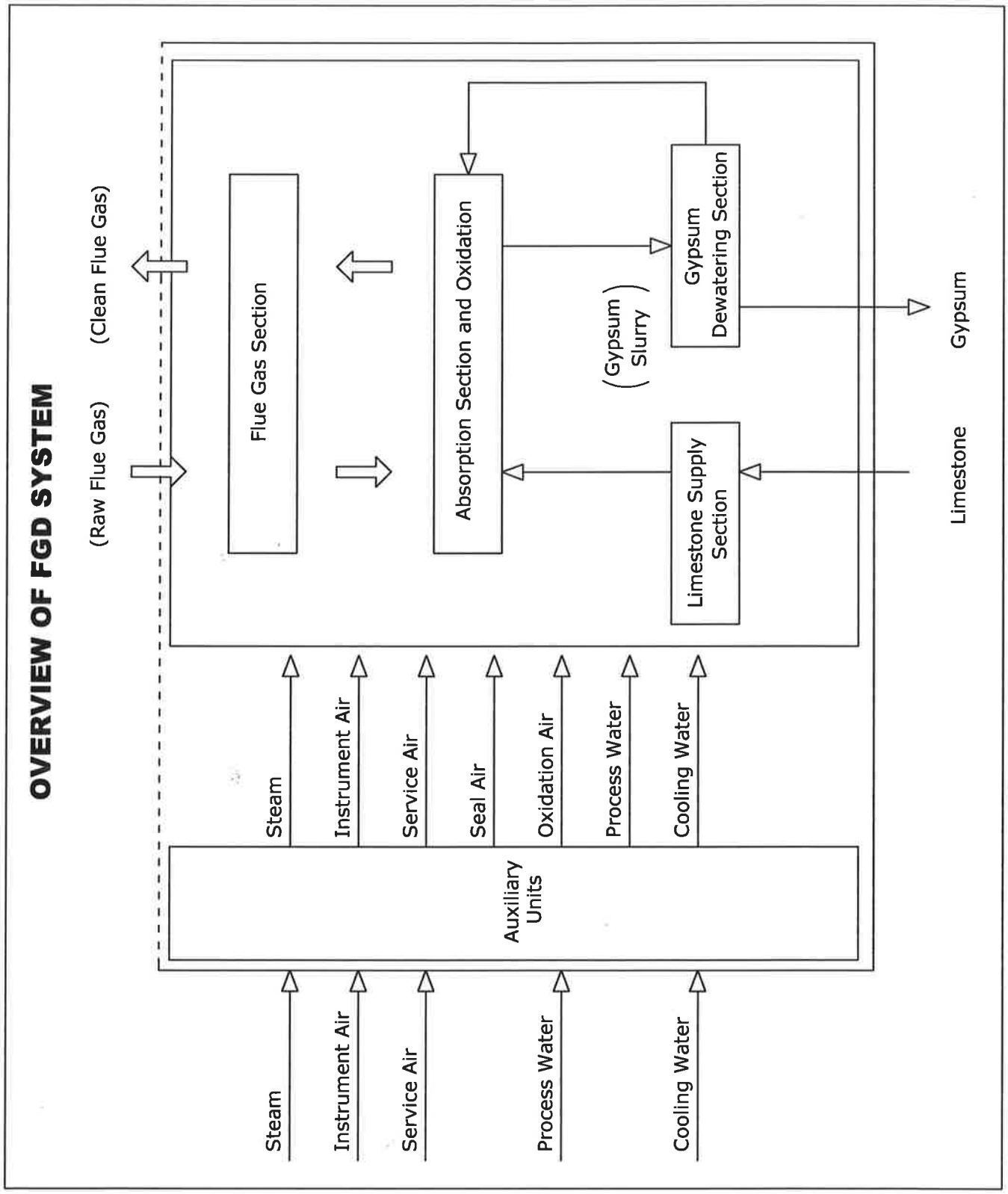

SULPHUR BALANCE (ESTIMATION PER UNIT)
275 M CHIMNEY
REHEATER
SO2, 100 mg/Nm3
SO2, 0.330 T/HR
SCRUBBER
EFFLUENT HOLDING TANK
FGD CAPTURE EFFICIENCY - 92.6 %
SO2, 1350 mg/Nm3
SO2, 4.46 T/HR
SUPER CRITICAL BOILER
SO2, 4.46 T/HR
SLURRY
SLUDGE
THICKENER
SULPHUR, 2.013 T/HR
BLEND COAL - 330 T/HR
@0.61 % S
LIMESTONE - 20 t/hr
WATER - 125 m3/hr
VACUUM FILTER
30 T/HR
GYPSUM

FIG - 4.13


OVERVIEW OF FGD SYSTEM
(Raw Flue Gas)
(Clean Flue Gas)
Flue Gas Section
Absorption Section and Oxidation
Gypsum Dewatering Section
(Gypsum Slurry)
Limestone Supply Section
Limestone
Gypsum
Steam
Instrument Air
Service Air
Seal Air
Oxidation Air
Process Water
Cooling Water
Auxiliary Units
Steam
Instrument Air
Service Air
Process Water
Cooling Water

The flue gas passes the reactor inlet system and the catalyst from top end flows to the bottom of the SCR reactor.

Typical SCR arrangement is shown in **Fig – 4.14** for illustration purposes:

SCR will consist of the following salient components / assemblies:

SCR reactor: The SCR reactor is a high dust, hot side arrangement located downstream of the economizer and upstream of the two air preheaters. Flue gas will flow vertically down through the catalyst layers. There will be two SCR reactor with two outlets located directly above the two air preheaters. Adequate clearance between catalyst layers will be provided to facilitate loading and unloading of modules as well as internal reactor inspections. Multiple layers of catalyst is provided. All ductwork in SCR system contains adequate vanes, baffles, and mixing devices to ensure that gas velocity, temperature and ammonia distribution requirements are met. The vanes and mixing devices are designed to promote streamlined flow. A spare layer accommodating the future addition for minimum one layer is provided. The SCR system has a reactor bypass to be used during start-up, shutdown and emergency conditions.

Catalyst: The catalyst supplied will be plate or honeycomb type with a vanadium/titanium composition. Catalyst pitch will be selected to provide an optimized design of geometric surface area versus volume and differential pressure. The module framework is constructed of carbon steel material.

Ammonia unloading : The reduction agent is delivered in road tank trucks. During the unloading process, it is placed in a catch basin in order to collect any spillage of ammonia. An unloading pump is used to empty the tank trucks and fill the storage tank.

Ammonia tank : The ammonia tank will be located outdoors at a location to be determined later. The capacity of the ammonia storage tank will be based upon seven (7) days storage based on ammonia flow requirement.

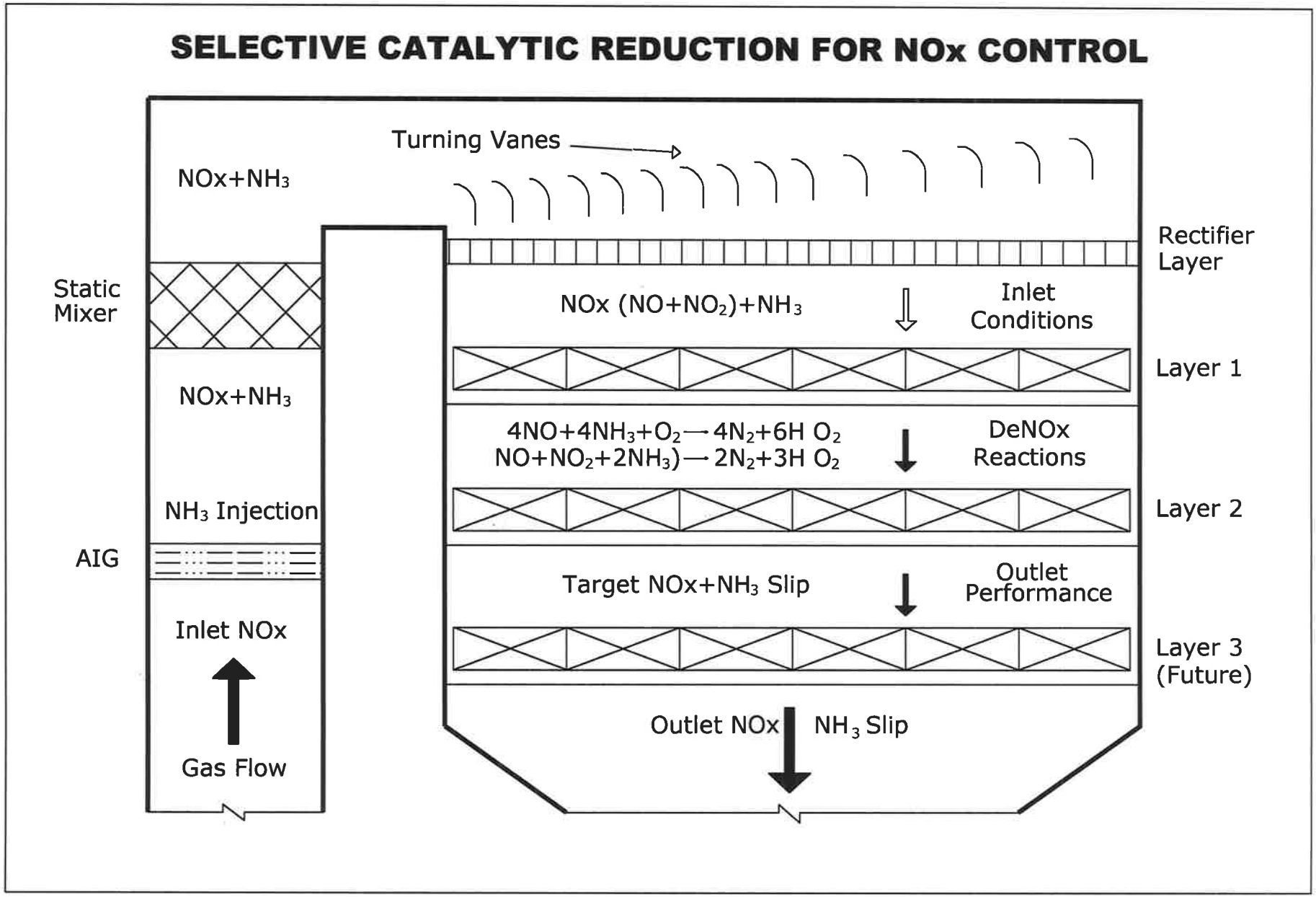

SELECTIVE CATALYTIC REDUCTION FOR NOx CONTROL
Turning Vanes
NOx+NH3
Rectifier Layer
Static Mixer
NOx (NO+NO2)+NH3
Inlet Conditions
Layer 1
NOx+NH3
4NO+4NH3+O2→4N2+6H O2
NO+NO2+2NH3)→2N2+3H O2
DeNOx Reactions
NH3 Injection
Layer 2
AIG
Target NOx+NH3 Slip
Outlet Performance
Inlet NOx
Layer 3 (Future)
Outlet NOx
NH3 Slip
Gas Flow

FIG - 4.14

4.2.1.6 STACKS

One single flue and two bi-flue stacks of 275 m height will be provided as per CPCB guidelines.

4.2.1.7 FUGITIVE DUST CONTROL

The measures proposed for control of Fugitive dust from various sources of the power project are detailed below

a. Coal Storage Yard: Water spray arrangement will be provided all-round the coal stockpiles to suppress the dust and to wet the coal while compacting to minimize the dust nuisance.

b. Coal handling Plant: Coal will be conveyed to the coal handling plant through closed conveyor system will be implemented to minimize the dust nuisance. All transfer points will be provided with bag filters.

c. Limestone Handling: Limestone will be unloaded in the covered sheds near to the limestone crusher. The limestone will be loaded into the crusher for crushing to a size of <25 mm. The limestone handling system is designed for 14 hours operation with designed capacity of 200 TPH. The hopper of the crusher will be provided with atomized water sprinkling system to suppress while loading limestone into the crusher. The crushed limestone will be conveyed to the storage silo hoppers provided with Bag filters for control of dust emissions.

d. Ash pond: Dry flyash from the plant will be transported to ash storage silos through pneumatic system. Five Flyash silos are proposed for storing dry flyash. All silos will be provided with Bag filters for control of dust emissions.

Unutilized flyash and bottom ash will be conveyed to ash pond with lean slurry system respectively. No dust emissions are anticipated due to wet handling system.

e. Gypsum handling & Storage: Gypsum generation from FGD is in wet form which will be dewatered in hydro-cyclones and vacuum belt filters. The Gypsum cake from the belt filter will be discharged through a Hopper to a Belt conveyor. The Belt Conveyor will transport the Gypsum to the Gypsum storage shed. No dust emissions are anticipated due to wet handling system.

4.2.1.8 CLEAN DEVELOPMENT MECHANISM (CDM)

The project is based on Supercritical Technology for the Power Cycle which will reduce greenhouse gas (GHG) emissions primarily Carbon Dioxide - CO_2.

The Baseline Carbon Dioxide Emissions from Power Sector have been worked out by Central Electricity Authority (CEA) based on detailed information obtained from all the operating Power Stations in the country. Weighted average emission factor, simple operating margin (OM), build margin (BM) and combined margin (CM) of all southern regional grid for FY 2013-14 (excluding inter grid and cross-country electricity transfers), is 0.99 tonne CO_2 / MWh.

Power plant with supercritical technology would increase the plant efficiency by more than 1.0% as compared to those employing sub-critical technology. The emission factor of CO_2 from the subject power project is worked out considering the coal consumption of 12.28 million tonnes, Gross Calorific value of 5115 kcal/kg, CEA CO_2 emission Factor of 92.5 gm CO_2/MJ based on GCV and oxidation factor of 0.98, the CO_2 generation from the power station is estimated to be about 0.831 tonne/MWh.

The projected power generation from the power plant at 85 % PLF is 297,84,000 MWh which corresponds to 247,50,504 tonnes per year of CO_2. Based on a baseline emission factor of 0.99 tonnes CO_2 / MWh (year 2013-14) for southern grid, the total CO_2 generation from the proposed power plant would be 294,86,160 tonnes per year, which corresponds to reduction in emission of 47,35,656 tonnes of CO_2 per year.

TSGENCO proposes to avail the CDM benefits. Benefits of CDM projects include investment in climate change mitigation projects in developing countries, transfer or diffusion of technology in the host countries, as well as improvement in the livelihood of communities through the creation of employment or increased economic activity.

4.2.2 NOISE ENVIRONMENT

The major noise generating sources during operation are:

	Typical Noise level (dB (A))
Steam turbines	84-97
Compressors	90-100
Boiler Feed Pump	88-97
Forced Draft Fans	87-100
Induced Draft Fans	80-87
Cooling Towers	70-75
Coal unloading	87-90
Coal crushers	90-95
Limestone crusher	95-100
DM Plant	83-85
Ash Slurry pumps	85-90

All the above sources will have inter distance of minimum of 50-100 m. The combined noise level of the above sources will not cross 100 dB(A).

Prediction of anticipated noise levels resulting from operation of the power plant have been computed using point source computation which is based on point source relationship i.e. for every doubling of the distance the noise levels decreased by 6 dB (A). Point source propagation is defined by the following equation:

$$Lp_2 = Lp_1 - 20 \log (r_2/r_1)$$

where Lp1 and Lp2 are sound pressure levels at points located at distances r1 and r2, respectively, from the source.

Considering the above equation and combined noise level of 100 dB(A), the noise levels at project boundary have been estimated as given in **Table – 4.7** and shown in **Fig - 4.15**.

TABLE – 4.7
PREDICTED NOISE LEVELS AT PROJECT BOUNDARY

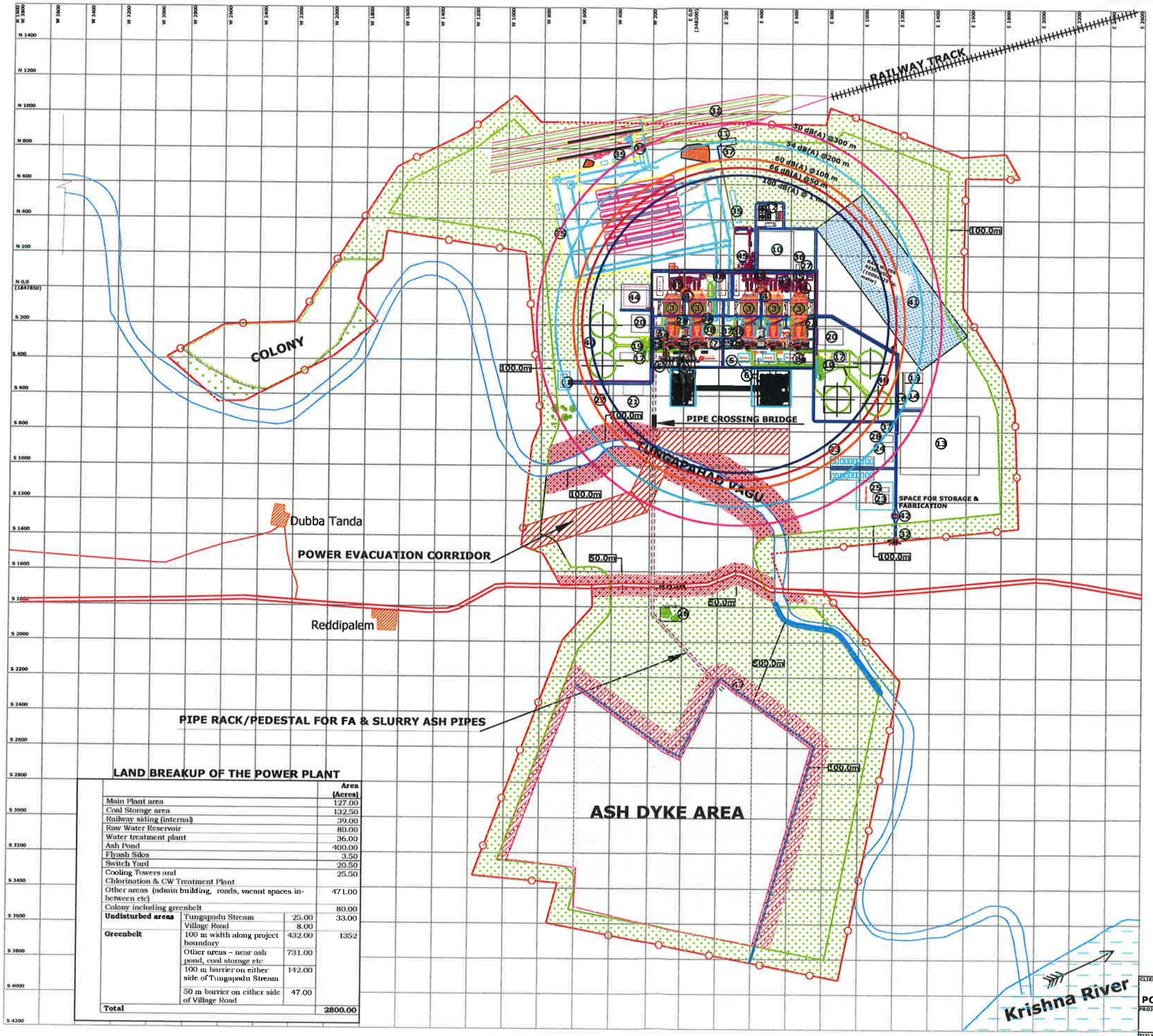
Distance from main plant area (m)	Noise level dB(A)	Location
1	100	Within project area
50	66	
100	60	
200	54	
300	50	At project boundary

Predictions carried are on as is basis, without taking into consideration any attenuation factors showed noise level of 50 dB(A) at project boundary which is far below the noise standard specified for Industrial Areas by CPCB i.e 75 dB(A) during day time and 70 dB(A) during night time.

Additional attenuation is expected, due to atmospheric effect and 100 m greenbelt and the compound wall along the project boundary which will further reduce the noise levels.

Nearest village/habitation to the project site is at 1.0 km distance ie. Veerlapalem Village. Impact of Noise level at this location due to the project in the operational phase will be negligible.

The nearest operating industry to the power project is 4.8 km. Cumulative impact on noise environment due to surrounding industries does not arise. However noise levels due to movement of trucks carrying flyash, limestone and gypsum and vehicular movement of plant personnel will have intermittent impact for short duration and are not continuous.



S.No.	DESCRIPTION	CONFIG.
1	POWER HOUSE BLDG	-
2	BOILER	-
2A	SCR	-
3	ESP	-
4	CHIMNEY	2+2+1
5	TRANSFORMER YARD	-
6	SWITCHYARD (CONT. ROOM)	-
7	SERVICE BLDG.	COMMON
8	DG BUILDING	2 Nos
9	COOLING TOWER(NDCT)	-
10	DM PLANT & CPU REGEN.	COMMON
11	FUEL OIL UNLOADING	COMMON
12	FUEL OIL COMPLEX	COMMON
13	PRE-TREATMENT PLANT	COMMON
14	CLARIFIED WATER TANK	COMMON
15	FIRE WATER TANK	COMMON
16	CLARIFIED CUM FIRE WATER P/H	COMMON
17	SIDE STREAM FILTERATION	2 + 3
18	H2 GEN. PLANT & CYLINDERS SHED	COMMON
19	CW P/H & FOREWAY	2 + 3
20	CHLORINATION & CW TREAT. PLANT	2 + 3
21	EFFLUENT TREAT. PLANT	COMMON
22	SEWAGE TREAT. PLANT	COMMON
23	ADMIN. BUILDING	COMMON
24	FIRE STATION BUILDING	COMMON
25	CANTEEN	2NOs
26	FLY ASH SILO AREA	COMMON
27	CHEMICAL LAB	COMMON
28	WORKSHOP	COMMON
29	COMPRESSOR HOUSE	2 + 3
30	COAL STOCK AREA	COMMON
31	MARSHLING YARD (BY TSGENCO)	COMMON
32	GATE COMPLEX CUM SECURITY BLDG.	COMMON
33	PERMANENT STORES (16MX30M)	18+1
34	AUXILIARY BOILER	-
35	CHP MCC	4 NOs
36	CHEMICAL LAB (PCRI)	COMMON
37	----------	-------
38	CST + PUMP HOUSE	2 + 3
39	AWRP/H & MCC	1
40	COOLING TOWERS (NDCT)	5
41	RAW WATER RESERVOIR	COMMON
42	PYLON/FOUNDATION STONE	-
43	ASH DYKE AREA	-
44	AMMONIA STORAGE&HANDLING PLANT	COMMON
45	FLUE GAS DESULFURIZATION (FGD)	-
46	LIMESTONE HANDLING AREA	COMMON
47	GYPSUM DEWATERING & STORAGE	COMMON
48	FGD CONTROL ROOM	COMMON

NOTES :-

1. ALL DIMENSIONS AND CO-ORDINATES ARE IN METER UNLESS NOTED OTHERWISE.

REFERENCE DRGS.

1. TENDER STAGE PLOT PLAN:ITSGENCO\HLG\RF\VRPM\01
2. CONTOUR PLAN DRG : SUV/2015/3512/PLAN

LEGEND

- RIVER
- ROAD
- RAILWAY TRACK
- PLANT BOUNDARY
- 100 m BARRIER ZONE
- COLONY
- CORRIDOR FOR TRANSMISSION LINES
- GREEN BELT
- ROAD WITH 50 M BARRIER ZONE ON TWO SIDES
- STORM WATER DRAIN
- TUNGAPAHAD VAGU WITH 100 M BARRIER ZONE ON TWO SIDES

LAND BREAKUP OF THE POWER PLANT

			Area (Acres)
Main Plant area			127.00
Coal Stonge area			132.50
Railway siding (internal)			39.00
Raw Water Reservoir			80.00
Water treatment plant			36.00
Ash Pond			400.00
Flyash Silos			3.50
Switch Yard			20.50
Cooling Towers and Chlorination & CW Treatment Plant			25.50
Other areas (admin building, roads, vacant spaces in-between etc)			471.00
Colony including greenbelt			80.00
Undisturbed areas	Tungapadu Stream	25.00	33.00
	Village Road	8.00	
Greenbelt	100 m width along project boundary	432.00	1352
	Other areas - near ash pond, coal stonge etc	731.00	
	100 m barrier on either side of Tungapadu Stream	142.00	
	50 m barrier on either side of Village Road	47.00	
Total			**2800.00**

FIG - 4.15

CLIENT: M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED

PROJECT: 4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

TITLE: **NOISE LEVEL CONTOURS**

4.2.2.1 NOISE POLLUTION CONTROL MEASURES

Encasement of noise generating sources will be done to control the noise levels. The steam turbine generators would be provided with acoustic enclosures and would be located in a closed building which considerably reduces the noise outside the turbine hall.

All operations and maintenance personnel working near noise prone areas would be provided with earmuffs & earplugs. Stand-alone noise proof cabins will be provided to operators. Job rotation for operators will be done to minimize continuous exposure.

Greenbelt will be developed in an area of 1352 acres within the project area. Of which, 100 m width all along the project boundary in an area of 432.00 acres is proposed which acts as noise and dust barrier.

With encasement of the noise generating sources and greenbelt, TSGENCO will comply with ambient noise standards.

In general the following methods are considered to control the noise pollution

- The use of complete or partial enclosures
- Introduction of control and monitoring rooms having good sound insulation properties for the benefit of operators.
- Proper plantation of trees depending on the wind velocity can reduce noise pollution on the surrounding area.
- Providing earmuffs and earplugs to the plant personnel and rotations of duties.

4.2.3 WATER ENVIRONMENT

4.2.3.1 WATER REQUIREMENT AND SOURCE

The daily water requirement of the power project is estimated to be about 2,40,000 m^3/day complying with the proposed new norm of 2.5 m^3/MWh and Zero Discharge Concept. Water requirement will be met from Krishna river. The location of the Intake well for tapping Krishna water is proposed at a distance of 1.0 km on the upstream of confluence of River Krishna and Tungapahad Vagu is shown in **Fig – 4.16.**

4.2.3.2 WATER STORAGE

Water reservoir in an area of 80 acres with storage capacity of about 10,80,000 m^3 capacity is proposed to store about 5 days requirement of the plant.

4.2.3.3 PRE TREATMENT

Water drawn from Krishna River will be subjected to pretreatment in clarifier before distribution to various units. The water for steam generation after pretreatment in the clarifier will be subjected to filtration in Mixed Bed Filter followed by demineralization in the DM plant before use in boiler for steam generation.

4.2.3.4 WATER BALANCE

The major requirement of water is for condensate cooling. COC of 5 has been considered for estimation of cooling water requirement. The following are the various areas where water is consumed in the plant

- Cooling water
- Boiler make-up
- DM Regeneration
- Condensate Polishing Unit
- Flue Gas Desulphurisation
- Ash and Coal Handling

WATER TAPPING POINT FROM RIVER KRISHNA

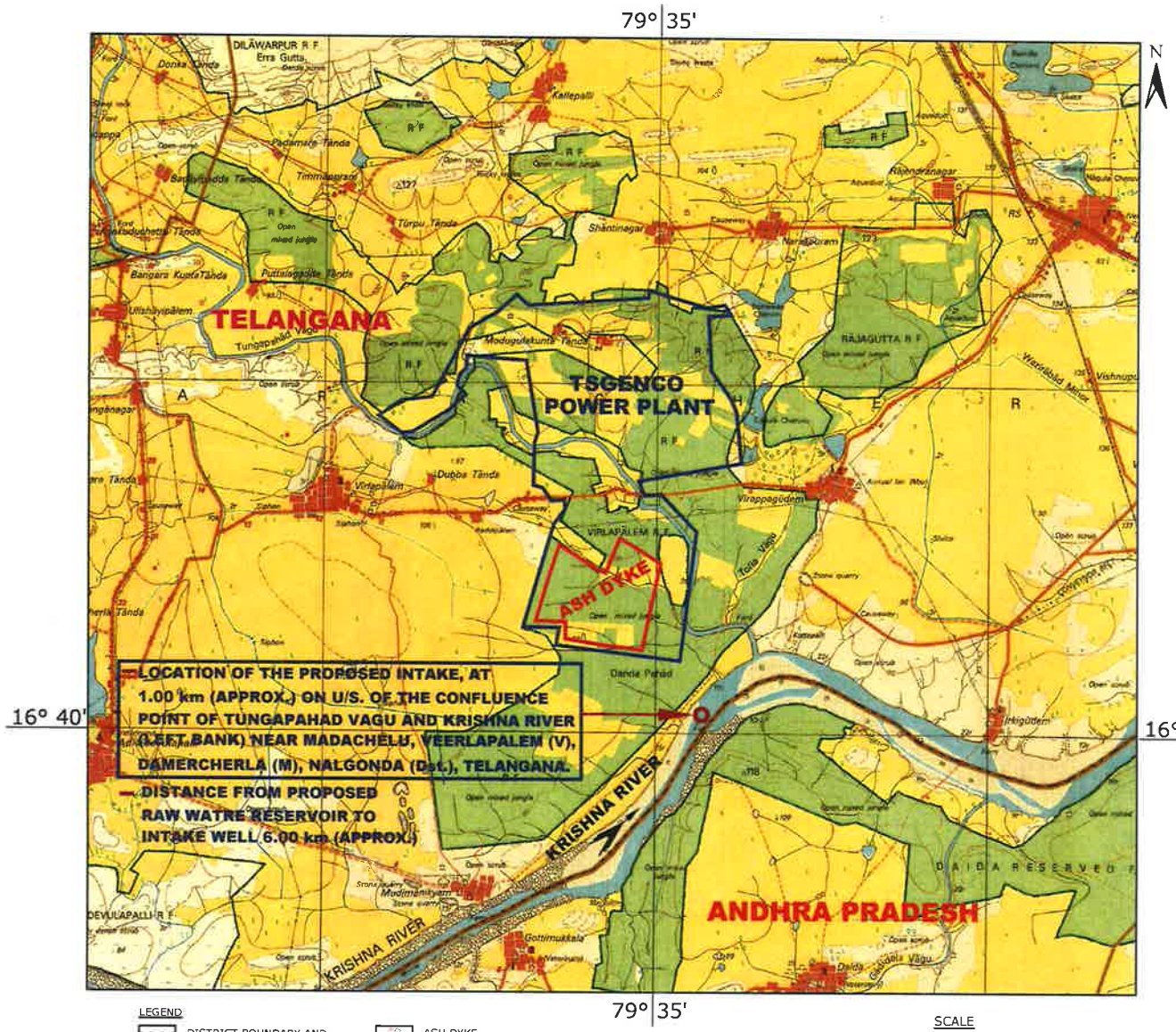


FIG - 4.16

- Service Water
- MRS
- AHP Seal Water
- HVAC
- Domestic use - Plant & Colony
- Mixed Bed Filter & Clarifier

Table – 4.8, Fig - 4.17 gives the water balance details of the power plant.

➲ TSGENCO will adopt closed circuit cooling system using Natural Draft Cooling Towers in the power plant. Of the total cooling water including auxiliary cooling water consumption of 198000 m^3/day, about 80.12 % (158640 m^3/day) is lost due to evaporation from the cooling tower and about 19.88 % (39360 m^3/day) will be generated as blow down.

➲ Water for steam generator will be treated in Mixed Bed Filter followed by DM plant. The DM plant will be designed to treat the clarified and filtered water to the required quantity of demineralized water of the specific quality. Backwash of Mixed Bed filter will be treated in raw water clarifier. DM regeneration will be neutralized and routed to CMB for further treatment

➲ Water requirement of Flue Gas Desulphurisation unit is estimated at 14880 m^3/day. Of the total consumption, the evaporation loss in FGD with flue gas is 13440 m^3/day and wastewater generation is 1440 m^3/day. The water balance of the FGD unit is shown in **Fig-4.18.**

➲ Service water requirement is for MRS, Ash Handling Plant, HVAC and other service requirement. The total requirement of the service water is estimated to be about 11760 m^3/day. No wastewater is generated from MRS, Ash Handling Plant and HVAC as the total will be used or lost in evaporation. Wastewater is generated mainly from other service utilities which are about 240 m^3/day which will be treated and reused.

WATER BALANCE
4000 MW (5 x 800 MW) YADADRI THERMAL POWER STATION

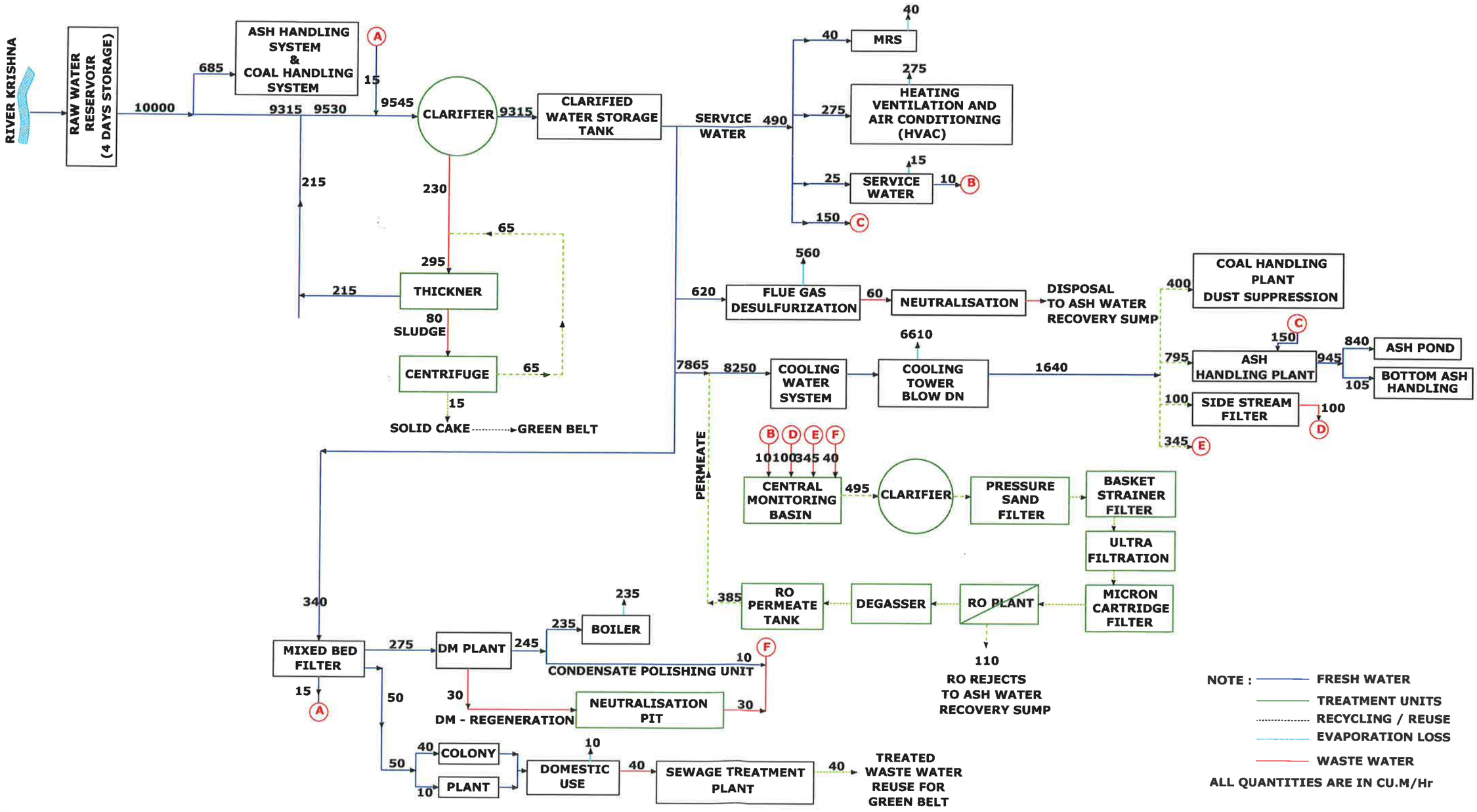


FIG - 4.17

FLUE GAS DESULFURIZATION (FGD) WATER BALANCE
4000 MW (5 x 800 MW) YADADRI THERMAL POWER STATION

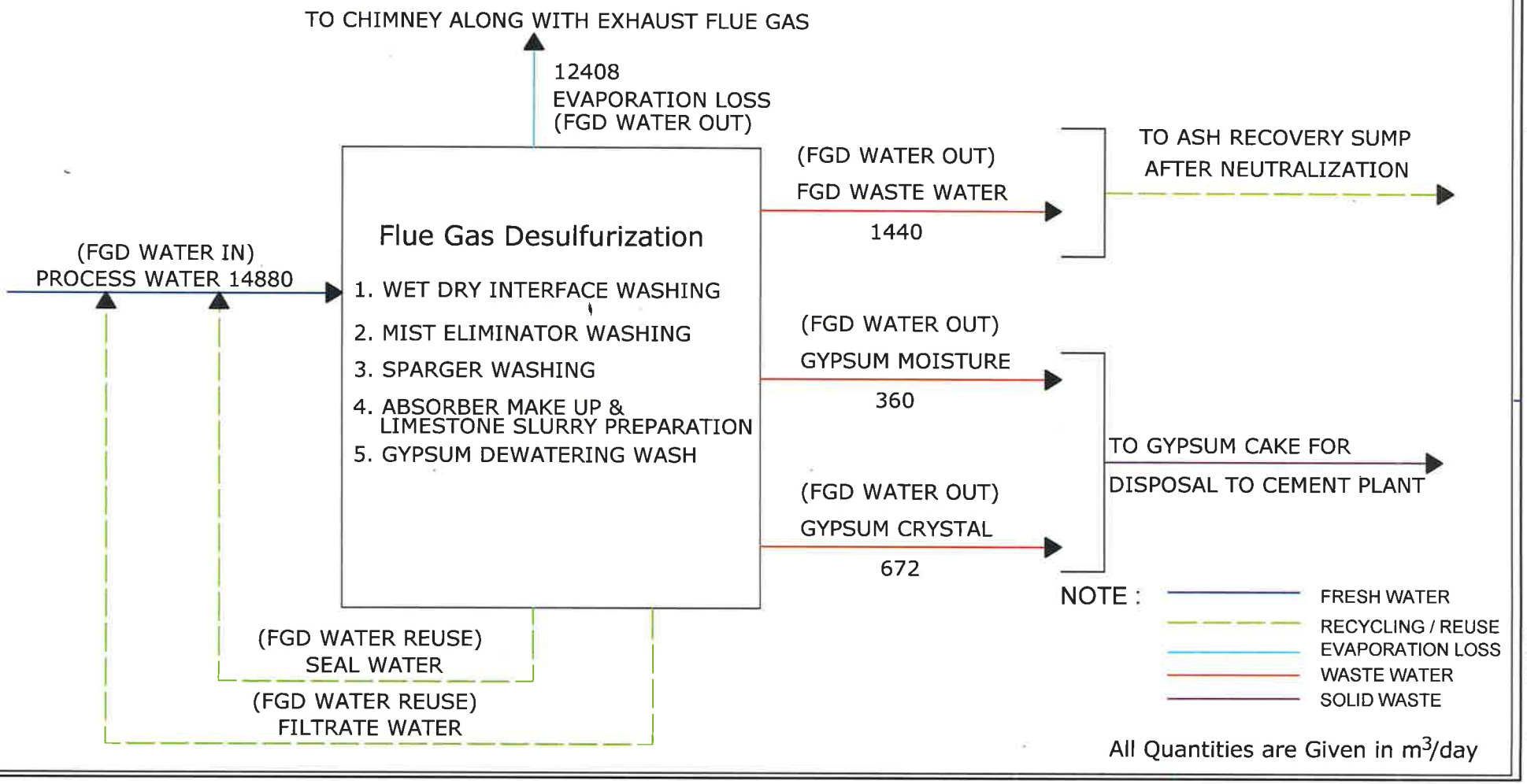


FIG - 4.18

TABLE-4.8
WATER BALANCE (m^3/day)

A. COOLING WATER

Unit	Require-ment	Loss (L) / Usage (U)	Waste water
Cooling Water including auxiliary cooling with Temperature rise across the condenser of 9.4 deg C	198000 (recycled water-9240)	158640	39360

B. NON – COOLING WATER

		Require-ment	Loss (L) / Usage (U)	Waste Water
Boiler make-up		4920	4920	0
DM Regeneration		1440	0	1440
Condensate Polishing Unit		240	0	240
Flue Gas Desulphurisation		14880	13440	1440
Ash and Coal Handling		16440	16440	0
Service Water	MRS	960	960	0
	AHP Seal Water	3600	3600	0
	HVAC	6600	6600	0
	Service water	600	360	240
Domestic use	Plant	240	48	192
	Colony	960	192	768
Mixed Bed Filter & Clarifier		360	0	360
Total		**51240**	**46560**	**4680**

TOTAL (A+B)	**249240**	**205200**	**44040**
RO permeate recycled as fresh water	**9240**		
Net Freshwater requirement	**240000**		

WASTE WATER GENERATION AND REUSE, m^3/day

		WASTE WATER	Utililisation	Treatment	REUSE/DISPOSAL
Cooling Tower Blowdown		39360	19080 – Ash handling 9600 – Coal Handling	10680 – to Central Monitoring Basin (CMB)	12600 – to RO plant for treatment • 9240 - RO Permeate recycled as freshwater to CWS • 3360 – RO reject disposal to ash pond
DM Regeneration		1440	Neutralisation followed by CMB	1920 - to Central Monitoring Basin (CMB)	
Condensate Polishing Unit		240	-		
Service Water		240	-		
Flue Gas Desulphurisation		1440			
Domestic use	Plant	192	-	STP-1	960 - Treated water reuse for greenbelt
	Colony	768	-	STP-2	
Mixed Bed Filter & Clarifier		360	-	Thickner & Centrifuge	360 - Sludge for use in Greenbelt
Total Wastewater		**44040**			

- Domestic consumption of the plant and colony is 1200 m^3/day. Clarified and filtered water would be supplied for potable use.

FIRE PROTECTION SYSTEM

It is proposed to provide a full fledged fire protection system including fire detection and fire alarms, namely hydrant system for all the areas of the power plant, high velocity water spray system for transformer, turbine lube oil tanks, medium velocity spray system for cable vault/gallery and portable fire extinguishers for all the buildings of the plant.

The source of water will be from the firewater storage tanks where adequate storage is available. This water is utilized only incase of any fire occurrence in the vicinity. Therefore this requirement is not a regular consumptive requirement.

4.2.3.5 WASTE WATER GENERATION

The total wastewater generation is estimated to be about 43320 m^3/day. Details of wastewater generation from various units is given in **Table – 4.9**.

TABLE - 4.9
WASTEWATER GENERATION, M^3/DAY

		WASTE WATER
Cooling		
Cooling Tower Blowdown		39360
Non Cooling		
DM Regeneration		720
Condensate Polishing Unit		240
Service Water		240
Flue Gas Desulphurisation		1440
Domestic use	Plant	192
	Colony	768
Mixed Bed Filter & Clarifier		360
Total Wastewater		**43320**

4.2.3.6 WATER POLLUTION CONTROL MEASURES

WASTEWATER TREATMENT AND DISPOSAL

The wastewater generated will be segregated as Industrial wastewater (42360 m^3/day) and domestic wastewater (960 m^3/day) for adopting different treatment methods.

A. INDUSTRIAL WASTEWATER TREATMENT

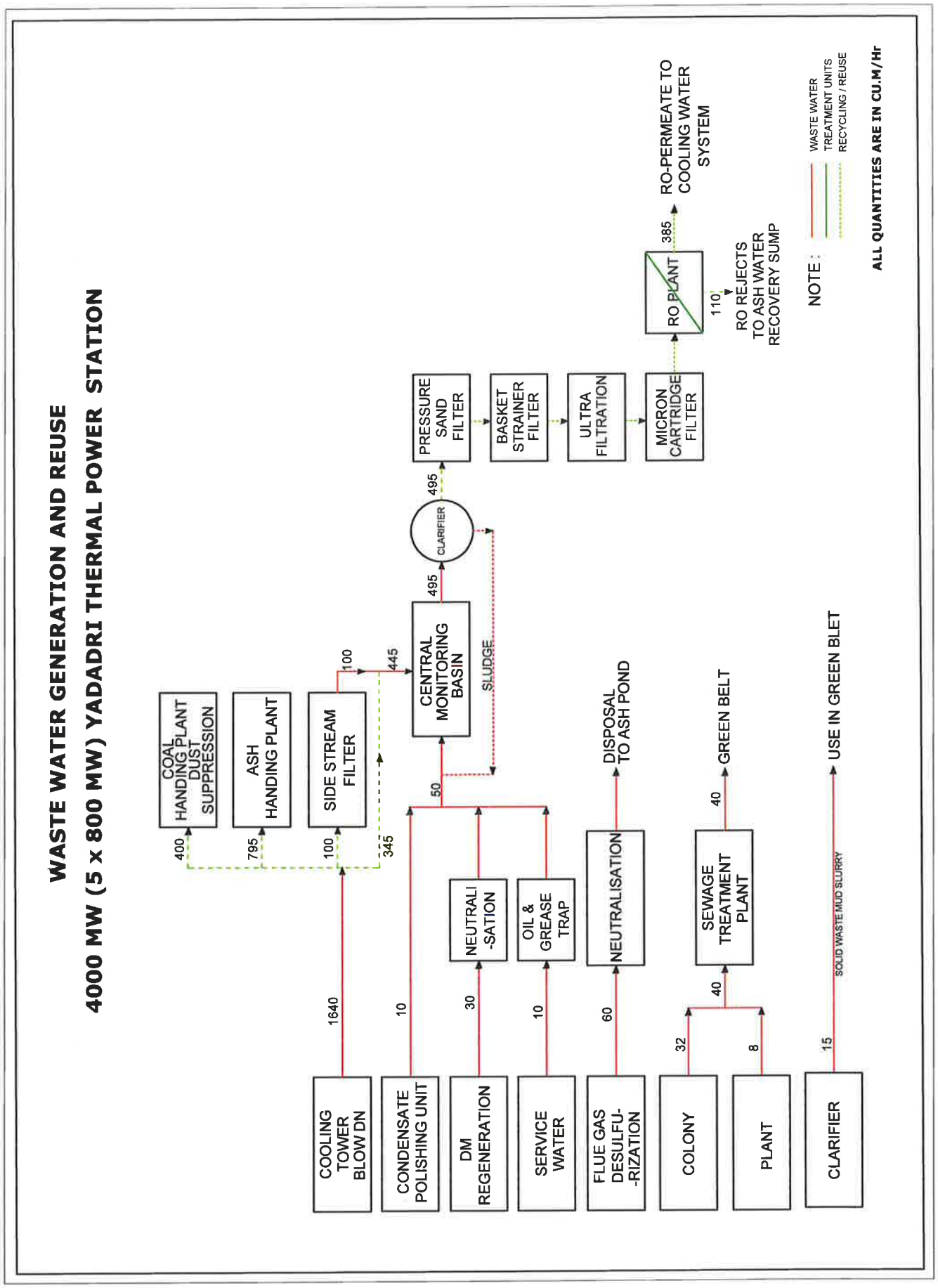
Total industrial wastewater generation from the power plant is 42360 m^3/day. The wastewater generated from the various units is subjected to treatment based on quality as shown in **Fig – 4.19.** Part of the Cooling tower blowdown i.e. about 28680 m^3/day which is reused in coal handling (for dust suppression) and Ash handling plants. About 2400 m^3/day will be treated in side stream filter and sent to Effluent Treatment Plant. Balance cooling tower blowdown (8280 m3/day) will be routed to CMB for further treatment along with wastewater generated from side stream filter (2400 m^3/day).

DM Regeneration wastewater of 720 m^3/day will be neutralized and Service water of 240 m^3/day will be treated for oil and grease removal. Neutralized DM wastewater along with service water and condensate polishing unit (240 m^3/day) will be routed to CMB for further treatment in ETP.

Total wastewater collected in the CMB i.e about 11880 m^3/day will be treated in ETP comprising the following units in series:

a. Clarifier
b. Pressure Sand Filter
c. Basket Strainer Filter
d. Ultrafiltration
e. Micro Cartridge Filter
f. Reverse Osmosis (RO) plant

FIG - 4.19


WASTE WATER GENERATION AND REUSE
4000 MW (5 x 800 MW) YADADRI THERMAL POWER STATION
COOLING TOWER BLOW DN
CONDENSATE POLISHING UNIT
DM REGENERATION
SERVICE WATER
FLUE GAS DESULFU--RIZATION
COLONY
PLANT
CLARIFIER
1640
10
30
10
60
32
8
15
NEUTRALI -SATION
OIL & GREASE TRAP
NEUTRALISATION
SEWAGE TREATMENT PLANT
50
40
40
DISPOSAL TO ASH POND
GREEN BELT
USE IN GREEN BLET
SOLID WASTE MUD SLURRY
SLUDGE
CENTRAL MONITORING BASIN
SIDE STREAM FILTER
ASH HANDING PLANT
COAL HANDING PLANT DUST SUPPRESSION
400
795
100
345
100
445
495
495
CLARIFIER
PRESSURE SAND FILTER
BASKET STRAINER FILTER
ULTRA FILTRATION
MICRON CARTRIDGE FILTER
RO PLANT
385
110
RO-PERMEATE TO COOLING WATER SYSTEM
RO REJECTS TO ASH WATER RECOVERY SUMP
NOTE :
WASTE WATER
TREATMENT UNITS
RECYCLING / REUSE
ALL QUANTITIES ARE IN CU.M/Hr

RO Treated water i.e RO permeate (9240 m^3/day) will be recycled to cooling water system. RO reject of about 2640 m^3/day will disposed to ash water recovery sump for ash handling.

360 m^3/day of clarifier sludge which is rich in nutrient (river water mud) will be used for greenbelt development.

Wastewater generated from Flue Gas Desulphurization unit is 1440 m^3/day which will be neutralized and disposed to ash water recovery sump for ash handling. The details of total waste water generation, recycling and treatment from various units of the project are given **Table – 4.10**.

TABLE - 4.10

WASTE WATER GENERATION, TREATMENT AND REUSE, M^3/DAY

		WASTE WATER	Utililisation	Treatment	REUSE/DISPOSAL
Cooling Tower Blowdown		39360	19080 – Ash handling	2400 - treated in side stream and disposed to CMB 9480 - to Central Monitoring Basin (CMB) and for treatment in ETP	• 9240 - RO Permeate recycled as freshwater to CWS • 2640 – RO reject disposal to ash water recovery sump for ash handling.
			9600 – Coal Handling		
DM Regeneration		720	Neutralisation followed by CMB		
Condensate Polishing Unit		240	-		
Service Water		240	-		
Flue Gas Desulphurisation		1440	Neutralisation	-	Disposal to Ash water recovery sump for ash handling
Domestic use	Plant	192	-	STP-1	960 - Treated water reuse for greenbelt
	Colony	768	-	STP-2	
Mixed Bed Filter & Clarifier		360	-	Thickener & Centrifuge	360 - Sludge for use in Greenbelt
Total Wastewater		**43320**			

No treated wastewater will be discharged into Krishna River or Tungapahad Vagu.

B. DOMESTIC WASTEWATER TREATMENT

PLANT

The water consumption in the plant for domestic use is 240 m^3/day. Wastewater generation will be about 192 m^3/day. This wastewater will be routed through a network of drains/pipes from various buildings of the power plant to the proposed Sewage Treatment Plant (STP) of 225 m^3/day capacity. STP-1 is proposed in the main plant area

COLONY

The water consumption in the colony is estimated at 960 m^3/day. Wastewater generation is 768 m^3/day. Sewage treatment plant i.e STP -2 of 850 m^3/day capacity based on Sequential Batch Reactor Process will be installed within the colony area (shown in **Fig - 2.1**).

C. CUMULATIVE IMPACT – WATER AND WASTEWATER ENVIRONMENT

The Project is based on Zero Discharge Concept. There will be no discharge of wastewater into any surface water bodies. Cumulative Impact of the subject power project with other industry does not arise.

4.2.3.7 WATER CONSERVATION MEASURES

The project will use about 38880 m^3/day of wastewater generated from the plant in various areas which will result in saving of about 12.0 lakh m^3/annum of fresh water.

Details of water conservation measures proposed in the plant are given below:

- 28680 m^3/day of wastewater generated as cooling tower blowdown will be recycled for Ash handling and Coal Handling.

- Installation of ETP with RO plant to treat about 11880 m^3/day will result in use of treated RO permeate of 9240 m^3/day as fresh water in cooling water system.
- Treated wastewater from Sewage Treatment Plants to the tune of 960 m^3/day will be used in greenbelt development. No freshwater will be drawn for greenbelt development.
- All the buildings in the main plant area having flat roof tops will be provided with rainwater collection system for routing the rainwater to harvesting pits. The estimated rainwater recharge potential is 24000 m^3/annum.

4.2.3.8 IMPACT OF WATER DRAWL ON RIVER KRISHNA

Information has been obtained from Govt. of Telangana, Irrigation and CAD Department on allocation of Krishna River water to various competing users including TSGENCO to assess the impact of withdrawal if any.

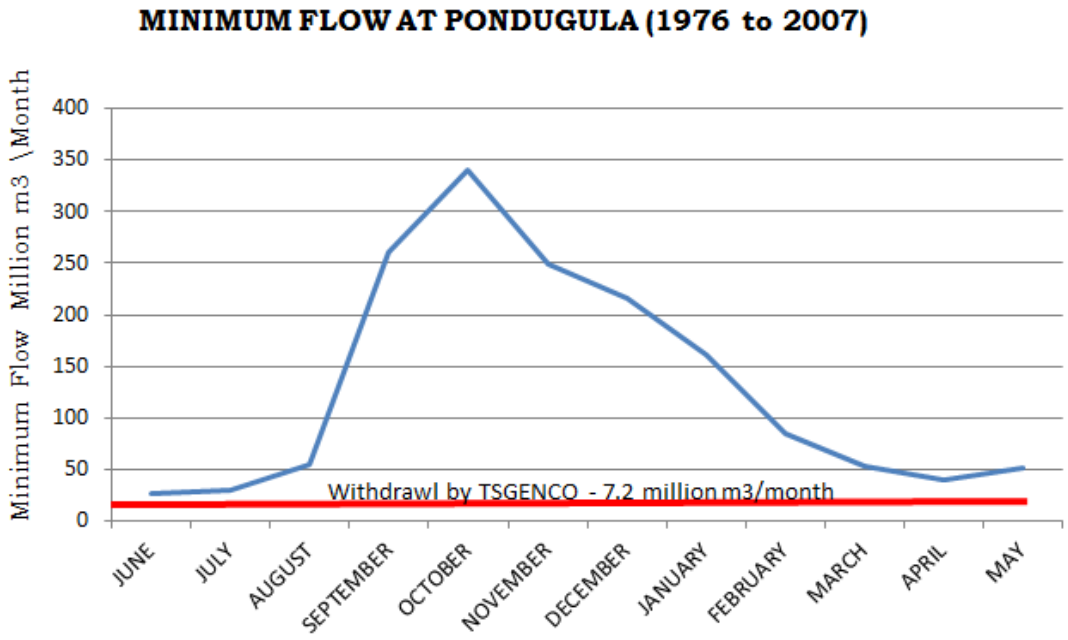
As per the information (**Annexure - 4C**), Krishna Water Disputes Tribunal - I (KWDT-I) has allocated 811 TMC to the erstwhile Andhra Pradesh (AP). Out of this allocation, AP has earmarked 299 TMC to the projects located in Telangana. Based on the utilization data for the period 1972-73 to 2007-08 (36 years), the average utilization of Krishna Water in Telangana is about 256 TMC.

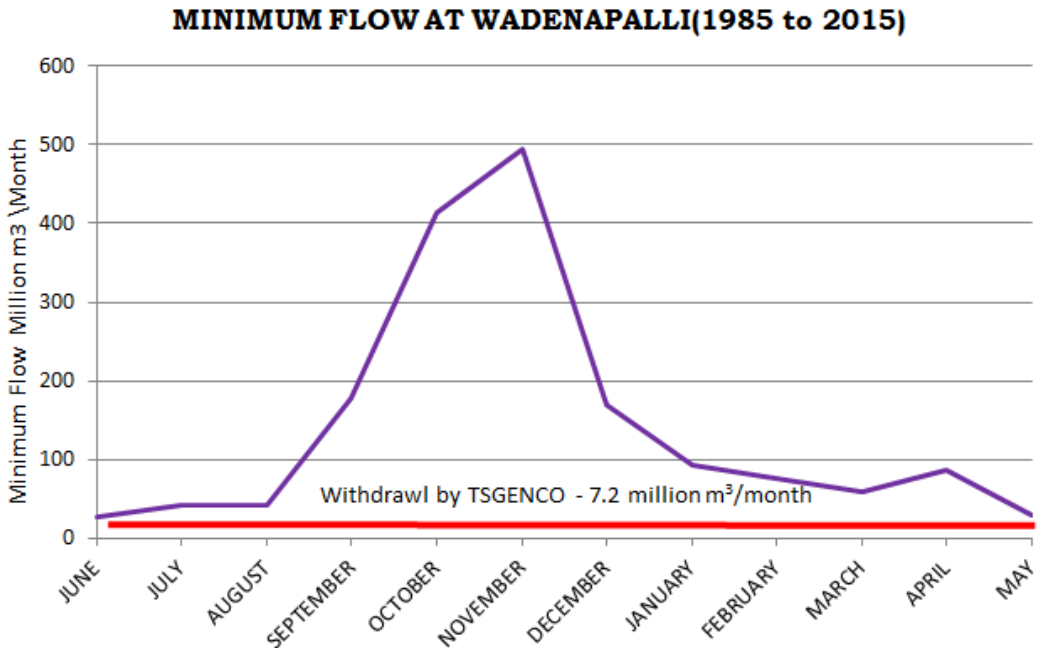
Govt of Telangana, Irrigation and CAD Department has allocated 208 cusecs of water (6.60 TMC) from Krishna River water vide G.O.Ms No.13 dt: 30.01.2015 (**Annexure - 2F**) to TSGENCO. The present requirement for the 4000 MW power plant is about 3.10 TMC.

To assess the impact of water drawl, Krishna river flows have been obtained from the following stations:

a) CWC gauging station at Pondugala – 8.0 Km from project site - Data available at this station is for the period 1976-2007.
b) CWC gauging station at Wadenapalli – 50 km from Project site - Data available is made available for the period 1985-2015.

The minimum flows at the above gauging stations and withdrawal of TSGENCO is shown in the graph below





It can be seen from the above graphs that the Minimum flow observed at Pondugala is 25.72 million m^3/month with 27.8 million m^3/month at Wadenapalli. It may be noted that the gauging station at Wadenapalli experience flow from River Musi as the gauging station is located after confluence of Musi with river.

Krishna river is perennial in nature and even during the summer, just before the first monsoon rain, the minimum flow (June, 2005) has been measured as 25.72 Mm^3/month at Pondugala G/D station and the minimum flow (June, 2005) has been measured as 27.84 Mm^3/month at Wadenapalli station against the power plant requirement of 7.21 Mm^3/month. Thus the withdrawal percentage is less than 30% in lean season.

4.2.3.9 IMPACTS ON FISHERIES DUE TO THE PROPOSED WITHDRAWAL OF WATER / DISCHARGE OF TREATED WASTEWATER INTO THE RIVER

Water drawl by TSGENCO will be about 0.24 million m^3/day. Flow of River Krishna as per the gauging station of Pondugala which is near to the project site varies from 4.34 To 31018 million m^3/day (Average – 617 million m^3/day). Thus the withdrawal of water (0.03 % of average flow) from River Krishna by TSGENCO project will not have significant impact.

Intake pipes and facilities will be installed during low flow periods

LOCATION OF INTAKE STRUCTURE

TSGENCO has carried out reconnaissance Survey for locating the intake structure on River Krishna. The intake point is selected near Madachelu considering the following

- ❖ Location of intake structure on upstream of Tungapahad Vagu at 1 km from confluence point to avoid disturbed flow.
- ❖ The intake is proposed away curve near the project site.
- ❖ No navigation is observed at this point.

To reduce impact on fisheries the following measures are proposed:

- ❖ R.C.C Intake well structure type of intake structure selected will not disturb flow conditions that provide free movement to fishes.

❖ Intake structures will be designed to minimize entrainment or impingement by providing strainers

❖ No wastewater will be discharged into the River Krishna by TSGENCO.

4.2.3.10 DESILTATION OF RIVER

TSGENCO will request the Irrigation Department, Govt. of Telangana to monitor the flows at the tapping point and also to undertake desiltation if required.

4.2.3.11 INUNDATION IMPACT

River Krishna flows at a distance of 0.50 km from the project boundary in southern direction.

The HFL level of river Krishna has been obtained officially from the Chief Engineer, covering Krishna and Godavari Basin Organization, Central Water Commission, Government of India. HFL is reported at 60.934 m amsl as on 15th October 2015, which is the maximum of last 32 years, from 1975 to 2006 (Station Code AK000E7, Pondugala, Sub-Division Lower Krishna SD1, N.S. Dam).

Fig – 4.20 shows the section showing elevation of HFL and the Project site.

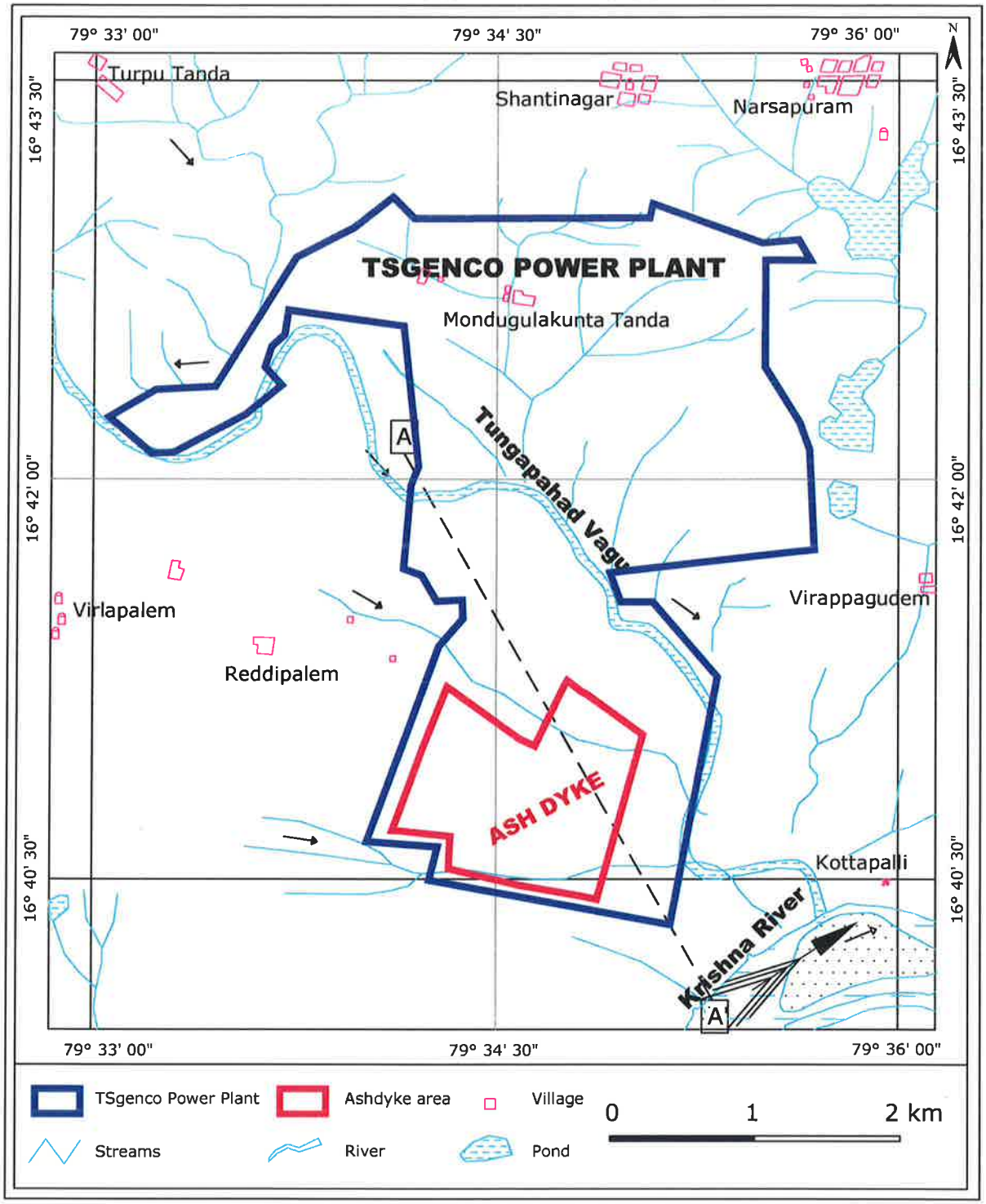
It can be seen from the above that the elevation of nearest point of ash pond is at 12 metres above HFL and its distance is around 790 metres. Hence, there is no possibility of ash pond and the plant being affected by Krishna river during any flood.

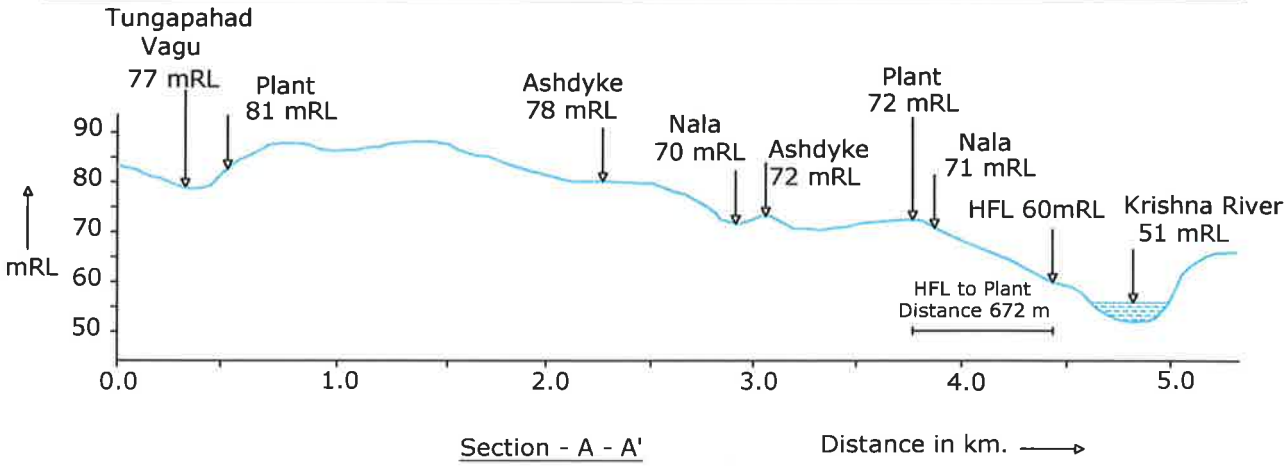
4.2.3.12 IMPACT OF TUNGAPAHAD VAGU & PROTECTION MEASURES

Tungapahad Vagu (stream) passes through the project area. About 3.90 km of this Vagu passes through the project site taking south-

FIG - 4.20

SECTION SHOWING ELEVATION OF HFL





easterly course and flows for a distance of 2.40 km before joining River Krishna.

The project activities will not interfere with flow of Tungapahad Vagu since there is no extraction of water or discharge. No diversion of Tungapadu vagu is proposed. Plant layout is designed to keep a minimum distance of 500 m buffer between ash pond and Tungapadu Vagu to prevent contamination. A 100 m barrier on either side of banks of the vagu will be left as barrier which will be developed under greenbelt.

The status of this vagu will continue to remain in the same state in terms of flow and alignment before and after the project as no water drawl or discharge, change in natural alignment of the Vagu is proposed by TSGENCO.

Tungapahad Vagu flows for a distance of 2.4 km after crossing the project boundary before joining River Krishna and there are no competing users on this stretch. It is also confirmed by Irrigation & CAD Department, Government of Telangana that the proposed power project is almost at end of the stream of Tungapahad Stream and there are no other competing users/sources downstream of the power project site or on the downstream of Tungapahad Vagu.

TSGENCO has approached Irrigation and CAD Department, Govt. of Telangana to ensure minimum flows in Tungapahad Vagu by controlling the discharges into NSLBC.

Letter obtained from Irrigation & CAD Department, Government of Telangana assuring maintaining minimum flow in the Tungapahad Vagu is enclosed as **Annexure – 4C.**

4.2.3.13 IMPACT DUE TO DIVERSION OF STREAMLETS AND CONTROL MEASURES

Drainage pattern of the project site showed presence of four 1st order streams and a major stream originating on the north and

western side of the plant and one 1st order streamlet which enters the ash pond area. These streamlets have flow only during rain.

The total catchment area of four 1st order stream and major stream originating on the north and western side of the plant is 18.72 km^2. The catchment yield, before it joins Tungapahad Vagu from the western side has been estimated as 3.83 Mm^3, taking 30% as runoff coefficient for hard rock topography and hilly terrain and average annual rainfall of 683 mm. However, the maximum runoff will be 16.25 cusecs, considering maximum rainfall of 250 mm /day and runoff coefficient of 30 % and hydraulic gradient of 10 m/km.

There is one 1st order streamlet with limited catchment area of 74 hectares which enters ash pond area and needs to be diverted to join another stream which is just flowing in the southern part of the ash pond. This being a 1st order stream and having limited catchment yield estimated as 0.15 Mm^3, taking 30 % as runoff coefficient for hard rock topography and hilly terrain. However, the maximum runoff, taking maximum rainfall of 250 mm /day and runoff coefficient of 30 % and hydraulic gradient of 11m/km, the flow will be 0.62 cumec.

During the project development, the above streams will get disturbed. To protect the flow from these streams during rain, it is proposed to divert the streams as detailed below.

a. The northern side stream will be diverted via drains to the Tungapahad Vagu whereas the western side stream will rejoin its normal course.

b. The western side stream has limited catchment area entering in the ash pond area which has to be diverted to join another stream flowing in the south. Another streamlet just passes through the southern part of the ash pond and will be allowed to flow undisturbed and the ash pond will formed away from this streamlet.

With the above proposed two diversions, the surface drainage will not be affected and all the surface drainage will join the natural drainage without affecting the surface water regime due to project. **Fig – 4.21** shows the drainage pattern of the project site before and after diversion of the rain water streamlets

4.2.3.14 STORM WATER MANAGEMENT & RAIN WATER HARVESTING

I. STORM WATER MANAGEMENT

The project area is located in the tail end of the watershed. Depth to Ground Water level is found to be shallow. The formations are near horizontal sedimentary bedded Shale deposits occurring at the top and are impermeable in nature. Hence large artificial ground water recharge structures are not planned. However the storm water management measures for the project area and roof top rain water harvesting measures are planned.

Storm water management is planned separately for main plant area and ash pond area as detailed below

A. MAIN PLANT AREA

Road side storm drains will be planned to drain the storm water into the seasonal streamlets.

Overland run-off leaving the Project Site will be provided with Silt Traps to collect silt and Silt Free / Dust Free storm water will be allowed to leave the Project Site premises.

Coal Stock Yard storm run- off will be collected in a separate Coal Dust collection Pond and dust free water will be let out from the area.

B. ASH POND AREA

Storm water drain in the northern direction of the ash pond at the outer periphery will be laid to collect the rainwater from the upstream. This drain will prevent washoff of the ash dyke and

FIG - 4.21 (A)
DRAINAGE PATTERN OF PROJECT SITE BEFORE DIVERSION OF RAIN WATER STREAMLETS

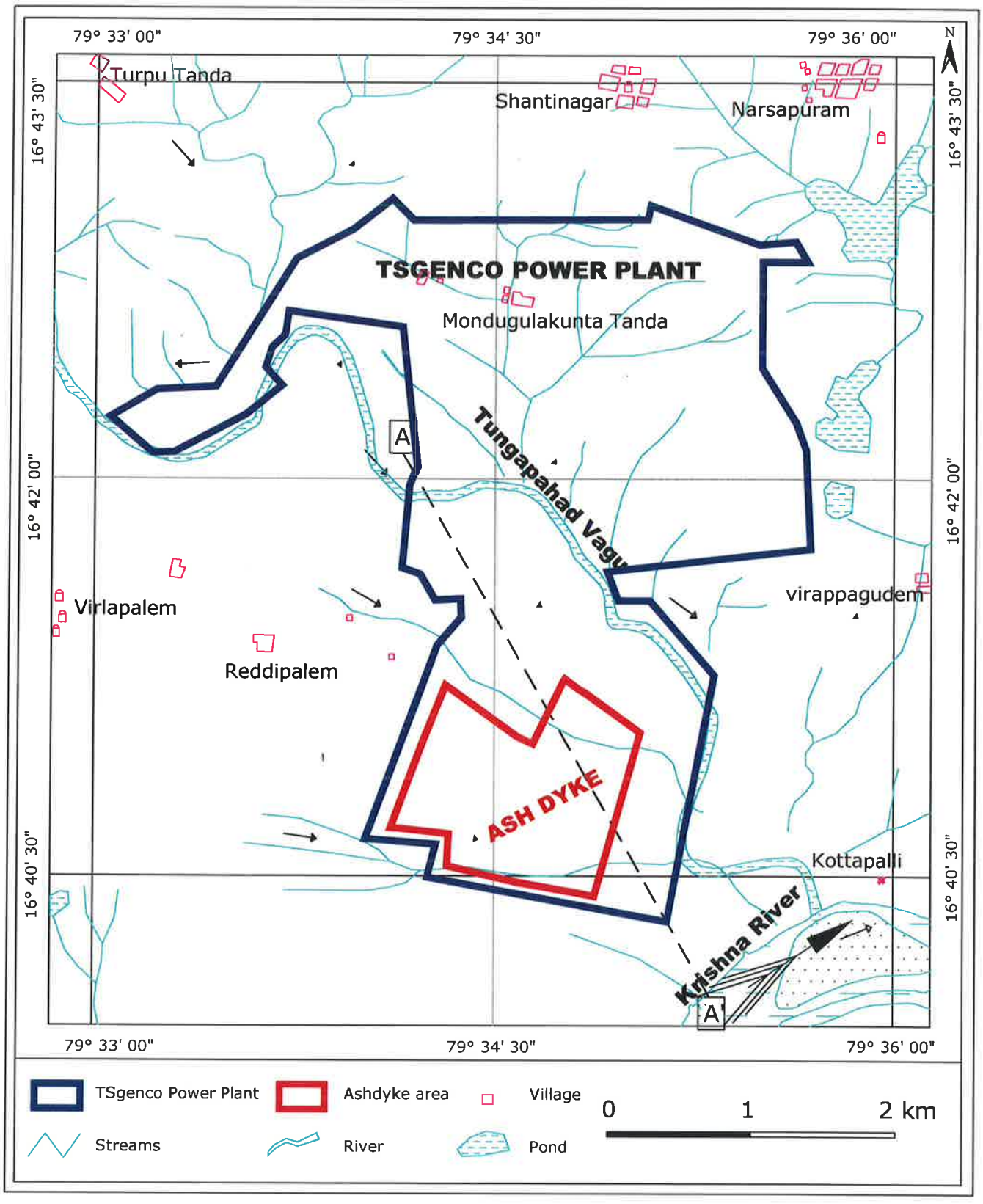
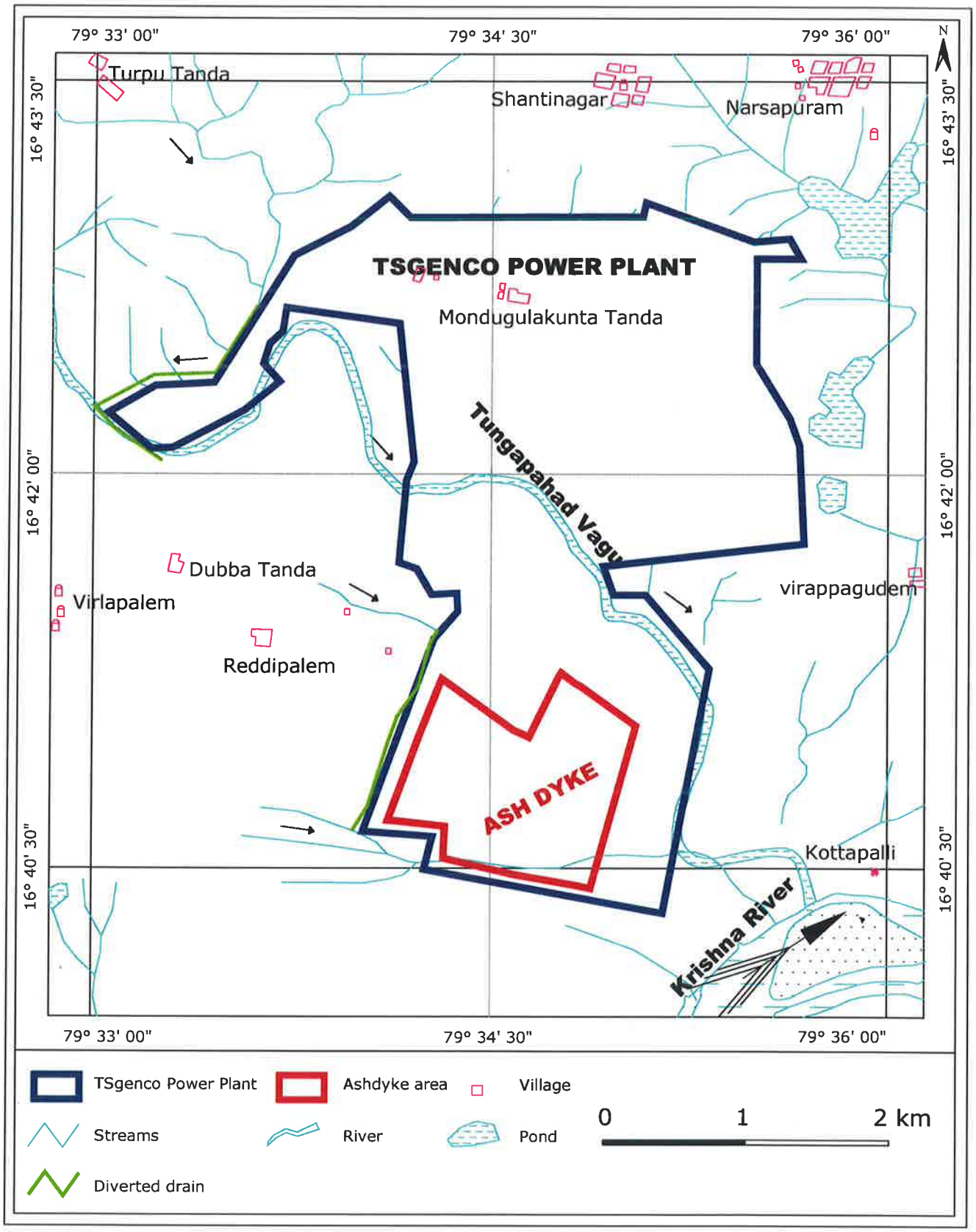


FIG - 4.21 (B)
DRAINAGE PATTERN OF PROJECT SITE AFTER DIVERSION OF RAIN WATER STREAMLETS



contamination. This drain will be connected to the stream lets on the downstream of ash point for draining into the Tungapahad Vagu.

II. RAINWATER HARVESTING

Rainwater harvesting is planned in the following area

a. Roof Top Harvesting

i. Proposed Power House, Admin Building, Service Building, CW Pump.
ii. Fire Water Pump House

b. Paved areas, road side drains and Green belt

A. ROOF TOP RAIN WATER UTILIZATION POTENTIAL IN PLANT AREA

(i) Proposed Power House, Admin Building, Service Building, CW Pump.

Total Roof top area available from Power house, Admin building, Service building, CW pump house and Clarified water pump house is 23600 m^2. All the roof top rain water will be collected through drain pipes and brought to a recharge trench which will be constructed in front and back of the building and filled with filter media as shown in **Fig-4.22**. The excess water will be collected in proposed Recharge Dug well **(Fig-4.23)**.

The availability of roof top water and the peak runoff from the roof top of the different buildings i.e. Power house, Admin building, Service building, CW pump house and Clarified water pump house having total roof top area of 23600 m^2 has been estimated as under, taking annual average rainfall as 624.2 mm, 0.85 as runoff coefficient for cemented roof and rainfall intensity which is about 60 mm/ hour day as peak rainfall for Nalgonda area.

FIG – 4.22

RECHARGE SYSTEM FOR PROPOSED FIRE WATER PUMP HOUSE

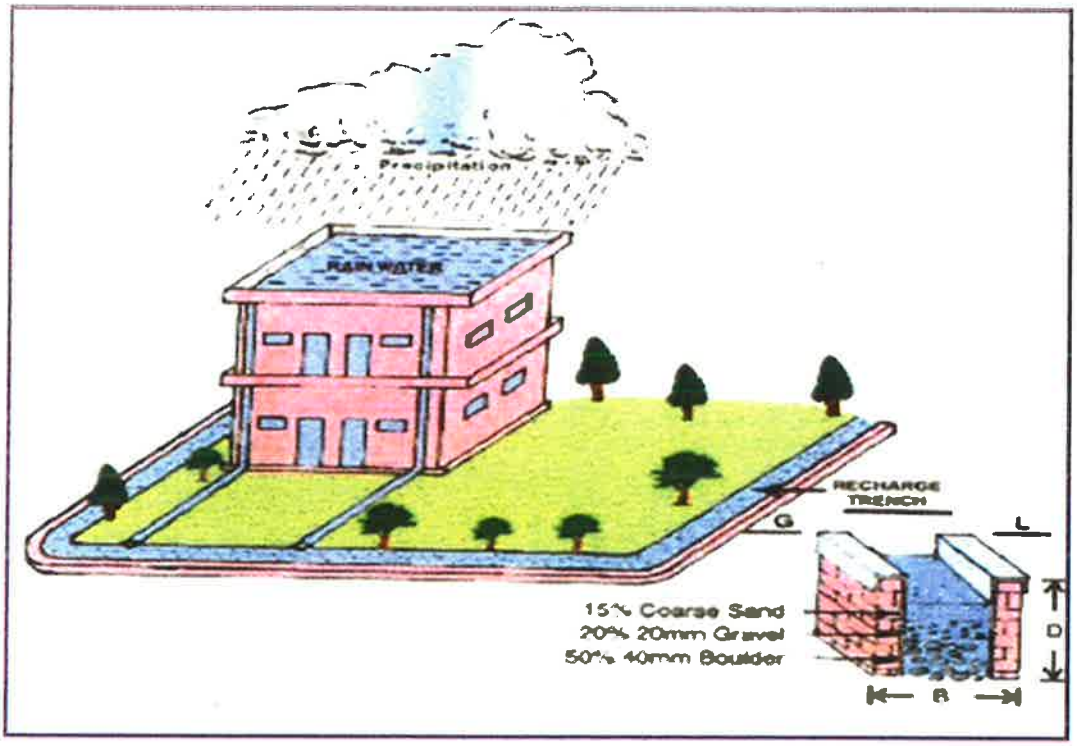
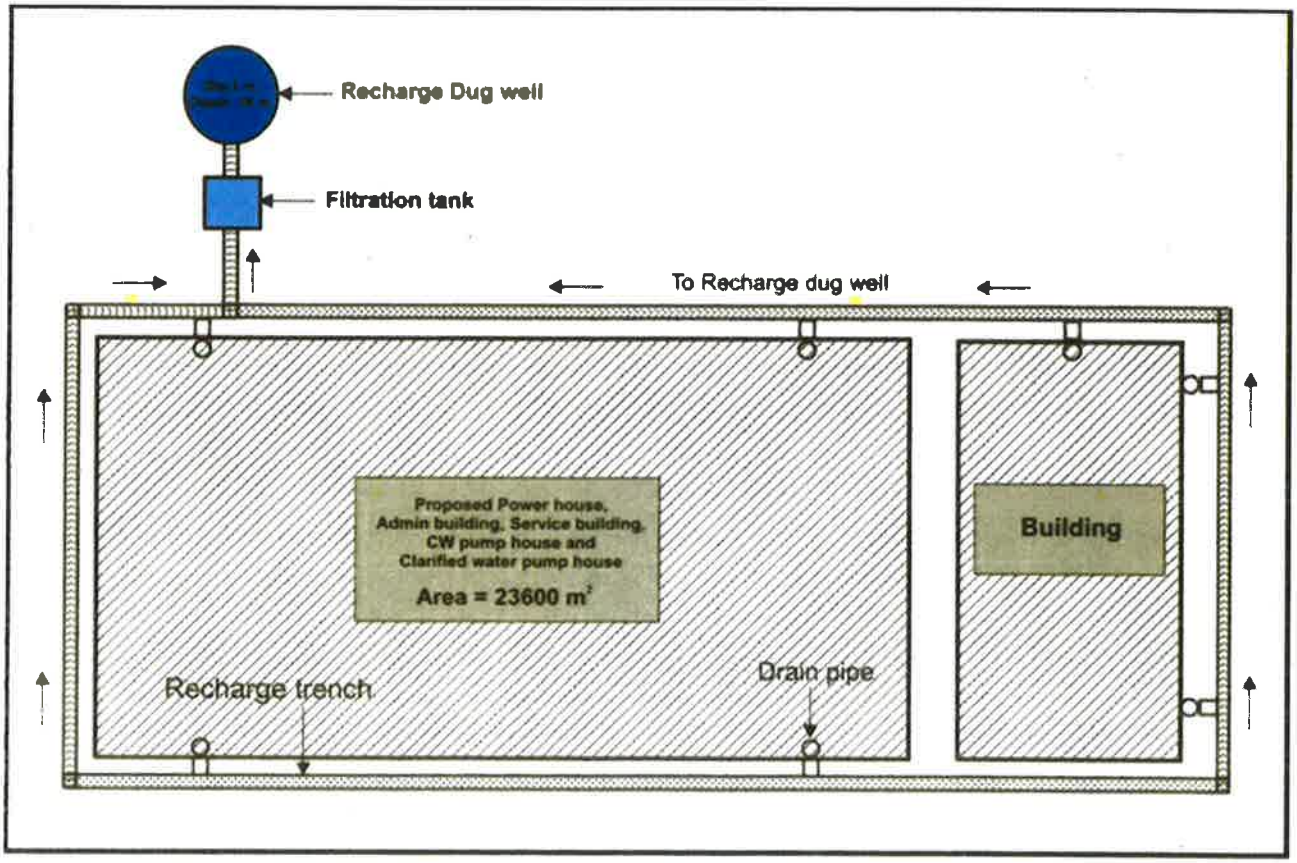


FIG – 4.23

PROPOSED RECHARGE DUG WELL



Availability of roof top rain water: 23600 x 0.85 x 0.624 =12517 m^3

Peak availability of water (60 minutes) 23600 x 0.85 x 0.06 =1204m^3.

It is proposed that roof top rain water from the Power house, Admin building, Service building, CW pump house and Clarified water pump house building (having total roof top area of around 23600 m^2) ma y be collected through 50 mm PVC drain pipes and brought to the recharge trench which will be constructed in front and back of the building and will have minimum length of 5100 metres in front and back of the building.

The capacity of the recharge trench is sufficient to accommodate the peak rainfall of 60 minutes taking 50% as void ratio.

0.5 x 1 x 5100 x 0.5 = 1275 m^3
W x D x L x void ratio = capacity

Any surplus water (during any cloud burst or slow infiltration rate of the trench) may be taken as overflow to proposed Recharge Dug well-constructed in the plant area. The water in the trench will gradually percolate and join the water table in due course of time.

(ii) Fire Water Pump House

There are proposed Fire water pump house having total roof top area of 300 m^2. All the roof top rain water will be collected through drain pipes and brought to a recharge trench which will be constructed in front and back of the building and filled with filter media as shown in **Fig-4.22**. The excess water will be collected in proposed Recharge Dug well (**Fig-4.23**).

The availability of roof top water and the peak runoff from the roof top of the Fire water pump house having total roof top area of 300 m^2 has been estimated as under, taking annual average rainfall as 624.2 mm, 0.85 as runoff coefficient for cemented roof

and rainfall intensity which is about 60 mm/ hour day as peak rainfall for Nalgonda area.

Availability of roof top rain water

= 300 x 0.85 x 0.624 = 159 m^3

Peak availability of water during 60 minutes

= 300 x 0.85 x 0.06 = 15 m^3

It is proposed that roof top rain water from the Fire water pump house building (having total roof top area of around 300 m^2) may be collected through 50 mm PVC drain pipes and brought to the recharge trench which will be constructed in front and back of the building and will have minimum length of 75 metres in front and back of the building.

The capacity of the recharge trench is sufficient to accommodate the peak rainfall of 60 minutes taking 50% as void ratio.

0.5 x 1 x 75 x 0.5 = 19 m3
W x D x L x void ratio = capacity

Any surplus water (during any cloud burst or slow infiltration rate of the trench) may be taken as overflow to proposed Recharge Dug well-constructed in the plant area. The water in the trench will gradually percolate and join the water table in due course of time.

B. **ROAD/PAVED AREAS AND GREEN BELT**

Water harvesting potential for paved areas and greenbelt are shown below in **Table – 4.11**

TABLE - 4.11
ILLUSTRATION OF WATER HARVESTING POTENTIAL FOR DIFFERENT LAND USES

S. No.	Description	Quantity
1	Average Annual rainfall	624 mm (0.624m)
2	Rainwater endowment of one hectare area (10,000 sq. m) per year	10,000 X 0.624= 6240 m3 per year
3	Water harvesting potential of -Paved areas and road side drains -Green belt and other areas left out	 75% of sl. no. 2 i.e. 4680 m3 per year 25% of sl. no. 2 i.e. 1560 m3 per year

TABLE - 4.12
WATER HARVESTING POTENTIAL IN THE PROPOSED PLANT AREA

Land Use	**Area (Ha)**	**Water Harvesting Potential (m^3/yr)**
Paved areas and road side drains	4	24960
Green belt	547.36	853881
Total Area	551.36	878841

From the above harvested area it is expected that 878841 m3 of rainwater is the potential for a normal year. This harvested water (fresh) should be stored in a separate tank for in plant water requirement. If the available water from paved areas cannot be stored and is recharged it is proposed that the runoff from the paved areas may be collected in the cemented drains having required slopes and taken the proposed recharge dug well.

The availability of water and the peak runoff from the road and paved area 4000 m^2 has been estimated as under, taking annual average rainfall 624 mm, 0.5 as runoff coefficient for cemented floor and average rainfall intensity of 60 mm /day as peak rainfall for the area.

Availability of water from paved areas

= 4000 x 0.50 x 0.624 = 1248 m^3

Peak availability of water during 24 hour

= 4000 x 0.50 x 0.06 = 120 m^3

III. TOTAL GROUND WATER RECHARGE

The total ground water from the roof top of buildings has been estimated as 12,676 m^3/year while from paved area, it is 1248 m3/year. All this quantity is based on the initial buildings which will be constructed under Phase-I. With construction of more buildings, this will increase according to roof top area and area of the paved roads.

TABLE - 4.13
TOTAL RAIN WATER HARVESTING POTENTIAL

Sr. No.	Structures	Total rain water harvested in m^3/yr	Ground water recharge in m^3/yr
1	Proposed Power house, Admin building, Service building, CW pump house and Clarified water pump house	12517	6258.5
2	Fire water pump house	159	79.5
3	Road and paved area	1248	624
4	Green belt (30% as surface runoff)	266411	133205
Grand Total		**280335**	**140167**

4.2.4 LAND ENVIRONMENT

4.2.4.1 IMPACT ON LAND USE AND MEASURES

The project will be developed in an area of 2800 acres. Of the total area of 2800 acres, 2095.28 acres is Forest Land falling under the jurisdiction of Veerlapalem Forest Block and 704.12 acres is Patta Land, Government Land, Udafa patta Land and D-Patta Land. the total land will be put to industrial use. There will be change in landuse of the project area of 2800 acres as per the layout

designed and land breakup designed for implementation of the power project

Greenbelt will be developed in an area of 1352 acres within the project area. TSGENCO will restore the degraded forest of 1049 acres which is part of greenbelt area proposed within the project area.

4.2.4.2 ADDITIONAL INFRASTRUCTURE

The following additional infrastructure will be developed as part of project development

a) New Road with Bridge will be laid to connect the Colony to Veerlapalem Village.
b) Right of way for Railway Line from Vishnupuram RS to the project site.
c) Right of way for water pipeline for water drawl from River Krishna to project.
d) Bypass road for Veerappagudem is proposed to avoid the village.

4.2.4.3 CONSERVATION PLAN FOR SCHEDULE-I SPECIES

Ecological studies carried out in the study area showed the presence of the following species falling under schedule – I as per The Wild Life Protection Act, 1972.

TABLE - 4.14

SCHEDULE – I AND THREATENED SPECIES PRESENT IN THE STUDY AREA

S. No.	Scientific Name	Common name	As per WL(P)A, 1972	IUCN Status
1.	*Pavo cristatus*	Indian Peafowl	Schedule - I	Least Concern
2.	*Python molurus**	Indian python	Schedule - I	Near Threatened
3.	*Varanus bengalensis*	Monitor lizard	Schedule - I	Least Concern
4.	*Nilssonia gangetica**	Indian softshell turtle	Schedule - I	Vulnerable

Indian Peafowl, Indian python and Monitor lizard are existing in the study area. Based on the information collected, Turtle is reported in the year of 1962-1963 and 1996-1998. No information is available on its presence in the last 18 years.

In order to conserve the Schedule – I Species, TSGENCO in coordination with Forest Department will prepare a Conservation Plan. TSGENCO has budgeted an amount of Rs 100 Lakhs. Based on the requirement, TSGENCO will allot additional budget.

4.2.4.4 CUMULATIVE IMPACT ON SOIL

The power project generate ash which will be disposed (unutilized) to ash pond provided with HDPE lining to prevent leaching into the soil.

No wastewater will be discharged from the power plant which will lead to soil contamination. The cumulative impact on soil due to the power project and the surrounding industries do not arise as the activities pertaining to the power project and the surrounding industries are confined to their respective project boundaries.

4.2.5 GREENBELT DEVELOPMENT PLAN

4.2.5.1 PROJECT AREA

An area of 1352 acres of the project area will be developed under greenbelt covering the following areas

TABLE – 4.15
GREENBELT DEVELOPMENT PLAN

	acres		
	Forest	**Non Forest**	**Total**
100 m width along project boundary	276.00	156.00	**432.00**
Other areas – near ash pond, coal storage etc	731.00	0	**731.00**
100 m barrier on either side Tungapadu Stream	12.00	130.00	**142.00**
50 m barrier on either side of Village Road	30.00	17.00	**47.00**
Total	**1049**	**303.00**	**1352**

Fig – 4.24 Shows the greenbelt development plan and year wise greenbelt development program.

A. GREENBELT DEVELOPMENT SCHEDULE

Greenbelt development will be taken up from the construction stage itself. Greenbelt will be developed in 1352 acres of the project area which will include restoration of the forest area of 1049 acres and development of greenbelt in non-forest area of 303 acres. It is proposed to develop an in-house nursery for developing greenbelt.

It is proposed to plant 600 saplings/acre for development of the greenbelt within the project site as per the schedule given below:

TABLE – 4.16
SCHEDULE OF GREENBELT DEVELOPMENT

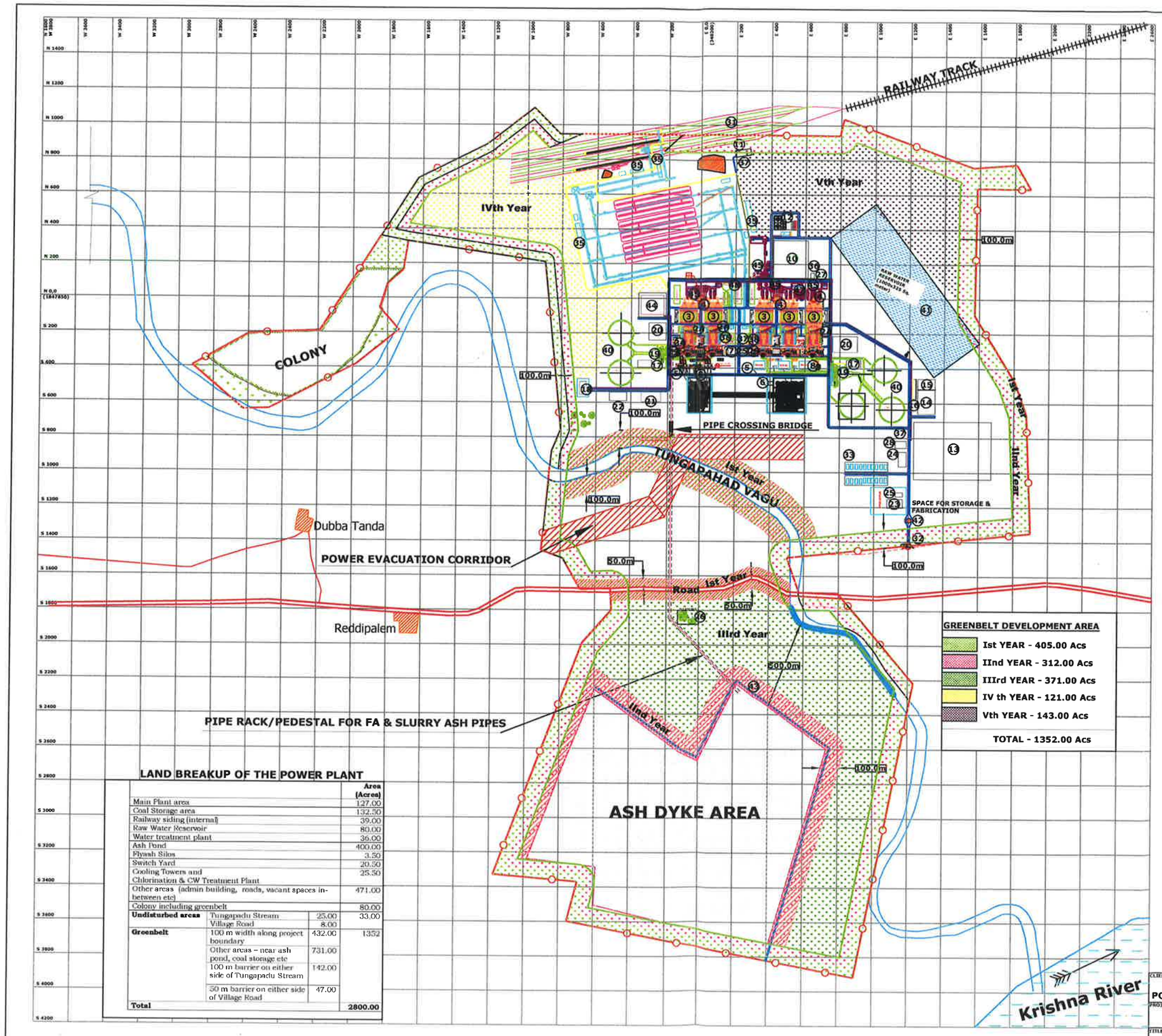
Years	area (acres)	No of saplings (@600 saplings/acre)
1st	405	243000
2nd	312	187200
3rd	371	222600
4th	121	72600
5th	143	85800
TOTAL	**1352**	**811200**

B. SPECIES PROPOSED FOR PLANTATION

The list of species proposed for greenbelt development based on agro climatic conditions are given in **Table - 4.17**

C. PATTERN OF GREENBELT DEVELOPMENT AND SPECIES

A curtain of trees covering a width of 100 m all around the power plant complex will be developed. The green belt design shall be as follows:



LAND BREAKUP OF THE POWER PLANT

			Area (Acres)
Main Plant area			127.00
Coal Storage area			132.50
Railway siding (internal)			39.00
Raw Water Reservoir			80.00
Water treatment plant			36.00
Ash Pond			400.00
Flyash Silos			3.50
Switch Yard			20.50
Cooling Towers and Chlorination & CW Treatment Plant			25.50
Other areas (admin building, roads, vacant spaces in-between etc)			471.00
Colony including greenbelt			80.00
Undisturbed areas	Tungapadu Stream	25.00	33.00
	Village Road	8.00	
Greenbelt	100 m width along project boundary	432.00	1352
	Other areas – near ash pond, coal storage etc	731.00	
	100 m barrier on either side of Tungapadu Stream	142.00	
	50 m barrier on either side of Village Road	47.00	
Total			**2800.00**

S.No.	DESCRIPTION	CONFIG.
1	POWER HOUSE BLDG	-
2	BOILER	-
2A	SCR	-
3	ESP	-
4	CHIMNEY	2+2+1
5	TRANSFORMER YARD	-
6	SWITCHYARD (CONT. ROOM)	-
7	SERVICE BLDG.	COMMON
8	DG BUILDING	2 Nos
9	COOLING TOWER(NDCT)	-
10	DM PLANT & CPU REGEN.	COMMON
11	FUEL OIL UNLOADING	COMMON
12	FUEL OIL COMPLEX	COMMON
13	PRE-TREATMENT PLANT	COMMON
14	CLARIFIED WATER TANK	COMMON
15	FIRE WATER TANK	COMMON
16	CLARIFIED CUM FIRE WATER P/H	COMMON
17	SIDE STREAM FILTERATION	2 + 3
18	H2 GEN. PLANT & CYLINDERS SHED	COMMON
19	CW P/H & FOREWAY	2 + 3
20	CHLORINATION & CW TREAT. PLANT	2 + 3
21	EFFLUENT TREAT. PLANT	COMMON
22	SEWAGE TREAT. PLANT	COMMON
23	ADMIN. BUILDING	COMMON
24	FIRE STATION BUILDING	COMMON
25	CANTEEN	2NOs
26	FLY ASH SILO AREA	COMMON
27	CHEMICAL LAB	COMMON
28	WORKSHOP	COMMON
29	COMPRESSOR HOUSE	2 + 3
30	COAL STOCK AREA	COMMON
31	MARSHLING YARD (BY TSGENCO)	COMMON
32	GATE COMPLEX CUM SECURITY BLDG.	COMMON
33	PERMANENT STORES (15MX30M)	18+1
34	AUXILIARY BOILER	-
35	CHP MCC	4 NOs
36	CHEMICAL LAB (PCRI)	COMMON
37	----------	-------
38	CST + PUMP HOUSE	2 + 3
39	AWRP/H & MCC	1
40	COOLING TOWERS (NDCT)	5
41	RAW WATER RESERVOIR	COMMON
42	PYLON/FOUNDATION STONE	-
43	ASH DYKE AREA	-
44	AMMONIA STORAGE&HANDLING PLANT	COMMON
45	FLUE GAS DESULFURIZATION (FGD)	-
46	LIMESTONE HANDLING AREA	COMMON
47	GYPSUM DEWATERING & STORAGE	COMMON
48	FGD CONTROL ROOM	COMMON

GREENBELT DEVELOPMENT AREA

- Ist YEAR - 405.00 Acs
- IInd YEAR - 312.00 Acs
- IIIrd YEAR - 371.00 Acs
- IV th YEAR - 121.00 Acs
- Vth YEAR - 143.00 Acs

TOTAL - 1352.00 Acs

NOTES :-

1. ALL DIMENSIONS AND CO-ORDINATES ARE IN METER UNLESS NOTED OTHERWISE.

REFERENCE DRGS.

1. TENDER STAGE PLOT PLAN:TSGENCO\RLG\RF\VRPM\01
2. CONTOUR PLAN DRG : SUV/2015/3312/PLAN

LEGEND

- RIVER
- ROAD
- RAILWAY TRACK
- PLANT BOUNDARY
- 100 m BARRIER ZONE
- COLONY
- CORRIDOR FOR TRANSMISSION LINES
- GREEN BELT
- ROAD WITH 50 M BARRIER ZONE ON TWO SIDES
- STORM WATER DRAIN
- TUNGAPAHAD VAGU WITH 100 M BARRIER ZONE ON TWO SIDES

FIG - 4.24

CLIENT: M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED

PROJECT: 4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

TITLE: **GREENBELT DEVELOPMENT PLAN**

TABLE – 4.17
LIST OF FLORA SPECIES RECOMMENDED FOR GREENBELT DEVELOPMENT

Sl. No	BOTANICAL NAME	COMMON NAME	HEIGHT (M)
	SMALL TREES & SHRUBS UP TO HEIGHT 0.5 M to 5 M		
1	*Acacia pennata*	Climbing wattle	5 M
2	*Bauhinia purpurea*	Hawaiian Orchid Tree	5 M
3	*Bauhinia racemosa*	Bidi Leaf Tree	3-5 M
4	*Caesalpinia pulcherrima*	Peacock Flower	3 M
5	*Callistemon citrinus*	Lemon Bottlebrush	5 M
6	*Calotropis gigantean*	Crown Flower	4 M
7	*Calotropis procera*	Rubber Tree	4 M
8	*Citrus limon*	Lemon	3-6 M
9	*Clerodendrum infortunatum*	Hill Glory Bower	0.5 - 4 M
10	*Datura metel*	Devil's Trumpet	0.5 - 4 M
11	*Gardenia jasminoides*	Jasmin	3 M
12	*Gardenia resinifera*	Jasmin	3 M
13	*Gardenia gummifera*	Cambi gum tree	3 M
14	*Hibiscus rosa-sinensis*	Hibiscus	2.5-5 M
15	*Ixora coccinea*	Jungle Flame	1.2-2 M
16	*Prosopis cineraria*	Ghaf	3-5 M
17	*Tabernaemontana divaricata*	Nero's Crown	1.5-1.8 M
18	*Zizyphus oenoplia*	Jackal Jujube	1.5 M
19	*Ziziphus numalaria*	Jharber	2 M
20	*Albizia amara*	Krishna Siris	3-6 M
21	*Murraya paniculata*	Orange Jessamine	3 M
22	*Abutilon indicum*	Indian Abutilon	2 M
23	*Bauhinia acuminata*	White Orchid-Tree	3 M
	SMALL TREES & SHRUBS UP TO HEIGHT 2 M to 10 M		
24	*Acacia senegal*	Sudan Gum Arabic	5-12 M
25	*Anona reticulata*	Wild-Sweetsop	8 M
26	*Anona squamosa*	Custedapple	8 M
27	*Bougainvillea spectabilis*	Great Bougainvillea	4-12 M
28	*Duranta repens*	Golden Dewdrop	6 M
29	*Emblica officinalis*	Indian Gooseberry	1-8 M
30	*Grewia subinequalis*	Phalsa	8 M
31	*Juniperus communis*	Common Juniper	10 M
32	*Lawsonia inermis*	Henna Tree	1.8 - 7 M
33	*Nerium indicum*	oleander	2-6 M
34	*Nerium oleander*	oleander	2 - 6 M
35	*Nyctanthus arbor-tristis*	Night-Flowering Jasmine	10 M
36	*Phoenix sylvestris*	Wild Date Palm	4 - 15 M

Sl. No	BOTANICAL NAME	COMMON NAME	HEIGHT (M)
37	*Phyllanthus acidus*	Gooseberry	2-9 M
38	*Thespesia populnea*	Portia Tree	6 - 10 M
39	*Psidium gujava*	Guava	1-6 M
40	*Tecoma stans*	Yellow Trumpetbush	4-6 M
41	*Cordia dichotoma*	Fragrant Manjack	7-10 M
42	*Saraca asoka*	Ashoka Tree	10 M
	SMALL TREES HEIGHT 10 M to 15 M		
43	*Buchanania lanzan*	Chironji Tree	15 M
44	*Bambusa arundinacia*	Bambu	11 M
45	*Barringtonia acutangula*	Freshwater Mangrove	8-15 M
46	*Barringtonia racemosa*	Powder-Puff Tree	10 - 15 M
47	*Bauhinia varigata*	Camel's Foot Tree	10-12 M
48	*black catechu*	Black Catechu	15 M
49	*Butea monosperma*	Flame-Of-The-Forest	15 M
50	*Carey arborea*	Slow Match Tree	15 M
51	*Dillenia indica*	Elephant Apple	15 M
52	*Gliricidia sepium*	Quickstick	12 M
53	*Moringa oleifera*	Drumstick Tree	10-15 M
54	*Phanera variegata*	Camel's Foot Tree	10 - 15 M
55	*Pithecellobium ducle*	Monkeypod	10-15 M
56	*Polyalthia longifolia*	Ashoka	9-15 M
57	*Prosopis chilensis*	Chilean Mesquite	14 M
58	*Ricinus communis*	Castor-Oil-Plant	12 M
59	*Senegalia catechu*	Kher	15 M
60	*Zizyphus maurtiana*	Chinese Date	15 M
61	*Citrus aurantium*	Bitter Orange	3-10 M
62	*Sesbania grandiflora*	Hummingbird Tree	10 M
63	*Sesbania sesban*	Egyptian Riverhemp	8 M
	SMALL TREES HEIGHT 15 M to 20 M		
64	*Acacia nilotica*	Gum Arabic Tree	5-20 M
65	*Aphanamixis polystachya*	Rohituka Tree	20 M
66	*Azadirachta indica*	Neem	15 - 20 M
67	*Bambusa vulgaris*	Common Bamboo	10-20 M
68	*Cassia fistula*	Golden Rain Tree	10 - 20 M
69	*Holoptelia integrifolia*	Indian Elm	18 M
70	*Kigelia Africana*	sausage tree	20 M
71	*Madhuca longifolia*	Mahua	20 M
72	*Mimuspos elengi*	Bullet Wood	16 M
73	*Morus alba*	White Mulberry	10-20 M
74	*onetia papyrifera*	Paper Mulberry	10-20 M

Sl. No	BOTANICAL NAME	COMMON NAME	HEIGHT (M)
75	*Sterculia foetida*	Wild Almond Tree	10 - 17 M
76	*Thuja occidentalis*	Northern White-Cedar	15 M
77	*Trema orientalis*	Charcoal-Tree	18 M
78	*Ficus hispida*	Hairy fig	15 M
79	*Adenanthera pavonina*	Red Lucky Seed	15 M
80	*Ficus glomerata*	Indian Fig Tree	10-16 M
81	*Bischofia javanica*	Bishopwood	9 -15 M
	HEIGHT MORE THAN 15 M to 25 M TREES		
82	*Acacia auriculiformis*	Earleaf Acacia	15 - 25 M
83	*Acacia polyacantha*	White Thorn	25 M
84	*Acacia tortilis*	Umbrella Thorn Acacia	21 M
85	*Adina cordifolia*	Kadam	20 M
86	*Albizia lebbeck*	Womens Tongues Tree	18-30 M
87	*Albizia odoratissimma*	Black Siris	15-25 M
88	*Aleurites fordii*	Tung Tree	20 M
89	*Anogeissus latifolia*	Axlewood	20 M
90	*Artocarpus lacucha*	Monkey Fruit	20-25 M
91	*Dalbergia sissoo*	North Indian Rosewood	25 M
92	*Delonix regia*	Royal Poinciana	15 - 20 M
93	*Diospyros melanoxylon*	Coromandel Ebony	25 M
94	*Erythrina variegata*	Indian Coral Tree	27 M
95	*Lagerstroemia speciosa*	Pride Of India	20 M
96	*Mallotus philippensis*	Kumkum Tree	25 M
97	*Millingtonia hortensis*	Indian Cork Tree	18 - 25
98	*Mimusops hexandra*	Spanish cherry	16 M
99	*Peltophorum Pterocarpum*	Yellow-Flame	15 - 25 M
100	*Pongamia pinnata*	Indian Beech	15 - 25 M
101	*Spathodea campalunata*	Nandi Flame	7 - 25 M
	HEIGHT MORE THAN 25 M AND ABOVE TREES		
102	*Acacia auriculiformis*	Tan Wattle,	30 M
103	*Aegle mormelos*	Bael	25 M
104	*Alstonia scholaris .*	Blackboard Tree	40 M
105	*Anthocephalus chinensis*	Burflower-Tree	45 M
106	*Artocarpus heterophyllus*	Jackfruit	40 M
107	*Cassia javanica*	Rainbow Shower Tree	25-40 M
108	*Casuarina equisetifolia*	Australian Pine Tree	35 M
109	*Ceiba pentandra*	White Silk-Cotton	20-25 M
110	*Cocos nucifera*	Coconut Tree	30 M
111	*Eucalyptus citriodora*	Eucalyptus	35 M
112	*Ficus benghalensis*	Indian Banyan	25 - 35 M

Sl. No	BOTANICAL NAME	COMMON NAME	HEIGHT (M)
113	*Ficus benjamina*	Ficus Tree	30 M
114	*Ficus elastic*	Indian Rubber Bush	30 - 40 M
115	*Ficus religiosa*	Pippala Tree	25 - 30 M
116	*Grevillea robusta*	Silver Oak	18-35 M
117	*Guazma ulmifolia*	West Indian Elm	30 M
118	*Hardwickia binate*	Hardwickia	25 - 30 M
119	*Lagerstroemia parviflora*	Pride-of-India	30 M
120	*Mangifera indica*	Mango	30 - 40 M
121	*Manilkara zapota*	Sapodilla	30 M
122	*Pinus roxburghii*	Chir Pine	30-50 M
123	*Populus nigra*	Black Poplar	20-30 M
124	*Samanea saman*	Rain Tree	25 M
125	*Spondias pinnata*	Golden Apples	25 M
126	*Syncarpia glomulifera*	Turpentine Tree	45-55 M
127	*Syzygium cumini*	Jamun	25 - 30 M
128	*Tamarindus indica*	Tamarind	25 - 35 M
129	*Tectona grandis*	Teak	35 - 45 M
130	*Terminalia alata*	Arjun Tree	20 - 25 M
131	*Terminalia arjuna*	Arjun Tree	20 - 25 M
132	*Terminalia bellerica*	Bastard Myrobalan	30 M
133	*Terminalia chebula*	Chebulic Myrobalan	30 M

PRIMARY ZONE

This zone will be the nearest one to the emission sources, where the ambient pollutant concentration is higher. The trees planted here will have dense spreading canopy. The trees should be close-set with Spacing of 2-3m between trees and width of this zone will be 25 metres.

SECONDARY ZONE

Outer to the above primary zone, 25 m width wide strip of land will be planted with trees which are moderately tolerant to the pollutants but are endowed with fast growing, dense foliage canopy.

CURTAIN ZONE

All along the boundary of power station complex, a 50 meter width land strip will be planted with trees which are tall in nature and evergreen in habit.

This zone will act as a barrier and as far as possible check the pollutants from going to and contaminating other areas beyond the power plant premises. The spacing between the trees would be kept more than 1 meter.

4.2.5.2 RESTORATION OF DEGRADED FOREST LAND

TSGENCO will take up additional plantation in the Reserved Forest that demarcates the project boundary on the south. In this regard, TSGENCO has sought the recommendations of the Forest Department, Government of Telangana.

Forest Department, Government of Telangana vide letter no. rc.No. 3561/2016/S6, dated 23.12.2016 **(Annexure – 4D)** has advised TSGENCO to take up the following

a. Plant species Naravepa and Nemilinara species which are highly suitable for the area.

b. At least one year old seedlings (bag plants) have to be planted in 0.60 m X 0.60 X 0.60 m cube pits
c. Soil moisture conservation works like Continuous contour Trenches, percolation tanks, Rock fill dams and Check dams have to be take-up to improve the sub surface moisture which will help in the success of plantations

4.2.5.3 DEVELOPMENT OF COMMON PROPERTY RESOURCES

Based on the information obtained during the primary survey carried out by BSET, an area of 4106 Ha of Barren and Un-cultivable land is available in Damercherla Mandal.

Bamboo which is fast growing and native of the area can be grown in the barren land. Bamboo has great industrial as well commercial demand all over the district. Bamboo leaves are also used as green fodder for milk animals. Bamboo cane mats have extensive market in and around and in the urban centers of the State.

Uncultivable land can be developed by planting fruit bearing Orchids.

TSGENCO with the help of Agricultural, Soil Conservation, Forestry, and Irrigation Department with the convergence of their resources will explore development of this common property in consultation with local panchayats and take up their development during operational phase of the project as part of CSR.

4.2.6 SOLID WASTE GENERATION AND MANAGEMENT

The solid waste generation from the project is from the following area

MAJOR SOLID WASTE

a. Ash from Boilers

OTHER SOLID WASTE

a. Gypsum from FGD
b. Sludge from Water Treatment Plant
c. Sludge from STPs
d. Waste from Plant
e. Garbage from Colony

4.2.6.1 MAJOR SOLID WASTE - ASH MANAGEMENT

The major solid waste generation from the project is ash in the form of fly ash and bottom ash. Maximum ash generation is due to use of blend coal. Steam generating units are the main sources of the solid waste where coal is burnt.

The peak generation of ash due to use of coal is estimated to be about 2.76 MTPA (at 85 % PLF). Of the total ash Fly ash generation is 2.20 MTPA (80% of Total Ash) and Bottom ash is 0.56 MTPA (20 % of Total Ash). The following table shows the ash generation from the power plant.

TABLE – 4.18
ASH GENERATION (MTPA)

	100% Imported coal	**Blend coal (50% Indian & 50% imported)**
Coal consumption, MTPA	11.02 @ 85 % PLF	12.28 @ 85 % PLF
Ash content considered for design	15	22.5
Ash generated per year in Million Tonnes @85%PLF	1.65	2.76
Fly Ash Generation (80% of total ash) million tonnes	1.32	2.2
Bottom ash (20% of total ash)	0.33	0.56

ASH HANDLING SYSTEM

Fly ash will be collected and stored in silos in dry form for utilization by ash users. The unutilized ash will be disposed to ash pond by wet handling system. The clinker (bottom ash) collected at

the bottom of the boiler will also be available to users if required. Bottom ash will be ground and disposed to Ash pond by wet handling.

Fly Ash from Fly Ash Evacuation ((FAE) Towers will be conveyed from all Fly Ash Evacuation (FAE) Towers to Fly Ash storage Silo in dry mode through Pressure conveying system

The untilised flyash will be conveyed by conventional slurry system along with ground bottom ash to Ash pond.

FLY ASH UTILIZATION

TSGENCO has approached the various cement plants located within 50 km radius for offtake of flyash generated from the plant. The following cement plant has expressed their willingness for the off take of flyash mentioning their requirement.

TABLE – 4.19
LIST OF CEMENT PLANTS FOR UTILISATION OF FLYASH

S. No	Name Of Plant	FLYASH MTPA	Distance from YTPS, km
1	Parasakti Cement Industries Ltd	0.105	8.0
2	Nagarjuna Cement Ltd	0.315	22.8
3	The India Cements Ltd	0.165	4.8
4	Penna Cement Industries Ltd	0.099	9.6
5	Deccan Cement Ltd	0.0495	11.3
6	Andhra Cement Ltd	0.015	11.7
7	Sri Chakra Cement Ltd	0.033	35.10
8	Anjani Portland Cement Ltd	0.0825	50.4
TOTAL		**0.864**	

The willingness letters received from the above cement plants are enclosed as **Annexure – 4E**. From the above table, it can be seen that the ash utilization quantity by Cement Plants in the 50 km radius is about 0.864 MTPA.

TSGENCO as per the MOEF notification S.O.254 (E) will setup ash based manufacturing facility within the project area which is mainly to produce flyash based bricks with a capacity of 10000 bricks /day which can utilize flyash of about 985 t/month (0.011 MTPA) and Gypsum of about 98 t/month (0.0012 MTPA)

TSGENCO will also promote, support and assist the locals in setting up of ash based product manufacturing units.

TSGENCO has firm tie up for offtake of flyash (including TSGENCO) consumption for brick plant) is 0.875 MTPA from 1st year itself.

TSGENCO will pursue with other cement plants located in 200 km radius for offtake of flyash.

Also TSGENCO will explore utilization of flyash in road construction projects under Pradhan Mantri Gramin Sadak Yojna and asset creation programmes of the Government involving construction of buildings, road, dams and embankments

With the above action plan, TSGENCO is confident of disposing balance flyash of 1.32 MTPA complying with the notification of MOEF & CC of 100 % ash utilization by fourth year. Based on this, the unutilised ash disposal to ash pond has been worked out and presented below

TABLE – 4.20

ASH UTILISATION AND UNUTILISED FLYASH DISPOSAL TO ASH POND AS PER MOEF & CC NOTIFICATION

		Year				MTPA
Ash Utilisation % as per MOEF Notification	**Generation MTPA**	**1st**	**2nd**	**3rd**	**4th**	**Untilised ash Disposed To Ash Pond**
25	2.20	0.55				1.65
50			1.10			1.10
75				1.65		0.55
100					2.20	0.00
Unutilised ash disposed to Ash pond						**3.30**

BOTTOM ASH

Bottom ash generation from the plant is 0.56 MTPA. TSGENCO will explore disposing of bottom ash for utilization in road construction, foundation and use as aggregate. The ash pond has been designed considering the unutilized flyash in first three years and 25 years bottom ash generation.

4.2.6.2 ASH POND

Ash pond will be designed to store ash of 17.05 million tonnes which include unutilized fly ash of 3.30 million tonnes (generated in first three years) and bottom ash of 13.75 million tonnes generated in 25 year.

The unutilized ash comprising fly ash and bottom ash will be disposed to the ash dyke proposed in an area of 400 acres of land. The dyke will be constructed progressively to a maximum height of 15 m above ground.

4.2.6.3 ASH POND LINING

In order to assess the requirement of ash pond lining, permeability and infiltration tests were carried out. Details of the same are given below

Permeability Tests (By Hydro-Geosurvey Consultants Pvt. Ltd., Jodhpur)

The coefficient of permeability of the ash pond area has been assessed. Tests were carried out at 10 locations **(Fig-4.25).** The results of permeability calculated from the first 60 minutes drawdown are given below.

FIG - 4.25

MAP SHOWING LOCATIONS OF PERMEABILITY TESTS AND INFILTRATION TESTS

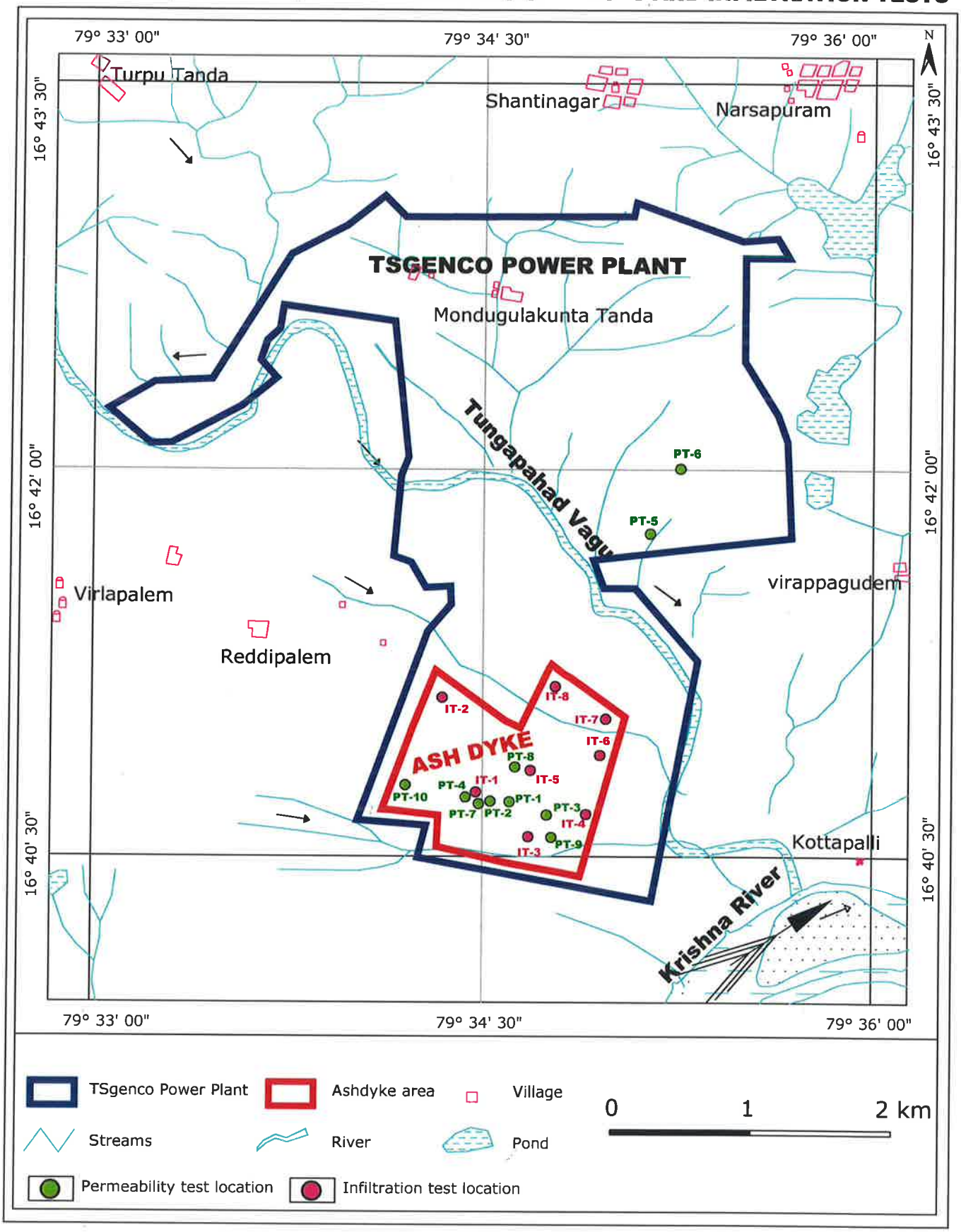


TABLE – 4.21
Coefficient of permeability in ash pond area
(Based on Falling head method).

Location	Depth tested below ground level (m)	K (cm/sec)
P-1	2.0 to 5.0	5.47E-06
P-2	2.0 to 5.0	5.76E-06
P-3	2.0 to 5.0	1.49E-05
P-4	2.0 to 5.0	1.25E-05
P-5	2.0 to 5.0	4.59E-07
P-6	2.0 to 5.0	2.09E-06
P-7	2.0 to 5.0	1.18E-05
P-8	2.0 to 5.0	4.60E-06
P-9	1.0 to 5.0	2.07E-06
P-10	1.0 to 5.0	2.39E-06

Infiltration test

The infiltration tests were conducted at 8 locations in ash pond area **(Fig – 4.25)**

TABLE – 4.22
Soil infiltration rates in ash pond area

Location	Steady State Infiltration Rate (mm/hr)	Saturated Hydraulic Conductivity (K_{sat})		
		(mm/hr)	(m/day)	(cm/sec)
I-1	2.5	3.625	0.087	1.01E-04
I-2	2.9	4.205	0.10092	1.17E-04
I-3	2.8	4.06	0.09744	1.13E-04
I-4	2.5	3.625	0.087	1.01E-04
I-5	3.7	5.365	0.12876	1.49E-04
I-6	3.2	4.64	0.11136	1.29E-04
I-7	2.6	3.77	0.09048	1.05E-04
I-8	2.4	3.48	0.08352	9.67E-05

Boreholes augured up to maximum depth of 5.0 metres below the ground level in the area, reveal the thickness of top soil as 0.15 to 0.35 metres followed by limestone having water table at a depth of

15 to 35 metres below ground level. The in-situ permeability values range from 1.25 x 10^{-5} to 4.59 x 10^{-7} cm/sec for the fractured shale and limestone, between depth from 1 to 5 metres. The underlying shale/limestone are weathered and fractured and therefore would exhibit higher permeability values.

The infiltration rate of soil is in the range of 3.5 - 5.4 mm/hr (9.67 x 10^{-5} to 1.49 x 10^{-4} cm/sec) observed in the pond areas will have still slower rate of flow after the ponds become operational due to turbid nature of water with higher density as compared to clean water and after compaction of the base.

HDPE LINING FOR ASH POND

The possibility of groundwater contamination due to the leaching of metals from the ash pond was examined. It has been found that the horizon below the proposed ash pond does not have the required permeability to arrest the seepage of water from the ash pond. It is necessary that an impervious lining be laid below the ash pond so that contaminated ash pond water does not join the zone of saturation. HDPE film will be provided over the clay lining as per design standards.

Impact of the ash pond on the ground water will be mitigated by providing an impervious layer of HDPE lining.

4.2.6.4 OTHER SOLID WASTE MANAGEMENT

Following are the other solid wastes generated from the various areas

a. Gypsum from FGD
b. Sludge from Water Treatment Plant
c. Sludge from STPs
d. Waste from Plant
e. Garbage from Colony

Gypsum generation from Flue Gas Desulphurisation unit is estimated to be about 3600 t/day (1.11 MTPA @ 85 % PLF). Gypsum generated will be disposed to various cement plants.

The requirement of Gypsum of the existing cement plants (total capacity of about 12.345 MTPA) and proposed cement plant (expansion and green field) capacity of about 9.0 MTPA located within 50 km is 1.06 MTPA.

Gypsum requirement in flyash brick plant of 10000 bricks/day proposed within the project area is estimated to be about 0.046 MTPA.

Total gypsum generated from the project will be consumed as detailed above. There is a potential of gypsum consumption by the other cement plants located in 200 km radius of the project area.

Other solid waste generation from the project along with nature, quantity and disposal are given below

TABLE – 4.23
SOLID WASTE GENERATION AND DISPOSAL
(Other than Coal Ash and Gypsum)

Type of solid waste	Nature	Quantity	Disposal
Gypsum	Hydrated Chemical Gypsum	3600 t/day (1.11 MTPA @ 85 % PLF).	To cement plants
Sludge from Water Treatment Plant @ Suspended Solids of 200 mg/l	Mud Slurry (Krishna River water)	360 m^3/day (48 t/day)	Use in greenbelt
Sludge from STPs	Organic waste	280 kg/day	Use in Greenbelt after sludge treatment
Waste from Plant @0.2 kg/head/day	Papers, cartons, thermocol, plastics, polythene	400 kg/day	Separation of Organic and Non Organic Waste

Type of solid waste	Nature	Quantity	Disposal
	bags, glass, waste vegetables and foods		Organic waste will be subjected to composting Non Organic Waste will be land filled
Garbage from Colony @0.5 kg/household/day	Organic waste	1000 kg/day	Organic waste will be subjected to composting in organic waste converter

The new Solid Waste Management Rules, 2016 stipulated under S.O. 1357(E) [08-04-2016] will be followed in handling the above solid waste

4.2.7 HAZARDOUS WASTE MANAGEMENT

Hazardous waste like waste oil, lube oil will be stored in a designated area as per the practices approved by State Pollution Control Board and the statutory provisions.

Spent Oil / lubricating oil and batteries will be disposed to the authorized vendors approved by State Pollution Control Board. Used batteries will be returned to Manufacturer.

4.3 SOCIO ECONOMIC ENVIRONMENT

Socio Economic Status of the study area is moderate. The project will provide employment for about 5000 persons during construction phase and 4000 persons during operational phase

The project will be implemented in an area of 2800 Acres. The R & R details of two villages and other land losers is detailed in Chapter - 7.

The social impact assessment carried out to study the impact of R & R i.e., Project Displaced families and Project affected families covering the following aspects is presented under Chapter – 7.

The CSR plan considering based on need based assessment of villages has been drawn and presented in Chapter - 8.

4.4 OCCUPATIONAL SAFETY & HEALTH MEASURES

4.4.1 OCCUPATIONAL HAZARDS

The occupational hazards associated with the power project, apart from the other environmental issues, are:

- Dust
- Noise,
- Heat
- Vibration.

Dust: The dust gets generated in power plant from the coal handling and stockpile areas, from the ash pond and ash handling areas. Combustion of coal also results in dust. From the boiler section due to combustion and pulverizing of coal, the dust is controlled by routing it through ESP/Bag filter and the emissions are restricted to less than the norms prescribed by the Ministry. The dust, so released gets dispersed into atmosphere through tall stacks. The dispersed dust gets diluted in the atmosphere and spreads to farther places depending on wind velocity, prevailing. By the time, it reaches the ground, it gets reduced largely. However, the fugitive dust that gets emitted at ground level from activities like the coal stockpiles and handling at different places causes more damage to workmen in the area. Its effect is restricted to work zone and its surrounds. Inhalation of this coal dust or fly ash leads to asthmatic problems like bronchitis and pneumoconiosis

Heat: Coal combustion in boilers is for generation of steam to impinge on turbines and the steam after turbine condenses through condenser. The boiler area and also from the pipelines, heat comes out. The same is reduced by insulating the pipeline and the boilers, to eliminate heat loss and also for a safer working environment. The exposure to heat may result in sickness and fatigue of workers and sometimes burns also. Occupational exposure to high heat in different operations may cause heat related disorders, like heat exhaustion and burns.

Noise: During construction and operation, number of machinery like generators, trucks, compressors, motors, pumps, boilers, turbines and various rotating equipment operate to produce noise. The units are located all over and noise prevails all through. Longer exposure to noise results in fatigue, nausea, hyper tension, hearing problem, regional vascular disorders, muscular-skeletal disorders, human error, productivity loss, accidents and injuries.

Vibration: The operating equipment, mostly during construction phase cause vibrations to the persons and also through the ground. This results in fatigue, nausea, headache and nervous sickness. Hearing loss and raised blood pressure, During operation the vibrations resulting from units like Compressors, pneumatic equipment, Boilers and turbines transmit through human body causing the effect.

Chemical Hazards: Leakage of Chemicals that are stored in the plant area are responsible for wide range of acute as well as chronic health impairments.

Fire and Explosion: Since large quantities of coal, other fuels and chemicals are stored the risks of fire and explosion are high. Areas of fire and explosion hazards are coal handling plant, coal conveyor, fuel oil/lubricant handling and storage areas, transformer/switch yards, boilers, hydrogen generation plant, etc.

Workplace physical hazards: In manual operations the workmen are subjected to stress that may lead to muscular disorders.

An Onsite &Offsite Emergency Plan is prepared complying with the Factories Act (1948) to handle the above hazards and presented in Chapter-7.

All the operations are so monitored to maintain the environment as per norms as per Factories ACT (1945).

4.4.2 MEASURES PROPOSED FOR CONTROL OF OCCUPATIONAL HAZARDS

Dust Control Measures:

The control measures adopted by thermal power plants to control emissions of particulates in flue gas and to control ambient air quality are as follows:

- High Efficiency ESP/bag filters for Boilers will be provided. Tall Stacks - discharge flue gas at high altitude to ensure wider dispersal of flue gas.
- Coal dust extraction and suppression system in coal handling plants to maintain a clean environment inside the plant.
- Provision of green belt and buffer zones around coal and ash handling areas to prevent fugitive dust emission.
- Spraying of water during coal/ash handling operations to prevent fugitive dust emissions.
- Provision of dust masks to the persons working in areas with high dust concentration to protect them from inhaling the dust.
- Enclosures for workers in coal/ash handling plants to protect from dust emissions.

Heat reducing measures: The following measures are adopted by the power plants to protect workers from heat:

- Providing proper ventilation
- Limiting time of work in high temperature environment.

Covered Rest shelters. with controlled environment (air cooled/air conditioned chamber with provisions for drinking water, washing facility, seating arrangement, first aid facilities, essential medicines etc.) for workers working in high temperature areas.

- Use of warning signs near high temperature services.
- Providing personal protective equipment like insulated gloves, shoes and thermal provision of cold water for drinking at workplace.
- Providing resting places

Noise Pollution Control Measures: In CFTPPs, the following measures are generally taken to control the emission of noise and protection of workers from high noise levels:

- Equipment Design - to generate low noise.
- Providing acoustic enclosures to machines to protect propagation of noise.
- Use of silencers and mufflers in intake and exhaust channels.
- Use of sound absorbing materials in walls and ceilings like mineral wool and saw dust.
- Use of vibration dampeners for absorption of Noise &vibrations.
- Spread out of Noise generating sources.
- Green belt and afforestation efforts help in reduction of propagation of noise.
- Provision of personal protective equipment such as ear plugs/ear muffs to workers working in high noise areas.

Vibrations reducing measures: The exposure of workers to vibrations is controlled by:

- Proper and regular maintenance of machinery;
- Design of machines with low vibration

4.4.3 PROTECTION MEASURES FOR HEALTH AND SAFETY

The following measures are to be adopted for protecting health and ensuring safety of workers.

- ❖ Trained first-aid personnel, with appliance
- ❖ Pre-employment medical examination
- ❖ Periodical medical examination
- ❖ Maintenance of records
- ❖ Use of personal protective measures
- ❖ Emergency preparedness
- ❖ Mock drill
- ❖ Specific audiometric tests for noise induced hearing loss
- ❖ Radiology for pneumoconiosis
- ❖ Accident management - minor, major, fatal and their records
- ❖ Health check-up camps
- ❖ Awareness programs
- ❖ Environmental monitoring
- ❖ Safety department and committee
- ❖ Display of Material Safety Data Sheet (MSDS)
- ❖ Hazards communication and controls - alarms, display warning signs, instructions
- ❖ Occupational health & safety training and education
- ❖ Health and safety policy
- ❖ Safety inspection/audits surveys.

Apart from the above, the environment is to be monitored as per the norms & frequency prescribed by respective statutory agencies.

4.4.4 OCCUPATIONAL HEALTH SURVEY

Occupational health checkup at the time of recruitment will be carried for all the employees for the following tests:

- Lung function test
- ECG
- Chest X-ray
- Blood analysis test
- Urine analysis test
- Audiometry
- Checking colour blindness
- Stool Analysis
- Sputum (Optional)

If any person who fails the above health checkup will not be recruited. Like so, a baseline data on the health status of workmen in the Pre-recruitment stage will be established. The same will be repeated periodically to update and to take action accordingly.

A full time qualified doctor trained in occupational health will be engaged. Health monitoring of the workers will be conducted at periodic intervals and health records will be maintained. Awareness programme for workers due to likely adverse impact on their health due to working in non-conducive environment will be carried out and precautionary measures like use of personal equipment etc. will be provided. Review of impact of various health measures undertaken at intervals as per statutory norms will be conducted with a follow up plan of action wherever required.

The first aid box will be made available for immediate treatment. First aid training is imparted to the selected employees regularly. The list of first aid members is being displayed at strategic places. A full-fledged health center manned by a qualified Doctor will be in operation with start of construction to take care of any emergencies.

4.5 IMPACT ON TRAFFIC AND MANAGEMENT MEASURES

Impact due to the projected traffic was assessed considering the material required for transport inward and outward of the project. the details of the same are given below

TABLE – 4.24
INWARD AND OUTWARD TRAFFIC OF THE PROJECT

	Quantity (tonnes/day)
Inward Transportation	
Limestone	2250
Outward Transportation	
Gypsum	3600
Flyash	8925
Total	**14775**

The number of trucks required for transport of the above material is given below:

TABLE – 4.25

ESTIMATION OF TRUCKS FOR TRANSPORT

	TOTAL MATERIAL TRANSPORT ON THE ROAD CONNECTING HIGHWAY
Total Quantity, t/day	14775
Capacity of each truck, tonnes	45
Number of trucks for total quantity including miscellaneous traffic due to power plant as 50	328
Total operational hours for trucks	16
Number of trucks per hour	21

Impact of Road traffic has been assessed under the following heads

a. Impact on air environment due to traffic and control measures
b. Impact on road infrastructure and control measures
c. Impact on road safety and control measures

4.5.1 IMPACT ON AIR ENVIRONMENT

The major emissions from the vehicular traffic are carbon monoxide, Oxides of nitrogen and PM. The ground level concentrations of CO and NOx were estimated employing CALINE model. The following is the estimation of trucks for transport of the raw material and finished products.

TABLE – 4.26

Emission norms for Heavy Diesel vehicles

Norms	**CO(g/kmhr)**	**NOx (g/kmhr)**	**PM(g/kwhr)**
Bharat Stage-IV	1.5	3.5	0.02

Other Inputs To The Model

Road length considered : 7.4 km
Road Width : 10 m

Worst Case Meteorology Considered

Wind Speed : 1m/sec
Atmospheric Stability : Unstable & Stable conditions

Pollutant concentrations were predicted for receptors located within 500 meters of the roadway.

The maximum ground level concentrations for the above emission rates and meteorological conditions estimated through CALINE4 are given below:

TABLE – 4.27

PREDICTED ONE HOUR MAXIMUM CONCENTRATIONS

	Concentration μg/m³		
	CO	**NOx**	**PM**
Unstable Condition	<0.1	0.04	0.46
Stable Condition	0.1	0.01	1.40

Predicted concentrations beyond 200 m on either side of the road way were found to be less than the above. Hence no impact on surrounding villages is envisaged.

4.5.2 ROAD INFRASTRUCTURE IMPROVEMENT

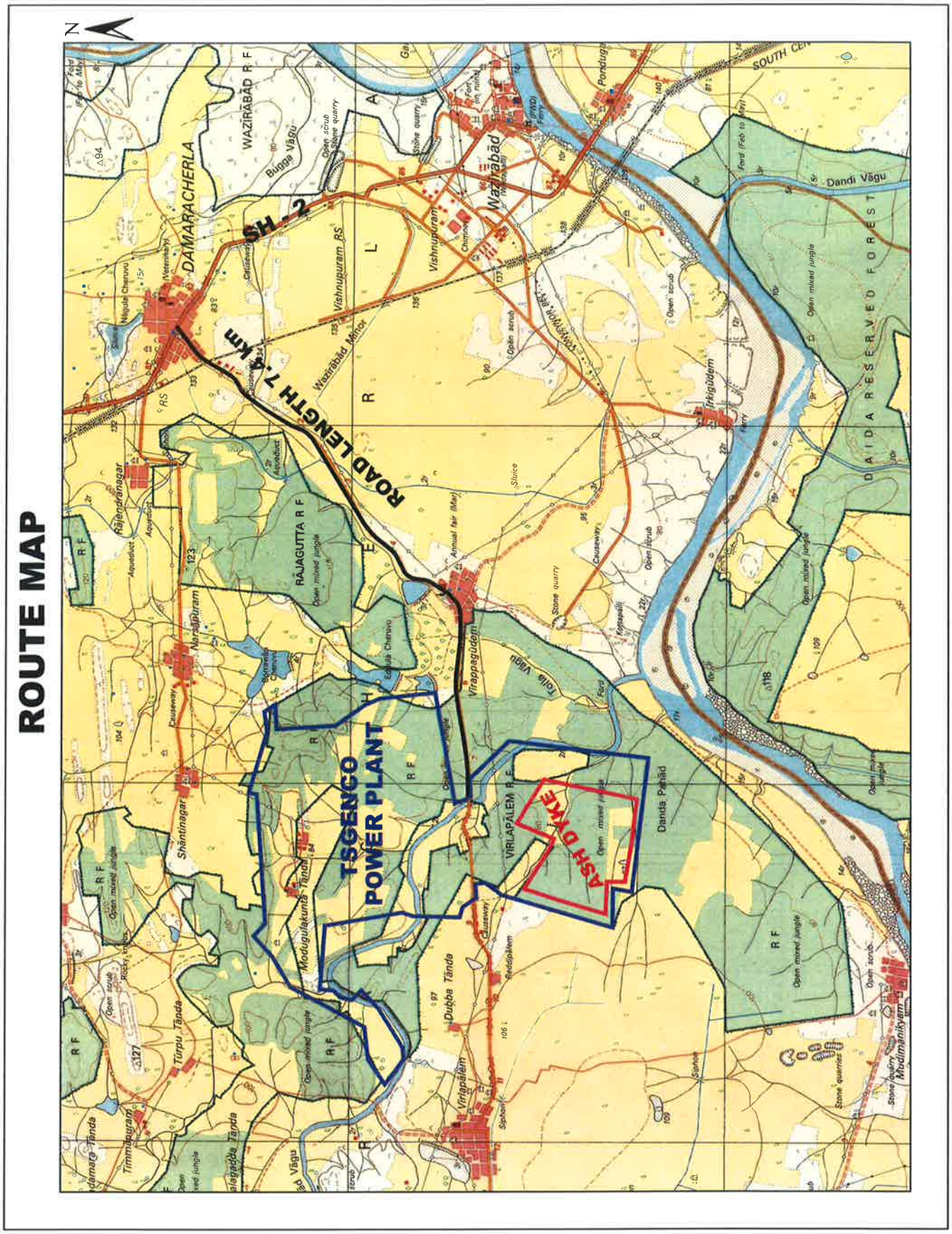
The road connecting the highway is a district road and is adequate to take additional trucks of 21 trucks/hr

TSGENCO will strengthen the road connecting SH-2 to the project site which is 7.4 km length to facilitate the movement of trucks during construction and operation of the project. Route map is shown in **Fig – 4.26**.

4.5.3 TRAFFIC SAFETY

The movement of the trucks before connecting the SH-2 will pass through Veerappagudem Village. TSGENCO will explore laying of bypass road avoiding Village.

FIG - 4.26


ROUTE MAP
N
SH - 2
ROAD LENGTH 7.4 Km
TSGENCO POWER PLANT
ASH DYKE
DAMARACHERLA
WAZIRABAD R F
RAJAGUTTA R F
VIRIJAPALEM R F
DAIDA RESERVED FOREST
Wazirabad
Vishnupuram
Vishnupuram RS
Wazirabad Minor
Virappagudem
Tolla Vagu
Dandi Vagu
Danda Parad
Modugulakunta Tanda
Dubba Tanda
Turpu Tanda
Timmapuram
Shantinagar
Narasapuram
Rajendranagar
Pondugala
Irkigudem
Muddamanikyam

In order to control accidents due to Traffic, Traffic safety awareness will be created among all project personnel during construction and operations.

Road safety initiatives proposed by TSGENCO on the above transportation route include the following:

- Trained and licensed drivers will be permitted.
- The trips made by each driver will be accounted to avoid overtiredness.
- Road signs indicating the speed to be maintained will be installed
- Sufficient speed breakers will be installed especially before villages.
- Regular maintenance of vehicles will be ensured
- Heavy construction equipment will be transported only during night hours
- Pedestrian crossing will be introduced near the villages
- Required signage for regulating the speed or movement of trucks and pedestrians will be introduced.
- Visibility of the roads will be improved by removing the obstructions on the road paths
- Intermittent presence of flag persons to warn the dangerous conditions will be mobilized
- First aid measures will be provided in the event of any accidents

CHAPTER - 5

ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

CHAPTER – 5 : ANALYSIS OF ALTERNATIVES (TECHNOLOGY & SITE)

5.1 ANALYSIS OF ALTERNATIVE TECHNOLOGY

The Power Project will be implemented based on Super-Critical Technology which is an advanced proven technology.

The main advantages of adopting higher unit size of 800 MW with supercritical parameters are detailed below:

- **Higher Efficiency :** The 800 MW supercritical units have higher efficiency because of higher steam parameters

- **Lower fuel consumption and lower emissions :** The higher efficiency 800 MW super critical units use lesser amount of fuel which also results in less emissions

- **CO_2 reduction:** Super critical power plants of 4000 MW with 800 MW Units will result in fuel saving of about 0.80 MTPA in comparison with 500 MW Units. This also results in reduction of CO_2 emission to an extent of 1.16 MTPA

- **Part load operations:** The 800 MW super critical units can operate on sliding pressure basis (which enables the power plant operator to operate the plant at lower pressure during low part load conditions. This will benefit the power plant in terms of fuel savings

- **Savings in capital cost:** Installation of higher capacity sets will result in savings in capital cost for the same capacity using lower capacity sets. It is estimated that about Rs 0.40 to 0.50 crores/MW will be saved by opting for 800 MW set instead of 500 MW set.

- **Startup time :** Super Critical units of 800 MW have a lower startup time compared to sub critical units of 500 MW

5.1.1 TECHNO-ECONOMIC EVALUATION OF AIR COOLED CONDENSATE SYSTEM VERSUS WATER COOLED CONDENSATE SYSTEM

TSGENCO in consultation with BHEL has evaluated the option of Air Cooled Condensor System in place of Water Cooled Condensor System. Dry condenser cooling systems are considered for the sites where availability of water is very scarce. In such case, the requirement of plant consumptive water shall reduce by about 80%. However, for typical Indian conditions, the dry cooling system shall result in reduction of plant output by about 6%-7% and correspondingly, gross heat rate shall increase by 6%-7%. The capital cost per MW of the plant shall also increase by about 10%. Increase in specific coal consumption causes increase in emissions also.

Dry cooling systems are costly technologies and are not comparable to wet cooling system on techno-economic considerations. However, for sites where adequate quantity of water is not available, Air Cooled Condensor System offers possible solution for power plant installation with much reduced water requirement.

The following table gives the details of Techno Economic Evaluation carried out for Air Cooled Condensor System versus Water Cooled Condensor System for subject power plant and site considerations.

Implementation of Water Cooled Condenser System has been considered based on the following Techno Economic Evaluation and site considerations.

S.No	Parameter	Remarks
1.	Power Output	As compared to wet cooling system, the dry condenser cooling system is likely to result in reduction of unit output by about 6%-7% for same amount of steam from the boiler. Thus, the gross output of a 800 MW Boiler may reduce to about 750 MW with use of ACC.
2.	Heat Rate	The heat rate of the unit with ACC is expected to be higher by about 6%-7%.
3.	Efficiency	Thermal efficiency of the plant reduces by 2% – 2.5% with the installation of ACC.

S.No	Parameter	Remarks
4.	Specific Coal Consumption and CO_2 emission	Specific coal consumption of the unit shall increase by about 6%-7%, and typical CO2 emission from the plant shall also increase by about 6%-7% with dry cooling system as compared to wet cooling system
5.	Auxiliary Power Consumption	Increase of about 4 MW for each 800 MW unit. The change in Aux Power Consumption largely depends on the plant layout.
6.	Cost	Increase in cost by upto 8%-10% per MW. This depends on location of water source and quality of water available for plant
7.	Tariff	Due to increase in installation cost, coal consumption and reduced output, there will also be increase of about 8 – 9% in the levelised tariff
8.	Imports	Rise in CIF due to import of tube bundles as the manufacturing facilities / technologies not available in India for large scale ACCs
9.	Provenness	No previous operational experience available for the ACC in large power plants in Indian conditions
10.	Condenser Cooling Make Water	ACC requires Zero Condenser Cooling Make up Water
11.	O&M expenses	Though the overall O&M expenses would reduce due to reduction in water charges and cost of chemicals but when spread over reduced output in case of dry cooling, O&M expenses per MW works out almost similar.

5.2 ANALYSIS OF ALTERNATIVE SITES FOR LOCATION OF POWER PLANT

Three (3) probable locations were assessed for site selection:

Site-1: Village Punukulachilka of Kothagudem Mandal, Khammam District, Telangana State

Site-2: Karukonda and Kunaram villages, Kothagudem mandal, Khammam district, Telangana State

Site-3: Veerlapalem Village, Dameracherla mandal, Nalgonda district, Telangana State.

SELECTION OF THE SITE

Site # 3 is chosen for establishment of the thermal power station considering the following advantages

- Availability of Government forest land
- Availability of good road connectivity
- Availability of Rail connectivity
- Availability of nearby water source i.e Krishna river
- Availability of land
- Existence of many cement industries in vicinity of the proposed power plant for offtake of fly ash

Site #1 is not chosen for the following reasons:

❖ Identified land of 8800 acres falls under Kinnarasani Wild Life Sanctuary and the area falls under eco-sensitive zone. Hence this site is not considered.

Site # 2 is not chosen for the following reasons:

❖ The site is endowment land to an extent of 4916.33 Acres available with pattedar passbooks and presently under the possession of Amba Satram under the maintenance of Sree Seetha Ramchandra Swami vari Devasthanam, Bhadrachalam which was registered with Endowment Department Khammam district.

❖ A Writ Petition is pending in Honourable High Court and Honourable High Court has granted stay for all further proceedings in relation to the acquisition of lands belongings to the temples Hence this site is not considered

The location of alternative sites considered for the proposed power plant is shown in **Fig - 5.1.**

FIG - 5.1

ALTERNATE SITES CONSIDERED FOR THE PROPOSED POWER PLANT



TABLE - 5.1
SITE SELECTION CRITERIA

S.No	Criteria	SITE-1 (Punukulachilaka)	SITE-2 (Karukonda & Kunaram)	SITE-3 (Veerlapalem)
1	Nearest Town	Kothagudem – 21.5 km - SSE	Kothagudem – 6.7 km - SE	Nalgonda – 50.0 km - NW
2	Road Connectivity	(NH – 221) 20.1 km – SSE Bhadrachalaem – ibrahimpatnam	(NH – 221) 6.8 km –SE Bhadrachalaem – ibrahimpatnam	NH-9 Connecting Hyderabad - Vijayawada – 45.0 km - N. SH - 2 connecting Miryalaguda - Dachpalli - 4.2 km - ENE
3	Rail Connectivity	Kothagudem- Karepalli Junction - (22.5 km, S)	Kothagudem- Karepalli Junction - (6.6 km,- SSE)	Miryalaguda – Guntur - (4.8 km,- E)
4	Port	kakinada port (208.0 km, SE)	kakinada port (201.0 km, SE)	kakinada port (295.0 km, ENE)
5	Water Source	Kinnerasani River 1.7km – N Kinnerasani Reservoir 6.5 km - SE	Kinnerasani River 13.0 km – NNE Kinnerasani Reservoir 8.0.km – NE Mureru Vagu - adjacent	Musi River – 7.4 km – E Tungapahad Vagu & Bandam Vagu – passing inside the plant site Krishna River – 0.5 km – SE
6	Coal Source (Domestic & Imported)	Indigenous coal - M/s Singareni Coal Collieries Ltd Imported coal - M/s MSTC, a Government of India Enterprise	Indigenous coal - M/s Singareni Coal Collieries Ltd Imported coal - M/s MSTC, a Government of India Enterprise	Indigenous coal - M/s Singareni Coal Collieries Ltd Imported coal - M/s MSTC, a Government of India Enterprise
7	Protected areas as per Wildlife Protection Act, 1972 (National Parks, Wildlife Sanctuaries and Reserves)	Nil in 10 km radius	Nil in 10 km radius	Nil in 10 km radius Tiger Reserve (Near Nagarjunasagar) – 12.0 km - SW
8	Reserved / Protected Forests (in 15 Km radius)	Punukulachilka RF - Adjacent Chatakonda RF – adjacent Paloncha west RF – 19.5km – SE Bangaruchilka RF – 2.9km – ESE Mundarkalapad RF – 5.5km – SE Punukulu RF- 9.8 km -SE	Chatakonda RF - Adjacent Paloncha west RF – 7.0km – SE Punukulachilka RF 11.5 km -NNW Punukulu RF- 8.1 km -NNE Suraram RF- 11.5 km -ENE Paloncha East RF – 13.0km – ESE Ramavaram RF – 11.0km – SE Chimalpad RF – 8.3km – SSW	Veerlapalem R F - Adjacent Wazirabad RF – 6.4 km – E Rajagutta RF – 0.3 km – E Daida RF – 1.2 km – SE Goli RF – 7.2 km – SW Adividevulapalli RF – 4.7 km – SW Oshipalem RF – 4.0 km –NW Molakacherla RF – 6.8 km – WNW Ragadappa RF – 6.5 km – NW Dilawarapur RF – 2.9 km – N Gangadevigutta RF – 5.7 km – NNE Pasupulabodu R F – 8.9 km – ENE Saidulnam R F – 9.3 km – E
9	Religious, Archeological Monuments	None within 15 km	None within 15 km	None within 15 km
10	Defence Installations	None within 15 km	None within 15 km	None within 15 km
11	Homestead oustees	Nil	Nil	Displacement of two hamlets
12	Forest land	Total land of 8800 acres falls under Kinnerasani Wildlife Sanctuary- Eco-sensitive zone.	-	2095.28 acres of project area is Forest Land falling under the jurisdiction of Veerlapalem Forest Block
13	Reasons for site selection and nonselection	➢ Total land selected for the proposed project falls under Kinnarasani Wild Life Sanctuary which is a eco-sensitive zone. ➢ Hence this site is not considered.	➢ Total land selected for the proposed project is an endowment land. ➢ High Court has granted stay for acquisition of lands belongings to the temples. ➢ Hence this site is not considered.	➢ Availability of Government forest land ➢ Availability of good road connectivity ➢ Availability of Rail connectivity ➢ Availability of nearby water source i.e., Krishna river ➢ Availability of land ➢ Existence of many cement industries in vicinity of the proposed power plant for offtake of fly ash

CHAPTER - 6

ENVIRONMENTAL MONITORING PROGRAM

CHAPTER – 6 : ENVIRONMENTAL MONITORING PROGRAM

6.1 ENVIRONMENTAL MONITORING PROGRAM

Monitoring of various environmental parameters will be carried out to ascertain the following:

- State of pollution within the project area and in its vicinity
- Generate data for predictive or corrective purpose in respect of pollution
- Examine the efficiency of Pollution Control Systems installed and
- Monitor the environmental impacts

The power plant will be based on Super Critical Technology and will be equipped with State of Art pollution control and monitoring systems. These measures will help in minimizing the impact on the environment due to the operation of the power plant.

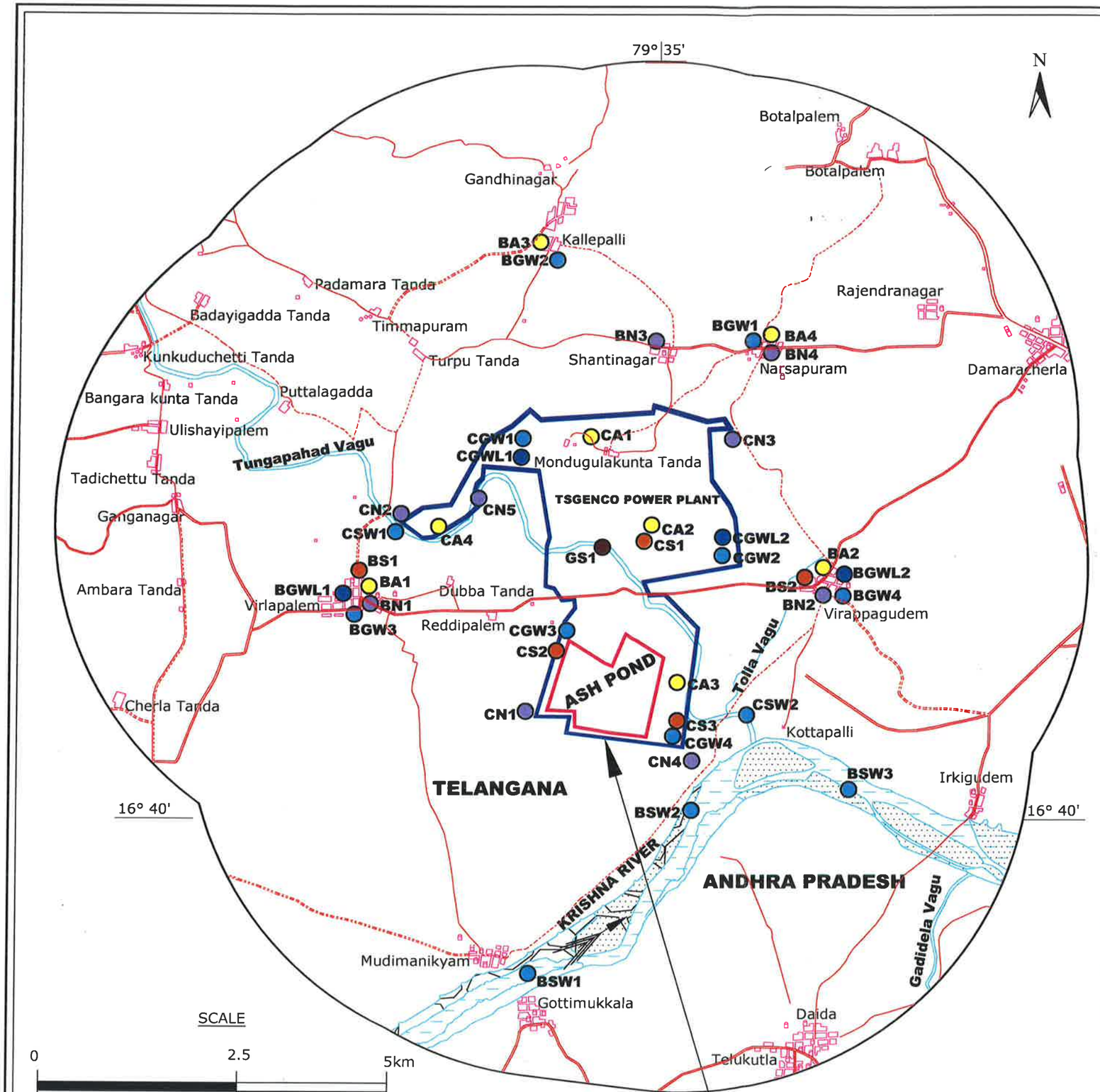
Post Project monitoring programme formulated for implementation during construction and operation phase will have a check on the pollution levels and compliance with the Standards prescribed.

Post Project Monitoring locations of various environmental parameters are shown in **Fig – 6.1**. Details of Post Project Monitoring Programme is presented below

6.1.1 MICRO METEOROLOGY

An automatic continuous recording meteorological station will be installed within the project area on top of administration building for recording the following micro meteorological parameters on hourly basis

- Temperature
- Relative Humidity
- Solar Radiation
- Wind Velocity and Direction
- Atmospheric Pressure
- Rain Fall



AMBIENT AIR QUALITY MONITORING LOCATIONS			
STATION CODE	CORE ZONE (PROJECT AREA)	STATION CODE	BUFFER ZONE
CA1	Near Coal Handling Plant/coal storage area	BA1	Veerlapalem Village
CA2	Near Main Plant area	BA2	Veerappagudem Village
CA3	Near Ash Pond	BA3	Kallepalli Village
CA4	Near Colony	BA4	Narsapuram Village

SURFACE WATER QUALITY MONITORING LOCATIONS			
STATION CODE	CORE ZONE (PROJECT AREA)	STATION CODE	BUFFER ZONE
CSW1	Upstream of Tungapahad Vagu – At entry point into the project area	BSW1	Upstream of Krishna River – upstream of Project area
CSW2	Downstream of Tungapahad Vagu – At exit point from the project area	BSW2	Upstream of Krishna River – downstream of project area and upstream of confluence point of Tungapahad Vagu
		BSW3	DownStream of Krishna River – down stream of confluence point of Tungapahad Vagu and Kirshna River

GROUND WATER QUALITY MONITORING LOCATIONS			
STATION CODE	CORE ZONE (PROJECT AREA)	STATION CODE	BUFFER ZONE
CGW1	Upstream of the main plant area i.e at NW Corner of the project area	BGW1	Narsapuram Village
CGW2	Downstream of the main plant area i.e at Eastern corner of the project area	BGW2	Kallepalli Village
CGW3	NW Corner of the Ash Pond Area	BGW3	Veerlapalem Village
CGW4	SE Corner of the Ash Pond Area	BGW4	Veerappagudem village

SURFACE WATER QUANTITY	
STATION CODE	
GS1	Gauging station on Tungapahad Vagu in the project area

GROUND WATER LEVEL MONITORING LOCATIONS			
STATION CODE	CORE ZONE (PROJECT AREA)	STATION CODE	BUFFER ZONE
CGWL1	Borewell-1 in project area	BGWL1	Veerlapalem bore well
CGWL2	Borewell-2 in project area	BGWL2	Veerappagudem bore well

SOIL QUALITY MONITORING STATIONS			
STATION CODE	CORE ZONE (PROJECT AREA)	STATION CODE	BUFFER ZONE
CSL1	Near Plant site	BS1	Veerlapalem village
CS2	Ash Pond area – NW corner	BS2	Veerappagudem village
CS3	Ash Pond area – SE corner		

NOISE MONITORING LOCATIONS			
STATION CODE	CORE ZONE (PROJECT AREA)	STATION CODE	BUFFER ZONE
CN1	Boundary of Power Plant Corner-1	BN1	Veerlapalem Village
CN2	Boundary of Power Plant Corner-2	BN2	Veerappagudem Village
CN3	Boundary of Power Plant Corner-3	BN3	Shantinagar Village
CN4	Boundary of Power Plant Corner-4	BN4	Narsapuram Village
CN5	Colony		

CLIENT:
M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED

PROJECT:
4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

TITLE:
ENVIRONMENTAL MONITORING STATIONS (CONSTUCTION PHASE & OPERATION PHASE)

PREPARED BY:
B.S.ENVI-TECH (P) LTD.,
SECUNDERABAD

6.1.2 AMBIENT AIR QUALITY

6.1.2.1 PROJECT AREA

Ambient air quality will be monitored through Continuous Ambient Air Quality stations (CAAQMS) for monitoring of Particulate Matter (PM10 and PM2.5), SO_2 and NOx at following four locations within the project area.

TABLE- 6.1

AAQ MONITORING STATIONS - PROJECT AREA

AAQ Monitoring Locations	**Project Area**	
	CA1	Near Coal Handling Plant /coal storage area
	CA2	Near Main Plant area
	CA3	Near Ash Pond
	CA4	Near Colony
Monitoring Frequency	Continuous Monitoring Through Continuous Ambient Air Quality Monitoring Stations (CAAQMS)	
Parameter of monitoring	PM_{10}, $PM_{2.5}$, SO_2, NOx & CO	

The Ambient air quality monitoring results of the above areas will be displayed at main gate and will be connected to the servers of CPCB and TSPCB

6.1.2.2 BUFFER ZONE

Ambient air quality will be monitored through Continuous Ambient Air Quality stations (CAAQMS) at the following villages

TABLE- 6.2

AAQ MONITORING STATIONS – BUFFER ZONE

AAQ Monitoring Locations	**Code**	**Village Name**	**wrt Project area**	
			Distance, km	**Direction**
	BA1	Veerlapalem	1.0	WSW
	BA2	Veerrapagudem	0.9	SE
	BA3	Kallepalli	2.4	N
Monitoring Frequency	Twice a week during construction phase and operation phase			
Parameters for monitoring	PM_{10}, $PM_{2.5}$, SO_2, NOx & CO			

Monitoring of Ambient air quality at above locations will be carried out twice a week during construction phase and operation phase to monitor parameters of Particulate Matter (PM10 and PM2.5), SO2 and NOx.

6.1.3 STACK EMISSION MONITORING

Continuous Emission Monitoring of Particulate Matter, SO_2 and NOx concentrations from the chimney will be carried out using online Continuous Emission Monitoring System (CEMS). CEMS will be installed at all the exits of five flues connected to the boilers

Periodic monitoring (monthly) of stack emissions by Stack Monitoring Kit will be taken up for counter checking the results of continuous monitoring once in a month. Additionally, analysis of Mercury in flue gas emission will be carried out to check the compliance with the norm of 0.03 mg/Nm^3. The stack monitoring data will be utilised to keep a check on the performance of flue gas treatment system comprising ESPs, FGD and SCR

6.1.4 WATER QUALITY MONITORING

Methodology and identification of water quality monitoring points: Monitoring points of surface water and ground water samples are identified based on Hydrology and Hydrogeology studies carried out. Keeping view of the extent of the project area, drainage pattern and direction of flow of surface and ground water movement, the following points are identified:

6.1.4.1 SURFACE WATER QUALITY MONITORING

Surface water quality will be monitored at the following two sources

- Tungapahad Vagu
- Krishna River

Based on the hydrology studies carried out, Tungapahad Vagu flows from NW direction towards south easterly direction with respect to the project area and Krishna River flows from Western Direction towards eastern direction with its nearest point to the project boundary at 0.5 km in southern direction.

TABLE- 6.3
SURFACE WATER QUALITY MONITORING LOCATIONS AT TUNGAPAHAD VAGU

Surface water quality Monitoring Locations	**CORE ZONE**		**BUFFER ZONE**	
	CSW1	Upstream of Tungapahad Vagu – At entry point into the project area	BSW1	Upstream of Krishna River – upstream of Project area
	CSW2	Downstream of Tungapahad Vagu – At exit point from the project area	BSW2	Upstream of Krishna River – downstream of project area and upstream of confluence point of Tungapahad Vagu
			BSW3	Downstream of Krishna River – down stream of confluence point of Tungapahad Vagu and Kirshna River
Monitoring Frequency	Once in a Month			
Parameters for monitoring	As per IS 10500 (drinking water quality standard)			

6.1.4.2 GROUND WATER QUALITY MONITORING

Based on the hydrogeological studies carried out, it is observed that the ground water flow in the study area is towards south and south east with hydraulic gradient of 5.88 m/km during pre-monsoon and 6.05 m/km during post monsoon (detailed under Chapter -3)

Based on the above inputs the following points are identified for monitoring

TABLE- 6.4
GROUND WATER QUALITY MONITORING AT PROJECT AREA AND BUFFER ZONE

Ground Water Quality Monitoring Locations	**CORE ZONE**		**BUFFER ZONE**	
	CGW1	Upstream of the main plant area i.e at NW Corner of the project area	BGW1	Narsapuram Village-1.0Km-NE
	CGW2	Downstream of the main plant area i.e at Eastern corner of the project area	BGW2	Kallepalli Village-2.4 Km - N
	CGW3	NW Corner of the Ash Pond Area	BGW3	Veerlapalem -1.0km – WSW
	CGW4	SE Corner of the Ash Pond Area	BGW4	Veerappagudem village– 0.9km – SE
Monitoring Frequency	Once in a Month.			
Parameters for monitoring	As per IS 10500 (drinking water quality standard)			

6.1.5 WATER QUANTITY MEASUREMENT

6.1.5.1 SURFACE WATER - TUNGAPAHAD VAGU

A Gauging Station will be installed to measure the flow in the Tungapahad Vagu at middle of the flow path traversing in the project area to ensure the minimum water flow maintenance by CAD as per the MOEF conditions imposed vide terms of reference. A record of the same will be maintained and shared with Irrigation Department to ensure minimum flow in Tungapahad Vagu.

6.1.5.2 GROUND WATER - PROJECT AREA

Piezometers will be installed at the following points for monitoring time series variation in the ground water table in compliance with TOR condition stipulated by MOEF & CC.

- Two Borewells within the project area
- Two Borewells in the nearby Villages at Veerlapalem and Veerappagudem

Monitoring frequency and parameters of monitoring are detailed in the following Table

TABLE- 6.5
GROUND WATER LEVEL MONITORING
PROJECT AREA AND BUFFER ZONE

	PROJECT AREA		BUFFER ZONE	
Ground Water Level Monitoring Locations	CGWL1	1.Borewell-1 in project area	BGWL1	Veerlapalem bore well--1.0km – WSW
	CGWL2	2.Borewell-2 in project area	BGWL2	Veerappagudem bore well– 0.9km – SE
Monitoring Frequency	Once in a Month.			
Parameters for monitoring	Water Level			

Records of water quality and quantity will be maintained.

6.1.6 WASTEWATER MONITORNG

The project is based on Zero Discharge Concept. No treated process wastewater will be discharged onto the land or into the ground or surface water bodies.

The treated domestic wastewater from the STPs located in the Plant and colony will be analysed for inlet and outlet quality to check performance of Sewage treatment Plants and to check the compliance with the standards prescribed for onland discharge as the treated wastewater will be used for greenbelt development with the project area and colony within the project area.

6.1.7 NOISE ENVIRONMENT

Day and Night time noise levels will be monitored at following locations to check compliance with the standards stipulated by CPCB.

Boundary of Power plant in all four corners will be monitored to check compliance with Noise standards prescribed for Industrial Area and in Colony to check compliance with Noise standard prescribed for residential areas

TABLE- 6.6
NOISE MONITORING LOCATIONS
PROJECT AREA AND BUFFER ZONE

Noise Monitoring Locations	**PROJECT AREA**		**BUFFER ZONE**	
	CN 1	Boundary of Power Plant Corner-1	BN1	Veerlapalem -1.0km – WSW
	CN 2	Boundary of Power Plant Corner-2	BN2	Veerappagudem village– 0.9km – SE
	CN 3	Boundary of Power Plant Corner-3	BN3	Shantinagar-0.7Km-N
	CN 4	Boundary of Power Plant Corner-4	BN4	Narsapuram Village - 1.0Km-NE
	CN 5	Colony		
Monitoring Frequency	Once in a month (24 hours monitoring on hourly basis) as per manufacturer standards & CPCB standards			
Parameters for monitoring	Noise levels.			

6.1.8 SOIL QUALITY MONITORING

Soil quality Monitoring will be carried out both within the project area and outside the project area to check contamination due to project activities.

6.1.8.1 PROJECT AREA

The soil quality at the following locations in the project area will be monitored:

a. Near Plant site
b. Ash Pond area – NW corner
c. Ash Pond area – SE corner

6.1.8.2 VILLAGES

The soil quality at the following nearby villages will be monitored:

a. Veerlapalem
b. Veerappagudem

TABLE- 6.7
SOIL QUALTIY MONITORING LOCATIONS
PROJECT AREA AND BUFFER ZONE

Soil Quality Monitoring Locations	CORE ZONE		BUFFER ZONE	
	CS1	Near Plant site	BS1	Veerlapalem village- 1.0km – WSW
	CS2	Ash Pond area – NW corner	BS2	Veerappagudem village– 0.9km – SE
	CS3	Ash Pond area – SE corner		
Monitoring Frequency	Once in a month.			
Parameters	As per CPCB for the following parameters □ Particle size distribution □ Texture □ pH □ Electrical conductivity □ Cation exchange capacity □ Alkali metals □ Sodium Absorption Ratio (SAR) □ Permeability □ Water holding capacity □ Porosity			

6.2 ENVIRONMENTAL LABORATORY

TSGENCO will set up full-fledged Environmental Laboratory to monitor all the environmental parameters as per the environmental monitoring plan in the operational phase. The laboratory facilities are proposed in order to attain self-sufficiency in environmental monitoring and to achieve the environmental goals as specified in Environmental Policy of TSGENCO.

All environmental parameters, which are to be monitored with respect to air emissions, effluent discharges etc., will be measured and analysed. The required test facilities are detailed below:-

- ❖ Atomic Absorption Spectrophotometer
- ❖ Spectrophotometer (UV / Visible)
- ❖ Dissolved Oxygen Analyser
- ❖ pH Meter
- ❖ Conductivity Meter
- ❖ BOD Incubator
- ❖ Nephalometer
- ❖ Centrifuge
- ❖ Stack Monitoring Kit
- ❖ Fine Dust Sampler
- ❖ Bomb Calorimeter
- ❖ Oven
- ❖ Furnaces
- ❖ Meteorological Instruments
- ❖ Flame Photometer

TSGENCO during the construction phase will hire the facilities of reputed external laboratory for carrying out the monitoring of Environmental Parameters.

6.3 BUDGETS FOR IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT PLAN

A budget of Rs 5597 Crores and Rs 430 crores/annum is earmarked towards capital cost and recurring cost respectively for implementing the various pollution control measures as described in the Environmental Management Plan. The breakup of EMP budget is given in **Table-6.8**

TABLE- 6.8
BUDGET FOR IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT PLAN

		Rs. Crores	
		Capital Cost	**Recurring cost/Annum**
Air Environment	• Electrostatic precipitator - ESP • Flue Gas Desulphurization system-FGD • Selective Catalytic Reduction	4150.00	332.0
	Dust Suppression system - Coal Handling area	1.20	0.10
	Dust Suppression system - Lime Stone Handling Area	1.20	0.10
	RCC chimney with 2 nos steel twin flue and 1no steel single flue(275 m high) – 3 Nos	320.00	16.00
	Bottom Ash and Fly ash collection Storage, dispensing system	400.00	40.00
Water Environment	Waste Water treatment system including RO plant and side stream, ETP	25.00	2.50
	Sewage Treatment Plants (plant and colony)	15.00	1.20
	Piezometers	0.08	0.0024
	Gauging station at Tungapadu vagu	0.05	0.0015
	Rain water Harvesting	0.25	0.020
	Natural draft cooling towers(5 Nos)	535.00	26.75
Land Environment	Ash pond with HDPE lining	90.00	7.20
	Fly ash brick making plant-2nos	0.70	0.035
	Green Belt Development including soil conservation	17.00	1.36
	Restoration of degraded forest areas-out side project areas	8.00	0.64
	Nursery	0.30	0.015
	Plugging and strengthening of banks of Tungapahad vagu within the project area	0.20	0.010
	Renewable Energy Roof top solar PV system	12.76	0.638
	Organic Waste Converter	0.50	0.025
Occupational Health	Personal protection devices	1.20	0.060
Monitoring	CEMS	15.00	1.20
	CAAQS (7 nos)	4.00	0.32
Total		**5597.44**	**430.177**

CHAPTER - 7

ADDITIONAL STUDIES

CHAPTER – 7: ADDITIONAL STUDIES

7.1 PUBLIC CONSULTATION

Public Consultation for the project was conducted on 31.05.2016. The proceedings are enclosed as **Annexure – 7A.** Revised detailed response and Action plan with budgetary provisions for issues raised in PH are enclosed as **Annexure – 7 B.**

7.2 RISK ASSESSMENT

Risk assessment study includes study of nature of hazards due to the proposed activities of the power project including operations involved in use of hazardous chemicals/fuels storage and handling. The study includes:

- Identification of hazards.
- Preliminary identification of hazardous area of the plant and threat of storages with respect to Fire and Explosion index.
- Identification of accident sequences and consequences
- Visualisation and Analysis of Maximum Credible accidental scenarios.
- Estimation of damage criteria for heat radiation and toxic concentration levels with recourse to health criteria and dose response.
- Study of onsite and offsite population characteristics.
- Study of characteristics of risk levels through study of nature of exposure, pathways and consequences of maximum credible accidental scenarios and presentation of results in terms of risk contours.
- Development of an "On-site" and "Off-site" Emergency Management Plan incorporating measures of safety prevention, mitigation and control of Hazardous events.

Hazard identification provides information on onsite hazardous substances, their nature, quantities and details of storage.

Preliminary hazard Identification is used to identify typical and often relatively apparent risk sources and damage events in a

system. As each hazard is identified, the potential causes, effects, and severity of accidents and possible corrective and/or preventive measures are also listed.

Hazards of significant nature whose consequences potential is of worth consideration and wherein a specified area or where more number of personnel likely to be present etc., are considered in identifying the hazards. The following hazards have been evaluated:

1. Fire Hazards
2. Explosion Hazards.
3. Toxic Hazards.

7.2.1 HAZARD IDENTIFICATION

7.2.1.1 PRELIMINARY HAZARD ANALYSIS

Coal is the fuel used in large quantities. The other hazardous materials and maximum quantities proposed to be stored is given below in **Table – 7.1**.

TABLE – 7.1

HAZARDOUS MATERIALS AND MAXIMUM QUANTITIES STORAGE

SR. NO	NAME OF SUBSTANCE	NO. OF TANKS / CYLINDER	EACH STORAGE CAPACITIES
1	Hydraulic Oil	10	55 KL
2	LDO	2	1000 KL
3	HFO	2	4000 KL
4	Hydrogen cylinder	430	6 M^3
5	Hydrogen storage tank	1	65 M^3
6	HCL	1	10 KL
7	H_2SO_4	1	10 KL
8	Ammonia	5	314M^3
9	Chlorine tonners	275	900kg

A systematic analysis of the fuels/chemicals and their quantities of storage has been carried out, to determine threshold quantities

as notified by GOI Rules, 1989 and the applicable rules are identified. Applicability of storage rules is summarized below in **Table – 7.2**

TABLE – 7.2

APPLICABILITY OF GOI RULES TO FUEL/CHEMICAL STORAGE

Sr. No.	Chemical/ Fuel	Listed in Schedule	Total Quantity (KL)	Threshold Quantity (T) for Application of Rules	
				5,7,9,13-15	10-12
1	LDO	Schedule-3, Group-5	2000 KL	25	200
2	HFO		8000 KL	25	200
3	Hydrogen	Schedule-3, Group-4	300X6 M^3	2	50
4	Hydrogen		1 X65 M^3		
5	HCL	Not Specified	1 X10 KL	Not Specified	
6	H_2SO_4	Not Specified	1X10 KL	Not Specified	
7	Ammonia	Schedule-3, Group-2	5 X314M3	50	500
8	Chlorine	Schedule-3, Group-2	275 X900kg	10	25

TABLE – 7.3

HAZARDOUS NATURE OF FUEL/CHEMICAL STORAGE

SR. NO.	NAME OF HAZARDOUS CHEMICALS	UNIT	TYPE OF HAZARD	TYPE OF CONTAINER
1.	Hydrogen	TG & Hydrogen Storage, Hydrogen Generation Plant	Fire/ Explosion	Cylinder Tank
2	Chlorine	Tonners	Toxic	Tonners
3.	LDO	Tank Farm	Flammable	Tank
4.	Heavy Fuel Oil	Tank Farm	Flammable	Tank
5.	Ammonia	Plant	Toxic	Storage tank

A. Type of Accidents.

TSGENCO will handle considerable quantity of toxic/ flammable/ explosive materials like- Coal, Ammonia, Hydrogen, Chlorine, LDO etc. The characteristics of the above materials can lead to thermal radiation and toxic effects. In general accidents can occur in three stages.

- ❖ Construction,
- ❖ Testing and Commissioning including start-up or shut down stages,
- ❖ Normal process operation and
- ❖ Storage and transfer operation.

The type of accidents that can occur is given below in **Table – 7.4**

TABLE – 7.4
TYPE OF ACCIDENTS

SR. NO.	HAZARDOUS CHEMICAL/ CONDITION	TYPE OF OCCURRENCE / ACCIDENT	PROBABLE REASONS / SOURCES
1	Hydrogen	Fire/Explosion	Leakage From H_2 Seal Oil System Or Any ignition source
2	Physical Position	Personnel Falling From Height	Working at elevated height & personnel may fall.
3	Carbon monoxide	Deficiency Of Oxygen	Due to incomplete combustion of fuel Sudden Carbon Monoxide disperses in the area & displaces the Oxygen.
4	Equipment	Physical Injury	While handling material, equipment etc, may create body injury. Dangerous part of the moving machinery may create body injury if not guarded properly. Striking against object.
5	Flying Metal Dust Particles	Eye Injury	Flying Particles will create injury.
6	In sufficient Supply of Oxygen	Suffocation, Deficiency of Oxygen	Confine space, vessel entry gutter-work, Furnace entry etc. may create such condition if safety measures are not taken or Safety permit System not followed
7	Ammonia	Leakage from pipe or storage tank	Due to gasket failure or pipe puncture due to physical damage or corrosion
8	Chlorine	Gas Leakage from tonner valve or piping	Due to valve failure of tonner or pipe line

B. Construction/ commissioning/ startup/ shutdown stages/ vessel/ tankage entry.

During construction stage, most of the accidents occur due to;

❖ Human errors (by-passing safety rules and regulations).

- ❖ Improper laying of cables.
- ❖ Improper Housekeeping (keeping combustible material near welding/ gas cutting operations)
- ❖ Material handling.
- ❖ Handling of tools.
- ❖ Working at heights/ elevated levels.
- ❖ Earth moving and filling.
- ❖ Pressure testing of lines.
- ❖ Uncovered trenches, Pressuring of the line etc.
- ❖ Unsafe electrical practices.

C. Process Operations

Accidents in thermal power plants generally occur due to Fire, Explosion and Toxic gas release, High-pressure steam leakages and electrical short circuits.

- ❖ Malfunctioning of equipment.
- ❖ Power failures.
- ❖ Failure to take corrective steps in time.
- ❖ Failure of utilities.
- ❖ System failure.
- ❖ Ageing of equipments.
- ❖ Improper communication.

Power generation process involves hazardous process which may lead to major emergency. The possibility of major emergency is identified as below:

Considering the structural and physical phenomena of equipment or vessel the following dangerous occurrence may occur if not detected in time as shown in **Table – 7.5**.

TABLE – 7.5
TYPE OF DANGEROUS OCCURRENCE AND POSSIBLE MAJOR ACCIDENTS

SR. NO	TYPE OF DANGEROUS OCCURRENCE.	REASON	TYPE OF POSSIBLE MAJOR ACCIDENT
1	Collapse of overhead Crane	Mechanical failure or excessive weight	Fall of equipment and injury
2	Explosion in H_2 seal system	Leakage from seal oil system	Explosion and Fire
3	Collapse or subsidence of building/Floor or roof	Unstable Structure	Debris and Injury
4	Fire	Fire at conveyor	Fire and burn injury
5	Collapse of tank or rupture of ammonia pipelines	Physical damage or gasket failure	Toxic release
6	Chlorine Cylinder Leakage	failure of valve	Toxic release
7	Toppling of Truck containing chlorine tonner	failure of vehicles	Toxic release

D. Storage and Transfer Operations.

- Accidents due to material spillage/ over filling, mechanical failure and external impacts.
- Accidents can also occur during opening & maintenance of pipelines, drums, columns, pumps, flanges, drains etc.
- Thunder and lightning.
- On the job accident due to human error.

E. System Elements/ Event that can lead to Major Accidents.

The system like storage vessels/ tanks, columns, pipelines involving highly flammable and hazardous chemicals can lead to major accidents under abnormal conditions. The various systems and its possible events are listed below in **Table – 7.6**.

TABLE – 7.6

SYSTEM ELEMENTS/ EVENT LEADING TO MAJOR ACCIDENTS

Sl.No.	Systems	Type Of Events
01.	Pipelines	Leak/ Rupture
02.	Columns/strippers/ Vessel	Dislocation of internals
03.	Furnaces	Tube leak/ Over pressure /Explosion
04.	Burners	Flange leak
05.	Pumps	Mechanical failure / Utility failure
06.	Compressors	Over pressure
07.	Valves	Leak
08.	Boilers	Over pressure / Utility failure
09.	Storage	Over filling/ over pressure
10.	Hoses	Leak / rupture
11.	Coal Storage	Spontaneous Ignition of Coal

7.2.1.2 POTENTIAL HAZARDS

Hazard is an event / incident that can lead to damage of equipment or personal injury. The following are the potential areas in a power plant that can lead to major accidents

a) Coal storage and handling
b) Chlorine storage and handling
c) Hydrogen generation plant, storage and handling
d) Ammonia Storage and handling
e) Fuel oil storage and handling
f) Storage H_2SO_4 and HCL
g) Electrical Hazards

NATURE OF POSSIBLE HAZARDS

Power generation process involves hazardous process which may lead to major emergency. The possibility of major emergency is identified in below **Table – 7.7**.

TABLE – 7.7

NATURE OF POSSIBLE HAZARDS

S. NO.	AREA OF ACCIDENT	REASON	TYPE OF BASIC MAJOR ACCIDENT
1	Boiler	Steam Leak	Burn Injury
2	Boiler	Explosion Due To High Steam Pressure	Burn Injury
3	Generator	Leakage From H_2 Glands	Explosion& FIRE
4	Coal Storage	Trapped O_2	Fire
5	Cable Gallery	Short Circuit	Fire
6	Transformers	Short Circuit & Oil Quality Deterioration	Fire
7	Coal Conveyor	Snapping of bed	Mechanical accident/Fire
8	Hydrogen Cylinder Storage System	Source of ignition	Fire & Explosion
9	Hydrogen Generation Plant	Source of ignition	Fire & Explosion
10	Injection of Ammonia	Leakage	Toxic Release In Atmosphere
11	Chlorine	Leakage	Toxic Release In Atmosphere

7.2.2 MAXIMUM CREDIBLE ACCIDENT ANALYSIS (MCAA)

Maximum Credible Accident Analysis (MCA Analysis) is one of the methodologies evolved to identify worst credible accident with maximum damage distance, which is still believed to be probable. The analysis does not include quantification of probability. The following is an attempt in that direction.

Hazardous substance may be released as a result of failures of catastrophes, causing damage to the surrounding area. The physical effects resulting from the release of hazardous substances are calculated by means of models. The results thus obtained through modeling are used to translate the physical effects in terms of injuries and damage to exposed population and environment.

The Damage Distances & Evacuation radius is calculated considering different major scenarios. These results will provide worst possible effects that are conceivable in the event of such failure. Actually, the chances of occurrences of such a disaster is very rare, because of number of events should take place in series leading to it. It may be notice in advance, if person is alert and sincere.

The following are the events/ Factors leading to a disaster having wind speed affect on life and property in surrounding area, if not controlled immediately.

- Maximum inventory at that movement and release of entire stored/ handling quantity.
- Spilled/ Leaked quantity is not recovered or controlled safely and quickly or mitigates measure fail to operate.
- Most stable weather condition preventing at the time of failure.
- Presence of ignition source before flammable vapour get dispersed below it safe limit.
- Inability by the operator to tackle the situation with necessary & adequate resources.
- Insufficient time to get evacuation to reach safe shelter by trapped/ involved person.

The following worst-case Scenarios are considered for accident consequences, which are described in below **Table – 7.8**.

TABLE – 7.8
WORST-CASE SCENARIOS FOR ACCIDENT CONSEQUENCES

S.No.	TYPE OF WORST CONDITION LEAD TO EMERGENCY	SCENARIO	EFFECT
1	Ammonia Tank / Pipe Rupture	Toxic Release	Asphyxiation,
2	Hydrogen Cylinder Failure	Fire Explosion	Pressure wave and damage to building
3	Hydrogen tank leakage	Fire explosion	Pressure wave and damage to surrounding buildings
3	Steam Line Failure	Steam leak	Burn injury
4	Boiler Explosion	Physical Injury	Pressure wave damage to property
5	Cl_2 Cylinder Leakage	Toxic	Asphyxiation,

ALOHA MODELING

To asses mainly the toxic hazard of NH_3, Cl_2 and fire and explosion of H_2 ALOHA MODELING is adopted.

ALOHA (Areal Locations of Hazardous Atmospheres) is a modeling program that estimates threat zones associated with hazardous chemical releases, including toxic gas clouds, fires, and explosions. A threat zone is an area where a hazard (such as toxicity) has exceeded a user-specified **Level of Concern (LOC)**.

KEY PROGRAM FEATURES

- Generates a variety of scenario-specific output, including threat zones, threat at specific locations, and source strength graphs.
- Calculates how quickly chemicals are escaping from tanks, puddles (on both land and water), and gas pipelines—and predicts how those release rates change over time.

TABLE – 7.9
SCENARIOS MODELLED BY ALOHA

Source	Toxic Scenarios	Fire Scenarios	Explosion Scenarios
Direct			
Direct Release	Toxic Vapor Cloud	Flammable Area (Flash Fire)	Vapor Cloud Explosion
Puddle			
Evaporating	Toxic Vapor Cloud	Flammable Area (Flash Fire)	Vapor Cloud Explosion
Burning (Pool Fire)		Pool Fire	
Tank			
Not Burning	Toxic Vapor Cloud	Flammable Area (Flash Fire)	Vapor Cloud Explosion
Burning		Jet Fire or Pool Fire	
BLEVE		BLEVE (Fireball and Pool Fire)	
Gas Pipeline			
Not Burning	Toxic Vapor Cloud	Flammable Area (Flash Fire)	Vapor Cloud Explosion
Burning (Jet Fire)		Jet Fire	

- ❖ Evaluates different types of hazard (depending on the release scenario): toxicity, flammability, thermal radiation, and overpressure.

- ❖ Models many release scenarios: toxic gas clouds, BLEVEs (Boiling Liquid Expanding Vapor Explosions), jet fires, vapor cloud explosions, pool fires, and flammable areas.

- ❖ Displays threat zones on MARPLOT maps (and also on Esri's ArcMap with the ALOHA ArcMap Import Tool and Google Maps and Google Earth using the export as KML feature).

- ❖ Works seamlessly with companion programs CAMEO Chemicals and MARPLOT; it can also be used as a standalone program.

DEVELOPMENT TEAM

- ❖ ALOHA is developed jointly by the National Oceanic and Atmospheric Administration's Office of Response and Restoration and the Environmental Protection Agency's Office of Emergency Management.

7.2.2.1 MODELING SCENARIOS CONSIDERED FOR MCA ANALYSIS

The following are the worst-case scenarios, which are considered for MCA analysis

A. LDO tank failures leading to pool fire

B. Ammonia Leakage leading to toxic concentrations

C. Chlorine leakage leading to toxic concentrations

D. Hydrogen leakage through pipe leading to explosion and Peak over pressure

E. Hydrogen tank failure leading to explosion and Peak over pressure

A1. LDO TANK FAILURES LEADING TO TANK FIRE AND POOL FIRE

Nature of Hazard from Oil Storage:

Diesel is a petroleum product. It is a highly flammable liquid having flash point between 32 –96 ^{o}C. However its auto ignition temperature is 256 ^{o}C. Its boiling point ranges between 150-400 ^{o}C. Furnace Oil is of similar characteristics having flash point above 66 ^{o}C. Major Hazards from oil storage can be fire. Maximum credible accidents from oil storage tank can be

a) Tank Fire
b) Pool / Dyke fire.

TANK FIRE

Oil is stored in floating roof tank. Leak in rim seal leading to accumulation of vapour is a source of fire. Lightning can be a source of ignition and can cause tank fire. Overflow from tank leading to spillage may cause vapour cloud formation. This can catch fire and it can flash back to the tank to cause tank fire.

POOL / DYKE FIRE

If there is outflow from the tank due to any leakage from tank or any failure of connecting pipes or valves, oil will flow outside and form a pool. Where the tank is surrounded by a dyke, the pool of oil will be restricted within that dyke. After sometime, the vapour from the pool can catch fire and can cause pool or dyke fire.

HEAT RADIATION AND THERMAL DAMAGE CRITERIA

The level of damage caused by heat radiation due to fire is a function of duration of exposure as well as heat flux (i.e. radiation energy onto the object of concern).This is true both for the effect on building and plant equipment and for the effect on personnel. However the variation of likely exposures times is more marked with personnel, due to

possibility of finding shelter coupled with protection of the skin tissue (clothed or naked body). Further, it is assumed that everyone inside the area by the pool fire will be burned to death (100% lethality) or will asphyxiate.

Radiation at various heat flux levels which are critical in risk analysis, are given in the **Table – 7.10**.

Table – 7.10
EFFECT OF HEAT RADIATION

Heat Radiation	**Effect**
37.5 kw/m^2	Damage to equipment
30.0 kw/m^2	Limit for Class 1 building materials
12.5 kw/m^2	Melting plastic
4.0 kw/m^2	Blistering
1.6 kw/m^2	Severe hot feeling

The damage and fatality (percentage of the exposed people to be killed) due to the exposure time is very important in determining the degree of fatality and corresponding effect distance. It is observed that the exposed persons normally find shelter or protection from the heat radiation (e.g. against a wall) within 10 seconds. However, exposure time of 30 seconds is normally assumed for pessimistic calculation which applies if people do not run away immediately or when no protection is available. The variation of the effects on humans due to heat flux and duration of exposure have been developed in the form of a Probit Equation which gives following values for human fatality levels in **Table – 7.11**

Table – 7.11
HEAT RADIATION AND FATALITY

	Exposure Time in seconds for % Fatality		
Radiation Level (kw/m^2)	**1 %**	**50%**	**99%**
1.6	500	1300	3200
4.0	150	370	930
12.5	30	80	200
37.5	8	20	500

FAILURE SCENARIOS FOR LDO AND CONSEQUENCES

This study is intended to find about the worst-case scenarios, as that will cover the other scenarios. A number of scenarios have been considered and finally the following failure scenarios have been analyzed following the MCA approach which will cover all the worst scenarios in this installation. Following **Table – 7.12** shows the heat radiation zones for different scenarios.

Table – 7.12
TANK FIRE HEAT RADIATION

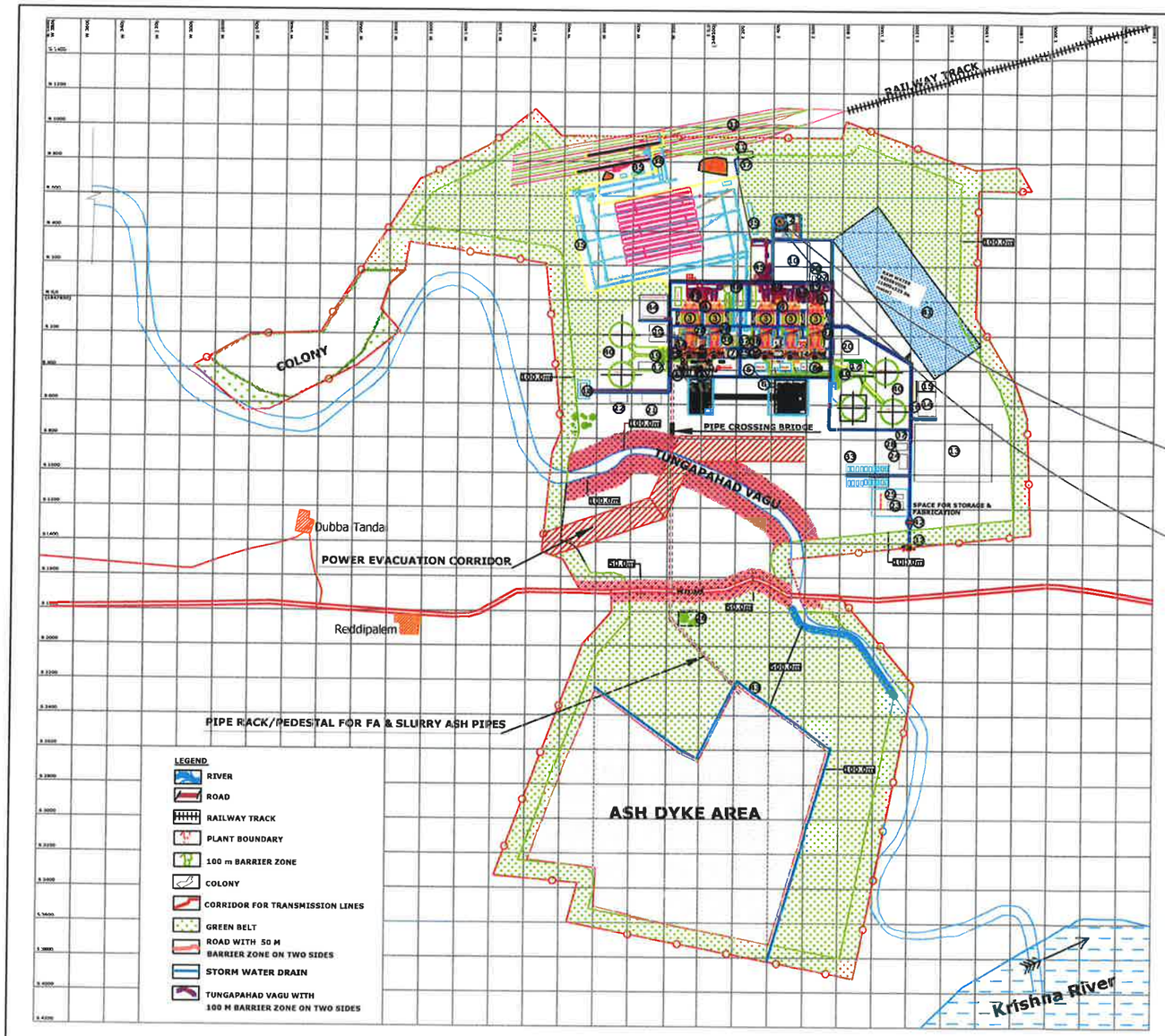
Consequence	**Heat dose (KW/m^2)**	**Tank Fire**	**Pool / Dyke Fire**
		Distance from Centre, m	Distance from Centre, m
Heavy Damage to Plant Equipment, 99% Fatality	37.5	12.56	160.8
Limit for Class 1 building	30	14.06	179.9
Melting Plastic, 1% Fatality	12.5	21.79	278.9
First degree burns in 20 seconds, non-fatal	4.0	38.5	493

The heat radiation contours plotted for LDO storage tank on the layout of the power plant for pool fire scenario is depicted in **Fig – 7.1 A&B.**

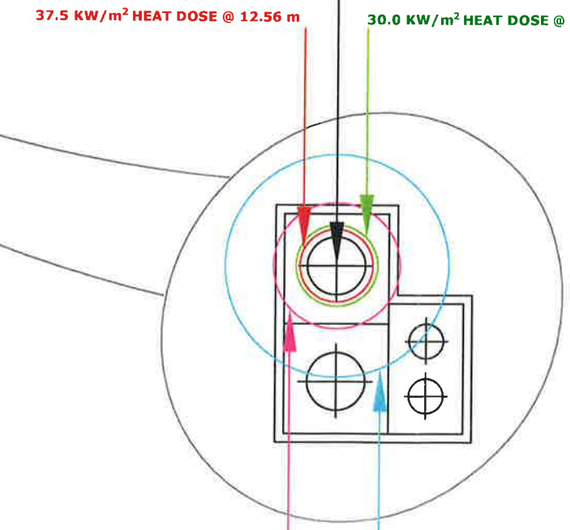
B.1 AMMONIA LEAKAGE LEADING TO TOXIC CONCENTRATIONS

The details considered for MCA scenario of Ammonia Leakage along with results of MCA scenario are given below

FIG - 7.1A



HEAT RADIATION CONTOURS PLOTTED FOR LDO STORAGE TANK



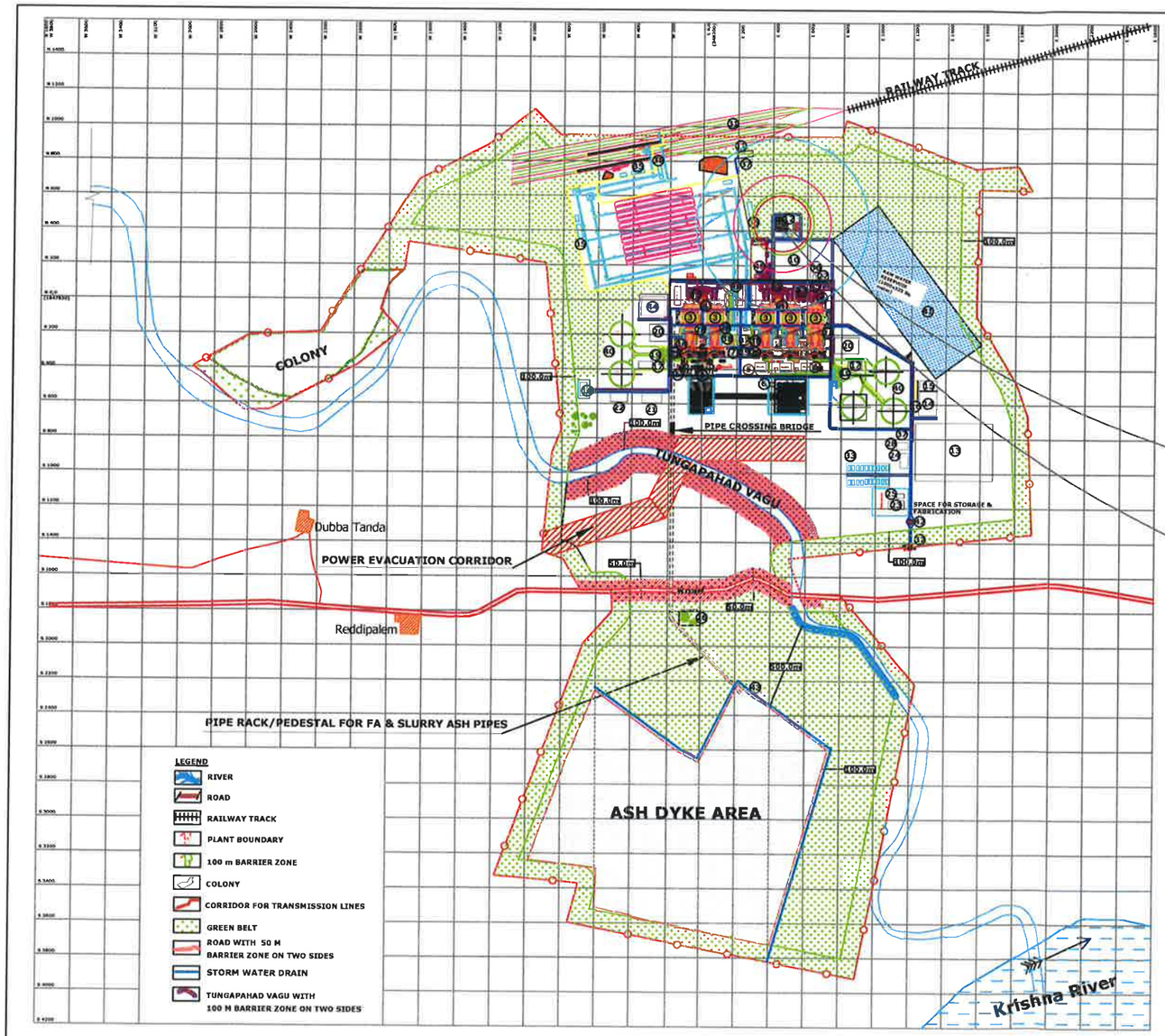
S.No	DESCRIPTION	CONFIG.
1	POWER HOUSE BLDG	-
2	BOILER	-
2A	SCR	-
3	ESP	-
4	CHIMNEY	2+2+1
5	TRANSFORMER YARD	-
6	SWITCHYARD (CONT. ROOM)	-
7	SERVICE BLDG.	COMMON
8	DG BUILDING	2 Nos
9	COOLING TOWER(NDCT)	-
10	DM PLANT & CPU REGEN.	COMMON
11	FUEL OIL UNLOADING	COMMON
12	FUEL OIL COMPLEX	COMMON
13	PRE-TREATMENT PLANT	COMMON
14	CLARIFIED WATER TANK	COMMON
15	FIRE WATER TANK	COMMON
16	CLARIFIED CUM FIRE WATER P/H	COMMON
17	SIDE STREAM FILTERATION	2 + 3
18	H2 GEN. PLANT & CYLINDERS SHED	COMMON
19	CW P/H & FOREWAY	2 + 3
20	CHLORINATION & CW TREAT. PLANT	2 + 3
21	EFFLUENT TREAT. PLANT	COMMON
22	SEWAGE TREAT. PLANT	COMMON
23	ADMIN. BUILDING	COMMON
24	FIRE STATION BUILDING	COMMON
25	CANTEEN	COMMON
26	FLY ASH SILO AREA	COMMON
27	CHEMICAL LAB	COMMON
28	WORKSHOP	COMMON
29	COMPRESSOR HOUSE	2 + 3
30	COAL STOCK AREA	COMMON
31	MARSHLING YARD (BY TSGENCO)	COMMON
32	GATE COMPLEX CUM SECURITY BLDG.	COMMON
33	PERMANENT STORES (15MX30M)	1R+1
34	AUXILIARY BOILER	-
35	CHP MCC	4 NOs
36	CHEMICAL LAB (PCRI)	COMMON
37	----------	----------
38	CST + PUMP HOUSE	2 + 3
39	AWRP/H & MCC	1
40	COOLING TOWERS (NDCT)	5
41	RAW WATER RESERVOIR	COMMON
42	PYLON/FOUNDATION STONE	-
43	ASH DYKE AREA	-
44	AMMONIA STORAGE&HANDLING PLANT	COMMON
45	FLUE GAS DESULFURIZATION (FGD)	----------
46	LIMESTONE HANDLING AREA	COMMON
47	GYPSUM DEWATERING & STORAGE	COMMON
48	FGD CONTROL ROOM	COMMON

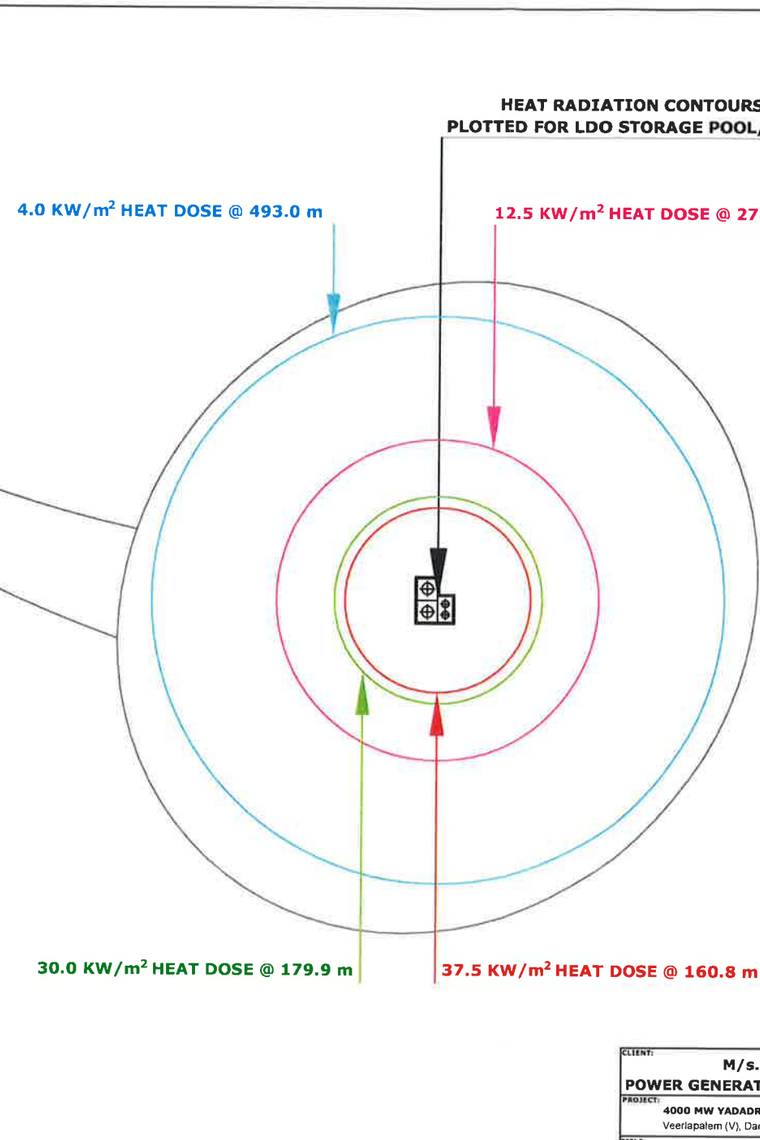
CLIENT:
M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED

PROJECT:
4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

TITLE:
HEAT RADIATION CONTOURS PLOTTED FOR LDO STORAGE TANK

FIG - 7.1B





S.No.	DESCRIPTION	CONFIG.
1	POWER HOUSE BLDG	-
2	BOILER	-
2A	SCR	-
3	ESP	-
4	CHIMNEY	2+2+1
5	TRANSFORMER YARD	-
6	SWITCHYARD (CONT. ROOM)	-
7	SERVICE BLDG.	COMMON
8	DG BUILDING	2 Nos
9	COOLING TOWER(NDCT)	-
10	DM PLANT & CPU REGEN.	COMMON
11	FUEL OIL UNLOADING	COMMON
12	FUEL OIL COMPLEX	COMMON
13	PRE-TREATMENT PLANT	COMMON
14	CLARIFIED WATER TANK	COMMON
15	FIRE WATER TANK	COMMON
16	CLARIFIED CUM FIRE WATER P/H	COMMON
17	SIDE STREAM FILTERATION	2 + 3
18	H2 GEN. PLANT & CYLINDERS SHED	COMMON
19	CW P/H & FOREWAY	2 + 3
20	CHLORINATION & CW TREAT. PLANT	2 + 3
21	EFFLUENT TREAT. PLANT	COMMON
22	SEWAGE TREAT. PLANT	COMMON
23	ADMIN. BUILDING	COMMON
24	FIRE STATION BUILDING	COMMON
25	CANTEEN	2NOs
26	FLY ASH SILO AREA	COMMON
27	CHEMICAL LAB	COMMON
28	WORKSHOP	COMMON
29	COMPRESSOR HOUSE	3 + 3
30	COAL STOCK AREA	COMMON
31	MARSHLING YARD (BY TSGENCO)	COMMON
32	GATE COMPLEX CUM SECURITY BLDG.	COMMON
33	PERMANENT STORES (15MX30M)	1R+1
34	AUXILIARY BOILER	-
35	CHP MCC	4 NOs
36	CHEMICAL LAB (PCRI)	COMMON
37	----------	----------
38	CST + PUMP HOUSE	2 + 3
39	AWRP/H & MCC	1
40	COOLING TOWERS (NDCT)	5
41	RAW WATER RESERVOIR	COMMON
42	PYLON/FOUNDATION STONE	-
43	ASH DYKE AREA	-
44	AMMONIA STORAGE&HANDLING PLANT	COMMON
45	FLUE GAS DESULFURIZATION (FGD)	-
46	LIMESTONE HANDLING AREA	COMMON
47	GYPSUM DEWATERING & STORAGE	COMMON
48	FGD CONTROL ROOM	COMMON

CLIENT:
M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED

PROJECT:
4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

TITLE:
HEAT RADIATION CONTOURS PLOTTED FOR LDO STORAGE POOL/DYKE

CHEMICAL DATA:

Chemical Name : AMMONIA (CAS Number: 7664-41-7)
Molecular Weight : 17.03 g/mole
IDLH : 300 ppm
LEL : 150000 ppm
UEL : 280000 ppm
Ambient Boiling Point : -28.4° F

Vapour Pressure at Ambient Temperature: greater than 1 atm
Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind : 5 meters/second from SE at 3 meters
Ground Roughness : open country
Cloud Cover : 5 tenths
Air Temperature : 35° C
Stability Class : D
No Inversion Height
Relative Humidity : 50%

SOURCE STRENGTH:

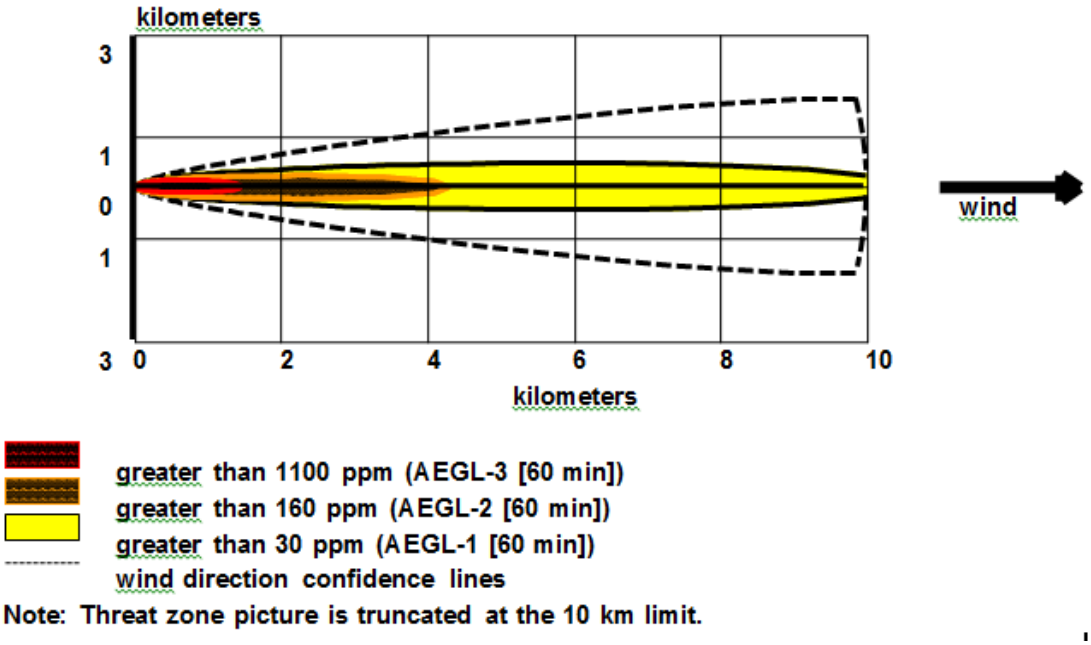
LEAK FROM HOLE IN VERTICAL CYLINDRICAL TANK

Flammable chemical escaping from tank (not burning)
Tank Diameter : 4 meters
Tank Length : 25 meters
Tank Volume : 314 cubic meters
Tank contains liquid
Internal Temperature : 35° C
Chemical Mass in Tank : 37,558 kilograms
Tank is 19% full
Circular Opening Diameter : 2 inches (50mm)
Opening is 1 meter from tank bottom
Release Duration : 44 minutes
Max Average Sustained Release Rate: 6,250 pounds/min
(Averaged over a minute or more)
Total quantity released : 70,657 pounds (32116 kg)

Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

THREAT ZONE

Model Run: Heavy Gas
Red : 1.4 kilometres --- (1100 ppm = AEGL-3 [60 min])
Orange: 4.3 kilometres --- (160 ppm = AEGL-2 [60 min])
Yellow: greater than 10 kilometres --- (30 ppm = AEGL-1 [60 min])



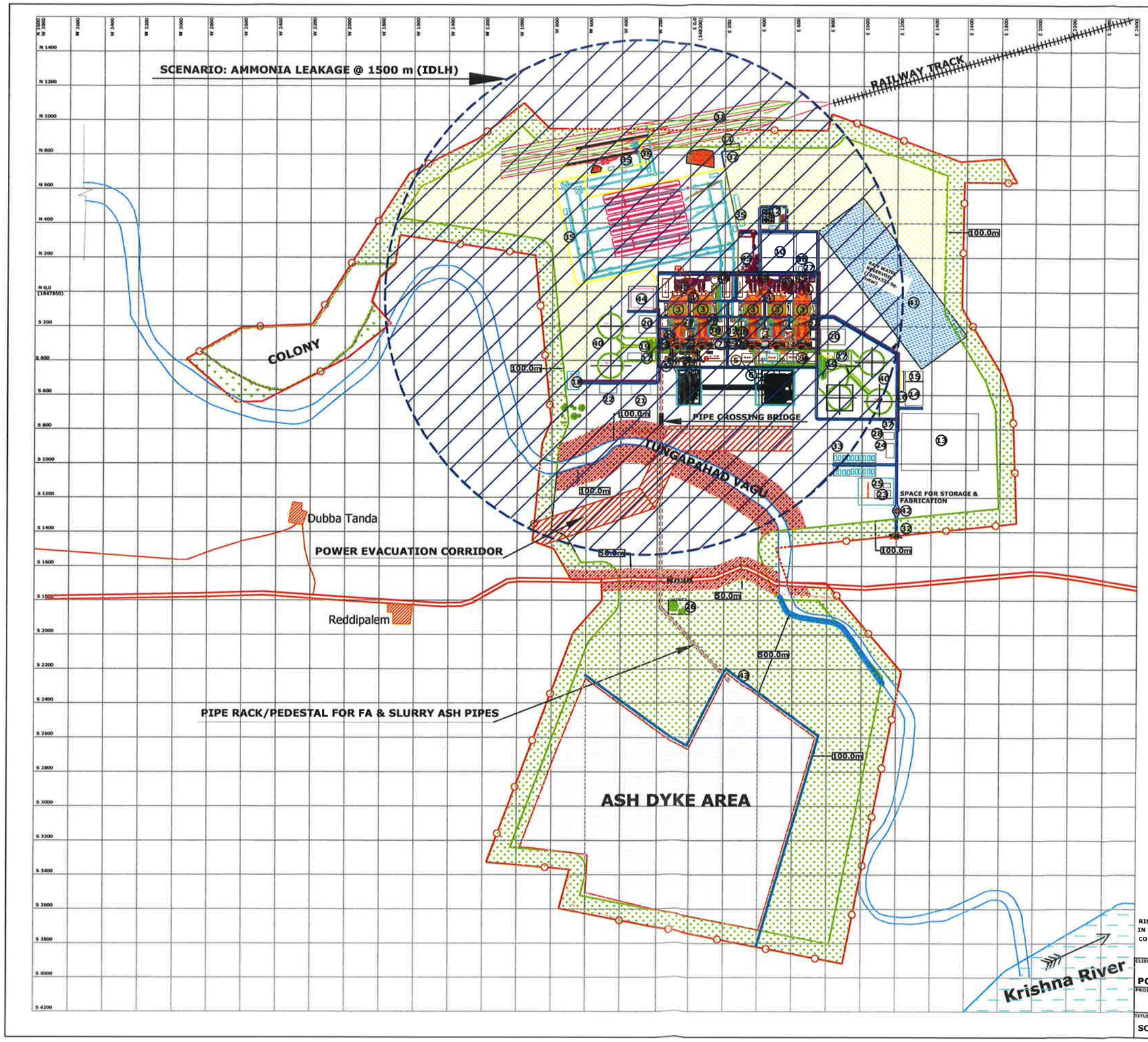
Note: Threat zone picture is truncated at the 10 km limit.

SUMMARY

Ammonia gas will get spread in direction of wind as shown in the above diagram the red zone which is Immediately Dangerous to Life or Health (IDLH) (300 ppm) is as high as 1500 meter which is up to the boundary of the plant and colony also.

Fig – 7.2 shows the IDLH impact zone superimposed on the plant layout.

FIG - 7.2



S.No.	DESCRIPTION	CONFIG.
1	POWER HOUSE BLDG	-
2	BOILER	-
2A	SCR	-
3	ESP	-
4	CHIMNEY	2+2+1
5	TRANSFORMER YARD	-
6	SWITCHYARD (CONT. ROOM)	-
7	SERVICE BLDG.	COMMON
8	DG BUILDING	2 Nos
9	COOLING TOWER(NDCT)	-
10	DM PLANT & CPU REGEN.	COMMON
11	FUEL OIL UNLOADING	COMMON
12	FUEL OIL COMPLEX	COMMON
13	PRE-TREATMENT PLANT	COMMON
14	CLARIFIED WATER TANK	COMMON
15	FIRE WATER TANK	COMMON
16	CLARIFIED CUM FIRE WATER P/H	COMMON
17	SIDE STREAM FILTERATION	2 + 3
18	H2 GEN. PLANT & CYLINDERS SHED	COMMON
19	CW P/H & POREWAY	2 + 3
20	CHLORINATION & CW TREAT. PLANT	2 + 3
21	EFFLUENT TREAT. PLANT	COMMON
22	SEWAGE TREAT. PLANT	COMMON
23	ADMIN. BUILDING	COMMON
24	FIRE STATION BUILDING	COMMON
25	CANTEEN	2NOs
26	FLY ASH SILO AREA	COMMON
27	CHEMICAL LAB	COMMON
28	WORKSHOP	COMMON
29	COMPRESSOR HOUSE	2 + 3
30	COAL STOCK AREA	COMMON
31	MARSHLING YARD (BY TSGENCO)	COMMON
32	GATE COMPLEX CUM SECURITY BLDG.	COMMON
33	PERMANENT STORES (15MX30M)	18+1
34	AUXILIARY BOILER	-
35	CHP MCC	4 NOs
36	CHEMICAL LAB (PCRI)	COMMON
37	----------	-------
38	CST + PUMP HOUSE	2 + 3
39	AWRP/H & MCC	1
40	COOLING TOWERS (NDCT)	5
41	RAW WATER RESERVOIR	COMMON
42	PYLON/FOUNDATION STONE	-
43	ASH DYKE AREA	-
44	AMMONIA STORAGE&HANDLING PLANT	COMMON
45	FLUE GAS DESULFURIZATION (FGD)	-
46	LIMESTONE HANDLING AREA	COMMON
47	GYPSUM DEWATERING & STORAGE	COMMON
48	FGD CONTROL ROOM	COMMON

NOTES :-

1. ALL DIMENSIONS AND CO-ORDINATES ARE IN METER UNLESS NOTED OTHERWISE.

REFERENCE DRGS.

1. TENDER STAGE PLOT PLAN:\TSGENCO\UL0\RF\VRPM\01
2. CONTOUR PLAN DRG : SUV/2015/3512/PLAN

LEGEND

- RIVER
- ROAD
- RAILWAY TRACK
- PLANT BOUNDARY
- 100 m BARRIER ZONE
- COLONY
- CORRIDOR FOR TRANSMISSION LINES
- GREEN BELT
- ROAD WITH 50 M BARRIER ZONE ON TWO SIDES
- STORM WATER DRAIN
- TUNGAPAHAD VAGU WITH 100 M BARRIER ZONE ON TWO SIDES

RISK CONTOUR SHOWING SCENARIO OF LEAK OF AMMONIA FROM HOLE IN VERTICAL CYLINDRICAL TANK LEADING TO TOXIC CONCENTRATIONS

CLIENT: M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED

PROJECT: 4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

TITLE: SCENARIO: AMMONIA LEAKAGE @ 1500 m (IDLH)

TABLE – 7.13

CONTROL MEASURES FOR CONTAINING AMMONIA WITHIN THE TANK AREA

S.NO	TYPE OF ACCIDENT	SYSTEM ELEMENT OF EVENT THAT LEAD TO ACCIDENT	HAZARD	SYSTEM RELEVANT COMPONENT
1.	Release of Ammonia gas	hole or crack in tank vessel or Piping or Gasket Failure or tank vessel or Malfunction Of Relief System	Toxicity, Health Hazard, bodily injury to Human Tissues, Environment Damage	Sprinkler system, dyke wall Fire Fighting Facility. Neutralization system, Dump tank (Spare), compliance, training
2	Release Of Ammonia Gas	Utility Failure	Toxicity, Health Hazard, bodily injury to Human Tissues, Environment Damage	DSC system
3.	Release Of Ammonia Gas	Toppling Of ISO Tanker Inside factory premises	Toxicity, Health Hazard, bodily injury to Human Tissues, Environment Damage, Spillage to Ground	Petroleum and Explosives Safety Organisation (PESO) compliance, training to drivers, inspection at entrance of factory good sealing system of valve and Piping
4	Explosion	External Fire	Bleve	Fire Protection, Sprinkler system for cooling of tank

TABLE – 7.14

PARAMETERS OF AMMONIA

S. No	Name of gas	ammonia
1	Class of weather	D relative humidity 50 %
2	IDLH	300 PPM
3	Acute exposure guideline levels (AEGL 3 (60 min))	100 PPM
4	Tank Volume	314 m^3
5	Opening in tank	5 centimeter at 2 meter height for bottom of tank
6	Release rate	2840 kg/min
7	Red zone	Radius 1506 m

C.1 CHLORINE LEAKAGE LEADING TO TOXIC CONCENTRATIONS

The details considered for MCA scenario of Ammonia Leakage along with results of MCS scenario are given below

CHEMICAL DATA:

Chemical Name : CHLORINE
CAS Number : 7782-50-5
Molecular Weight : 70.91 g/mol
IDLH : 10 ppm
Ambient Boiling Point : -29.5° F
Vapor Pressure at Ambient Temperature: greater than 1 atm
Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA:

Wind : 5 meters/second from SE at 3 meters
Ground Roughness : open country
Cloud Cover : 5 tenths
Air Temperature : 35° C
Stability Class : D
No Inversion Height
Relative Humidity : 50%

SOURCE STRENGTH

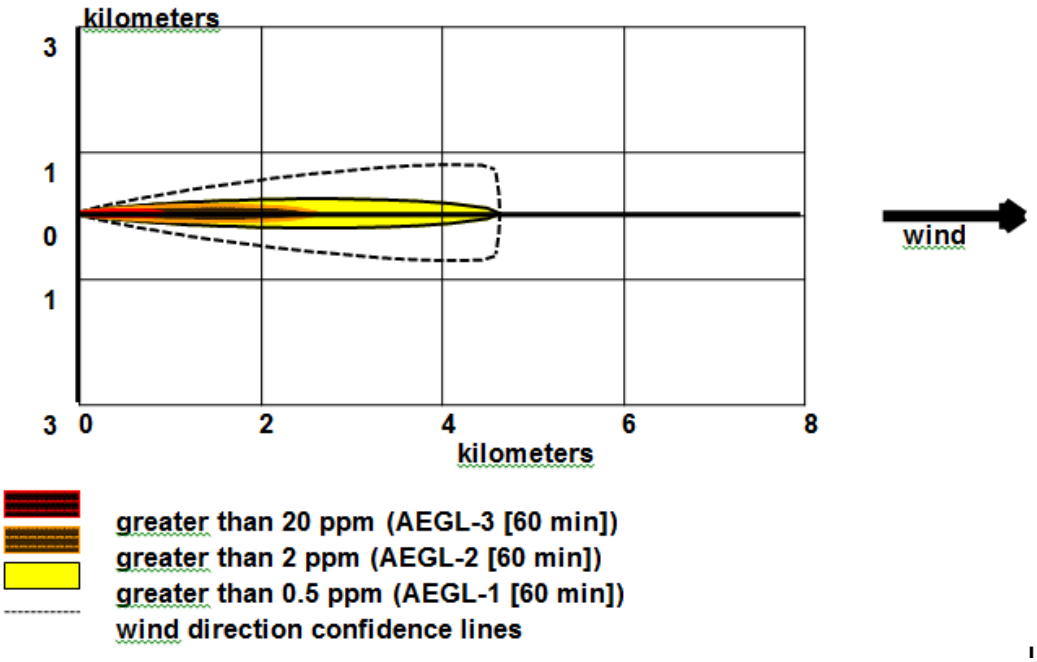
Leak from hole in horizontal cylindrical tank
Non-flammable chemical is escaping from tank

Tank Diameter : 0.760 meters
Tank Length : 2.65 meters
Tank Volume : 1.20 cubic meters
Tank contains liquid
Internal Temperature : 35° C
Chemical Mass in Tank : 980 kilograms
Tank is 59% full
Circular Opening Diameter: 1 inch (25mm)
Opening is 1 foot (300mm) from tank bottom

Note: RAILCAR predicts a stationary cloud or 'mist pool' will form.

Model Run : Traditional ALOHA tank
Release Duration : 7 minutes
Max Average Sustained Release Rate: 969 pounds/min435kg/min (averaged over a minute or more)
Total Amount Released : 1,167 pounds (530kg

Note: The chemical escaped as a mixture of gas and aerosol (two phase flow).

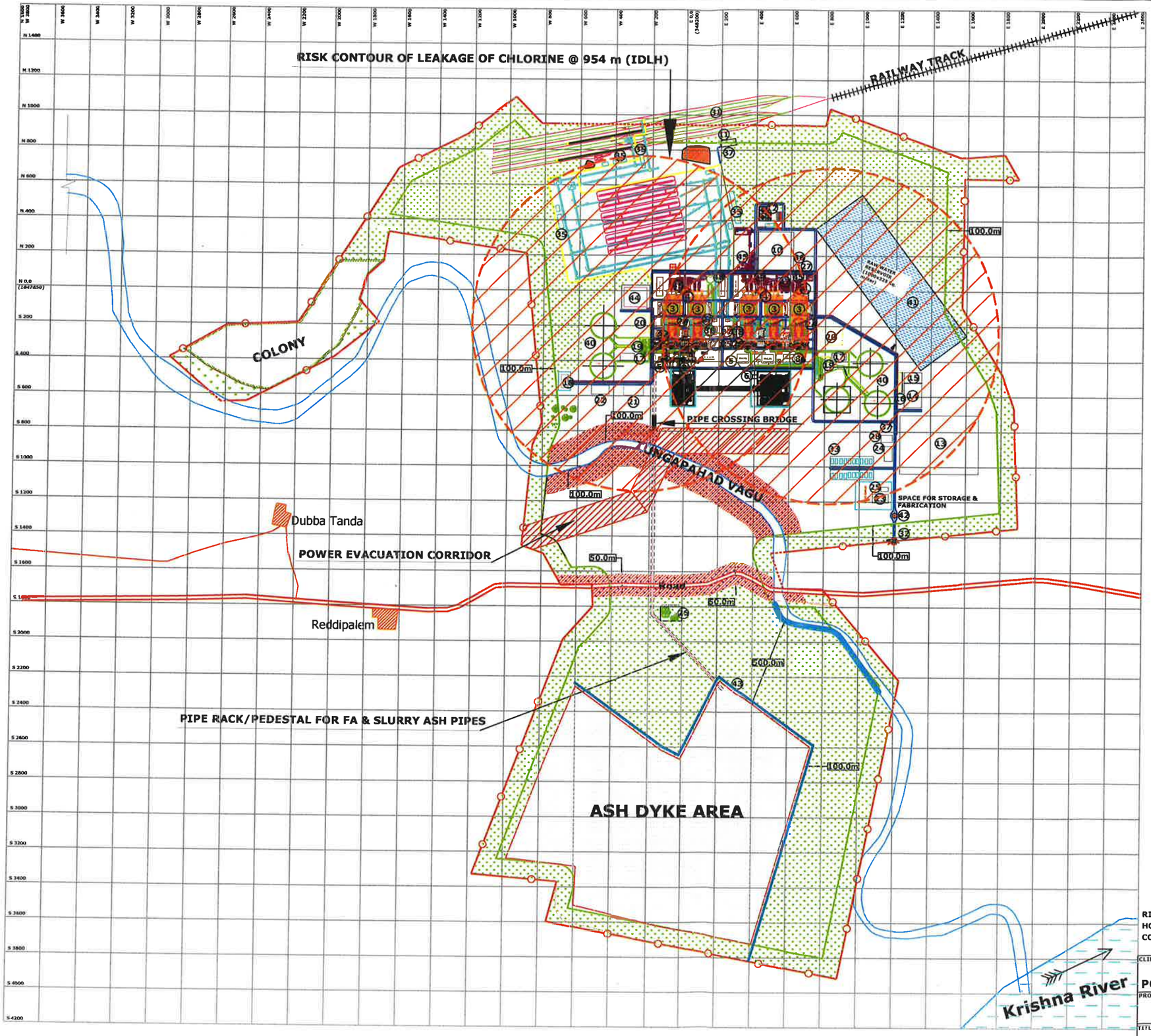


SUMMARY

The toxic release of Cl_2 gas in case of failure of valve mounting, in red zone i,e IDLH immediate danger to life and death area is 954 m radius mainly in direction of wind prevailing at that time which can be seen by wind sock placed over the buildings at highest points.

Fig – 7.3 shows the Risk Contour of Leak of Chlorine from hole in horizontal cylindrical tank

FIG - 7.3



S.No.	DESCRIPTION	CONFIG.
1	POWER HOUSE BLDG	-
2	BOILER	-
2A	SCR	-
3	ESP	-
4	CHIMNEY	2+2+1
5	TRANSFORMER YARD	-
6	SWITCHYARD (CONT. ROOM)	-
7	SERVICE BLDG.	COMMON
8	DG BUILDING	2 Nos
9	COOLING TOWER(NDCT)	-
10	DM PLANT & CPU REGEN.	COMMON
11	FUEL OIL UNLOADING	COMMON
12	FUEL OIL COMPLEX	COMMON
13	PRE-TREATMENT PLANT	COMMON
14	CLARIFIED WATER TANK	COMMON
15	FIRE WATER TANK	COMMON
16	CLARIFIED CUM FIRE WATER P/H	COMMON
17	SIDE STREAM FILTERATION	2 + 3
18	H2 GEN. PLANT & CYLINDERS SHED	COMMON
19	CW P/H & FOREWAY	2 + 3
20	CHLORINATION & CW TREAT. PLANT	2 + 3
21	EFFLUENT TREAT. PLANT	COMMON
22	SEWAGE TREAT. PLANT	COMMON
23	ADMIN. BUILDING	COMMON
24	FIRE STATION BUILDING	COMMON
25	CANTEEN	2NOs
26	FLY ASH SILO AREA	COMMON
27	CHEMICAL LAB	COMMON
28	WORKSHOP	COMMON
29	COMPRESSOR HOUSE	2 + 3
30	COAL STOCK AREA	COMMON
31	MARSHLING YARD (BY TSGENCO)	COMMON
32	GATE COMPLEX CUM SECURITY BLDG.	COMMON
33	PERMANENT STORES (15MX30M)	18+1
34	AUXILIARY BOILER	-
35	CHP MCC	4 NOs
36	CHEMICAL LAB (PCRI)	COMMON
37	----------	-------
38	CST + PUMP HOUSE	2 + 3
39	AWRP/H & MCC	1
40	COOLING TOWERS (NDCT)	5
41	RAW WATER RESERVOIR	COMMON
42	PYLON/FOUNDATION STONE	-
43	ASH DYKE AREA	-
44	AMMONIA STORAGE&HANDLING PLANT	COMMON
45	FLUE GAS DESULFURIZATION (FGD)	-
46	LIMESTONE HANDLING AREA	COMMON
47	GYPSUM DEWATERING & STORAGE	COMMON
48	FGD CONTROL ROOM	COMMON

NOTES :-

1. ALL DIMENSIONS AND CO-ORDINATES ARE IN METER UNLESS NOTED OTHERWISE.

REFERENCE DRGS.

1. TENDER STAGE PLOT PLAN:TSGENCO\NLG\SRT\VRPH\01
2. CONTOUR PLAN DRG : SUV/2013/3313/PLAN

LEGEND

- RIVER
- ROAD
- RAILWAY TRACK
- PLANT BOUNDARY
- 100 m BARRIER ZONE
- COLONY
- CORRIDOR FOR TRANSMISSION LINES
- GREEN BELT
- ROAD WITH 50 M BARRIER ZONE ON TWO SIDES
- STORM WATER DRAIN
- TUNGAPAHAD VAGU WITH 100 M BARRIER ZONE ON TWO SIDES

RISK CONTOUR SHOWING SCENARIO OF LEAK OF CHLORINE FROM HOLE IN HORIZONTAL CYLINDRICAL TANK LEADING TO TOXIC CONCENTRATIONS

CLIENT:
M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED

PROJECT:
4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

TITLE:
RISK CONTOUR OF LEAKAGE OF CHLORINE @ 954 m (IDLH)

TABLE – 7.15

CONTROL MEASURES FOR CONTAINING CHLORINE WITHIN THE TANK AREA

SR.NO	TYPE OF ACCIDENT	SYSTEM ELEMENT OF EVENT THAT LEAD TO ACCIDENT	HAZARD	SYSTEM RELEVENT COMPONENT
1.	Release of Chlorination gas	hole or crack in tank vessel or Piping or Gasket Failure or tank vessel or Malfunction Of Relief System	Toxicity, Health Hazard, bodily injury to Human Tissues, Environment Damage	DSC system. Sprinkler system, Dyke wall Fire Fighting Facility. Neutralization system, Cylinders rule Compliance, training
2	Release of Chlorination gas	leakage in piping	Toxicity, Health Hazard, bodily injury.	Fire Fighting Facility, Neutralization system, good sealing system of valve and Piping, Cylinders Rule, Compliance, training
3.	Release of Chlorination gas	toppling of truck filled with tonner in power plant premises	Toxicity, Health Hazard, bodily injury to Human Tissues, Environment Damage, Spillage to Ground	Cylinders Rule, Compliance training, to drivers inspection at entrance of power plant

TABLE – 7.16

PARAMETERS OF CHLORINE

S. No	Name of gas	Chlorine
1	Class of weather	D relative humidity 50 %
2	IDLH	10 PPM
3	AEGL 3 (60M1N)	20PPM
4	Tank Volume	1.2 m^3
5	Opening in tank	2.5 centimeter at 30 centimeter bottom of tonner
6	Release rate	440 kg/min
7	Red zone	1906 m

C.2 DAMAGE CRITERIA FOR CHLORINE

The effect of chlorine on human beings at different concentrations is given in below **Table – 7.17**.

TABLE – 7.17

EFFECT OF CHLORINE ON HUMAN BEINGS AT VARIOUS CONCENTRATIONS

S.No	Effects	Parts of Chlorine Gas per million parts of air by volume
1.	Least amount required producing slight symptoms after several hours exposure	1.0
2.	Least detectable odour	3.5
3.	Maximum amount that may be inhaled for 1 hour without serious disturbances	4.0
4.	Noxiousness, impossible to breath for several minutes	5.0
5.	Least amount required to cause irritation of throat.	15.1
6.	Least amount required to cause coughing	30.2
7	Amount dangerous in 30 minutes to 1 hour	40 to 60
8.	Kills most animals in very short time	100

D.1 HYDROGEN LEAKAGE THROUGH PIPE LEADING TO EXPLOSION AND PEAK OVER PRESSURE

The details considered for MCA scenario of Hydrogen Leakage through Pipe along with results of MCS scenario are given below

CHEMICAL NAME: HYDROGEN

CAS Number : 1333-74-0
Molecular Weight : 2.02 g/mol
LEL : 40000 ppm
UEL : 750000 ppm
Ambient Boiling Point : -423.0° F
Vapor Pressure at Ambient Temperature: greater than 1 atm
Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA:

Wind : 5 meters/second from SE at 3 meters
Ground Roughness : Open country
Cloud Cover : 5 tenths
Air Temperature : 35° C
Stability Class : D
No Inversion Height
Relative Humidity : 50%

SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank
Flammable chemical escaping from tank (not burning)

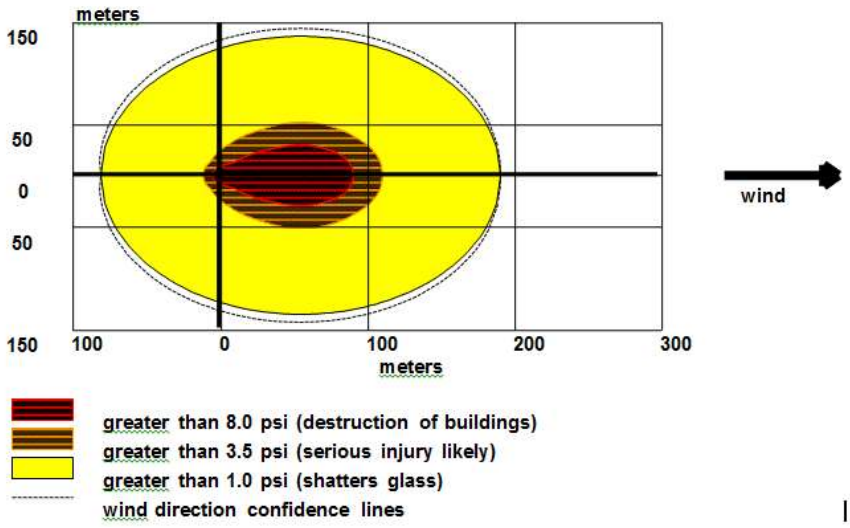
Tank Diameter :0.23 m
Tank Length : (1.83 m)
Tank Volume : 35.3 gallons (0.1336 m^3)
Tank contains gas only
Internal Temperature : 35° C
Chemical Mass in Tank : 0.0016 tons
Internal Pressure : 138 atmospheres
Circular Opening Diameter: 2.5cm
Release Duration : 1 minute

Max Average Sustained Release Rate: 0.0529 pounds/sec
(0.24 Kg/ sec)
(averaged over a minute or more)
Total Amount Released : 3.17 pounds (1.440 Kg)

THREAT ZONE:

Threat Modeled: Overpressure (blast force) from vapor cloud explosion
Type of Ignition: ignited by spark or flame
Level of Congestion: congested

Model Run: Gaussian
Red : 91 meters --- (8.0 psi = destruction of buildings)
Orange: 111 meters --- (3.5 psi = serious injury likely)
Yellow: 191 meters --- (1.0 psi = shatters glass)

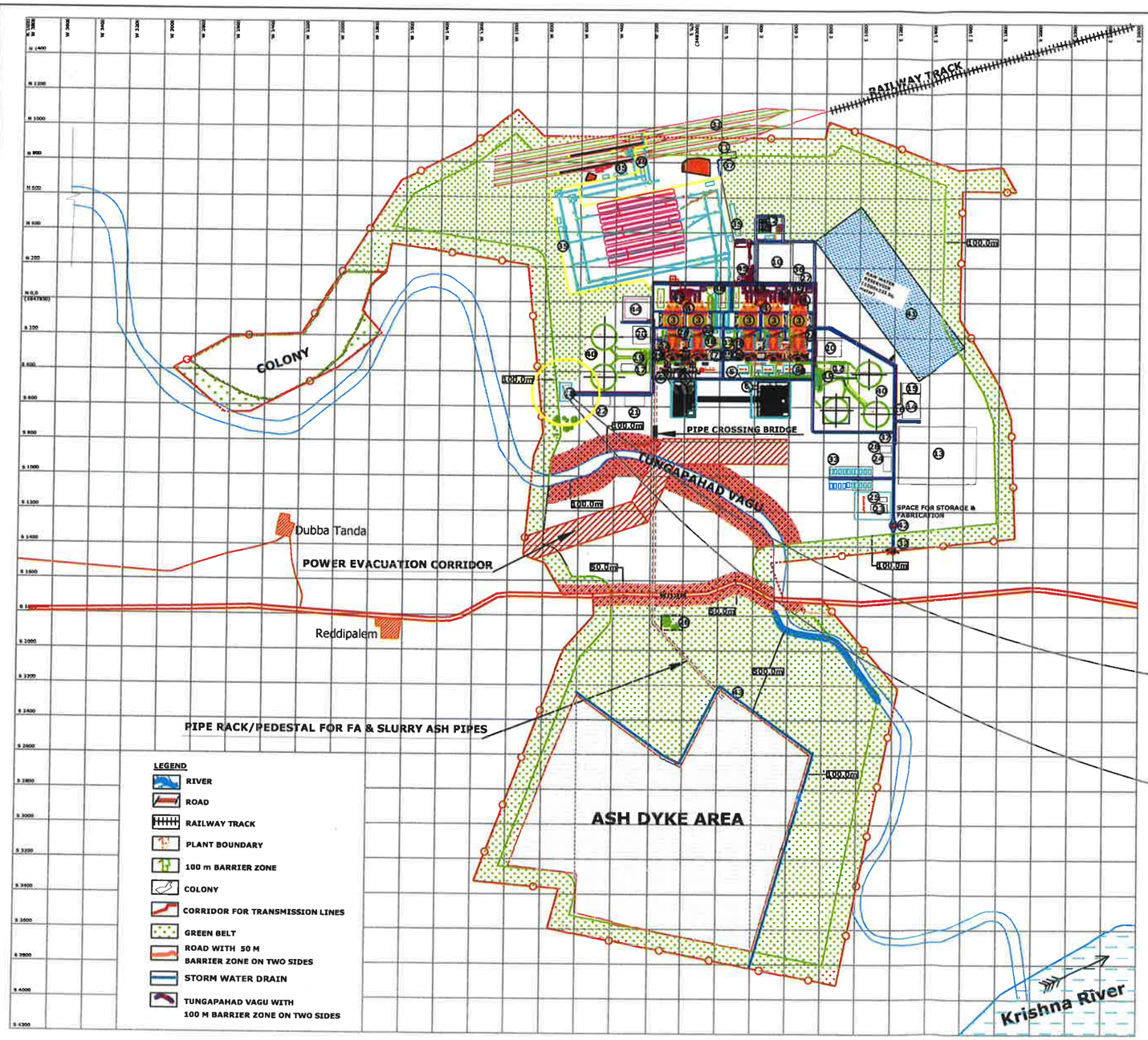


SUMMARY

In the Storage area of H_2 cylinder 25 meter radius damage may occur as per the above diagram. **Fig - 7.4** shows the risk contour due to Leak from hole in Horizontal cylindrical tank of Hydrogen

Safety Measures: Shed area should be kept open from top to avoid any acculmation of H_2 gas and any un protected light fitting.

FIG - 7.4

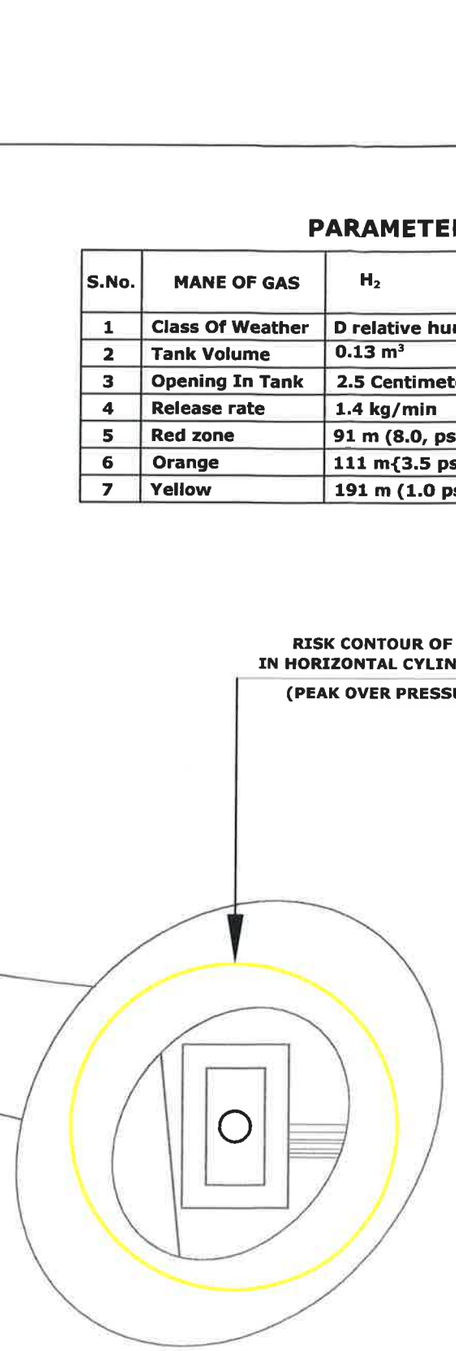


PARAMETERS OF H_2

S.No.	MANE OF GAS	H_2
1	Class Of Weather	D relative humidity 50%
2	Tank Volume	0.13 m^3
3	Opening In Tank	2.5 Centimeter at 30 centimeter bottom ot tonner
4	Release rate	1.4 kg/min
5	Red zone	91 m (8.0, psi =destruction of building)
6	Orange	111 m{3.5 psi = serious injury likely)
7	Yellow	191 m (1.0 psi = shatters glass)

RISK CONTOUR OF LEAKAGE FROM HOLE IN HORIZONTAL CYLINDRICAL TANK OF HYDROGEN

(PEAK OVER PRESSURE 1.0 psi @ 191 m)



S.No	DESCRIPTION	CONFIG.
1	POWER HOUSE BLDG	-
2	BOILER	-
2A	SCR	-
3	ESP	-
4	CHIMNEY	2+2+1
5	TRANSFORMER YARD	-
6	SWITCHYARD (CONT. ROOM)	-
7	SERVICE BLDG.	COMMON
8	DG BUILDING	2 Nos
9	COOLING TOWER(NDCT)	-
10	DM PLANT & CPU REGEN.	COMMON
11	FUEL OIL UNLOADING	COMMON
12	FUEL OIL COMPLEX	COMMON
13	PRE-TREATMENT PLANT	COMMON
14	CLARIFIED WATER TANK	COMMON
15	FIRE WATER TANK	COMMON
16	CLARIFIED CUM FIRE WATER P/H	COMMON
17	SIDE STREAM FILTERATION	2 + 3
18	H2 GEN. PLANT & CYLINDERS SHED	COMMON
19	CW P/H & FOREWAY	2 + 3
20	CHLORINATION & CW TREAT. PLANT	2 + 3
21	EFFLUENT TREAT. PLANT	COMMON
22	SEWAGE TREAT. PLANT	COMMON
23	ADMIN. BUILDING	COMMON
24	FIRE STATION BUILDING	COMMON
25	CANTEEN	2NOs
26	FLY ASH SILO AREA	COMMON
27	CHEMICAL LAB	COMMON
28	WORKSHOP	COMMON
29	COMPRESSOR HOUSE	2 + 3
30	COAL STOCK AREA	COMMON
31	MARSHLING YARD (BY TSGENCO)	COMMON
32	GATE COMPLEX CUM SECURITY BLDG.	COMMON
33	PERMANENT STORES (15MX30M)	1B+1
34	AUXILIARY BOILER	-
35	CHP MCC	4 NOs
36	CHEMICAL LAB (PCRI)	COMMON
37	----------	-------
38	CST + PUMP HOUSE	2 + 3
39	AWRP/H & MCC	1
40	COOLING TOWERS (NDCT)	5
41	RAW WATER RESERVOIR	COMMON
42	PYLON/FOUNDATION STONE	-
43	ASH DYKE AREA	-
44	AMMONIA STORAGE&HANDLING PLANT	COMMON
45	FLUE GAS DESULFURIZATION (FGD)	-
46	LIMESTONE HANDLING AREA	COMMON
47	GYPSUM DEWATERING & STORAGE	COMMON
48	FGD CONTROL ROOM	COMMON

RISK CONTOUR SHOWING SCENARIO OF HYDROGEN TANK FAILURE LEADING TO EXPLOSION AND PEAK OVER PRESSURE

CLIENT:
M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED

PROJECT:
4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

TITLE:
RISK CONTOUR OF LEAKAGE FROM HOLE IN HORIZONTAL CYLINDRICAL TANK OF HYDROGEN

TABLE – 7.18

CONTROL MEASURES FOR CONTAINING HYDROGEN WITHIN THE TANK AREA

S. NO	TYPE OF ACCIDENT	SYSTEM ELEMENT OF EVENT THAT LEAD TO ACCIDENT	HAZARD	SYSTEM RELEVENT COMPONENT
1.	Release of H_2 gas	hole or crack in cylinder or piping or gas failure or malfunction of relief system	Fire explosion ,body injury to the people	DSC system, leak detection system, Fire Fighting Facility. Cylinders Rule, Compliance, training
2	Release of H_2 gas	leakage in piping	Fire explosion ,body injury to the people	Fire Fighting Facility, good sealing system of valve and Piping, Cylinders Rule, Compliance, training
3.	Release of H_2 gas	toppling of truck filled with cylinders in power plant premises	Fire explosion ,body injury to the people	Cylinders Rule, Compliance training, to drivers inspection at entrance of power plant

TABLE – 7.19

PARAMETERS OF H_2

SR NO.	NAMF OF GAS	H_2
1.	Class Of Weather	D relative humidity 50%
2.	Tank Volume	0.13 m^3
3.	Opening In Tank	2.5 Centimeter at 30 centimeter bottom of tonner
4.	Release rate	1.4 kg/min
5.	Red zone	91 m (8.0, psi =destruction of building)
6.	Orange	111 m (3.5 psi = serious injury likely)
7.	Yellow	191 m (1.0 psi = shatters glass)

E.1 HYDROGEN TANK FAILURE LEADING TO EXPLOSION AND PEAK OVER PRESSURE

The details considered for MCA scenario of Hydrogen Tank Failure along with results of MCA scenario are given below

Chemical Name : Hydrogen Tank
CAS Number : 1333-74-0
Molecular Weight : 2.02 g/mol
LEL : 40000 ppm
UEL : 750000 ppm
Ambient Boiling Point : -423.0° F

Vapor Pressure at Ambient Temperature: greater than 1 atm
Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind : 5 meters/second from SE at 3 meters
Ground Roughness : open country
Cloud Cover : 5 tenths
Air Temperature : 35° C
Stability Class : D
No Inversion Height
Relative Humidity : 50%

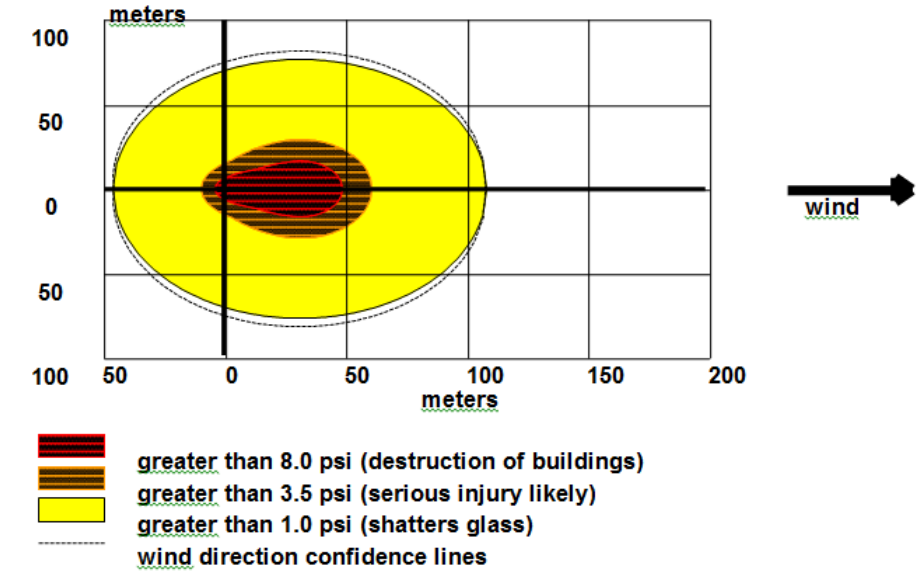
SOURCE STRENGTH:

Leak from hole in vertical cylindrical tank

Flammable chemical escaping from tank (not burning)
Tank Diameter : 4 meters
Tank Length : 5.17 meters
Tank Volume : 65 cubic meters
Tank contains gas only
Internal Temperature : 35° C
Chemical Mass in Tank : 0.17 tons
Internal Press : 30 atmospheres

Circular Opening Diameter: 2.5 centimeters
Release Duration : 17 minutes
Max Average Sustained Release Rate: 65.3 pounds/min (29.68 Kg/Min) (averaged over a minute or more)
Total Amount Released : 320 pounds 145kg

THREAT ZONE:
Threat Modeled: Overpressure (blast force) from vapor cloud explosion
Type of Ignition: ignited by spark or flame
Level of Congestion: congested
Model Run: Gaussian
Red : 49 meters --- (8.0 psi = destruction of buildings)
Orange: 61 meters --- (3.5 psi = serious injury likely)
Yellow: 108 meters --- (1.0 psi = shatters glass)



SUMMARY:

H_2 gas tank is kept in H_2 generation area which is at 30 bar pressure due to any leak the area surrounded will have explosive effect and as per the above drawing within 107 meter radius damage will be significant, people working in this area must be made aware of the consequences, and during design no permanent structure where people occupancy is there has to be avoided.

Fig-7.5 shows the risk contour due to Leak from hole in vertical cylindrical tank of Hydrogen

TABLE – 7.20
CONTROL MEASURES FOR CONTAINING HYDROGEN WITHIN THE TANK AREA

S.NO	TYPE OF ACCIDENT	SYSTEM ELEMENT OF EVENT THAT LEAD TO ACCIDENT	HAZARD	SYSTEM RELEVENT COMPONENT
1.	Release of H_2 gas	hole or crack in cylinder or piping or gas failure or malfunction of relief system	Fire explosion ,body injury to the people	DSC system, leak detection system, Fire Fighting Facility. Cylinders Rule, Compliance, training
2	Release of H_2 gas	leakage in piping	Fire explosion ,body injury to the people	Fire Fighting Facility, good sealing system of valve and Piping, Cylinders Rule, Compliance, training

TABLE – 7.21
PARAMETERS OF H_2

S. NO.	NAME OF GAS	H_2
1.	Class Of Weather	D relative humidity 50%
2.	Tank Volume	65.0 m^3
3.	Opening in Tank	2.5 Centimetre at 30 Centimetre bottom of tonner
4.	Release Rate	29.68 kg/min
5.	Red zone	49 Mtr(8.0 psi =destruction of building)
6.	Orange	61 Mtr(3.5 psi = serious injury likely)
7.	Yellow	108 Mtr (1.0 psi = shatters glass)

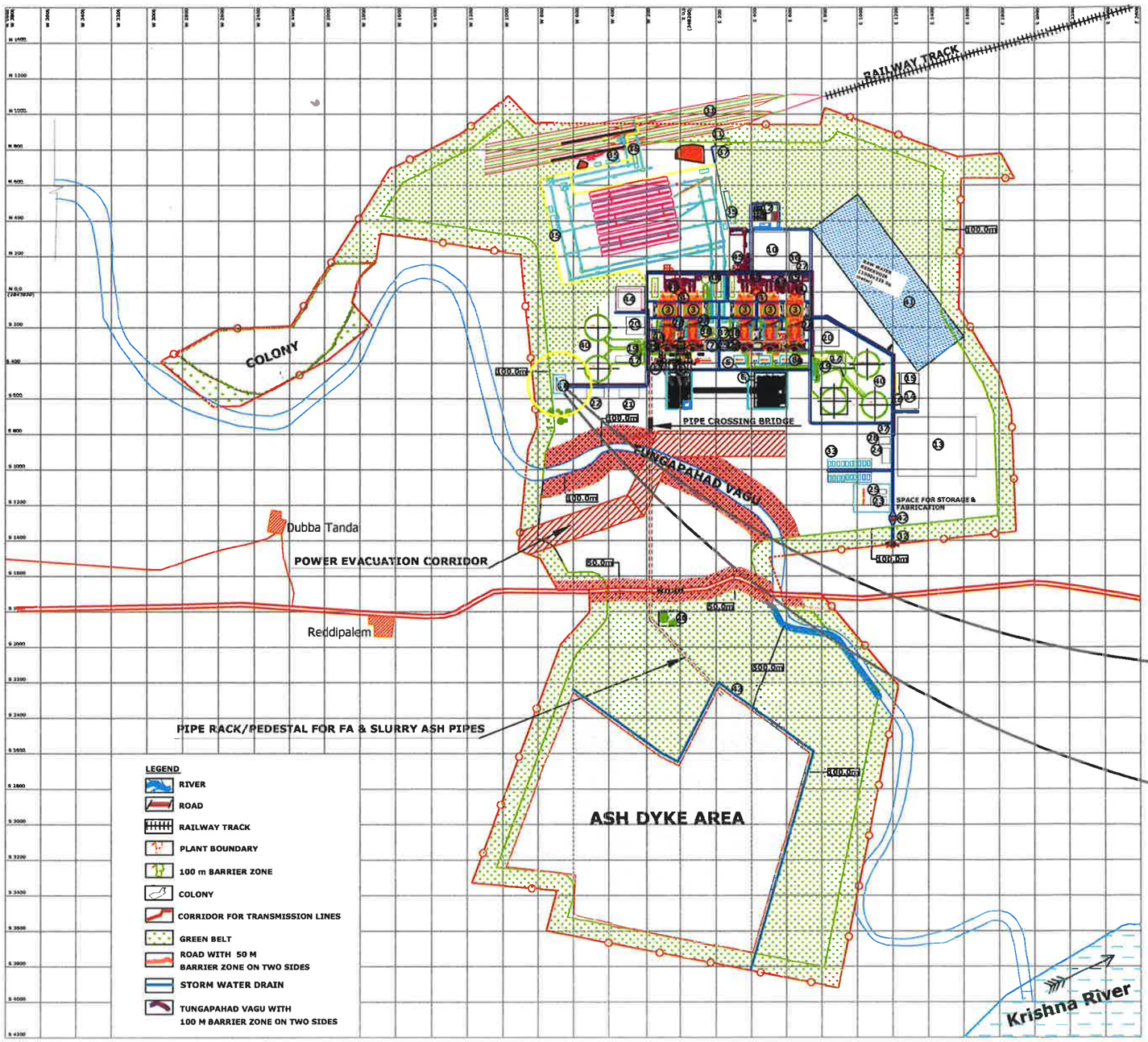
7.2.3 COAL HANDLING PLANT

The project will store about 7.5 lakh tonnes coal in the coal storage yard at any given time which is 15 days requirement of the Power Plant hence the risk of storage will be quite high. The fire protection sprinklers and other remedies will be applied.

FIG - 7.5

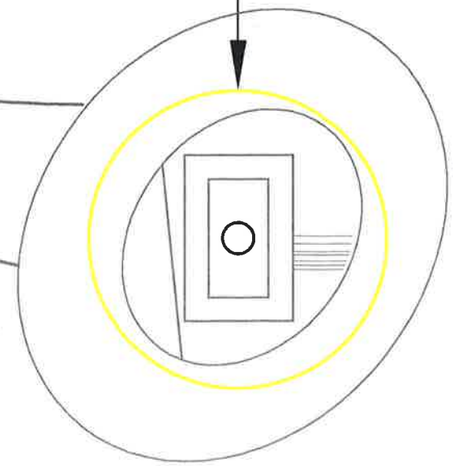
PARAMETERS OF H_2

S.No.	MANE OF GAS	H_2
1	Class Of Weather	D relative humidity 50%
2	Tank Volume	65.0 m^3
3	Opening In Tank	2.5 Centimeter at 30 centimeter bottom ot tonner
4	Release rate	29.68 kg/min
5	Red zone	49 m (8.0 psi =destruction of building)
6	Orange	61 m (3.5 psi = serious injury likely)
7	Yellow	108 m (1.0 psi = shatters glass)



RISK CONTOUR SHOWING SCENARIO OF HYDROGEN LEAKAGE THROUGH PIPE LEADING TO EXPLOSION AND PEAK OVER PRESSURE

RISK CONTOUR OF LEAKAGE FROM HOLE IN VERTICAL CYLINDRICAL TANK OF HYDROGEN (PEAK OVER PRESSURE 1.0 psi @ 108 m)



S.No	DESCRIPTION	CONFIG.
1	POWER HOUSE BLDG	-
2	BOILER	-
2A	SCR	-
3	ESP	-
4	CHIMNEY	2+2+1
5	TRANSFORMER YARD	-
6	SWITCHYARD (CONT. ROOM)	-
7	SERVICE BLDG.	COMMON
8	DG BUILDING	2 Nos
9	COOLING TOWER(NDCT)	-
10	DM PLANT & CPU REGEN.	COMMON
11	FUEL OIL UNLOADING	COMMON
12	FUEL OIL COMPLEX	COMMON
13	PRE-TREATMENT PLANT	COMMON
14	CLARIFIED WATER TANK	COMMON
15	FIRE WATER TANK	COMMON
16	CLARIFIED CUM FIRE WATER P/H	COMMON
17	SIDE STREAM FILTERATION	2 + 3
18	H2 GEN. PLANT & CYLINDERS SHED	COMMON
19	CW P/H & FOREWAY	2 + 3
20	CHLORINATION & CW TREAT. PLANT	2 + 3
21	EFFLUENT TREAT. PLANT	COMMON
22	SEWAGE TREAT. PLANT	COMMON
23	ADMIN. BUILDING	COMMON
24	FIRE STATION BUILDING	COMMON
25	CANTEEN	2NOs
26	FLY ASH SILO AREA	COMMON
27	CHEMICAL LAB	COMMON
28	WORKSHOP	COMMON
29	COMPRESSOR HOUSE	2 + 3
30	COAL STOCK AREA	COMMON
31	MARSHLING YARD (BY TSGENCO)	COMMON
32	GATE COMPLEX CUM SECURITY BLDG.	COMMON
33	PERMANENT STORES (15MX30M)	1B+1
34	AUXILIARY BOILER	-
35	CHP MCC	4 NOs
36	CHEMICAL LAB (PCRI)	COMMON
37	----------	-------
38	CST + PUMP HOUSE	2 + 3
39	AWRP/H & MCC	1
40	COOLING TOWERS (NDCT)	5
41	RAW WATER RESERVOIR	COMMON
42	PYLON/FOUNDATION STONE	-
43	ASH DYKE AREA	-
44	AMMONIA STORAGE&HANDLING PLANT	COMMON
45	FLUE GAS DESULFURIZATION (FGD)	-
46	LIMESTONE HANDLING AREA	COMMON
47	GYPSUM DEWATERING & STORAGE	COMMON
48	FGD CONTROL ROOM	COMMON

CLIENT:
M/s. TELANGANA STATE POWER GENERATION CORPORATION LIMITED

PROJECT:
4000 MW YADADRI THERMAL POWER STATION (5 x 800 MW)
Veerlapalem (V), Damercherla (M), Nalgonda District, Telangana State.

TITLE:
RISK CONTOUR OF LEAKAGE FROM HOLE IN VERTICAL CYLINDRICAL TANK OF HYDROGEN

7.2.3.1 COAL STORAGE RISK ANALYSIS OBJECTIVES OF ANALYSIS

Preliminary Hazard Analysis (PHA) is a broad based study carried out to identify potential hazards associated with various process and storage operations carried out for any facility. The objective of PHA is to carryout detailed analysis and suggests remedial measures for mitigating potential identified hazard.

The criteria used for carrying out PHA for coal storage and handling is the existence of large coal inventories being handled and stored in open yards.

In coal storage area, fire is the likely hazard due to spontaneous combustion is shown in **Table – 7.22**:

TABLE – 7.22

Area of the Plant	Type of Hazard
Coal Stock Yard	Fire (Spontaneous combustion)

7.2.3.2 SPONTANEOUS COMBUSTION OF COAL

The risk from fire exists where significant amounts of coal are in storage. Coal is a combustible material, making it susceptible to a variety of ignition scenarios. One of the most frequent and serious causes of coal fires is spontaneous combustion, which has been responsible for a number of incidents in recent years.

Preventing spontaneous combustion coal fires involves attention to many different factors. Among the most critical are the type, age and composition of coal, how it is stored and how it is used. Given the right kind of coal, oxygen, and a certain temperature and moisture content, coal will burn by itself.

Spontaneous combustion has long been recognized as a fire hazard in stored coal. Spontaneous combustion fires usually begin as "hot spots" deep within the reserve of coal. The hot spots appear when coal absorbs oxygen from the air. Heat generated by the oxidation can initiate the fire.
Such fires can be very stubborn to extinguish because of the

amount of coal involved (often hundreds of tons) and the difficulty of getting to the seat of the problem. Moreover, coal is either in the smouldering or flaming stage may produce copious amounts of methane and carbon monoxide gases. In addition to their toxicity, these gases are highly explosive in certain concentrations, and can further complicate efforts to fight this type of coal fire.

Even the most universal firefighting substance, water, cannot be used indiscriminately, because of the remote possibility of a steam explosion; it is advisable that water be applied carefully and from a safe distance. The above information suggests that coal fires require awareness and prior planning to extinguish efficiently, completely, and safely.

7.2.3.3 CAUSES OF SPONTANEOUS COAL FIRES

The following general factors have been mentioned as contributing causes:

- Coal handling procedures allowed for long-time retention of coal, which increases the possibility of heating.
- New coal added on top of old coal created segregation of particle sizes, which is a major cause of heating.
- Too few temperature probes installed in the coal bunker resulted in an excessive period of time before the fire was detected.
- Failure of equipment needed to fight the fire.
- Delay in the application of water.
- Inadequate policies, procedures, and training of personnel prevented proper decision making, including the required knowledge to immediately attack the fire.
- Failure to learn lessons from previous coal bunker fires at the coal storage area.

7.2.3.4 RECOMMENDATIONS FOR COAL STORAGE

- Storing coal with low sulphur content is helpful. Sulphur compounds in coal liberate considerable heat as they oxidize.
- Air circulating within a coal pile should be restricted as it contributes to heating; compacting helps seal air out.

- Moisture in coal contributes to spontaneous heating because it assists the oxidation process. Moisture content should be limited to 3 %; sulphur content should be limited to 1 %, "as mined." Coal having high moisture content should be segregated and used as quickly as possible. Efforts should be made to keep stored coal from not being exposed to moisture.
- Following the "First in, First out" rule of using stock reduces the chance for hot spots by helping preclude heat buildup for portions of stock which remain undisturbed for a long term. The design of coal storage bins is important in this regard.
- High ambient temperature aids the spontaneous heating process. Use coal as quickly as possible .The longer large coal piles are allowed to sit, the more time the spontaneous ignition process has to work.
- The shape and composition of open stock piles can help prevent fires. Dumping coal into a big pile with a trestle or grab bucket can lead to problems. Rather, coal should be packed in horizontal layers (options range from 1 1/2 to 3' high) which are then leveled by scraping and compacted by rolling. This method helps distribute the coal evenly and thus avoids breakage and segregation if fine coal. Segregation of coal particles by size should be strenuously avoided, as it may allow more air to enter the pile and subsequent heating of finer sizes.
- The height of the coal pile is also important, limit unlayered, uncompacted high grade coal to a height of 15' (10' for low grade coal); maximum height is 26' for layered and packed coal.
- Properly inspect, test and maintain installed fire protection equipment.
- Maintain an updated pre-fire plan and encourage regular visits to coal facilities by the site or local emergency response force

ROLL PACKING

Roll packing helps to exclude O_2 and thus to prevent fire by discouraging spontaneous combustion. Coal is distributed by a grab bucket or by other means in a uniform layer. The layer is then leveled by scrapping and compacted by rolling. Distributing the coal evenly avoids breakage and segregation of the coal. The firm packing helps shed water.

CHECKING TEMPERATURE

Steam rising from a pile or the odour of burning coal is an indication of spontaneous heating, but an earlier or more reliable indication is obtained by checking the temperature/ hot spots/CO detection.

Rise of temperature can be noted by use of thermocouples. Hot spots can be detected by use of IR coal fire monitors. CO detectors can indicate that coal combustion has started.

7.2.3.5 RANKING OF HAZARD FOR COAL STORAGE

NFPA Ranking

The National Fire Protection Association (NFPA) flammability, reactivity and health hazard rating for coal is given below:

TABLE – 7.23
Degree of Hazard (NFPS Rating)

Material	N_f	, N_h	N_r
Coal	1	1	0

N_f = Number of flammability, N_h = Number of health hazard, N_r = Number of reactivity

TABLE – 7.24
RANKING OF HAZARD FOR COAL STORAGE

Classification	Definition
Health Hazard Nh	
4	Materials, which on very short exposure could cause death or major residual injury, even though medical treatments were given.
3	Materials, which on short exposure could cause serious temporary or residual injury, even though medical treatments were given.
2	Materials which on intense or continued exposure could cause temporary incapacitation or possible residual injury unless medical treatment is given.
1	Materials, which on exposure would cause irritation but only minor residual injury, even if **no** treatment is given.

Classification	Definition
0	Materials, which on exposure under fire conditions, would offer no hazard beyond that of ordinary combustible material.
NL	**Not** listed
Flammability Hazard Nf	
4	Materials which will rapidly or completely vaporise at atmospheric pressure and normal ambient temperature, or which are readily dispersed in air and which will burn readily.
3	Liquids and solids that can be ignited under almost all ambient temperature conditions.
2	Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.
1	Material that must be preheated before ignition can occur.
0	Materials that will not burn.
NL	Not listed
Reactivity Hazard N_r	
4	Materials which in themselves are readily capable of detonation or of explosive decomposition or reaction at normal temperature and pressures.
3	Materials which in themselves are capable of detonation or explosive reaction but require a strong initiating source or which must be heated under confinement before initiation or which react explosively with water.
2	Materials which in themselves are normally unstable and readily undergo violent chemical change but do not detonate. Also materials, which may react violently with, water or which may form potentially explosive mixtures with water.
1	Materials which themselves are normally stable, but which **can** become unstable at elevated temperature and pressures or which may react with water with some release of energy but not violently.
0	Materials which themselves are normally stable, even under fire exposure conditions, and which are not reactive with water.
NL	Not listed

7.3 DISASTER MANAGEMENT PLAN

The objective of project is to engage safe operations. All efforts, right from the design stage will be emphasized on safety and

elimination of accidents. However due to human errors or system malfunctions, accidents could happen. The suffering and damage as a result of an accident is determined by the potential of loss, surrounding the event. But by taking effective action at the time of occurrence of the incident, severity and full potential loss can be largely contained/ avoided. Effective action is possible for handling major emergencies with preplanned procedures by utilizing the combined resources of the TSGENCO and out-side emergency services.

TSGENCO has prepared Emergency Preparedness Plan for implementation in all its operating plants. Emergency Preparedness Plan of YTPS has been prepared in line with the operating plants considering all the hazardous material storage and related operations of 4000 MW Supercritical Power Plant following Rule-13 of the manufacture, storage and import of hazardous chemicals rules, 1989 and its amendments. This plan will be updated post construction of YTPS plant.

Apart from the provision of the hazardous chemicals rules, section 41B(4) of the Factories Act, 1948 (as amended) also require every TSGENCO to draw up an On-site Emergency Plan with detailed disaster control measures for the industry and to educate the workers employed in the Power Project premises. The general public living in the vicinity will be informed and educated about safety measures and actions required to be taken in the event of an accident. Accordingly "Disaster Management Plan" is prepared and will be circulated to all concerned widely. This plan deals with probable hazards, their consequences, protections, preventive measures and action Plan to deal with the emergencies. It also clearly assessed its strengths and weakness, supports available within and from neighboring industries/ organization etc. This Plan also identifies the authority / responsibilities and actions of the people to act at the time of emergency. All emergency numbers (fire station, police station, nearby hospitals, ambulance services, doctors, plant heads, inspector of factories, pollution control board, etc) will be displayed at strategic locations and at security gate.

7.3.1 ON -SITE EMERGENCY PLAN

Emergencies may occur due to many reasons. It may occur due to natural causes like earth quake, cyclone, flood etc. or it may be due to malfunction of standard working systems or practices.

In the Power Plant handling hazardous materials, large-scale emergencies will be essentially those of a major release of flammable or toxic material and of events, which have significant environmental impact.

This On-site Emergency plan is made considering the nature and scale of the events and based upon all relevant information including, most importantly, practical operating experience.

The Emergency plan is aimed at enduring safety of people, protection of environment, protection of installation, restoration of production and salvage operations in the same order of priorities. For effective implementation of the Emergency plan, it will be widely circulated and personnel will be trained through mock drills.

The Emergency plan reflects the probable consequential severities of the undesired event due to deteriorating conditions or through 'Knock on 'effects. Further the Emergency Plan demonstrates that the correctness of assessment of the consequences, use of supporting evidences currently available and reliable information and incident data and if necessary the reports of outside consultancies.

To tackle the consequences of a major emergency inside the Power Plant a major emergency plan has been formulated and this document is called "DISASTER MANAGEMENT PLAN".

The objective of the major emergency plan is to make use of the combined resources of the plant and the outside services to achieve the following.

- ❖ Effect the rescue and Medical treatment of casualties.
- ❖ Safeguard other people.
- ❖ Minimize damage to property and the environment.
- ❖ Initially contain and ultimately bring the incident under control.
- ❖ Identify any dead.
- ❖ Provide authoritative information to the news media.
- ❖ Provide for the needs of relatives.
- ❖ Secure the safe rehabilitation of affected area.
- ❖ Preserve relevant records and equipment for the subsequent enquiry into the cause and circumstances of the Emergency.

IDENTIFICATION OF MAJOR HAZARD POTENTIALS

MAJOR PLANT SECTIONS

Considering the process and the material to be used at Thermal Power Station, the following are considered as major plant sections.

- ❖ Coal Handling plant.
- ❖ Main plant (Boiler, Turbo Generator, Lube Oil Tanks)
- ❖ Water treatment plant.
- ❖ Hydrogen generation plant and filling area.
- ❖ Ammonia Storage and handling area
- ❖ Chlorine Storage and handling area
- ❖ Switchyard including sub-stations and transformers.
- ❖ Fuel oil handling plant.
- ❖ Cable Galleries.
- ❖ Stores where hazardous, flammable and explosive materials are stored.

MAJOR HAZARD POTENTIAL ASSESSMENT

The major disasters or emergencies usually take birth from one or any combination of the following:

- ❖ Slow isolated fires.
- ❖ Fast spreading fires.
- ❖ Explosions.

❖ Uncontrolled release of toxic/corrosive/flammable liquids.
❖ Uncontrolled release of toxic/flammable gases/ducts depending upon the nature, scale, speed and impact on environment.
❖ Breach of ash dyke.

RELEASE OF GASES / DUST – AREAS

❖ Chlorine in Water treatment Plant.
❖ Hydrogen in Turbo Generator area of Main Plant.
❖ Ammonia in flue gas treatment system
❖ Pulverized coal dust from mills associated piping and flue gases.
❖ Coal dust in transfer points of CHP, Crushers, Wagon tippers and Mill areas.
❖ Flue gases from the ducts.

RELEASE OF CHEMICALS AREAS

❖ Chemical tanks and Chlorine in Water treatment plant.
❖ Acid & Alkali storage tanks in Water Treatment Plant.
❖ Fuel oil tanks in Fuel oil handling section.
❖ Control Fluid in turbine system.

MAJOR CAUSES OF ON-SITE EMERGENCY:

CHLORINE LEAKAGE

Liquid Chlorine filled containers will be brought by the suppliers through their own transport. The tonners will be placed on its seat, specially fabricated for this purpose.

The tonners will be connected to the manifold system and then to the evaporation line for use. The possible emergencies in this process are mentioned below.

EXPLOSION OF CYLINDERS DUE TO SABOTAGE ACTIVITIES

In case of any accident/sabotage activity and blasting of manifold system or Chlorine tonners with the use of explosives, heavy quantum of Chlorine may leak, which in no case can be sealed. In

that case, only action is evacuation of victims and others. However, such probabilities will be reduced to almost zero, by providing fool proof security measures and restricting entry into chlorine handling / storage area.

EXPLOSION DUE TO FIRE

Such an explosion may occur due to fire also. But again to prevent such event, no flammable material is allowed to be kept in the vicinity of Chlorine. Even uncontrolled growth of grass is not allowed there.

RELEASE OF CHLORINE DUE TO LEAKAGE

Due to corrosion or mishandling leakage of chlorine from chlorination system has happened in different parts of the country. Most of the leakage occur from the tonner valves and joints. On few occasions, leakage at the shell also comes to the light.

To control such leakage, emergency sealing kits will be provided close to the chlorine container stores.

The staff will be fully trained to seal any leakage with the help of such emergency kit in shortest possible time and neutralize the leaking Chlorine. A specially designed chlorine neutralization pit will be provided at Chlorination plant. This can be used if there is any uncontrollable chlorine leakage from any tonner. Breathing equipment will also be provided, to use in such operation.

EXPLOSION

Explosion in the plant is possible in Hydrogen filling area, oil storage tanks, or where Hydrogen Cylinders are stored. To prevent such possibility Hydrogen is purged with inert gas like Nitrogen or Carbon Di-Oxide and always purity above 98% is maintained.

1. In oil storage tanks appropriate fire fighting system is provided.
2. Explosion of Boiler Furnace due to internal pressurization.

COAL DUST EXPLOSION

Coal dust can explode when they are suspended in air. A coal dust explosion may occur if the coal dust is present in the concentration between Upper Explosive Limit & Lower Explosive Limits i.e., 30- 2000 grams/m^3 of air and also a source of ignition like sparks caused by friction or static electricity. However measures will be adopted to prevent the chances of explosion in the design state itself. To prevent the accumulation of dust, dust suppression and dust extraction systems are proposed at strategic locations.

BOILER EXPLOSION

Whenever Boiler gets pressurized due to non-evacuation of steam, there are chances of Boiler explosion. However, various interlocks and protections will be provided for Boiler during design stage to avoid Boiler explosion.

TURBINE GENERATOR EXPLOSION

Hydrogen gas explosion is a possible hazard in generator. However, the Generator is designed to withstand explosion. Seal oil system is also provided for the Generator to prevent the leakage of H_2 gas. And also the H_2 purity is continuously monitored and maintained always above 98%. All the H_2 cylinders will be checked for high purity.

FIRE IN CABLE GALLERIES

The main hazard in cable galleries is fire. To contain fire, heat sensors and smoke detectors will be provided in the cable galleries to detect the fires at the inception stage itself. Automatic sprinkler systems will be provided at important places to extinguish the fires. Also fire resistance barriers will be provided at the cable entries/ intersections, intermittent places on cable trays, cable raisers and cable entry points.

TRANSFORMER HAZARDS

Possible hazards in transformers are:

- Failure of terminal bushings and flashover.
- Sudden gas pressure formation due to transformer internal failure and
- Subsequent failure of explosion vents and pressure release devices may cause explosion of transformer and fires
- Accumulated leakage oil from different parts of transformers can catch
- Fire due to spurious sparking.
- To take care of above possible hazards, adequate protection systems are proposed as per engineering and in case of failure, an emulsifier flooding system is proposed to quench fires.

SUB-STATION HAZARDS

Where indoor switchgears are provided, fires and explosions may occur due to:

- Short Circuit either at bus bars, breaker high voltage parts or cable termination chambers may occur due to reptile's ingress or falling of internal accessories on to live parts.
- Failure of supporting insulators of bus bars, breakers, termination and subsequent earthling of supply may cause flash over.
- Failure of measurement equipments like CTs & PTs may cause flashover in the concerned chambers.
- To take care of the above problems, the following precautions are taken.
- Plugging of cable gland plates and breaker inspection plates against reptile entry.
- Periodical inspection, / testing of switchgear equipment.
- Providing proper nomenclature of switchgear equipment with regards to voltage level, feeder description and panel numbering to avoid wrong identification.

WATER TREATMENT PLANT HAZARDS

There are chances of spill-over from storage tank. There are chances of chemical burns due to contact with acids/alkalies. However, dyke walls will be provided to contain any over flow / leakage of acids from tanks. Also all these spill-overs will be collected in neutralization pits and disposed off.

FUEL OIL HANDLING SYSTEM HAZARDS

The main hazard in fuel oil section in fires and storage tanks explosion. However, to contain the chances of fires/explosions due to spillover dyke walls will be provided all around the fuel oil storage tanks. Apart from this, foam pores and MV water spray systems will be provided on all Fuel Oil tanks. The level gauges and temperature monitors will be also provided on the fuel oil tanks.

STORAGE /GODOWN-HAZARDS

The main hazards in stores / godowns are fire and explosion due to stored gas cylinders. However to prevent the chances of fires and explosions, gas cylinders and flammable materials will be stored safely with utmost care and precautions. Fire hydrant/Portable fire extinguishers systems will be provided in nearby storage area.

FACILITIES PROPOSED TO CONTROL

HAZARDS FIRE FIGHTING

For protection against fire, all yard equipment and plant equipment will be protected by a combination of hydrant system, automatic sprinkler spray system (emulsifier system), fixed foam system for oil handling areas, automatic high velocity and medium velocity sprinkler spray system, auto-modular inert gas based system for control rooms apart from portable and mobile fire extinguishers located at strategic areas of plant buildings and adequate Passive Fire Protection measures. The systems will be

designed as per the recommendations of NFPA or approved equivalents in accordance with the Tariff Advisory Committee/Loss Prevention Association of India guidelines.

- In view of vulnerability to fire and its importance in the running of the power station, effective measures will be taken to tackle fire in the susceptible areas such as cable galleries, fuel oil handling areas, coal handling plant areas including transfer points, crusher houses and tunnels, etc.

- For containment of fire and preventing it from spreading in cable galleries, unit wise fire barriers with self-closing fire doors will be provided. In addition, all cable entries / openings in the cable galleries, tunnels, floors will be sealed with non-inflammable / fire resistant sealing materials to prevent fire propagation for at least three (3) hour. Fire protection cable coating compound over cables at switchgear entry points, power station building entry points and trays shall be provided to prevent damage from fire for at least thirty (30) minutes.

Adequate separating distances will be maintained between different process blocks and hazardous equipment. To prevent fire from spreading through ventilation & air conditioning ducts, dampers with auto closing arrangements will be provided at appropriate locations. FRLS power and control cables will be used.

Fire water pumps will be installed in the filtered water pump house. In the filtered water storage tank water will be stored as dedicated dead storage for meeting firewater requirement in exigencies.

In addition to the above facilities, adequate number of manual call points, as well as portable and mobile (wheel mounted) fire extinguishers of soda acid type, foam type, chemical type, and carbon- dioxide type will be provided at suitable locations throughout the plant area to meet NFPA code as well as Tariff Advisory Committee/ Loss Prevention Association of India guidelines. These extinguishers may be used during the early stages of fire to prevent from spreading.

FIRE WING

A full-fledged fire station operated by Fire Officer & sufficient staff. The fire control room will be manned in 3 shifts round the clock.

The fire station will be equipped with the following facilities to handle the fire promptly and actively Hydrant Landing Valves / Yard Hydrant.

Fire hydrant mains will be laid covering all major risk areas. The layouts of hydrant mains will be kept at all the shift officers.

a) *EMULSIFIER SYSTEM*

The Emulsifier system is proposed on transformer areas GT, UATs, Station Transformers. In the emulsifier system, Quartz bulb fuses at 79 °C and release air from the line due to pressure drop of air deluge valve opens and water sprinkles through separate nozzles provided on the transformers.

b) *PORTABLE FIRE EXTINGUISHERS*

FIXED FOAM SYSTEM

HFO & LDO Tanks would be provided with fixed foam system. The foam station would be situated near Heavy Fuel Oil Tanks where foam concentrate has to be kept in tanks. The mixer of water and foam concentrate goes to the HFO, LDO tanks, thrown on to the top surface of the oil tanks and converts into foam to extinguish the fire.

MEDIUM VELOCITY SYSTEM

In addition to the foam system, the LDO tank would be provided with Medium Velocity Spray system to cool down the oil vapors which develop due to heating of the oil in case of fire incident.

SPRINKLER SYSTEM

All coal conveyors would be provided with the sprinkler system against fire hazard. Quartz bulb and Fusible plug heat detectors would be provided at the tips of each pipe covered.

Under the network of pipe meant for sprinkling system, the bulbs break at 79°C of heat and through the tips the water automatically spray out on the Conveyor, Transformers and LDO tank areas to arrest the fire.

In addition to above firefighting equipment, portable and mobile fire extinguishers would be installed at all locations of the plant including Main Plant, control rooms, Switch Gear rooms, Laboratories, Off site Administration building etc.

FIRST AID CENTER:

A First Aid Center and dispensary will be provided inside the plant premises and manned round the clock. Ambulance facility would be available round the clock within the plant premises and tie up will be made with nearest hospitals. The minimum medical staff will be as follows.

No. of Doctor	1
No. of Nursing Staff	4
Ambulances (with oxygen administration facility)	1
Lab Technicians	2
Pharmacist	2

COMMUNICATION FACILITIES

Public address system would be provided in the plant, Telephone and Internal Communication facilities would be available at all required desk or with officials in control room. P & T (STD) telephones, Fax & Carrier Communication facilities would be provided in Chief Engineer/ O&M office and in unit control board to contact nearby industries to ask for assistance. The facility will

be also used to contact district authorities for information and help. The plant would be connected to corporate office through VSAT (Very Small Aperture Terminals).

EMERGENCY POWER SUPPLY

Emergency lights would be provided at all vulnerable areas for lighting arrangements as well as to operate minimum equipment for operating the plant safely. Both the units would be provided with DG Sets as well as DC battery Systems which comes on automatically in case of power failure. More than one supply through different transmission systems would also be provided to ensure electric supply without fail.

EMERGENCY SAFETY EQUIPMENT

The following emergency safety equipments would be made available in Unit Control Board, Fire Station, Water Treatment Plant, Fuel Oil Pump House, Shift-In-Charge engineer's office and Safety Office.

Self-contained breathing apparatus.
Gas masks.
Chlorine leak arresting kits.
Emergency suits.
Gum boots.
Hand gloves.
Aprons etc.

EMERGENCY CONTROL CENTRE (ECC)

The Emergency Control Centre is proposed which would be fully equipped with all communication facilities to contact. Emergency Control Centre will be centrally located and will see that it is nearer to Unit Control Board, Switch Yard Control Room & Chemical wing to give instructions to the Officers.

The Emergency Control room will be manned by the Chief Incident Controller, the Officials nominated as key personnel and Sr.

Officers of outside services called in for assistance. No other personnel shall have access to the Control Centre.

ECC will also contain the following data:

- Safety data pertaining to all hazardous materials likely to cause emergency.
- Procedure of major and special fire fighting, rescue operations, first aid etc.,
- Procedures for tackling Chlorine gas and other chemical leakages.
- Emergency call out list of persons drafted for emergency control, key personnel, Fire, Safety, First aid, Medical, Personnel, Welfare & Industrial Relations, Security, Police and District Administration Authorities.

EVACUATION & ASSEMBLY POINTS

In an emergency, it would certainly be necessary to evacuate personnel from affected areas and as per precautionary measure to further evacuate non-essential workers, in the first instance from areas likely to be affected where the emergency escalate. The evacuation will be effected on getting necessary instructions from Superintending Engineer / O&M/. On evacuation, employees shall assemble at assembly points.

The following areas are identified as assembly points and employees shall assemble at the assembly points depending on the area of emergency.

1. Switch yard control room
2. Main plant security gate.
3. Service building.

EMERGENCY ALARMS

The Emergency siren will be sounded by the Security Personnel with the instructions of Divisional Engineer/Shift Engineer from the Security control room and it is proposed to install the sirens at the following places.

1) Fire Station Control Room
2) Housing Colony Security Gate

The above locations will be manned round the clock. The emergency alarm shall consist of represent long short blast for continuous period of 2 minutes. The purpose is to advise all persons on the major emergency occurred in the plant. The alarm is sounded such that the nature of emergency can be distinguished as a Chlorine release or a major fire.

EMERGENCY SIREN

In case of Fire - 5 Seconds ON
5 Seconds OFF

All clear Signal- continuous siren for 3 minutes

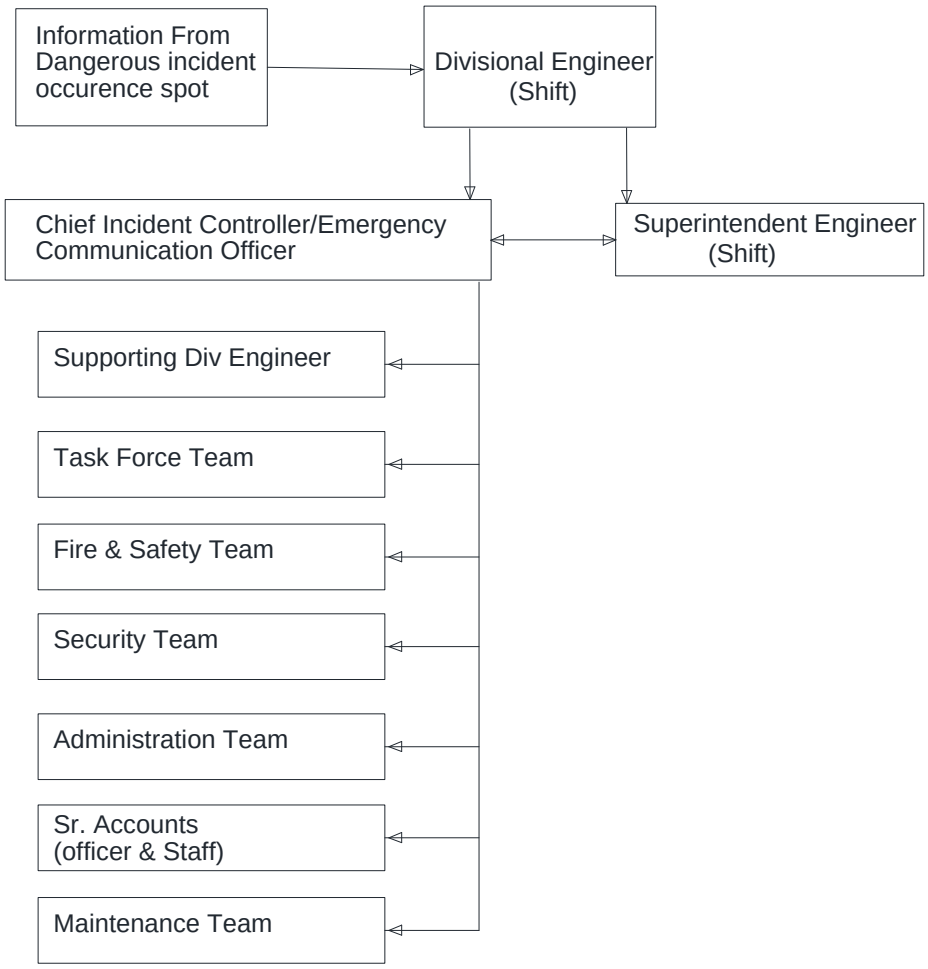
ACTION PLAN

For effective control and management of an Emergency, an action plan and organization chart is prepared along with responsibilities.

The Action Plan Consists of

i. First Information from the site.
ii. Responsibility of Superintending Engineer / O&M concerned.
iii. Responsibility of Divisional Engineer / O&M.
iv. Responsibility of declaration of Emergency.
v. Responsibility of Emergency communication officer.
vi. Responsibility of Key personnel.
vii. Responsibility and action to be taken by essential staff and various teams.
viii. Responsibility for all clear signal.

Emergency Management Organization Chart



FIRST INFORMATION FROM THE SITE

The first person who observes / identifies the hazardous incident will inform by announcing through public addressing system and by telephoning to the Shift Divisional Engineer in Unit Control Board about the hazard. The observer will also telephone to Fire station in case of Fire hazard. The Divisional Engineer / Shift will inform to concerned Superintending Engineer (According to the area of hazard) and also to the Chief Engineer / O&M and Asst. Divisional Engineer / Tech. to Chief Engineer / O&M and communicate it to all key personnel about the incident

RESPONSIBILITIES OF SUPERINTENDING ENGINEER

The Superintending Engineer on knowing about hazardous incident, immediately will rush to the incident site and take overall charge and inform the same to Chief Engineer / O&M. On arrival, he will assess the extent of emergency and decide if major emergency exists and inform the Emergency Communication Office accordingly. His responsibilities will be:

- To direct all operations within the affected area taking into consideration priorities for safety of personnel, minimum damage to the plant, property, environment and minimum loss of materials.
- To provide advice and information to the Fire & Security Officers and the local Fire Services.
- To ensure that all non-essential workers/staff on the areas affected will be evacuated to the appropriate assembly points and the areas are searched for casualties.
- To set up communication points and establish contact with Emergency Control Centre in the event of failure of electric supply and thereby Public Address System (PAS) and internal telephones failure.
- To report on all significant developments to the Chief Engineer / O&M.
- To have regard to the need to preserve the evidence so as to facilitate any enquiry into the cause and circumstances, which caused or escalated the emergency.

RESPONSIBILITIES OF THE CHIEF INCIDENT CONTROLLER (CHIEF ENGINEER / O & M)

The Chief Engineer / O&M, who is also the Chief Incident Controller, will assume overall responsibilities for the Factory and its personnel in case of any emergency. His responsibilities are:

- To assess the magnitude of the emergency situation and decide if staff needs to be evacuated from their assembly points to identified safer places.

- To undertake continuous review of possible developments and assess in consultation with key personnel as to whether shutdown of the plant or any section of the plant and evacuation of personnel are required.
- To Co-Ordinate with senior officials of Police, Fire brigade, Medical, Factories Inspectorate and provide advice on possible effects on areas outside the factory premises.
- To look after rehabilitation of affected persons and discontinuation of emergency.
- To issue authorized statements to news media, and ensure that evidence is preserved.
- For enquiries to be conducted by the Statutory Authorities.

RESPONSIBILITIES FOR DECLARATION OF MAJOR EMERGENCY

The Superintending Engineer on hearing the hazardous incident will go to the scene of the incident make an informal assessment of the situation and decide whether a major emergency exists or is likely develop. On his decision he will inform the Chief Engineer / O&M and activate the major emergency procedure Superintending Engineer /O&M who has knowledge and experience to recognize the fact of major emergency potential for it, in consultation with Chief Engineer /O&M, declare a Major Emergency.

Once the Emergency alarm is raised the Emergency Procedures will be activated.

MAKING THE EMERGENCY KNOWN INSIDE THE PLANT

The major emergency will be made known to everyone inside the plant by resounding the alarm.

Separate alarms will be sounded to warn different types of major emergencies such as Fire and Explosion or Toxic gas escape same alarm can be used with different number of times as given and Public Address System will also be available throughout the Plant.

A) SAMPLE EMERGENCY MESSAGE:

On getting the message that emergency has been declared, Chief Engineer / O&M/ Superintending Engineer / O&M will rush to the affected / likely to be affected areas and announce through fixed / mobile P.A. system the following message.

"HEAVY CHLORINE LEAK HAS TAKEN PLACE IN POWER PROJECT AND AS A RESULT OF WHICH CHLORINE CONTENT IN THE ATMOSPHERE MAY BECOME HIGH"

B) "STEP TO CONTROL THE SITUATION IS IN PROGRESS".

In the mean time you are advised to:

- Not to get panic.
- Keep the doors and windows tightly closed.
- Don't try to come out from closed doors if you find irritating smell.
- If found necessary we may evacuate you to the nearest evacuation center be prepared it.

Announcement would be made by the concerned official in Local Language and English. Similarly announcement regarding termination of the emergency also would be made.

RESPONSIBILITIES OF EMERGENCY COMMUNICATION OFFICER

On hearing the emergency alarm he will proceed to Emergency Control Centre. He will:-

- Report to Chief Engineer / O&M and Superintending Engineer /O&M and maintain contact with them.
- On the information received from the Superintending Engineer/ O&M of the situation recommending evacuation, if necessary, evacuate the staff from assembly points.
- Identify suitable staffs to act as runners or a messenger, who are listed in the Essential Staff, between him and the

Superintending Engineer /O&M if the telephone and other system of communication fail due to any reason.

- ❖ Maintain inventory of items in the Emergency Control Centre.
- ❖ Contact local meteorological office to receive early notification of changes in weather condition in case of gas leak and prolonged action.
- ❖ Maintain a log of incidents.
- ❖ Keep in constant touch with happenings at the emergency site and with Superintending Engineer /O&M.
- ❖ Liaise with neighborhood fire brigades, hospitals, civil and Police authorities on advice from Chief Engineer /O&M.

KEY PERSONNEL

- All divisional heads.
- Superintending Engineer/O&M.
- Chief Medical Officer.
- Head of Safety
- Security Officer.
- Fire Officer.
- Essential Staff.

A list of key personnel and their phone numbers will be informed to all concerned suitably. If necessary, they will decide the actions needed to shut down plant, evacuate personnel, carryout emergency engineering works, arrange for supplies of equipment, personnel etc., carryout atmosphere test, provide catering facilities, liaison with local bodies, state government authorities, inform relatives of the victims, media etc.,

RESPONSIBILITIES OF KEY PERSONNEL

A) *DEPARTMENTAL HEADS*

The departmental heads will provide assistance as required by Chief Incident Controller. They will decide which member of their departments is required at the incident site.

B) *SUPERINTENDING ENGINEER / O&M*

He will:

- Report to Chief Engineer/O&M.
- Ensure that all non-essential workers in the affected areas are evacuated to assembly points in consultation with the Chief Engineer/O&M.
- Receive reports from nominated persons from assembly points and pass on the information.
- Keep liaison with other co-coordinators to meet the requirements of services such as materials, security management, transportation, medical, canteen facilities etc., as required during emergency.
- Be in constant touch with Chief Engineer /O&M and feed him correct information of the situation.
- Give information to press, public and authorities concerned on instruction from Chief Engineer /O&M.
- Ensure that causalities received adequate attention at medical centre and arrange required additional help and inform relatives of the injured.
- Arrange to inform public on Radio and TV about evacuation etc.,
- Arrange TV coverage on handling emergency.

C) *CHIEF MEDICAL OFFICER*

Chief Medical Officer will render medical treatment to the injured and if necessary will shift the injured to nearby Hospitals. He will mobilize extra medical help from outside if necessary. He will keep a list of qualified first aid workers.

D) *HEAD OF SAFETY*

On hearing the emergency alarm, he will proceed to the site. He will:-

- Make sure that all safety equipments will be made available to the emergency teams.
- Participate in rescue operations.

- ❖ Co-ordinate to transfer the injured persons to medical centre and arrange for first aid.
- ❖ Keep in contact with the CHIEF ENGINEER /O&M and the Superintending Engineer/O&M and advise them on the condition of injured persons.

E) *SECURITY OFFICER*

On hearing the Emergency alarm, he will proceed to main entrance / main gate.

He will:

- ❖ Arrange to control the traffic at the gate and the incident area.
- ❖ Direct the security staff to the incident site to take part in the emergency Operations under his guidance and supervision.
- ❖ Evacuate the people in the plant or in the nearby areas as advised by Superintending Engineer / O&M after arranging the transport through Transport-ln-charge.
- ❖ Allow only those people who are associated with handling emergency.
- ❖ Maintain law and order in the areas; if necessary seek the help of Police.
- ❖ Maintain communication with Chief Engineer/O&M & Superintending Engineer/O&M.

F) FIRE OFFICER

On hearing the emergency, he will reach the fire station and arrange to sound the alarm as per the type of emergency in consultation with Superintending Engineer/O&M. He will:

- ❖ Guide the fire fighting crew i.e., firemen and trained plant personnel and shift the fire fighting facilities to the emergency site. Adequate facilities will be made available.
- ❖ Take guidance of the Superintending Engineer/O&M for fighting as well assessing the requirement of lighting and providing

temporary by pass of the work.

- Maintain communication with Superintending Engineer/O&M & Chief Engineer/O&M.

G) ESSENTIAL STAFF

- Attendants.
- First Aiders.
- Personnel for emergency engineering work such as for providing extra lighting or replacement of lighting, providing temporary by pass of the work.
- Personnel for transporting equipment to the incident site from other parts of the works.
- Personnel for moving tankers or vessels from area of risk
- Personnel for acting as runners in case of communication difficulties
- Personnel for manning plant entrance, in liaison with the police to Direct emergency vehicles entering the plant, to control traffic leaving the plant and to turn away or make alternate arrangement for visitors and other traffic arriving at the gate.

It is the responsibility of the Superintending Engineer O&M to identify the above essential staff and form a Task Force which report at defined plant control centers so that they can be readily contacted. It is the responsibility of the Superintending Engineer/O&M to remove all non-essential staff to assembly points.

Responsibilities of Teams

A. TASK FORCE

- To identify source of hazard and try to neutralize / contain it.
- To isolate remaining plant and keep that in safe condition.
- To organize safe shut down of plant, if necessary.
- To organize all support services like operation of fire pumps, sprinkler systems etc.

B. MAINTENANCE TEAM

- Attend to all emergency maintenance jobs on top priority.
- To take steps to contain or reduce the level of hazard created due to disaster.
- To organize additional facilities as desired.

C. FIRE FIGHTING TEAM

In case fire erupts and emergency is due to fire the Fire Fighting team is responsible for.

- To rush to fire spot and extinguish the fire.
- To seek help from outside fire fighting agencies through knowledge of plant officials.
- To evacuate persons affected due to whatever reasons.

D. COMMUNICATION TEAM

- To maintain the Communication network in working condition.
- To attend urgent repairs in the communication system, if required.
- To arrange messengers for conveying urgent messages when needed so.
- To help plant authorities to communicate with external or internal authorities /officials.

E. SECURITY TEAM

- To man all gates.
- To bar entry of unauthorized persons.
- To permit, with minimum delay, the entry of authorized personnel and outside agencies, vehicles etc., who have come to help
- To allow the ambulance / evacuation vehicles etc., to go through the gates with security escort.

F. ADMINISTRATION TEAM

- ❖ To rescue the casualties on priority basis.
- ❖ To transport casualties to first aid post, safe places, or medical centers.
- ❖ To account the personnel.
- ❖ To pass information to the kith and kin of fatal or seriously injured persons.

G. SAFETY TEAM

- ❖ To arrange required safety equipment.
- ❖ To measure gas concentrations, in case of gas leakage at various places.
- ❖ To guide authorities on all safety related issues.
- ❖ To record accident details.
- ❖ To collect and preserve evidences in connection with accident inquiry.
- ❖ To report the accident to statutory authorities and Chief Engineer/O&M.

H. MEDICAL TEAM

- ❖ To arrange first aid materials / stretchers immediately and reach the site of incident.
- ❖ To arrange for immediate medical attention.
- ❖ To arrange for sending the casualties to various hospitals and nursing homes etc.,
- ❖ To ask specific medical assistance from outside including specialists in consultation with Chief Engineer / O&M and Superintending Engineer /O&M.

SUPPORT TEAMS

In addition to the teams already mentioned, there will be two additional teams known as support teams.

A. SUPPORT TEAM TO CHIEF ENGINEER / O&M:

This team assists Chief Engineer / O&M during the emergency to execute his functioning in consultation with him. The members of the team and their responsibilities are given below.

- HEAD OF PERSONNEL (Divisional Engineer /Admn.)
  - Contacting statutory authorities.
  - Arranging for relievers and catering facilities.
  - Giving information to News Media.
  - Arranging shelters for affected persons.
  - Contacting medical centers and nursing homes.
  - Providing all over support, as necessary.

- HEAD OF MATERIALS (Divisional Engineer/Stores)
  - Arranging for urgently required materials through cash purchase or whatever means.

- HEAD OF FINANCE (Sr. Accounts Officer)
  - Arranging funds for various relief measures as well as emergency purchase of materials and sending his representative for emergency purchases.

B. SUPPORTING TEAM TO SUPERINTENDING ENGINEER / O&M.

The support team to Superintending Engineer/O&M will consists of :

- Asst. Divisional Engineer/Technical.
- Divisional Engineer/General.
- Divisional Engineer /Electrical, Maintenance.

The team may call upon additional persons depending upon the need.

The team will assist the Superintending Engineer/O&M in manning communication and passing instruction the team.

One Asst. Engineer / Technical will always be available with Superintending Engineer/O&M for recording all information coming in and instructions going out.

RESPONSIBILITY FOR ALL CLEAR SIGNAL

After cessation of emergency, Superintending Engineer/O&M will communicate to Chief Engineer/ O&M about it. After verification of Status, Chief Engineer /O&M will communicate to announce the "All clear" by instructions to sound the "ALL CLEAR SIGNAL".

7.3.2 OFF-SITE EMERGENCY PLAN

The task of preparing the Off-Site Emergency Plan lies with the District Collector, however the off-site plan will be prepared with the help of the local district authorities. The proposed plan will be based on the following guidelines. Off-site emergency plan follows the on-site emergency plan. When the consequences of an emergency situation go beyond the plant boundaries, it becomes an off- site emergency. Off-site emergency is essentially the responsibility of the public administration. However, the factory management will provide the public administration with the technical information relating to the nature, quantum and probable consequences on the neighboring population.

The off-site plan is based on those events which are most likely to occur, but other less likely events which have severe consequence are also be considered. Incidents which have very severe consequences yet have a small probability of occurrence are also be considered during the preparation of the plan. However, the key feature of a good off- site emergency plan is flexibility in its application to emergencies other than those specifically included in the formation of the plan.

The roles of the various parties who will be involved in the implementation of an off- site plan are described below. Depending on local arrangements, the responsibility for the off- site plan either rest with the works management or, with the local authority. Either way, the plan identifies an emergency

coordinating officer, who would take the overall command of the off-site activities.

As with the on-site plan, an emergency control center will be setup within which the emergency coordinating office can operate. An early decision will be required in many cases on the advice to be given to people living "within range" of the accident - in particular whether they should be evacuated or told to go indoors. In the latter case, the decision can regularly be reviewed in the event of an escalation of the incident. Consideration of evacuation may include the following factors.

- In the case of a major fire but without explosion risk (e.g an oil storage tank), only houses close to the fire are likely to need evacuation, although a severe smoke hazard may require this to be reviewed periodically;

- If a fire is escalating and in turn threatening a store of hazardous material, it might be necessary to evacuate people nearby, but only if there is time; if insufficient time exists, people will be advised to stay indoors and shield themselves from the fire.

ASPECTS PROPOSED TO BE CONSIDERED IN THE OFF-SITE EMERGENCY PLAN

The main aspects, which will be included in the emergency plan, are:

ORGANIZATION

Details of command structure, warning systems, implementation procedures, emergency control centers.

Names and appointments of incident controller, site main controller, their deputies and other key personnel.

COMMUNICATIONS

Identification of personnel involved, communication center, call signs, network, lists of telephone numbers.

SPECIALIZED KNOWLEDGE

Details of specialist bodies, firms and people upon whom it may be necessary to call i.e. those with specialized chemical knowledge, laboratories.

VOLUNTARY ORGANIZATIONS

Details of organizers, telephone numbers, resources etc Chemical Information

Details of the hazardous substances stored or procedure on each site and a summary of the risk associated with them.

METEOROLOGICAL INFORMATION

Arrangements for obtaining details of whether conditions prevailing at the time and weather forecasts.

HUMANITARIAN ARRANGEMENTS

Transport, evacuation centers, emergency feeding treatment of injured, first aid, ambulances, temporary mortuaries.

PUBLIC INFORMATION

Arrangements for dealing with the media press office; informing relatives, etc.

ASSESSMENT

Arrangements for: (a) collecting information on the causes of the emergency; (b) reviewing the efficiency and effectiveness of all aspects of the emergency plan.

ROLE OF THE EMERGENCY CO-ORDINATING OFFICER

The various emergency services will be co-ordinated by an Emergency Coordinating Officer (ECO), who will be designated by the District Collector. The ECO will liaise closely with the site main controller. Again depending on local arrangements, for very severe incidents with major or prolonged off-site consequences, the external control will be passed to a senior local authority administrator or even an administrator appointed by the central or state government.

ROLE OF THE LOCAL AUTHORITY

The duty to prepare the off-site plan lies with the local authorities. The emergency planning officer (EPO) appointed will carry out his duty in preparing for a whole range of different emergencies within the local authority area. The EPO will liase with the works, to obtain the information to provide the basis for the plan. This liaison will ensure that the plan is continually kept up-to-date.

It will be the responsibility of the EPO to ensure that all those organizations which will be involved off site in handling the emergency, know of their role and are able to accept it by having for example, sufficient staff and appropriate equipment to cover their particular responsibilities. Rehearsals for off-site plans will be organized by the EPO.

ROLE OF POLICE

Formal duties of the police during an emergency include protecting life and property and controlling traffic movements. Their functions will include controlling bystanders evacuating the public, identifying the dead and dealing with casualties, and informing relatives of death or injury.

ROLE OF FIRE AUTHORITIES

The control of a fire will be normally the responsibility of the senior fire brigade officer who would take over the handling of the

fire from the site incident controller on arrival at the site. The senior fire brigade officer will also have a similar responsibility for other events, such as explosions. Fire authorities in the region will be apprised about the location of all stores of flammable materials, water and foam supply points, and fire-fighting equipment. They will be involved in on-site emergency rehearsals both as participants and on occasions, as observes of exercises involving only site personnel.

ROLE OF HEALTH AUTHORITIES

Health authorities, including doctors, surgeons, hospitals, ambulances, and so on, will have a vital part to play following a major accident, and they will form an integral part of the emergency plan.

For major fires, injuries will be the result of the effects of thermal radiation to a varying degree, and the knowledge and experience to handle this in all but extreme cases may be generally available in most hospitals. Major off-site incidents are likely to require medical equipment and facilities additional to those available locally, and a medical "mutual aid "scheme should exist to enable the assistance of neighboring authorities to be obtained in the event of an emergency.

ROLE OF GOVERNMENT SAFETY AUTHORITY

The Factory Inspectorate of the region are likely to review the DMP and to ensure that the organization responsible for producing the off-site plan has made adequate arrangements for handling emergencies of all types including major emergencies. They may wish to see well documented procedure and evidence of exercise undertaken to test the plan. In the event of an accident, local arrangements regarding the role of the Factory Inspector will apply. These may vary from keeping a watching brief to a close involvement in advising on operations.

DISASTER MANAGEMENT & EMERGENCY PREPAREDNESS FOR NATURAL DISASTERS

Natural disasters can neither be predicted nor prevented. The problem before us is how to cope with them, minimizing their impact. Increase in urban population coupled with the construction of man- made structures often poorly built and maintained subject cities to greater levels of risk to life and property in the event of earthquakes and other natural hazards. One of the main objectives is to reduce the risk of loss of human life and property and to reduce costs to the society. Cases of natural disasters with phenomena of enormous magnitude that cannot be controlled by any direct means of human intervention will be dealt with to reduce the impact on human beings and property.

Earthquakes in the recent past (1995 and 1996) have occurred in Nalgonda District with magnitude of 4.1 - 4.6. YTPS will take appropriate measure in designing the power plant structures.

The Project area falls under Seismic Zone - II.

Earthquake disaster mitigation program consists of three components which are Preparedness, Rescue and Rehabilitation as described below. Earthquake mitigation program and preventive action program in India are outlined.

a. Preparedness

The preparedness phase involves the following aspects:

- Hazard zoning.
- Earthquake prediction and warning.
- Implementation of earthquake engineering codes.
- Strengthening of existing structures.
- Education & training.
- Seismic instrumentation-new & upgradation.
- Insurance.
- Emergency preparedness
- Training for handling damaged buildings.

Preparation of contingency plan and creation of administrative structure for effective and coordinated action during the emergency. This would include arrangements of digging & clearing equipment (bulldozers, cranes, chain saw, drills & crowbars etc.) for rescue of people trapped in collapsed houses, materials for shelters, emergency bridges, fire wood, medical facilities including mobile hospitals & medicines, immunisation, water tankers & water purifiers.

b. Rescue:

Rescue at the time of emergency involves the following operations:

- Maintenance of law and order; prevention of trespassing, looting, Keeping roads clear from sightseeing persons so that free movement of rescue vehicles is assured, etc.
- Evacuation of people.
- Recovery of dead bodies and their disposal.
- Medical care for the injured.
- Supply of food and water and restoration of water supply lines.
- Temporary shelters like tents, metal sheds.
- Restoring lines of communications & information.
- Restoring transport routes
- Quick assessment of damage and demarcation of damaged areas according to grade of damage.
- Cordoning off of severely damaged structures that are liable to collapse during aftershocks.
- Temporary shoring of certain precariously standing buildings to avoid collapse and damage to other adjoining buildings.

c. *Rehabilitation*

After the emergency, rehabilitation involves the following aspects:

- Repair, restoration, strengthening or demolition of damaged buildings.
- Selection of sites for new settlements, if necessary.

- ❖ Adoption of strategies for new constructions like construction through contractors or by self-help; construction of core houses only or supply of construction material only.
- ❖ Execution of the construction program.
- ❖ Preview/review of seismic codes & construction norms.
- ❖ Training of personnel, engineers, builders and artisans.
- ❖ Rehabilitation of destitute persons, orphans, widows, the aged and the handicapped. Responsibility for All Clear Signal

After cessation of emergency, Superintending Engineer/ O&M will communicate to Chief Engineer/ O&M about it. After verification of Status, Chief Engineer/ O&M will communicate to announce the "All clear" by instructions to sound the "ALL CLEAR SIGNAL".

Evaluation & Functioning of Disaster Plan Full Mock Drill Monitoring Committee

The mock drills will be conducted at regular intervals; the full mock drill monitoring committee consists of the following committee members.

CE/O&M	-	Chairman of the committee
SE/O&M	-	Vice Chairman
SE/CHP	-	(Alternate to Chairman in his absence)
FIRE OFFICER	-	Organizer
DE/E&P	-	Member
MEDICAL OFFICER	-	Member
WELFARE OFFICER	-	Member
SECURITY OFFICER	-	Member
DE/TMD/	-	Member
SAFETY OFFICER	-	Member

The committee may invite any other official/expert, if considered necessary.

The committee will supervise the following activities:

- Functioning of emergency Control centre, specifically availability of all facilities as mentioned in the plan and its functional healthiness.
- To evaluate communication of the Disaster Management Plan to all segments of employee's to familiarize them about their responsibilities in case of any disaster including evaluation of behavior of employees and others.
- To ensure that all facilities as required under the plan from within the plant or from nearby industries/aid centers under mutual assistance scheme or otherwise are available.
- To ensure that the necessities under material assistance scheme is properly documented and the concerned employees will be made fully aware of this.
- To ensure that employees are fully aware of the steps to fight any emergency like sealing of chlorine leakage, fire fighting or other such causes.
- All employees will be trained about their responsibilities /duties. They are all aware of evacuation routes, direction of evacuation, the equipment to be used during evacuation or the method of evacuation.
- All employees will be fully trained to rescue their colleagues who are affected due to cause of disaster. In case they are unable to rescue their colleagues, they should know to whom they are to inform about such persons.
- All employees will be fully trained in first aid, use of desired equipment including breathing apparatus, first aid box etc., and will be available at the desired location.
- All Warning alarms will be functional. Public address system will be in healthy condition.
- All telephone lines / communication systems will be provided in control rooms and there will no removal of the facilities (as prescribed) for the control rooms.
- It is very clear amongst the concerned officers who shall call for assistance under Mutual Aid Scheme or the facilities (as prescribed) from the control room.

- It is very clear amongst the concerned officers who shall call for assistance under Mutual Aid scheme or the facilities from within.
- It is clear at the plant who shall declare emergency.
- It is clear at the Plant, who shall inform the District Authorities, State Authorities and Corporate Centre.

Steps of Mock Drills

The Mock Drills should be carried out step by step as stated below in **Table – 7.25**.

TABLE – 7.25
STEPS OF MOCK DRILLS

First Step	Test the effectiveness of communication system.
Second Step	Test the speed of mobilization of the plant emergency teams.
Third Step	Test the effectiveness of search, rescue and treatment of Casualties.
Fourth Step	Test Emergency isolation and shut down and remedial measures taken on the system.
Fifth Step	Conduct a full rehearsal of the actions to be taken during an emergency.

The Disaster Management Plan should be periodically revised based on experience gained from the Mock Drill.

Smaller version of the plan for different possible disasters will be prepared both in English and local languages and circulated widely in post commissioning stage

7.4 SOCIAL IMPACT ASSESSMENT

Social Impact Assessment has been carriedout with an objective to identify the potential socio-economic impacts that are likely to arise as a result of the proposed project and provide a mitigation plan along with budget and monitoring system with respect to;

- positive and negative impacts
- intensity of impacts in terms of none, low, moderate or high
- duration of impact in terms of short term, long term and permanent impact
- extent of impact in terms of site and local impacts
- Probability of occurrence of impact as none, low probability (5% to 30 % chance), medium probability (30 % -70 % chance), highly probable (most likely, 70% - 90% chance) or definite (impact will definitely occur).

For each parameter defined above, rating of impact has been assigned as given below in **Table – 7.26**.

TABLE – 7.26

RATING OF IMPACT

Intensity (I)	Duration (D)	Extent (E)	Probability (P)
10 –High	5 – long term	5- Buffer zone – 5-10 km	5-Certain
6 – Medium	3 – medium term	4- Buffer zone – 3-5 km	4-Most probable
4 – low	2 – short term	2 - Buffer zone – 1-3 km	2-Probable
1- None	1 - none	1 – Project site (Core zone)	1 – Least probable

Occurrence and severity was assessed based on the above rating for each impact using the following formula:

SV (significance Value) = (Intensity + duration + extent) x probability

The maximum value is 100 significance value (SV). The potential impacts were then rated as below for both with and without mitigation measures:

SV>80 : High Significance
Indicates reconsideration of the project

SV-40-80 ; Medium Significance
Indicates requirement of mitigation

SV<40 ; Low Significance
Indicates right selection of the project

The impact assessment has been carried out for the Construction and Operational Phase of the project;

7.4.1 SOCIAL IMPACTS DURING CONSTRUCTION PHASE

Construction will commence on receipt of all statutory clearances and will be implemented as given below

- Unit#1 and #3 :36 months from Zero date
- Unit#2, #4 and #5 : 48months from Zero date

The maximum duration of the construction phase will be 64 months.

The potential impacts during the construction phase of the proposed project with significance rating for each impact before and after mitigation are given below.

TABLE – 7.27
SOCIAL IMPACT ASSESSMENT - CONSTRUCTION PHASE

Social Impact (construction phase)		Before Mitigation						After Mitigation					
		I	D	E	P	SV	SIG	I	D	E	P	SV	SIG
Rehabilitation & Resettlement - Homestead		10	3	1	5	90	H	10	2	1	5	65	M
Rehabilitation & Resettlement - Landlosers		10	3	1	5	90	H	10	2	1	5	65	M
Agriculture loss		3	3	1	2	20	L	1	1	1	5	15	L
Natural resources depletion	Forest	10	5	1	5	80	H	6	5	1	5	60	M
	Water resources	6	5	1	4	48	M	6	5	1	4	48	M
Employment potential		6	5	5	4	64	M	1	1	5	5	35	L
Population influx		1	1	4	4	28	L	6	2	2	4	40	M
Traffic Hazards		1	1	5	1	7	L	6	2	2	4	40	M
Increase in business opportunities in local services		1	1	5	1	7	L	6	5	5	4	64	M

Impacts anticipated during this construction phase include:

- ❖ Rehabilitation & Resettlement - Project Displaced Families
- ❖ Rehabilitation & Resettlement - Project Affected Families

- ❖ Effect on Agriculture land
- ❖ Effect on Natural resources – Forest and water resources
- ❖ Employment potential
- ❖ Population influx
- ❖ Traffic Hazards
- ❖ Increase in business opportunities in local services

7.4.1.1 REHABILITATION & RESETTLEMENT - PROJECT DISPLACED FAMILIES

The project will displace about 173 families residing in the proposed project area in two isolated pockets of habitation i.e Modugulakunta Tanda and Kapura Tanda.

	
Modugulakunta Tanda	Kapura Tanda

R & R has been initiated in accordance with Section 45 of Right to Fair Compensation and Transparency (RFCT) in Land Acquisition (LA), Rehabilitation and Resettlement Act (RRACT), 2013 by Govt of Telangana through Rehabilitation and Resettlement Committee under the Chairmanship of District Collector.

Residential Houses for 173 Project Displaced Families under Indira Awas Yojana programme will be built. For establishment of Rehabilitation Centre, total amount of Rs. 16.00 Crores is proposed for land acquisition, providing basic amenities, constructing Govt. Buildings, religious buildings and providing grave yard, etc.

Details of R & R are furnished below in subsequent paragraphs.

7.4.1.2 REHABILITATION & RESETTLEMENT – PROJECT AFFECTED FAMILIES

The total area of proposed project is 2800 acres. Of these 2095.28 acres is Forest Land for which necessary forest clearance was obtained. TSGENCO has deposited an amount of Rs.118.46 crores towards Net Present Value (NPV) of Forest Land diverted and Rs. 80.13 Crores towards maintaining the Compensatory Afforestation in CA land.

Balance area of 704.12 acres is Patta Land, Government Land, Udafa patta Land and D-Patta Land which is partly under cultivation was acquired. The total number of Project Affected Families under acquisition of this land are 413. Compensation for Project Affected Families to sustain livelihood :

a. Providing employment to one person in the family not less than the minimum wages in the total employment of the project.
   Or
b. Onetime payment for Rs. 5.00 Lakhs per each family under Annuity. Total amount of Rs. 29.20 Crores.
   or
c. To implement annuity policies that shall pay not less than Rs. 2000/- per month per family for 20 years, with appropriate indexation to the consumer price index for agricultural labourers.

The total financial benefits of PDFs & PAFs proposed by the Project Administrator & Joint Collector, Nalgonda will be paid to directly to the concerned bank accounts at a time after obtaining the approval from the Government.

The financial R&R benefits of the (411) Project Affected Families will be deposited in the concerned Revenue Deposits till the settlement of disputes of land enjoyment rights for the land to an extent of Ac. 204-32 Gts with (86) cases. The above land is handed over to TSGENCO. After settlement of the above cases, the R&R benefits will be paid to the land enjoyers as PAFs as per

the eligibility. Hence, the R&R benefits to be paid to PAFs will be enhanced due to increase of PAFs in addition to (411) PAFs.

7.4.1.3 EFFECT ON AGRICULTURE LAND

The 704.12 acres of land was partly under cultivation. With the proposed compensation, the farmers will procure the land in the surrounding areas and continue to undertake farming or undertake other small business depending on their individual living

7.4.1.4 EFFECT ON NATURAL RESOURCES

VEGETATION/FOREST AND WATER RESOURCES

Natural resources existing in the project area include Vegetation/Forest, Tungapahad stream and ground water.

Vegetation existing in the project area is mainly shrub vegetation with occasional presence of trees in the degraded forest of Veerlapalem Forest Block





TSGENCO has deposited an amount of Rs.118.46 crores towards Net Present Value (NPV) after enumeration of the vegetation and Rs. 80.13 Crores is paid towards maintaining the Compensatory Afforestation in CA land.

As part of project development, greenbelt will be developed in 1307 acres of the project area which will include restoration of the non-forest area of 1004 acres of the degraded forest land and development of greenbelt in an area of 300 acres**.** It is proposed to plant 600 saplings/acre for development of the greenbelt within the project site. Detailed greenbelt development plan is given in Chapter -4, Fig -4.24.

Tungapahad vagu flowing across the project area will be protected by developing greenbelt in barrier of 100 m on either zone. No water will be drawn or discharged into the stream.

No ground water will be tapped for use in the project. Rainwater harvesting proposed will help in recharging of the ground water

7.4.1.5 EMPLOYMENT POTENTIAL

The project will provide employment to about 5000 persons during construction phase and to about 4000 persons during operation phase.

Preference will be given to persons from Project Displaced Families and Project Affected Families based on suitability. TSGENCO will tie-up with the local ITI for training the local people especially the youth to enable them with necessary skillsets.

7.4.1.6 POPULATION INFLUX

The project will employ the external manpower especially the skilled technicians and specialist contractors for executing the project. External manpower entry will result in a population influx into the area. Construction phase has potential to create social tensions. TSGENCO will take all necessary measures like stipulating guidelines to contractors for employing local people, facilities to be provided etc., to protect the neighbouring communities from social exploitation.

The EPC contractor will be responsible for managing the construction workforce and it will be ensured that appropriately managed. Increases in risk of sexually transmitted diseases are likely to occur. TSGENCO will conduct AIDS awareness camps in association with NGOs.

7.4.1.7 TRAFFIC HAZARDS

During construction phase movement of heavy machinery, over dimensioned equipment (ODE), construction material etc on the road connecting the highway will lead to a significant increase in vehicular traffic. This traffic movement will be mainly on road connecting project site and State Highway (SH-2) which is passing through one village i.e Veerappagudem. Increased traffic will result in wear and tear of road and also will result in fugitive dust

TSGENCO will strengthen the road connecting SH-2 to the project site which is 7.4 km length to facilitate the movement of trucks during construction and operation of the project. TSGENCO will review the feasibility of laying a bypass road from State Highway avoiding Veerappagudem Village.

In order to control accidents due to Traffic, Traffic safety awareness will be created among all project personnel during construction and operations. Safety initiatives proposed by TSGENCO on the above transportation route are detailed in Chapter - 4, Para - 4. 5.3.

7.4.1.8 INCREASE IN BUSINESS OPPORTUNITIES IN LOCAL SERVICES

Influx of population into the project area by construction workforce will increase the demand for goods and services. The project will pave way for indirect employment arising out of a big infrastructural project like transport requirements, catering, ancillary industries, material handling, trading and other associated services.

7.4.2 SOCIAL IMPACT ASSESSMENT - OPERATIONAL PHASE

The project is designed for a life of 25 years. Tentatively, the project will be commissioned by the end of 52 months after receipt of all statutory clearances. The potential impacts during operational phase of the proposed project and significance rating for each impact before and after implementing the control measures is given in **Table – 7.28**.

TABLE – 7.28

SOCIAL IMPACT ASSESSMENT– OPERATIONAL PHASE

Social Impact (operation phase)	Before Mitigation						After Mitigation					
	I	D	E	P	SV	SIG	I	D	E	P	SV	SIG
• Employment opportunities	10	5	5	5	100	H	4	5	5	5	60	M
• Environment pollution	10	5	5	5	100	H	4	5	5	5	60	M
• Health and safety impacts of project operations	6	5	5	4	64	M	6	5	5	2	32	M
• Traffic Movement and Safety	10	3	5	5	90	H	6	5	5	4	64	M
• Community development measures under CSR activities	10	5	5	5	100	H	4	5	5	5	70	M

Impacts anticipated during this phase include:

- Employment opportunities
- Environment pollution
- Health and safety impacts of project operations
- Traffic Movement and Safety
- Community development measures under CSR activities

7.4.2.1 EMPLOYMENT OPPORTUNITIES

The Operational phase of the project will employ about 4000 Persons. About 2000 persons under direct Employment and 2000 in indirect employment.

Employability opportunities will be provided to persons who are not employed in power plant by providing training to the identified people in the surrounding villages through the ITI's,

Polytechnic Colleges for trades such as electrician, welders, fitters, draftsmen. An amount of Rs 22.83 crores is earmarked for the same.

Other Community development activities proposed with a total budget of Rs 100.40 crores such as training of local unemployed youth in various skills, personality development, development of self-help groups for women will provide employability opportunities

7.4.2.2 ENVIRONMENTAL POLLUTION

Environmental pollution with respect to the project is detailed under the following heads

- Air pollution
- Noise pollution
- Water pollution and
- Land pollution

7.4.2.1.1 AIR POLLUTION

The project will result in emission of Particulate matter from stacks as well as fugitive dust from storage areas, Sulphur dioxide and oxides of nitrogen from stacks

TSGENCO will implement the power plant complying with the new norms of MoEF & CC. To comply with this new norm, an amount of Rs 0.90 crore per MW will be incurred as additional budget for implementation of flue gas cleaning system incorporating high efficiency ESPs for control of Particulate Matter, Flue Gas Desulphurisation for control of SO_2 and Selective Catalytic reduction for control of NOx.

The measures proposed for control of fugitive dust are detailed in Chapter - 4, Para 4.2.1.5.

7.4.2.1.2 NOISE POLLUTION

The major noise generating sources during operational phase of the power plant are: Steam turbines, Compressors, Boiler Feed Pump, Forced Draft Fans, Induced Draft Fans, Cooling Towers, Coal crushers, Limestone crusher, Ash Slurry pumps etc

Noise levels due to the above sources at project boundary will comply with National Ambient Noise. The impact on nearest village i.e Veerappagudem and Veerlapalem which are beyond 500m will be negligible. However, Veerappagudem village located on the road connecting the power plant will have marginal impact due to traffic movement.

7.4.2.2 HEALTH AND SAFETY IMPACTS OF PROJECT OPERATIONS

Occupational Health and safety issues will have impact on persons working in the Power plant throughout the operational phase.

Operations resulting in dust emission and noise levels will affect the work zone manpower.

Occupational Health center will be provided within the project area to provide immediate medical attention

Medical camps and awareness programmes will be conducted for the power plant personnel and also at nearest villages to create awareness on HIV/AIDS.

7.4.2.3 TRAFFIC MOVEMENT AND SAFETY

During operational phase, the traffic movement on the road connecting the highway will increase by 21 trucks/hr

TSGENCO will strengthen the road connecting SH-2 to the project site which is 7.4 km length to facilitate the movement of trucks during construction and operation of the project. TSGENCO will develop a bypass road to avoid Veerappagudem in consultation

with Road and Bridge Department. This will facilitate smooth movement of traffic especially large equipment and over dimension equipment.

In order to control accidents due to the traffic, traffic safety awareness will be created among all project personnel during construction and operations.

Road safety initiatives proposed by TSGENCO on the above transportation route are detailed in Chapter -4, Para-4.5.3.

7.4.2.4 COMMUNITY DEVELOPMENT MEASURES UNDER CSR ACTIVITIES

The project will result in improvement of basic infrastructure especially in the areas of education, health care and basic services and providing employment opportunities.

TSGENCO has earmarked Rs 100.40 Crores for implementation of various Community Development Measures under Corporate Social Responsibility. Various Community Development Measures proposed are detailed under Chapter – 8, Para 8.4

7.4.3 STATEMENT OF SOCIAL IMPACTS

The majority of impacts identified during the impact assessment are reduced to low significance by implementing mitigation measures. However, impacts of R & R of PDFs and PAFs will remain of medium significance even with mitigation, due to their permanent nature. The R & R Package proposed will ensure that the quality of life of displaced persons is equal to or better than prior to displacement since all necessary infrastructural facilities are provided apart from construction of houses.

7.4.4 PROPOSED SOCIAL IMPACT MANAGEMENT MEASURES

Based on the potential socio-economic impacts identified, in order to reduce potential negative social impacts and enhance potential positive social impacts, mitigation measures are

proposed for implementation during construction and operation phase.

7.4.5 BUDGET FOR MITIGATION OF SOCIAL IMPACTS

The estimated budget for mitigation of social impacts during construction and operation phases are given below in **Table – 7.29**

TABLE – 7.29

BUDGET FOR SOCIAL IMPACT MITIGATION MEASURES

	Budget (Rs Crores)
Resettlement & Rehabilitation Plan	40.37
Establishment of R & R Center	16.00
Community Development Plan – CSR Budget	100.40
Health and Safety camps	1.00
Traffic Management at Veerappagudem	0.40
Conducting Health Camps once in 6 months at Five Gram Panchayats	0.25
Awareness campaigns on Sexually Transmitted Diseases such as HIV/AIDS, water borne diseases, Sanitation and hygiene etc.	0.10
Total	**158.52**

7.4.6 TRIBAL WELFARE FUND

TSGENCO has allocated an amount of Rs 100 Lakhs as permanent corpus fund for tribal welfare in addition to the compensation as per RRACT, 2013 for the land losers. The social welfare schemes and Health care facilities listed under CSR activities will be extended to listed PDFs and PAFs.

7.4.7 SOCIO-ECONOMIC MONITORING PROGRAMME

Monitoring programme of implementation of mitigation measures will commence during construction phase and will continue during operational phase.

TABLE – 7.30

SOCIO-ECONOMIC MONITORING PROGRAMME

	Monitoring area	Parameters	Frequency
Resettlement Action Plan	Resettlement Site	Quality of Life of Households and commitment made in R & R Plan	Once in three months for first two years And annually for next three years
Livelihood restoration	Resettlement Site	commitment made in R & R Plan	Once in three months for first two years And annually for next three years
Community Development Plan	All Villages listed under CSR	Implementation of the activities listed under CSR plan	TSGENCO will form a Station Level Committee to review the progress of CSR initiatives once in every six months
Health and Safety Plan	Plant operations	Occupational Health and Safety	Once in a year
	Veerlapalem Village	General Health	Once in a year
	Veerappagudem	General Health and safety	Once in a year Road traffic safety – on hourly/ daily basis

7.4.8 SUMMARY OF SOCIAL IMPACT ASSESSMENT

The proposed project of 4000 MW will be developed in an area of 2800 acres. The community development activities proposed by project authorities with budget of Rs 100.40 crores will enhance the socio economic status of the area.

The most significant impact of the project is the R & R of approximately 173 households in two isolated pockets of habitation i.e Modugulakunta Tanda and Kapura Tanda. Project Affected Persons in terms of land oustees are about 411.

R & R detailed in Para 7.5 compensates for loss of House hold structures by relocating to Kallepalli village located at a distance

of 2.4 km in Northern direction. Estimated budget of Rs 16.00 crores will be incurred/deposited with R & R Committee constituted by District Collector for establishment of Rehabilitation Centre for land acquisition, providing basic amenities, constructing Govt. Buildings, religious buildings and providing grave yard, etc.

The loss of livelihood is compensated in the R & R Package by following:

a) Providing employment to one person in the family not less than the minimum wages in the total employment of the project.
   Or
b) Onetime payment for Rs. 5.00 Lakhs per each family under Annuity. Total amount of Rs. 29.20 Crores.
   Or
c) To implement annuity policies that shall pay not less than Rs. 2000/- per month per family for 20 years, with appropriate indexation to the consumer price index for agricultural labourers.

Project will give preference to the local people in providing employment at both construction and operational phase. Where the employment opportunity could not be provided, employability opportunities will be extended by providing training to the identified people in the surrounding villages through industry Dept. (or) State Govt. Depts. in the ITI's for trades such as electrician, welders, fitters, drafts men, fly ash based products like bricks, sheets etc.,

7.5 REHABILITATION AND RESETTLEMENT–LAND ACQUISITION

TSGENCO has acquired 2800 acres for setting up of the project. The landuse of the project site is mainly degraded reserved forest, semi-agricultural and partly revenue land with two isolated pockets of habitation i.e Modugulakunta Tanda and Kapura Tanda.

Of the total area of 2800 acres, 2095.28 acres is Forest Land falling under the jurisdiction of Veerlapalem Forest Block and 704.12 acres is Patta Land, Government Land, Udafa patta Land and D-Patta Land falling under the jurisdiction of Damercherla Mandal, Nalgonda District.

FOREST LAND - FOREST CLEARANCE

TSGENCO has applied to MOEF & CC, Govt of India for diversion of forest land of 4334.01 Ha. Application registration number of State Govt of Telangana is 0063/FOR.I(1)/2014

MoEF & CC (FC Section) , Govt Of India vide letter F.No.8-07/2015-FC dated 27th April, 2015 has approved Stage – I Clearance for diversion of 1892.35 Ha under Veerlapalem forest block, Damercherla Mandal, Nalgonda District.

TSGENCO has deposited an amount of Rs.118.46 crores towards Net Present Value (NPV) of Forest Land diverted and Rs. 80.13 Crores towards maintaining the Compensatory Afforestation in CA land.

Subsequently, Stage – II clearance was accorded for Vide letter F.No.8-07/2015-FC dated 7th July, 2015.

REHABILITATION AND RESETTLEMENT FOR OTHER LANDS (NON FOREST LAND)

Non Forest land proposed for use in the power project is 704.12 acres which is Patta Land, Government Land, Udafa patta Land and D-Patta Land falling under the jurisdiction of Damercherla Mandal, Nalgonda District

TABLE – 7.31
REHABILITATION AND RESETTLEMENT FOR OTHER LANDS
(NON FOREST LAND)

		Area (Acres	Jurisdiction
Non Forest Land	Udafa Kharaj Khata	9.10	Talla veerappagudem
	D-Form Patta	168.38	Veerlapalem
	Govt Assigned	136.20	
	Patta Land	174.24	
	Udafa Patta	147.38	
	Udafa Kharaj Khata	66.02	

The landuse of Patta Land is semi-agricultural with two isolated pockets of habitation i.e Modugulakunta Tanda and Kapura Tanda.

R & R has been initiated in accordance with Section 45 of Right to Fair Compensation and Transparency (RFCT) in Land Acquisition (LA), Rehabilitation and Resettlement Act (RRACT), 2013 by Govt of Telangana through Rehabilitation and Resettlement Committee under the Chairmanship of District Collector.

Based on the survey carriedout by Revenue, Forest and Survey Departments, it is estimated that there are 173 Project Displaced Families (PDFs) and 411 Project Affected Families (PAFs).

As per RRACT, 2013, R & R Committee was appointed by District Collector Nalgonda with the following members to monitor and review the progress of implementation of R & R scheme and to carryout post implementation social audits in consultation with the Gramsabha

TABLE – 7.32

MEMBERS OF R & R COMMITTEE

1	Chairman	District Collector, Nalgonda
a)	A representative of women residing in the affected area	Smt. Gugulothu Saroja W/o Balu, R/o Modugulakunta Tanda
b)	A representative each of the SC& ST residing in the affected area	Sri Rupavath Shanker, S/o Jagiram R/o Kapoora Thanda
c)	A representative of voluntary organization working in the area	-
d)	A representative of National Bank	Manager, SBH, Vazeerabad
e)	The Land Acquisition Officer of the Project	Revenue Divisional Officer, Miryalaguda
f)	The Chair Person of the Panchayat located in the affected area or their nominee	Surpanch, Veerlapalem village, Damercherla Mandal.
g)	The Chair Person of the District Planning Committee or his nominee	Chairman, Zillaparishad Nalgonda
h)	The Member of Parliament and Member of Legislative Assembly of the concerned area or their nominees.	Member of Parliament, Nalgonda, Member of Legislative Assembly Miryalaguda
i)	A representative of the requiring body	Executive Engineer, Civil, Thermal, TSGENCO
j)	Administrator for R&R as the member convener	Joint Collector, Nalgonda

The above committee is responsible to monitor and review the Rehabilitation and Resettlement benefits to be provided to the PDFs and PAFs. The committee has to review and cause approval of the R & R Scheme placed before the committee by the Project Administrator taking into consideration of the impact that the project is likely to have on various components such as livelihood of affected families, public and community properties, assets and infrastructure particularly roads, public transport, drainage, sanitation, sources of drinking water, sources of water for cattle, community ponds, grazing land, plantations, public utilities such as post offices, fair price shops, food storage gowdowns, electricity supply, health care facilities, schools and educational or training facilities, anganwadies, children parks, places of workship, land for traditional tribal institutions and burial and cremation grounds.

The committee is responsible to carryout social Audits in consultation with the Gramsabhas on implementation of Rehabilitation and Resettlement benefits

As per the above, Revenue Department, Govt of Telangana has issued notice of Gram sabha on 15-02-2016 informing the Date of Gramsabha by Revenue Department, Govt of Telangana on 18-02-2016.

Resolution on R & R based on Gramsabha held on 18-02-2016 was passed by District Collector in presence of R & R Committee. Details of the resolution and R & R benefits finalized are given below

R & R benefits of the PDFs and PAFs of Modugulakunta Tanda and Kapura Tanda villages who have lost their lively hood were completely monitored by the Committee for land acquisition.

Project Administrator and Joint collector, Nalgonda has proposed the details of benefits to the PDFs and PAFs who lost their livelihood due to land acquisition as follows in **Table – 7.33**.

TABLE – 7.33
DETAILS OF FAMILIES

S. No.	Village (Residential Houses)	Families	Major Sons	Unmarried Major Daughters	Senior Citizen	Total No. Families
Project Displaced Families						
1.	Modugulakunta Tanda (51)	55	24	06	02	87
2.	Kapura Tanda (35)	58	19	04	05	86
	Total (86)	113	43	10	07	173
Proiect Affected Families						
1.	Thimmapura m	23				
2.	Thalla Veerappagudem	117				
3.	Veerlapalem	226				
4.	Kothapally	24				
5.	Dubba Thanda	8				
6.	Saath Thanda	13				
	Total	411				

Benefits of Rehabilitation and Resettlement

❖ Construction of Residential Houses for 173 Project Displaced Families under Indira Awas Yojana programme.

❖ Compensation for 173 Project Displaced Families and (411) Project Affected Families:

a) Providing employment to one person in the family not less than the minimum wages in the total employment of the project.

Or

b) One time payment for Rs. 5.00 Lakhs per each family under Annuity. Total amount of Rs. 29.20 Crores.

or

c) To implement annuity policies that shall pay not less than Rs. 2000/- per month per family for 20 years, with appropriate indexation to the consumer price index for agricultural labourers.

❖ 173 Project Displaced families shall get livelihood allowance for Rs. 3000/- per each family i.e. Rs. 36000/- per Annum. Total Rs. 0.62 Crores

❖ 173 Project Displaced families shall get payment of Rs. 50000/- per family towards transport expenses for shifting of family and their belongings. Total Rs. 0.87 Crores.

❖ 26 Project Displaced families shall get payment of Rs. 25000/- per family towards grant for pinfold for cattle and 7 Project Displaced Families shall get payment of Rs. 25000/- per family towards grant for petty shops. Total Rs. 0.09 Crores.

❖ 173 Project Displaced families shall get Rs. 50000/- per family as Rehabilitation allowance. Total Rs. 0.87 Crores

It is proposed to pay an amount of Rs. 40.37 Crores towards above benefits.

For establishment of Rehabilitation Centre, total amount of Rs. 16.00 Crores is proposed for land acquisition, providing basic amenities, constructing Govt. Buildings, religious buildings and providing grave yard, etc.

As per the LA RR Act, 2013, the following resolutions are made for the above proposals.

1. The draft Rehabilitation and Resettlement report proposed by the Project Administrator & Joint Collector, Nalgonda shall be accepted and submit to the Commissioner (R&R) for approval.

2. The total financial benefits of PDFs & PAFs proposed by the Project Administrator & Joint Collector, Nalgonda shall be paid to directly to the concerned bank accounts at a time after obtaining the approval from the Government.

3. The financial R&R benefits of the (411) Project Affected Families arc deposited in the concerned Revenue Deposits till the settlement of disputes of land enjoyment rights for the land to an extent of Ac. 204-32 Gts with (86) cases. The above land is handed over to TSGENCO. After settlement of the above cases, the R&R benefits will be paid to the land enjoyers as PAFs as per the eligibility. Hence, the R&R benefits to be paid to PAFs will be enhanced due to increase of PAFs in addition to (411) PAFs.

7.5.1 STATUS OF R & R & ACTION PLAN

The District Administration (DA) has identified about acres 13.21 gts. of land at Kallepalli Village. The DA has sanctioned an amount of Rs 61.30 lacs to be paid to the owners of the land for acquiring the land to establish R & R Center along with other necessary infrastructural facilities.

R & R Committee was appointed by District Collector Nalgonda as per the RRACT, 2013 to monitor and review the progress of implementation of R & R scheme and to carryout post implementation social audits in consultation with the Gramsabha

7.6 INFRASTRUCTURE FACILITIES FOR WORKERS (CONSTRUCTION & OPERATION)

TSGENCO will provide the following infrastructure facilities for the workers during construction and operation

- Septic tanks with soak pits will be provided at construction camp
- Water for the construction labour will be supplied
- Fuel for cooking will be supplied
- Health Center with all necessary medicines will be provided
- Rest room with all facilities will be provided.
- Canteen facility at subsidy prices will be provided

7.7 HARNESSING SOLAR POWER

Solar Power will be generated by Roof Top Solar Power Panels. The estimated roof top area of the project area available for installation of Solar Panels is about 31900 m^2. Details of the roof top area availability is given below

TABLE – 7.34
ESTIMATED ROOF TOP AREA

Sl. No.	Buildings	Roof Top Approx. area. [in sq m.]
1.	Power House, Admin Building, Service Building, CW Pump House and Clarified Water Pump House	23600
2.	Fire water Pump House	300
3.	Coal Handling Area	5000
4.	Ash Handling Area	3000
	Total	**31900**

Crystalline Solar Photo Voltaic technology will be adopted. Considering 80% roof top area available for solar panel installations, the total solar power generation is estimated to be approx. 2552 KW (@ 0.1kW/m^2)

An amount of Rs 16.5 crores will be incurred for setting up the solar panels in the plant area. TSGENCO will also evaluate the feasibility of establishing a solar panel roof on the raw water reservoir to harness solar power.

COLONY

The roof top areas of quarters, guest house and field hostel, shopping complex will be utilized for harnessing Solar Power.

30 % of the street lighting within the plant and colony will be based on Solar Power Street Lights.

TSGENCO will evaluate the feasibility of establishing Solar Powered Fence for the compound wall.

CHAPTER - 8

PROJECT BENEFITS

CHAPTER – 8 : PROJECT BENEFITS

8.1 PROJECT BENEFITS

Implementation of the Power project will result in the following benefits:

- Bridging of power deficit in the newly formed State of Telangana
- About 5000 people will be given temporary employment during the peak construction period. TSGENCO will give preference to local people.
- Indirect employment arising out of a big infrastructural project like transport requirements, catering, ancillary industries, material handling, trading and other associated services.
- Employment in operational phase of power project would be 4000. About 2000 persons under direct Employment and 2000 in indirect employment. Preference will be given to locals in both direct and indirect employment during operation phase
- Colony is proposed within the project area in an area of 80 acres. This will be developed with all necessary facilities like community center, club house, guest house, field hostel etc.
- Improvement of infrastructure as well as upliftment of social structure in the area through Community development activities such as training of local unemployed youth in various skills, personality development, development of self help groups for women, providing drinking water facility, strengthening of rural roads, rain water harvesting etc
- Development of road connecting SH-2 and project area.
- Rehabilitation of the existing Thandas to Kallepalli village with all necessary infrastructural facilities
- Project will restore the degraded forest area. About 1352 acres of degraded forest will be developed under greenbelt in consultation with Forest Department
- Local youth will be encouraged to setup flyash based manufacturing units with necessary support from TSGENCO.

8.2 PROPOSED CORPORATE SOCIAL RESPONSIBILITY (CSR) ACTIVITIES

In order to improve the socio-economic status and human development indicators of the local population, an interrelated and mutually reinforcing set of initiatives are proposed as part of Corporate Social Responsibility plan of the Yadadri Thermal Power Station (YTPS).

The CSR plan has been by prepared by M/s Centre for Management and Social Research Development, Hyderabad on the basis of participatory community consultations, focus group discussions, key informant interviews, a baseline socio-economic survey and the relevant secondary data on the socio-economic and human development status of villages around the power project area. CSR has been updated considering the issues and needs raised during the public hearing conducted for the project on 31.05.2016.

At the outset, this chapter lays out the CSR initiatives of TSGENCO for the next 10 years. The subsequent sections contain detailed CSR interventions that have been planned for the local communities and their initial and recurring allocations.

TSGENCO commits to effectively implement a wide range of CSR initiatives in a transparent and participatory manner as part of Corporate Social Responsibility. The company's CSR activities are firmly anchored in socio-economic development of the surrounding villages.

TSGENCO has formulated a set of objectives and identified core areas of intervention for an impact-oriented implementation of CSR policy; the objectives and the core areas are as follows:

Core Sectors of Corporate Social Responsibility

1. Education and capacity building
2. Health and family welfare
3. Sustainable development

4. Infrastructure development
5. Rehabilitation of Physically challenged people among land losers.

TSGENCO will contribute to the following socio-economic development of surrounding villages:

- ❖ Conducting Medical camps and awareness camps on adult education
- ❖ Distribution of fruit bearing saplings
- ❖ Infrastructure development (Construction of Community buildings & Bridges)
- ❖ Education to the students of surrounding villages
- ❖ Bus facility to the students of surrounding villages who will be studying in local schools
- ❖ Payment of better wages leading to improvement of living conditions

Apart from the above activities, TSGENCO will also be involved other development activities such as:

1. Providing drinking water facility
2. Health camps and distribution of Homeo medicines
3. Cooking gas supply through TSGENCO Co-operative stores
4. Providing accommodation for Public utilities

THE CORPORATE SOCIAL RESPONSIBILITY PLAN

The following CSR plan has been prepared by adhering to a scientific and participatory methodology as outlined above. The sector-wise CSR activities proposed in villages falling within a radius of 10 km of the power project include:

8.2.1 DRINKING WATER

a) Construction of new or additional overhead water tanks in habitations where these are needed;
b) Providing PVC pipe line from bore wells to overhead tanks in the required villages;

c) Ensuring safe drinking water to the people of villages by providing RO plants wherever required.

8.2.2 EDUCATION

a) Provision of furniture, computers, sports kits, books for libraries and development of play grounds in the schools wherever there is requirement;
b) Provision of additional infrastructural facilities such as boundary walls for the schools in the villages wherever required;
c) Provision of assistance for providing drinking water facility and maintenance of toilets in the schools;
d) Provision of new buildings for schools and Anganwadi centers in the required villages;
e) Provision of bore well in the schools wherever required

8.2.3 HEALTH

a) Conducting health camps once in every 6 months and distribution of free medicines for major ailments;
b) Addressing local health related issues through awareness campaigns in the villages;
c) Construction of buildings for Veterinary hospitals wherever there is a need;
d) Construction of buildings for PHC/Sub-center where required.

8.2.4 SANITATION

a) Provision of individual toilets in a phased manner;
b) Construction of roadside drainage system in the villages wherever there is a requirement;
c) Construction of toilets in Anganwadi centers wherever required and providing necessary infrastructure

8.2.5 ELECTRIFICATION

Provision of street lights in the required habitations with solar mechanism;

8.2.6 INFRASTRUCTURE

a) Paving of internal roads in the villages wherever required;
b) Construction of all-weather approach roads to villages where these are required;
c) Resurfacing of WBM road wherever applicable in the villages;
d) Laying of BT roads wherever required;
e) Culvert development wherever applicable;
f) Fencing and bore well for burial ground wherever required;
g) Provision of dust bins wherever required.

8.2.7 LIVELIHOOD ENHANCEMENT

a) Training in vocational or job-oriented activities, particularly for youth, in collaboration with the existing institutions such as ITIs and junior colleges. The trades in which training can be imparted would include, but not limited to: tailoring/embroidery, dairy, desk top publishing and basic IT skills, digital photography, vehicle servicing, electrician, diesel mechanic, fitter, masonry, para-medical services, mobile phone servicing and interior design/decoration;
b) Assistance and facilitation in setting up and managing income-generating.

8.2.8 REHABILITATION OF PHYSICALLY CHALLENGED PEOPLE

Rehabilitation of physically challenged persons, widows and Senior citizens belonging to land loser households

The above activities are indicative reflecting the needs and priorities of the local communities. These core activities will be upgraded and further prioritized from time to time to better reflect the needs and aspirations of the local people.

8.2.9 ACTION PLAN FOR TRAINING OF LOCAL EMPLOYABLE YOUTH

Based on the information collected during primary survey, Cement Industries, agro based industries, Drugs & Pharmaceuticals,

Mineral based industries, Plastic based units are existing in the region. Local educated unemployed persons were not been considered for the employment opportunities due to lack of technical skills.

Based on the information obtained, VIKAS is one ITI Training Centre located at Damercherla started in the year 2008 with good infrastructural facilities. Some of the following trades and the number of students trained in VIKAS are given below

VIKAS ITI (Two Years course)

SL No	Name of the Trade	2008-2009	2009-2010	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016	Total
1	Electricians	110	40	40	60	60	60	60	430
2	Fitters	0	20	20	20	20	20	20	120
3	Civil Draftsmen	0	20	20	20	07	10	10	87
	Total	110	80	80	100	87	90	90	637

Source: VIKAS ITI Center

Based on the information obtained, the major reasons for not attracting the local people for training in ITI are

- Out of 637 trained till now, very few got employment opportunities.
- Lack of mobility among the trainees to the urban areas due to poverty.
- Lack of motivational support compared to the B.Tech Engineering graduates.
- Lack of Proper recognition to the ITI Sector from the Government.
- Lack of soft skills training

Action Plan of TSGENCO for training of local employable youth is given below

- TSGENCO will tieup with local ITIs and Polytechnic colleges to impart necessary technical skills required by the project during construction and operation
- TSGENCO will identify specific training needs required by the projects and provide necessary infrastructural support like Audio Visual Aids, Library, study tours, faculty support

etc to the existing institutions in region

- ❖ TSGENCO will establish Vocational Training Institute to impart necessary skills to local youth which will enable them to utilize opportunities in power project as well as in the surrounding industries
- ❖ TSGENCO has earmarked budget of Rs 22.83 crores for providing the above activities

A tentative estimate of the technical manpower requirement during construction and operation phases of the Project is given below

S. No.	Name of the Trades	Construction	Operation
1	Electricians	200	100
2	Line men	100	50
3	Erection of the Poles	300	20
4	Welding	50	20
5	Mechanical	30	10
	Total	**680**	**200**

8.3 CSR BUDGET

Based on the present rates, the cost estimations were prepared and for some activities lump sum provisions are made for the CSR activities proposed in selected villages around YTPS. To ensure that a detailed budget can be developed, attempt is made to derive at a unit cost for each activity. **Table – 8.1** below provides the details of unit costs.

TABLE – 8.1

ITEM WISE ESTIMATION FOR IMPLEMENTING THE CSR ACTIVITIES

Category no.	Activities	Unit	Cost in Rs.
1	Construction of drains	100 m	85000
2	Construction of CC Roads with a width of 4.0M	1000 m	5500000
3	Providing over Head Tank with 5 HP motor	60000 ltr capacity	2500000
4	Laying of BT road	1 km	1500000
5	Laying Drinking Water supply pipelines (100 mm dia PVC pipe)	1 km	300000
6	Providing Solar Street lights	1 No.	30000
7	Providing Mineral water plant (RO Plant) for safe drinking water The location for setting up of RO plant will be decided by the local Panchayat/Municipality and operation costs of the plant will be borne by Panchayat/Municipality. Only annual equipment maintenance will be provided by TSGENCO	1 No.	1000000
8	Development of green belt (including cost of plant, labour charges, tree guard etc.) - Capital expenditure Rs. 1500/- per 1 sapling for initial plantation and one year maintenance @ Rs. 500/- per 1 sapling	1 sapling	2000
9	Conducting of Training programme for youth and employment opportunities (for one year)/Income Generating Activities trainings for women	Training cost per person	28000
10	Providing Individual Toilets	1 No.	25000
11	Providing furniture, computers, Lab equipment, sports kits, books for libraries and development of play ground	Lump Sum/Per school	500000
12	Boundary wall for schools	1 Rm	2500
13	Providing maintenance cost of toilets in schools and replacement of sanitary fittings and salary of cleaner per annum	Lump sum/ school	180000
14	Development of school buildings and construction of additional class rooms for schools in 5 villages	Lumpsum/ 5 villages	4000000
15	Construction of building for Anganwadi center (15'X15')	1 No.	500000
16	Provision of bore well in schools	1 No	70000
17	Rehabilitation of physically challenged persons, widows and senior citizens	Lumpsum	2183066
18	Conducting awareness campaigns against sexually transmitted diseases	Lumpsum	20000
19	Conducting health camps once in 6 months	Lumpsum	100000
20	Assistance to vulnerable groups	Lumpsum/Unit	50000
21	Community Halls	Lumpsum /1No	800000
22	Hand pumps	Lumpsum /1No	20000

The following **Table – 8.2** provides the details of number of works under each activity and the total budget under each activity have been calculated based on the unit rate given above.

TABLE -8.2
GP/VILLAGE WISE CONSOLIDATED CSR BUDGET

Sl. No.	Village Name	Distance from Plant	Total Population	No of Households	No of Unemployed youth	Estimated Budget (Rs)
1	Damaracharla Rajagattu, Veerabhadrapuram	7km	15117	4267	1120	72335000
2	Veerlapalem Sath Thanda, Dubba Thanda	3km	5186	1218	460	75302550
3	Talla Verrappagudem	2 km	2526	721	250	54780000
4	Irkigudem	4km	1760	557	150	29648000
5	Adavidevulapalli, Vadderagudem	8km	8226	2146	800	131750000
6	Mudimanikyam	7km	1879	535		66762500
7	Narsapuram	5km	1763	602	700	52100000
8	Thimmapuram Putlagadda, Padamata Thanda, Thurpu Thanda	6.5km	2286	608	350	45422500
9	Kallepalli, Shantinagar)	5km	2942	722	250	45565000
10	Bothalapalem	8km	1888	482	200	41550000
11	Ulsaipalem, Bangarugadda, Kalava Katta, Indira Nagar, Gandhi Nagar	8km	1986	592	350	42775000
12	Vadapalli	8km	6952	2112	500	55050000
13	Dilawarpur	10km	2232	816	185	32230000
14	Kondrapolu, Rallavagu Thanda	9km	2672	550	250	41450000
15	Gandhinagar	6km	679	179	100	24750000
16	Appallamma Gudem, Lokia Thanda, Sitya Thanda	9km	1626	352	500	40300000
17	Donka Thanda, Badaigadda	8km	1750	522	150	41820000
18	Ragadapa Kunkudichettu Thanda, Pedda Thanda, Meetia Thanda	9km	1695	386	300	34130000
19	KG Reddy colony	9km	1763	458	150	27050000
		Total				1004000550

A total of Rs. 100.40 Crores which is approximately 0.4% of the total cost of the project has been allocated.

CONSOLIDTED ACTIVITY WISE CSR BUDGET

The following **Table – 8.3** presents the activity wise CSR budget allocation:

TABLE – 8.3 CSR ACTIVITY WISE BUDGET

		Amount in Rs
A	**DRINKING WATER**	
1	Construction of OH tanks with 5 HP submersible pumps	40000000
2	Providing safe drinking water through RO Plants	28100000
3	Drinking water supply pipe lines : 100 mm dia PVC Pipe @ Rs. 3 lakh per 1 Km (4")	6900000
	TOTAL OF A	75000000
B	**SANITATION**	
4	Providing Individual Toilets in a Phased manner in all the villages	110900000
	TOTAL OF B	110900000
C	**EDUCATION**	
5	Providing furniture, computers, sports kits, books for library and development of playground,	3500000
6	Boundary wall for schools and Anganwadi centres	175000
7	Construction of building for School	3000000
8	Construction of toilets in Anganwadi Centre / Schools	25000
9	Construction of building for Anganwadi centre	4950000
	TOTAL OF C	11650000
D	**HEALTH CARE**	
10	Conducting Health Camps once in 6 months at Gram Panchayat Office /Ward of each village	3250000
11	Awareness campaigns on Sexually Transmitted Diseases such as HIV/AIDS, water borne diseases, Sanitation and hygiene etc.	
12	Construction of Veterinary hospitals	4500000
	TOTAL OF D	7750000
E	**INFRASTRUCTURE DEVELOPMENT**	
13	Construction of side drains	62050000
14	Solar Street lights	16980000
15	Construction of CC Roads with a width of 4.0M	422400000
16	Provision of hand pumps	80000
17	Construction of community hall	20000000
18	Construction of Library Building	4500000
19	BT Road	17250000
20	Bus shelter	600000
21	Burial ground	1500000
22	Gravel road	5000000
23	Construction of Gram Panchayat Building	500000
24	Constrution of bridge	2000000
	TOTAL OF E	552860000

		Amount in Rs
F	**LIVELIHOOD ENHANCEMENT AND YOUTH EMPOWERMENT**	
25	Training to the identified peoplein the surrounding villages through industry Dept. (or) State Govt. Depts. in the ITI's for trades such as electrician, welders, fitters, drafts men, fly ash based products like bricks, sheets etc	228367550
	TOTAL OF F	228367550
G	**ENVIRONMENT AND GREEN BELT DEVELOPMENT**	
26	Plantation proposed in vacant lands/Government lands and Capital expenditure Rs. 1500/- per 1 sapling for initial plantation including tree guards and one year maintenance @ Rs. 500/- per 1 sapling.	13373000
	TOTAL OF G	13373000
H	**ASSISTANCE TO VULNERABLE GROUPS**	
27	Assistance to Anganvadi, Self Help Groups, Women empowerment, SC & STs	3000000
	TOTAL OF H	3000000
I	**REHBILITATION OF PHYSICALLY CHALLENGED**	
28	Rehabilitation of physically challenged persons, widows and Senior citizens belonging to land loser households	1100000
	TOTAL OF I	1100000
	Total (A+B+C+D+E+F+G+H+J+I)	1004000550

8.4 CSR ACTIVITIES MONITORNG MECHANISM

The TSGENCO will form a Station Level Committee to review the progress of CSR initiatives once in every six months. Local Panchayat heads of the Villages will be involved to monitor implementation of the listed activities of CSR

TSGENCO will appoint a leading Institute or University to conduct third party Audit once in a year for monitoring of the implementation of CSR activities.

TSGENCO will receive periodic reports from the CSR Cell endorsed by Village Panchayat Heads on annual basis to dovetail planning for subsequent years.

CHAPTER - 9

ENVIRONMENTAL COST BENEFIT ANALYSIS

CHAPTER – 9: ENVIRONMENTAL COST BENEFIT ANALYSIS

Not applicable as it is not recommended at the Scoping stage.

CHAPTER - 10

CHAPTER – 10 : ENVIRONMENAL MANAGEMENT CELL

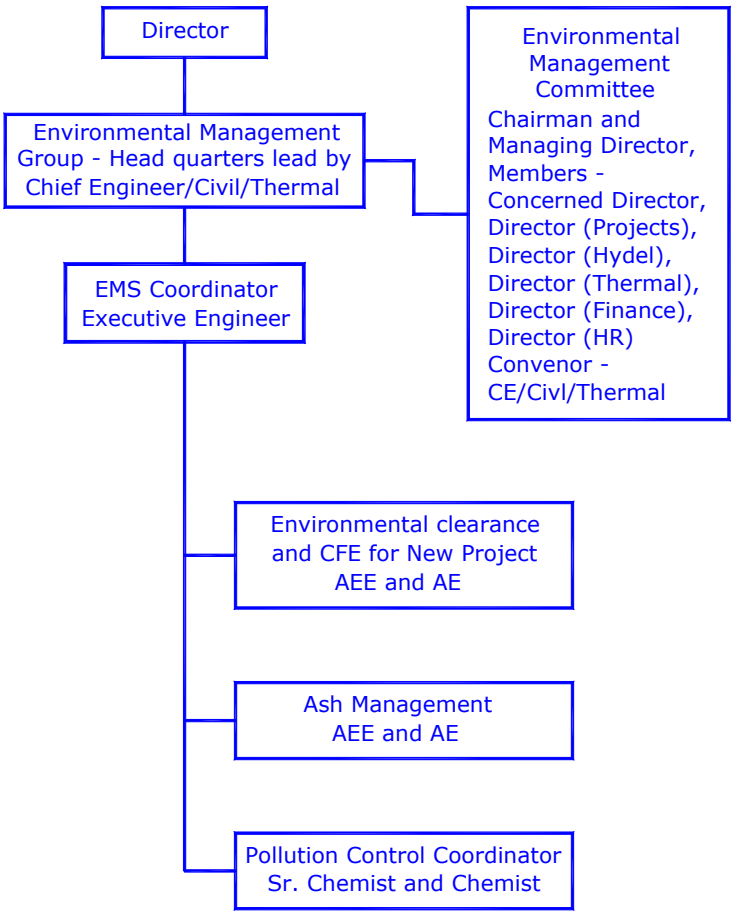
10.1 ENVIRONMENTAL MANAGEMENT CELL

TSGENCO has formulated dedicated Environmental Management Group (EMG) at station level as well as at the corporate level to meet the commitment to environment considering the requirement of environmental issues to ensure sustainable development and environment protection.

10.1.1 ENVIRONMENTAL GROUP AT CORPORATE OFFICE

The Organisation structure of the Environmental Management Group at Corporate Office is shown below:

ENVIRONMENTAL MANAGEMENT GROUP CORPORATE OFFICE



The Role of the Concerned Director includes participation in management review, reviewing action plans of the respective stations designed for achieving environmental policy goals, approving allocation of resources for implementing the action plans in the respective stations. The Environmental Management Group at Headquarters level will be led by Chief Engineer.

The main responsibility of the Chief Engineer is as follows:

- Organize the Management Reviews
- Review of implementation of Environmental Policy at headquarters level
- Review and support for implementation of programs designed for respective project (station level) & headquarters level
- Review of Monitoring and measurement of environmental performance of all Projects
- Implementation of environmental Committee decisions

The environmental management group will have an environmental management committee. The environmental management committee meetings will be convened by the Chief engineer/ Civil/ Thermal as the Convener once in every quarter and as and when necessity arises with Concerned Director, Director (Thermal), Director (Hydel), Director (Projects) and Director (Finance), Director (HR) as members. The Chairman and Managing Director will be the Chairman of the Committee.

THE ROLE OF THE ENVIRONMENTAL MANAGEMENT COMMITTEE

- The Committee will review all environmental legal requirements applicable to the stations and their compliance.

- ❖ The station level action plans prepared for achieving the environmental policy will be reviewed in the light of the technical and legal requirements and the achievability in the identified time frame and allocation of funds for implementation.

- ❖ Update any changes in the standards or Legal requirements and structuring guidelines at the stations for bringing them into operational level.

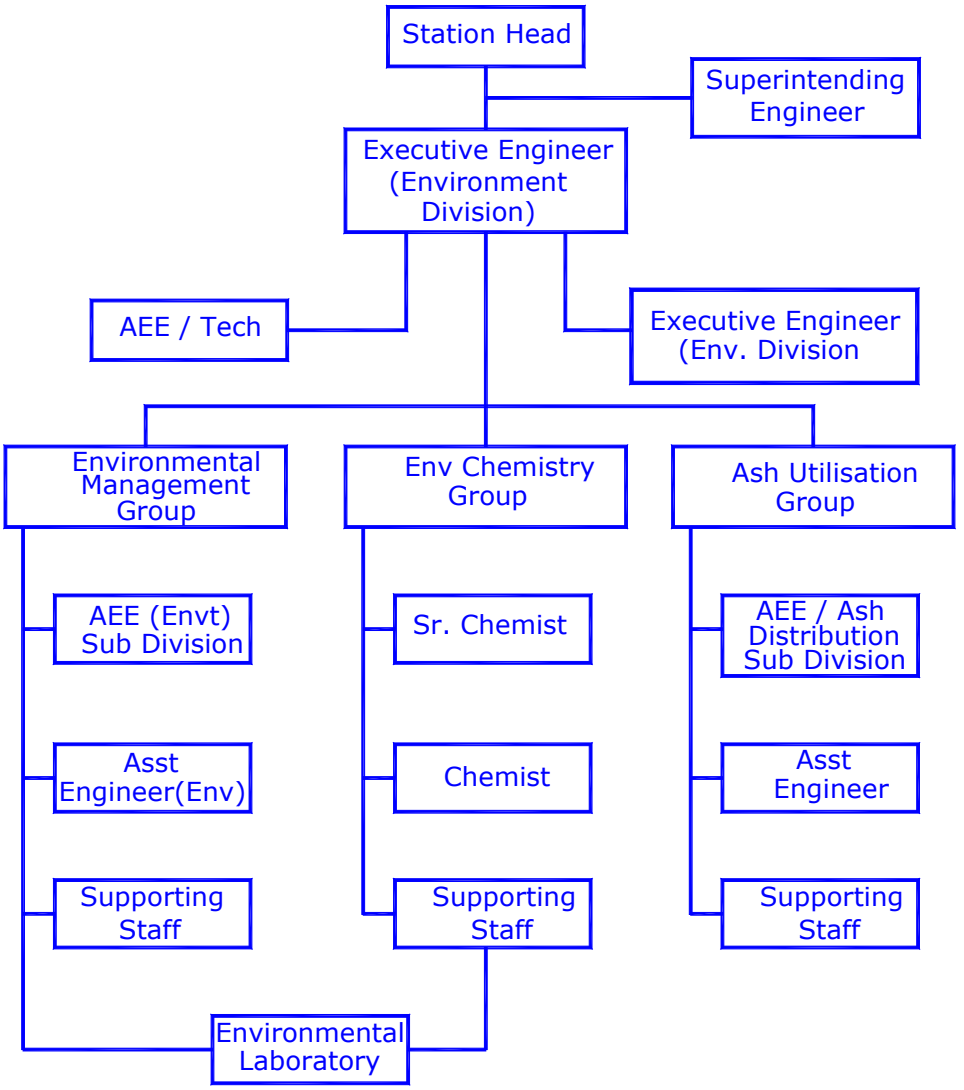
- ❖ Review of Compliance reports and Audit reports and suggest the plan for implementation to reach compliance status.

EMS Coordinator (Executive Engineer), works in the corporate office. The EMS Coordinator (EE) works under the control of Superintending Engineer (SE). Under the direction of EMS Coordinator, the components covering Environmental Clearance and Consent for Establishment for new projects will be executed by AEE and AE whereas Ash Management will be executed by another group constituting AEE and AE. Further, all the station level monitoring reports and legal compliances will be collected and monitored by Senior Chemist and Chemist in association with technical services group of the Power plant.

10.1.2 ENVIRONMENTAL GROUP AT PROJECT/STATION LEVEL

The organizational setup for Environmental Management is presented below in

ENVIRONMENTAL MANAGEMENT GROUP
STATION LEVEL



The responsibilities of Station Head are as follows:

- ❖ Review the legal registry
- ❖ Attending the CFO meetings and obtaining consents
- ❖ Attending legal hearings

- ❖ Review the status of Environmental compliances/ non-compliances frequently and at least once in monthly and initiate appropriate action plans

- ❖ Appraisal with Corporate office about the sanction of action plans submitted and ensure support for technical and financial clearances for executing the same

- ❖ Submission of reports to the concerned authorities time to time

- ❖ Any other issues relating to the environmental aspects.

10.2 ENVIRONMENT POLICY

TSGENCO, as a leading utility company in Telangana State, has always been proactive and dovetail the environmental aspects from concept to operation. This covers siting the new projects, design, construction and operation of the plants. Not only identifying the best available technologies at the concept stage, the company is ensuring the efficiency of operations duly acknowledging the environmental setting where the plants are located.

TSGENCO's Environment Policy to conserve and protect Environment is enclosed as **Fig – 10.1**.

The objectives of the Policy are:

- ❖ To function in a sustainable manner duly protecting the environment.

- ❖ To facilitate periodic review and to put in place appropriate institutional arrangements to ensure environmental safeguards.

- ❖ To ensure that all the pollution control systems/ devices/ equipment are operational and well maintained to achieve the designed efficiency.

FIG-10.1

ENVIRONMENTAL POLICY OF TSGENCO

- TSGENCO is committed to build, operate and manage the Power Plants economically, efficiently and in an environmentally sound manner.
- We will conduct all our operations and processes in a planned manner complying with the applicable statutory national and state environment related acts, notifications and rules, regulations and established good industry practices. We will provide the requisite resources and work environment, training and development of personnel to achieve continual improvement of environmental performance. We will ensure environmental requirements are complied by all our stakeholders, they act responsibly and are competent to carry out their jobs.
- We will strive for continual improvement and regularly review performance and implement suitable measures to ensure compliance with the stated plans.

27/1/2017

CHIEF ENGINEER/CIVIL/THERMAL/TSGENCO

A. AJAY
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- ❖ To review and evaluate the existing pollution control systems/ devices to carry out the up-gradation wherever essential and feasible.

- ❖ To conduct environmental audit by in-house technical group, environmental monitoring to assess statutory compliance and bring in non-compliances to a minimal level.

- ❖ To utilize resources in optimal manner, reduce waste and to adopt waste utilization to the extent feasible considering the existing operational machinery.
- ❖ To review periodically the best industrial practices in India and the world and to identify the technical and financial requirements to adopt them.

- ❖ To interact with Financial Institutions as needed.

- ❖ To bring in best available technologies while planning and designing the future units.

- ❖ To impart training for skill development and orientation to various work groups in the organization and with specific reference to environmental aspects.

- ❖ To conduct outreach programs on environmental aspects through awareness programs, in-plant visits from time to time and organizing special programs during World Environment Day and Earth Day.

10.3 COMPLIANCE MANAGEMENT SYSTEM

The environmental audit helps the power station management in meeting their responsibilities towards better environment. The audit program helps to identify and correct, as early as possible, any existing or potential environmental compliance problems or environmental liability risks present in an operation. It is a process whereby an organization's environmental performance is tested against its environmental policies and objectives.

10.3.1 AUDIT PROCEDURE

In general, Environmental Audit includes broadly the following activities:

- Pre-audit activities
- Activities at the site
- Post-audit activities

Pre-audit activities include various preparatory works. The preliminary information on the power plant will be obtained through a questionnaire. The information include location of the industry with surrounding land uses, climatic conditions, raw materials used, details on water utilization, wastewater generation and disposal, gaseous emissions, solid waste/hazardous waste, and organizational set-up and policies of the company for environmental management.

The preliminary information received will be reviewed to identify main areas of concern. Audit team will be organized and special tasks will be allocated to the team members. The team will include employees from production, laboratory, pollution control operations, technical staff for monitoring and analysis of waste samples and an environmental specialist. The number of people may vary from 4 to 8. Resources such as the sampling and monitoring equipment and laboratory facilities for analysis will be checked if available at site or else arrangements will be made for their availability through external sources such as private/ government laboratories, loan from other industries, etc. The visit programme will then be intimated to the plant or industry.

10.3.2 ACTIVITIES AT THE SITE

The activities at site include deriving material balance, identifying waste flow lines, monitoring of characteristics, evaluating performance of pollution control equipment or system, assessing environmental quality, holding discussions with the management and finally preparing the draft report. Interviews will be carried out with various cross sections of the staff engaged in production,

laboratory, environment management, etc, so as to understand different operational mechanisms.

The entire plant will be inspected thoroughly. The aspects of site layout, material handling and storage, drainage system, safety aspects, lapses/negligence in operations and attitude of operators in process and waste treatment facilities, handling of scrap and wastes, usage of signboards, colour codes etc will be observed.

After completing the above-mentioned activities including determining material balance, identifying waste flow, monitoring and analysis of various samples and field observations, a draft report will be prepared with findings and possible recommendations.
The draft report will be presented before the senior management and various points will be thoroughly discussed. The Management will put forward their views.

10.3.4 POST-AUDIT ACTIVITIES

Various aspects like the optimum usage of raw material, efficiency of waste water treatment facilities, etc., will be evaluated and compiled. Based on the above, a final report will be prepared along with the recommendations. The final report, if necessary may be sent to the Corporate Centre for comments so as to make further modifications

The recommendations include measures for best practicable environmental management. If the annual burden, i.e. the annualized capital cost of the pollution control measures and their operating cost, for the implementation of all the recommendations, is high and the investment not feasible, then these recommendations will be implemented in phases. Priorities will be fixed and action plans with time-frame will be formulated.

Follow-up actions will be taken to check the progress of implementation of recommendations. The Environmental Division of the plant will meet the other Divisional heads periodically to review the progress.

10.3.5 MANAGEMENT REPORTING

Having defined the various functions dealing with environmental related aspects, an extensive system of management reporting and exception reporting of all environmental related parameters, deviations and constraints will be established. Audit checks will be carriedout at identified points within the plant and outside with respect to emissions in air, effluent discharge, and ash pond effluents etc. at appropriate frequencies and then report the results to the Station Head at Project Level and Corporate EMG. Exception reports are put up to the management. Based on the nature of deviations and the trend, identification of gaps, audit reports etc. decisions are taken to control the deviating parameters. These decisions are classified as:

- Short Term i.e. through which problems can be resolved within a week or so and include such issues which generally reflect operational corrections, improvements and generally do not involve capital modifications.

- Medium Term which involve a deviation of a few months, say up to 12 months and include minor capital modifications etc.

- Long Term decisions, which basically involve retrofitting and major capital modifications of the existing plant and equipment.

Based on the decisions, the implementation of remedial actions is monitored periodically. This process of auditing and exception reporting to the management helps evolve appropriate response and actions and ensure sustainable operation of the power plant.

CHAPTER - 11

SUMMARY & CONCLUSIONS

CHAPTER – 11 : SUMMARY & CONCLUSIONS

11.1 INTRODUCTION

M/s. Telangana State Power Generation Corporation Limited (TSGENCO) proposed to setup a 4000 MW (5X800 MW) - Supercritical Coal Based Yadadri Thermal Power Station at Veerlapalem Village, Damercherla Mandal, Nalgonda (Dist), Telangana to meet the present and future power demand of newly formed Telangana State.

The proposal is a Category - A project as per Environmental Impact Assessment (EIA) Notification SO 1533 dated 14-09-2006 which necessitates obtaining the Environmental Clearance from Ministry of Environment and Forests & Climate Change (MoEF&CC), Government of India. TSGENCO as per the requirement of EIA notification has submitted necessary application to MoEF&CC, GoI for issuing Terms Of Reference (TOR).

The proposal was considered by the Expert Appraisal Committee - Thermal Power (EAC-T) during 45th EAC meeting of MoEF&CC, GoI, New Delhi held on 29th-30th October2015. During the appraisal, EAC opined that a site visit by a Sub-Committee is required to ascertain the ground situation before taking a decision in connection with the matters relating to a tributary/channel of River Krishna passing through the proposed site etc. Standard Terms of Reference was issued by MoEF & CC, GoI vide letter No. J-13012/18/2015 - IA.I(T)s dated 2nd November, 2015. The Sub-Committee visited the site on 05-12-2015 and its report was discussed by EAC-T, MoEF & CC in the EAC-T meeting held on 18th December, 2015. The committee during the meeting sought replies to the concerns that have been raised by EIA Resource and Response Centre, New Delhi (ERC) vide their representation dated 28.10.2015 before issue of the TOR. TSGENCO submitted the replies vide lr.No.CE/C/Thermal/SE/C/TCD-I/F.YTPS (5x800MW)/D.No237/15 Dt 22.12.2015 to the concerns raised.

TOR for the proposal was granted by MoEF & CC after further appraisal in the EAC meeting held on 28-29th January, 2016. The Additional Terms of Reference (Addl.ToR) was approved in addition to Standard ToR granted by MoEF&CC for carrying out the EIA study vide letter No. J-13012/18/2015-IA.I(T) Dt 16.02.2016.

Draft EIA report was prepared by M/s. Bhagavathi Ana Labs Pvt. Ltd.(a Bureau Veritas Group Company), Hyderabad based on site specific baseline data collected during the period December, 2015 to February, 2016.

The Public Hearing was conducted on 31.05.2016 by Telangana State Pollution Control Board.

Final EIA report incorporating the details of the Public Consultation was prepared and submitted to MoEF&CC through online on 25.06.2016. The proposal was discussed in 63rd Reconstituted Expert Appraisal Committee meeting held on 30.08.2016 for grant of Environmental Clearance. During the discussions, the committee observed major short comings in the EIA/EMP and opined that the report needs to be redone to address the points listed under major shortcomings as per EAC, MoEF&CC minutes (MOM) of meeting dated 31.08.2016.

TSGENCO appointed M/s B. S. Envi-Tech (P) Ltd., Secunderabad for preparing the Revised EIA Report. The subject report is the Revised EIA Report prepared incorporating all the issues raised in the MOM of EAC, MoEF & CC.

MoEF& CC vide its minutes of meeting dated 31.08.2016 has directed TSGENCO to reconduct the Public Hearing based on the Revised EIA Report. TSGENCO has represented to MOEF & CC for exemption of reconducting the Public Hearing. Public hearing was exempted vide minutes of Meeting of 1st EAC (Thermal Power) MoEF&CC, GoI dated 28.12.2016.

TSGENCO vide the Minutes of Meeting of 1st EAC (Thermal Power) MoEF&CC, GoI dated 28.12.2016 was advised by MOEF & CC to

publish the public notice in the following newspapers to make the Public aware about the revised EIA/EMP and seek comments (if any)

Newspaper 1- English National News Paper
Newspaper 2 –Vernacular (Telugu) News Paper

The Revised Final EIA Reports are made available on Telangana State Pollution Control Board website for minimum of 21 days after the public notice.

11.2 PLANT CAPACITY, COST AND IMPLEMENTATION SCHEDULE

TSGENCO proposes to implement the 4000 MW power project as given below:

PROJECT SCHEDULE

S.No	Unit Capacity	Tentative time schedule
1.	2 X 800 MW	Unit#1 and #3 : 36 months from Zero date
2.	3 X 800 MW	Unit#2, #4 and #5 : 48 months from Zero date

Source: TSGENCO

11.3 TECHNOLOGY SELECTION & IMPLEMENTATION

TSGENCO proposes to establish 4000 MW (5 X 800 MW) Yadadri Coal Based Thermal Power Station based on Super-Critical Technology. The Plant is based on use of blended coal (50% Indigenous and 50% Imported coal) or 100% Imported Coal. TSGENCO has taken adequate measures in consultation with BHEL to comply with the proposed emission standards as per latest Government Gazette Norms, dated 07.12.2015.

11.4 PROJECT SITE AND ITS ENVIRONS

The project site is located at Veerlapalem (V), Dameracherla (M), Nalgonda District, Telangana State with an average msl of about 79 m.

11.5 REQUIREMENT OF THE PROJECT

- The total land requirement of the project is estimated to be about 2800 acres complying with CEA norm of 0.7 acres/MW. Of the total area of 2800 acres, 2095.28 acres is Forest Land falling under the jurisdiction of Veerlapalem Forest Block and 704.12 acres is Patta Land, Government Land, Udafa patta Land and D-Patta Land falling under the jurisdiction of Damaracherla Mandal, Nalgonda District.

- The landuse of the project site is mainly degraded reserved forest, semi-agricultural and partly revenue land with two isolated pockets of habitation i.e Modugulakunta Tanda and Kapura Tanda.

- The project will use blended coal having ratio of 50 % Indigenous coal and 50 % Imported coal or 100 % Imported coal supported by the secondary fuel oil (LDO) for start-up and Heavy Oil for flame stabilization at low loads.

- The estimated coal requirement of the plant is 12.28 (blend coal)/11.02 (imported coal) MTPA

- TSGENCO has entered into Memorandum of Understanding (MOU) with M/s Singareni Coal Collieries Ltd (SCCL) for supply of Indigenous Coal

- TSGENCO has entered into Memorandum of Understanding (MOU) with M/s MSTC, a Government of India Enterprise for supply of Imported Coal.

- Indigenous coal will be transported by rail through proposed railway line.

- Imported coal will be received by ships at Krishnapatnam/Kakinada/Visakhapatnam ports. From the Ports, coal will be transported by Indian Railways to the project site.

- The project is based on Zero Discharge considering recycling of treated wastewater. Water requirement of the project is estimated

to be 10,000 m^3/hr (97.8 cusecs/3.10 TMC per year) considering optimized COC of 5.0 and complying with the new norm of 2.5 m^3/MWHr. This requirement will be met from River Krishna.

- Govt of Telangana, Irrigation and CAD Department has allocated 208 cusecs of water (6.60 TMC/year) from Krishna River water. TSGENCO will utilize about 97.8 cusec (3.10 TMC per year) for the proposed 4000 MW from this allocation.

- TSGENCO will install intake structure including pumping station near Madachelu area which is about at 1.0 km distance i.e. on upstream side of confluence point of Tungapahad Vagu & Krishna river. Pipeline will be laid from this point to the project site.

- The Power generated will be evacuated through 400KV double circuit Quad Core Moose Conductor to the following interconnecting substations, namely

  i. Choutuppal
  ii. Dindi
  iii. Maheshwaram
  iv. Jangoan

- The total manpower requirement during construction 5150 (150 – Direct and 5000 indirect and during operation is 4000 (2000 – Direct and 2000 – indirect)

- Preference will be given to local persons from neighboring villages based on suitability during construction and operational phase.

- Colony will be constructed within the project site for the employees of the power plant in 80 acres. The colony will include the following

  a. Quarters for 2000 employees
  b. Project Hostel
  c. Guest House
  d. Community Center
  e. Recreational Facilities
  f. Health Center

11.6 BASELINE STUDY

Baseline data was collected during study period of Winter season covering the months of December, 2015, January, 2016 and February, 2016 by M/s. Bhagavathi Ana Labs Pvt. Ltd. (a Bureau Veritas Group Company).

MoEF&CC, Expert Appraisal Committee permitted use of baseline data collected during Winter, 2015-16 for the Revised EIA Report which is presented in this report. Additionally, Baseline data was collected for one month during Post Monsoon 2016 (October, 2016) as part of validation. The baseline data of both Winter, 2015-16 and Post Monsoon 2016 (October, 2016) is presented in this report.

Ambient air quality of the study area has been assessed through a network of 10 ambient air quality locations representing the downwind, cross wind and upwind impact scenario of the project site.

- The Ambient Air Quality monitored in the study area was found to be well within the limits of NAAQ standards prescribed for Residential, Rural & Other Areas.

- The day equivalent noise levels were found to be moderately higher due to local activities in the villages. Noise levels recorded in the night time were found to be less. Noise levels recorded during the day and night time were found to be less than 50.3 dB (A).

- Assessment of water quality in the study area included the quality assessment of parameters as per the Indian standard IS 10500 (Drinking Water standard). Ten Ground water samples and ten Surface water samples from various locations in and around the Project site within 10 km radius were collected for assessment of the physico-chemical and bacteriological quality during Post Monsoon, ’16

- Ground water samples collected from ten locations within the study area showed compliance of all parameters with the drinking water standard of IS 10500 except for fluoride content.

- Surface water samples collected from different locations within the study area showed compliance of all parameters with the drinking

water standard of IS 10500 except for fluoride and bacteriological content.

- Ten samples were collected to assess the soil quality in the 10 km study area of plant site which revealed low fertile quality

- There are no wild life sanctuaries, national parks, elephant/tiger reserves within 10km radius of the study area. Amrabad Tiger Reserve is located at a distance of 14.03 km from project site.

- As per Wild Life (Protection) Act, 1972, four schedule – I species i.e Indian Peafowl, Indian python, Monitor lizard and Indian softshell turtle are present in the study. However these Schedule – I species are not falling in the endangered category.

11.7 ENVIRONMENTAL IMPACTS AND MANAGEMENT PLAN – CONSTRUCTION PHASE

The environmental impacts and management plan during construction phase are detailed below.

- The construction of power project would result in increase of Particulate Matter/dust concentrations due to fugitive dust. Frequent water sprinkling in the vicinity of the construction sites would be undertaken. It will be ensured that both gasoline and diesel powered vehicles are properly maintained to comply with exhaust emission requirements.

- Noise levels generated during construction activity sometimes may be high. Onsite workers working in noise prone areas would be provided with earmuffs & ear plugs.

- Water for construction will be met from River Krishna. The location of the proposed water intake structure is about at 1.0 km distance which is on upstream side of confluence point of Tungapahad Vagu & Krishna river. Pipeline will be laid prior to commencement of construction. Raw water reservoir which is proposed for storage of water in the operational phase will be constructed initially during the construction phase to store the river water for meeting the requirement during construction.

- Construction camps will be setup with full-fledged drinking water supply and sanitation facilities. These facilities would be connected to a septic tank and maintained to ensure minimum impact on the environment. It will be ensured that there will be no discharge of any wastewater into River Krishna or Tungapahad Vagu. The facilities will be designed to meet the construction manpower of 5000.

- Existing roads will be utilized for initial construction needs. TSGENCO will strengthen the approach road to the project site.

- Measures will be taken to ensure least inconvenience to the local people by restricting speed (speed breakers will be built by the Company).

- The project development will involve cut and fill quantities for achieving the required grades as per the layout design. Quantity of cutting is about 80,00,000 m^3 and the quantity of filling required is about 66,00,000 m^3. The fill quantity required is less than the cut quantity. Hence, the material obtained from cutting will be used for filling low lying areas. No material will be required from outside the project area for grading.

- A senior Environment and Safety Officer belonging to the EPC contractor will coordinate the Safety and Environmental aspects in consultation with TSGENCOs Station Level Environmental Group.

- A 24 Hr Medical Aid Room with qualified para-medical staff and fully equipped Ambulance will be made available at site.

- TSGENCO will tie up with nearby Hospitals in Nalgonda to provide timely medical help and treatment in case of medical emergency. In addition, proper co-ordination will be made with neighboring industries so as to ensure that emergency medical aid is extended in the least time.

- Adequate number of fire tenders with trained personnel will be made available to handle any fire accident at site.

- The manpower working will be given training on Occupational Safety and Health during construction.

11.8 ENVIRONMENTAL IMPACTS AND MANAGEMENT PLAN – OPERATIONAL PHASE

The major activities which are likely to result in impact on various environmental components during the operation phase are as follows:

a) Emissions from boilers due to combustion of coal
b) Dust emission from coal stock pile, limestone and gypsum storage areas
c) Noise from various noise generating sources
d) Water consumption and wastewater generation
e) Ash generation and other solid waste generation

The changes over the existing baseline quality due to the proposed activities of the power project during operation have been predicted using suitable air quality models coupled with qualitative and quantitative predictive techniques. After evaluation of the changes in relevant parameters, the overall impacts on the environment have been workedout based on which a detailed Environmental Management Plan has been formulated as given below.

11.8.1 AIR ENVIRONMENT

The proposed power project will result in emission of Particulate Matter, Sulphur Dioxide and Oxides of Nitrogen due to combustion of coal in the boilers.

Coal storage and coal handling will result in fugitive dust emissions.

Groundlevel concentrations are estimated considering the emissions from proposed power plant and cumulative ground level concentrations are estimated considering the emission details of the existing and proposed sources located within 15 km.

The emissions from the operating industries are reflecting in the baseline monitoring studies carried out during the study period.

The additional emissions in 15 km radial extent are from the proposed industries. However, in order to assess the cumulative impact of all the industries within 15 km radius, emissions from all the listed industries (Operating and Proposed) have been considered for estimation of Cumulative Ground level concentrations of PM10, SO_2 and NOx. The scenarios considered and ground level concentrations estimated are given below

GROUND LEVEL CONCENTRATION, µg/m³

	Source	PM_{10}	SO_2	NOx
Scenario for Ground Level Concentrations				
Scenario – A	4000 MW Yadadri Thermal Power Station (5 x 800 MW)	13.44	18.18	18.18
Scenarios for Cumulative Ground Level Concentrations				
Scenario – B	Considering emissions from proposed industries (4000 MW Yadadri Thermal Power Station (5 x 800 MW), Krishna Godavari Power Plant (Not commissioned) and My Home Industries Ltd Plant (Green field project)	13.56	18.87	18.91
Scenario – C	Considering emissions from proposed and operating industries	13.99	31.76	30.38

There is no overlap of concentration of one industry on the other due to inter distance of various industries and position of the emission sources. Also the subject power plant will have release of emission from chimneys of 275 m height compared to other plants located within 15 km radius.

In order to estimate overall scenario, the incremental cumulative ground level concentration due to emissions from proposed industries computed under Scenario – B are superimposed on the baseline concentrations (village wise) to estimate the overall post project scenario which would prevail at the post operational phase. The overall scenario is well within the limits stipulated by NAAQS, 2009.

AIR POLLUTION CONTROL MEASURES

Air pollution control measures of Power plant have been redesigned at an additional cost, considering ***FLUE GAS TREATMENT SYSTEM*** to comply with the following new emission norms of MoEF & CC stipulated for Thermal Power Plants as per the Gazette Notification S.O. 3305 (E) dated 07.12.2015

ESP outlet dust concentration	: 30 mg/Nm^3
SOx	: 100 mg/Nm^3
NOx	: 100 mg/Nm^3
Mercury	: 0.03 ppm

Flue gas treatment system is proposed for:

a. Reduction of Particulate emissions
b. Reduction of SO_2 emissions
c. Reduction of NO_x emissions

One single flue and two bi-flue stacks of 275 m height will be provided as per CPCB guidelines.

FUGITIVE DUST CONTROL

The measures proposed for control of Fugitive dust from various sources of the power project are detailed below

a. Coal Storage Yard: Water spray arrangement will be provided all-round the coal stockpiles to suppress the dust and to wet the coal while compacting to minimize the dust nuisance.

b. Coal handling Plant: Coal will be conveyed to the coal handling plant through closed conveyor system which will minimize the dust nuisance. All transfer points will be provided with bag filters.

c. Limestone Handling: Limestone will be unloaded in the covered sheds near to the limestone crusher. The limestone will be loaded into the crusher for crushing to a size of <25 mm. The hopper of

the crusher will be provided with atomized water sprinkling system to suppress while loading limestone into the crusher. The crushed limestone will be conveyed to the storage silo hoppers provided with Bag filters for control of dust emissions.

d. Ash pond: Dry flyash from the plant will be transported to ash storage silos through pneumatic system. Three Flyash silos are proposed for storing dry flyash. All silos will be provided with Bag filters for control of dust emissions. Unutilized flyash and bottom ash will be conveyed to ash pond. No dust emissions are anticipated due to wet handling system.

e. Gypsum handling & Storage: Gypsum generation from FGD is in wet form which will be dewatered in hydro-cyclones and vacuum belt filters. The Gypsum cake from the belt filter will be discharged through a Hopper to a Belt conveyor. The Belt Conveyor will transport the Gypsum to the Gypsum storage shed. No dust emissions are anticipated due to wet handling system.

11.8.2 NOISE ENVIRONMENT

During operation, the major noise generating sources are Steam turbines, Compressors, Boiler Feed Pump, Forced Draft Fans, Induced Draft Fans, Cooling Towers, coal unloading, Coal crushers, Limestone crusher, DM Plant and Ash Slurry pumps

All the above sources will have inter distance of minimum of 50-100 m. The combined noise level of the above sources will not cross 100 dB(A).

Predictions carried are on as is basis, without taking into consideration any attenuation factors showed noise level of 50 dB(A) at project boundary which is far below the noise standard specified for Industrial Areas by CPCB i.e 75 dB(A) during day time and 70 dB(A) during night time.

Additional attenuation is expected, due to atmospheric effect and 100 m greenbelt and the compound wall along the project boundary which will further reduce the noise levels.

Nearest village/habitation to the project site is at 1.0 km distance ie. Veerlapalem Village. Impact of Noise level at this location due to the project in the operational phase is negligible.

The nearest operating industry to the power project is 4.8 km. Cumulative impact on noise environment due to surrounding industries does not arise. However noise levels due to movement of trucks carrying flyash, limestone and gypsum and vehicular movement of plant personnel will have intermittent impact for short duration and are not continuous.

NOISE PREVENTION MEASURES

Encasement of noise generating sources will be done to control the noise levels. The steam turbine generators would be provided with acoustic enclosures and would be located in a closed building which considerably reduces the noise outside the turbine hall.

All operations and maintenance personnel working near noise prone areas would be provided with earmuffs & earplugs. Stand alone noise proof cabins will be provided to operators. Job rotation for operators will be done to minimize continuous exposure.

Greenbelt will be developed in an area of 1352 acres within the project area. Of which, 100 m width all along the project boundary in an area of 432.00 acres is proposed which acts as noise barrier and fugitive dust control.

11.8.3 WATER ENVIRONMENT

The daily water requirement of the power project is estimated to be about 2,40,000 m^3/day complying with the proposed new norm of 2.5 m^3/MWh and Zero wastewater discharge. Water requirement will be met from Krishna river which is located at a distance of 0.5 km from the project site in the southern direction. Intake well for tapping Krishna water will be constructed at a distance of 1.0 km on the upstream of confluence of River Krishna and Tungapahad Vagu.

The total wastewater generation is estimated to be about 43320 m^3/day

WATER POLLUTION CONTROL MEASURES

The wastewater generated will be segregated as Industrial wastewater (42360 m^3/day) and domestic wastewater (960 m^3/day) for adopting different treatment methods. The details of total waste water generation, recycling and treatment from various units of the project are given below in Table.

WASTE WATER GENERATION, TREATMENT AND REUSE, M^3/DAY

		WASTE WATER	Utililisation	Treatment	REUSE/DISPOSAL
Cooling Tower Blowdown		39360	19080 – Ash handling 9600 – Coal Handling	2400 - treated in side stream and disposed to CMB 9480 - to Central Monitoring Basin (CMB) and for treatment in ETP	• 9240 - RO Permeate recycled as freshwater to CWS • 2640 – RO reject disposal to ash water recovery sump for ash handling.
DM Regeneration		720	Neutralisation followed by CMB		
Condensate Polishing Unit		240	-		
Service Water		240	-		
Flue Gas Desulphurisation		1440	Neutralisation	-	Disposal to Ash water recovery sump for ash handling
Domestic use	Plant	192	-	STP-1	960 - Treated water reuse for greenbelt
	Colony	768	-	STP-2	
Mixed Bed Filter & Clarifier		360	-	Thickner & Centrifuge	360 - Sludge for use in Greenbelt
Total Wastewater		**43320**			

No treated wastewater will be discharged into Krishna River or Tungapahad Vagu.

OTHER MEASURES

Krishna river is perennial in nature and even during the summer, just before the first monsoon rain, the minimum flow (June, 2005) has been measured as 25.72 Mm^3/month at Pondugala G/D station and the minimum flow (June, 2005) has been measured as 27.84 Mm^3/month at Wadenapalli station against the power plant requirement of 7.21 Mm^3/month. Thus the withdrawal percentage is less than 30% in lean season.

Water drawal by TSGENCO will be about 0.24 million m^3/day. Flow of River Krishna as per the gauging station of Pondugala which is near to the project site vary from 4.34 To 31018 million m^3/day (Average – 617 million m^3/day). Thus the withdrawal of water (0.03 % of average flow) from River Krishna by TSGENCO project will not have significant impact.

River Krishna flows at a distance of 0.50 km from the project boundary in southern direction. The elevation of nearest point of ash pond is 12 metres above HFL and its distance is around 790 metres. There is no possibility of ash pond and the plant being affected by Krishna river during any flood.

Tungapahad Vagu (stream) passes through the project area. About 3.90 km of this Vagu passes through the project site taking south-easterly course and flows for a distance of 2.4 km before joining River Krishna.

The project activities will not interfere with flow of Tungapahad Vagu since there is no extraction of water or discharge. No diversion of Tungapahad vagu is proposed. Plant layout is designed to keep a minimum distance of 500 m buffer between ash pond and Tungapahad Vagu to prevent contamination. A 100 m barrier on either side of banks of the vagu will be left as barrier which will be developed under greenbelt.

Storm water management measures will be implemented to harvest rainwater

11.8.4 LAND ENVIRONMENT

The major solid waste generation from the project is ash in the form of fly ash and bottom ash. Maximum ash generation is due to use of blend coal. Steam generating units are the main sources of the solid waste where coal is burnt.

The peak generation of ash due to use of coal is estimated to be about 2.76 MTPA (at 85 % PLF). Of the total ash Flyash generation is 2.20 MTPA (80% of Total Ash) and Bottom ash is 0.56 MTPA (20 % of Total Ash).

BOTTOM ASH

Bottom ash generation from the plant is 0.56 MTPA. TSGENCO will explore disposing of bottom ash for utilization in road construction, foundation and use as aggregate. The ash pond has been designed considering the unutilized flyash in first three years and 25 years bottom ash generation.

ASH POND

Ash pond will be designed to store ash of 17.05 million tonnes which include unutilized flyash of 3.30 million tonnes (generated in first three years) and bottom ash of 13.75 million tonnes generated in 25 year. HDPE film will be provided over the clay lining as per design standards.

LAND POLLUTION CONTROL MEASURES

TSGENCO has acquired 2800 acres for settingup of the project. The landuse of the project site is mainly degraded reserved forest, semi-agricultural and partly revenue land with two isolated pockets of habitation i.e Modugulakunta Tanda and Kapura Tanda.

2095.28 acres is Forest Land falling under the jurisdiction of Virlapalem Forest Block and 704.12 acres is Patta Land, Government Land, Udafa patta Land and D-Patta Land falling under the jurisdiction of Damaracherla Mandal, Nalgonda District.

TSGENCO has obtained Forest Clearance from MoEF & CC for diversion of Forest Land Vide letter F.No.8-07/2015-FC dated 7th July, 2015.

The landuse of Patta Land is semi-agricultural with two isolated pockets of habitation i.e Modugulakunta Tanda and Kapura Tanda.

R & R has been initiated in accordance with Section 45 of Right to Fair Compensation and Transparency (RFCT) in Land Acquisition (LA), Rehabilitation and Resettlement Act (RRACT), 2013 by Govt of Telangana through Rehabilitation and Resettlement Committee under the Chairmanship of District Collector. It is proposed to pay an amount of Rs. 40.37 Crores towards R & R benefits.

The District Administration (DA) has identified about acres 13.21 gts. of land at Kallepalli Village. The DA has sanctioned an amount of Rs 61.30 lacs to be paid to the owners of the land for acquiring the land to establish R & R Center along with other necessary infrastructural facilities.

R & R Committee was appointed by District Collector Nalgonda as per the RRACT, 2013 to monitor and review the progress of implementation of R & R scheme and to carryout post implementation social audits in consultation with the Gramsabha

ASH MANAGEMENT

TSGENCO has approached the various cement plants located within 50 km radius for offtake of flyash generated from the plant. Cement Industries have expressed their willingness letters and the ash utilization quantity by Cement Plants in the 50 km radius is about 0.864 MTPA.

TSGENCO as per the MoEF notification S.O.254 (E) will setup ash based brick manufacturing facility within the project area.

TSGENCO will also promote, support and assist the locals in setting up of ash based product manufacturing units.

TSGENCO has firm tieup with nearby cement plants for offtake of about 0.875 MTPA of flyash (including TSGENCO consumption for brick plant) from 1st year itself.

TSGENCO will pursue with other cement plants located in 200 km radius for offtake of flyash.

Also TSGENCO will explore utilization of flyash in road construction projects under Pradhan Mantri Gramin Sadak Yojna and asset creation programmes of the Government involving construction of buildings, road, dams and embankments

With the above action plan, TSGENCO is confident of disposing balance flyash of 1.32 MTPA complying with the notification of MoEF & CC of 100 % ash utilization by fourth year.

GREENBELT DEVELOPMENT PLAN

Greenbelt development will be taken up from the construction stage itself. Greenbelt will be developed in 1352 acres of the project area which will include restoration of the forest area of 1049 acres and development of greenbelt in nonforest area of 303 acres. It is proposed to develop an in-house nursery for developing greenbelt.

It is proposed to plant 600 saplings/acre for development of the greenbelt within the project site.

TSGENCO will takeup additional plantation in the Reserved Forest that demarcates the project boundary on the south. In this regard, TSGENCO has sought the recommendations of the Forest Department, Government of Telangana.

Forest Department, Government of Telangana vide letter no. rc.No. 3561/2016/S6, dated 23.12.2016 has advised TSGENCO to takeup the following activities

a. Plant species Naravepa and Nemilinara species which are highly suitable for the area.

b. Atleast one year old seedlings (bag plants) have to be planted in 0.60 m X 0.60 X 0.60 m cube pits
c. Soil moisture conservation works like Continuous contour Trenches, percolation tanks, Rock fill dams and Check dams have to be takenup to improve the sub surface moisture which will help in the success of plantations

11.9 CSR - COMMUNITY DEVELOPMENTAL ACTIVITIES

TSGENCO will contribute to the following socio-economic development of surrounding villages:

- Conducting Medical camps and awareness camps on adult education
- Distribution of fruit bearing saplings
- Infrastructure development (Construction of Community buildings & Bridges)
- Education to the students of surrounding villages
- Bus facility to the students of surrounding villages who will be studying in local schools
- Payment of better wages leading to improvement of living conditions

Apart from the above activities, TSGENCO will also be involved other development activities such as:

1. Providing drinking water facility
2. Health camps and distribution of Homeo medicines
3. Cooking gas supply through TSGENCO Co-operative stores
4. Providing accommodation for Public utilities

A total of Rs. 100.40 Crores which is approximately 0.4% of the total cost of the project has been allocated.

11.10 BUDGET FOR IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT PLAN.

A budget of Rs 5597 Crores and Rs 430 crores/annum is earmarked towards capital cost and recurring cost respectively for implementing

the various pollution control measures as described in the Environmental Management Plan.

11.11 POST PROJECT MONITORING PLAN

Post Project monitoring programme formulated for implementation during construction and operation phase will have a check on the pollution levels and compliance with the Standards prescribed.

11.12 CONCLUSION

TSGENCO will implement the 4000 MW (5X800 MW) - Supercritical Coal Based Yadadri Thermal Power Station at Veerlapalem Village, Damercherla Mandal, Nalgonda (Dist), Telangana. The project will meet the present and future power demand of newly formed Telangana State.

The project is designed to comply with all the conditions stipulated by MoEF & CC and TSPCB

TSGENCO will implement additional pollution control equipment to comply with the new norms of MoEF & CC stipulated for Thermal Power Stations. An additional budget of Rs 0.9 crore/MW will be incurred to comply with new emission norms of MoEF & CC stipulated for Thermal Power Plants as per the Gazette Notification S.O. 3305 (E) dated 07.12.2015.

The project is based on zero discharge concepts with no discharge to any streams or water bodies. Tertiary treatment measures are proposed for treating and reusing the wastewater generated from the power plant

TSGENCO has firm tieup for offtake of flyash (including TSGENCO) consumption for brick plant) is 0.875 MTPA from 1st year itself.

With the above action plan, TSGENCO is confident of disposing balance flyash of 1.32 MTPA complying with the notification of MoEF & CC of 100 % ash utilization by fourth year.

TSGENCO has allotted Rs. 100.40 Crores for undertaking various socio economic development activities as per the community

development plan which will help improving the overall quality of life of the people living in the area.

TSGENCO has allotted a sum of Rs 5597 Crores towards implementation of the various pollution control measures to comply with the latest notification of MOEF & CC. the project deserves Environmental Clearance considering implementation of various pollution control and socio economic measures in the Nalgonda District if the newly formed State of Telangana.

CHAPTER - 12

DISCLOSURE OF CONSULTANTS

CHAPTER – 12 : DISCLOSURE OF CONSULTANTS

The Revised Environmental Impact Assessment (EIA) Report of 4000 MW Yadadri Thermal Power Station (5 x 800 MW - Supercritical Coal Based Thermal Power Plant), Telangana State Power Generation Corporation at at Virlapalem Village, Damarcherla Mandal, Nalgonda (Dist), Telangana for obtaining Environmental clearance has been prepared by B. S. Envi-Tech (P) Limited, Secunderabad. Undertaking of BSET is enclosed **Annexure – 12A**.

Draft EIA Report and Final EIA report were prepared by M/s. Bhagavathi Ana Labs Pvt. Ltd. (a Bureau Veritas Group Company), NABET, QCI Accredited Consultant Organisation. The proposal was considered for EAC Appraisal for grant of EC on 30.08.2016. During the discussions, the committee observed major short comings in the EIA/EMP and opined that the report needs to be redone to address the points listed under major shortcomings as per EAC, MOEF&CC minutes (MOM) of meeting held during 29th & 30th of august 2016.

TSGENCO appointed M/s B. S. Envi-Tech (P) Ltd., Secunderabad for preparing the Revised EIA Report. B.S. Envi-Tech (P) Limited is accredited as Category "A" Consultant by National Accreditation Board for Education and Training (NABET), Quality Council of India (QCI).

Revised EIA Report is prepared incorporating The Terms of Reference (Standard Terms of Reference and Additional Terms of Reference) and issues raised as per minutes of EAC meeting of MOEF & CC dated 31.08.2016.

MoEF&CC, Expert Appraisal Committee permitted use of baseline data collected during winter, 2015-16 for the Revised EIA Report which is presented in this report. Additionally, Baseline data was collected by B.S. Envi-Tech (P) Ltd for one month during October, 2016 (Post Monsoon 2016).

The data pertaining to Ecology was retained from the Earlier Final EIA report. A counter check of the Ecological data has been done by primary survey and the findings have been incorporated.

Socio Economic aspects pertaining to Primary Survey and Focus Group Discussions (FGD) prepared by M/s Centre for Management and Social Research Development (CMSRD), Hyderabad was retained from was retained from the Earlier Final EIA report. Additional information on Socio Economic issues was collected by BSET to address some of the points as per the Terms of Reference.

The data pertaining to Hydrogeology prepared by M/s. Hydro-Geosurvey Consultants Pvt. Ltd., Jodhpur (HCPL) through M/s Vimta Labs Limited, Hyderabad was retained from the Earlier Final EIA report.

The Revised EIA report has been prepared by B. S. Envi-Tech (P) Limited with the qualified Functional Area Experts approved by NABET, QCI. having experience of more than 25 years in respective Functional Areas.

B. S. Envi-Tech (P) Ltd extends the Consultancy Services in the following fields:

- Environmental Impact Assessment studies for Environmental Clearance.
- Obtaining Consent for Establishment/Operation from SPCB's.
- Analytical services – NABL accredited Laboratory.

- Monitoring of Environmental Parameters as per statutory requirements.

- Performance Testing of Emissions/Pollution Control Equipment

- Environmental Audits
    - (1) Third Party Environmental Audit
    - (2) Environmental Statement (Form – V)

- Preparation of Mining Plans (Registered as Qualified Person (RQP) by Indian Bureau of Mines (IBM))
    - (1) Preparation of Mining Plans
    - (2) Monitoring of Environmental Parameters for Mines as Per IBM and DGMS Guidelines.

NABET Accreditation of B. S. Envi-Tech (P) Limited is enclosed as **Annexure – 12 B.**

ANNEXURES

ANNEXURE –1A

No.J-13012/18/2015-IA.I (T)s
Goverment of India
Minister of Enviroment,Forest and Climate Change
Impact Assessment Division
***

Indira Paryavaran Bhavan,
Vayu Wing,3rd Floor,Aliganj,
Jor Bagh Road,New Delhi-110003
02 Nov 2015

To,

M/s TELANGANA STATE POWER GENERATION CORPORATION LIMITED
VIDYUT SOUDHA, KHAIRTABADHYDERABAD,
Hyderabad-500082
Telangana

Tel.No.040-23499417; Email:cecthermal2@yahoo.com

Sir/Madam,

This has reference to the proposal submitted in the Ministry of Environment, Forest and Climate Change to prescribe the Terms of Reference (TOR) for undertaking detailed EIA study for the purpose of obtaining Environmental Clearance in accordance with the provisions of the EIA Notification, 2006. For this purpose, the proponent had submitted online information in the prescribed format (Form-1) along with a Pre-feasibility Report. The details of the proposal are given below:

1. Proposal No.:	IA/TG/THE/31153/2015
2. Name of the Proposal:	5 X 800 MW YADADRI THERMAL POWER STATION
3. Category of the Proposal:	Thermal Projects
4. Project/Activity applied for:	1(d) Thermal Power Plants
5. Date of submission for TOR:	19 Sep 2015

In this regard, under the provisions of the EIA Notification 2006 as amended, the Standard TOR for the purpose of preparing environment impact assessment report and environment management plan for obtaining prior environment clearance is prescribed with public consultation as follows:

1(d):STANDARD TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY FOR THERMAL POWER PLANTS PROJECTS AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT

1) The proposed project shall be given a unique name in consonance with the name submitted to other Government Departments etc. for its better identification and reference.

2) Vision document specifying prospective long term plan of the project shall be formulated and submitted.

3) Latest compliance report duly certified by the Regional Office of MoEF for the conditions stipulated in the environmental and CRZ clearances of the previous phase(s) for the expansion projects shall be submitted.

4) The project proponent needs to identify minimum three potential sites based on environmental, ecological and economic considerations, and choose one appropriate site having minimum impacts on ecology and environment. A detailed comparison of the sites in this regard shall be submitted.

5) Executive summary of the project indicating relevant details along with recent photographs of the proposed site (s) shall be provided. Response to the issues raised during Public Hearing and the written representations (if any), along with a time bound Action Plan and budgetary allocations to address the same, shall be provided in a tabular form, against each action proposed.

6) Harnessing solar power within the premises of the plant particularly at available roof tops and other available areas shall be formulated and for expansion projects, status of implementation shall also be submitted.

7) The geographical coordinates (WGS 84) of the proposed site (plant boundary), including location of ash pond along with topo sheet (1:50,000 scale) and IRS satellite map of the area, shall be submitted. Elevation of plant site and ash pond with respect to HFL of water body/nallah/River and high tide level from the sea shall be specified, if the site is located in proximity to them.

8) Layout plan indicating break-up of plant area, ash pond, green belt, infrastructure, roads etc. shall be provided.

9) Land requirement for the project shall be optimized and in any case not more than what has been specified by CEA from time to time. Item wise break up of land requirement shall be provided.

10) Present land use (including land class/kism) as per the revenue records and State Govt. records of the proposed site shall be furnished. Information on land to be acquired including coal transportation system, laying of pipeline, ROW, transmission lines etc. shall be specifically submitted. Status of land acquisition and litigation, if any, should be provided.

11) If the project involves forest land, details of application, including date of application, area applied for, and application registration number, for diversion under FCA and its status should be provided along with copies of relevant documents.

12) The land acquisition and R&R scheme with a time bound Action Plan should be formulated and addressed in the EIA report.

13) Satellite imagery and authenticated topo sheet indicating drainage, cropping pattern, water bodies (wetland, river system, stream, nallahs, ponds etc.), location of nearest habitations (villages), creeks, mangroves, rivers, reservoirs etc. in the study area shall be provided.

14) Location of any National Park, Sanctuary, Elephant/Tiger Reserve (existing as well as proposed), migratory routes / wildlife corridor, if any, within 10 km of the project site shall be specified and marked on the map duly authenticated by the Chief Wildlife Warden of the State or an officer authorized by him.

15) Topography of the study area supported by toposheet on 1:50,000 scale of Survey of India, along with a large scale map preferably of 1:25,000 scale and the specific information whether the site requires any filling shall be provided. In that case, details of filling, quantity of required fill material; its source, transportation etc. shall be submitted.

16) A detailed study on land use pattern in the study area shall be carried out including identification of common property resources (such as grazing and community land, water resources etc.) available and Action Plan for its protection and management shall be formulated. If acquisition of grazing land is involved, it shall be ensured that an equal area of grazing land be acquired and developed and detailed plan submitted.

17) A mineralogical map of the proposed site (including soil type) and information (if available) that the site is not located on potentially mineable mineral deposit shall be submitted.

18) Details of fly ash utilization plan as per the latest fly ash Utilization Notification of GOI along with firm agreements / MoU with contracting parties including other usages etc. shall be submitted. The plan shall also include disposal method / mechanism of bottom ash.

19) The water requirement shall be optimized (by adopting measures such as dry fly ash and dry bottom ash disposal system, air cooled condenser, concept of zero discharge) and in any case not more than that stipulated by CEA from time to time, to be submitted along with details of source of water and water balance diagram. Details of water balance calculated shall take into account reuse and re-circulation of effluents.

20) Water body/Nallah (if any) passing across the site should not be disturbed as far as possible. In case any Nallah / drain is proposed to be diverted, it shall be ensured that the diversion does not disturb the natural drainage pattern of the area. Details of proposed diversion shall be furnished duly approved by the concerned Department of the State.

21) It shall also be ensured that a minimum of 500 m distance of plant boundary is kept from the HFL of river system / streams etc. and the boundary of site should also be located 500 m away from railway track and National Highways.

22) Hydro-geological study of the area shall be carried out through an institute/ organization of repute to assess the impact on ground and surface water regimes. Specific mitigation measures shall be spelt out and time bound Action Plan for its implementation shall be submitted.

23) Detailed Studies on the impacts of the ecology including fisheries of the River/Estuary/Sea due to the proposed withdrawal of water / discharge of treated wastewater into the River/Sea etc shall be carried out and submitted along with the EIA Report. In case of requirement of marine impact assessment study, the location of intake and outfall shall be clearly specified along with depth of water drawl and discharge into open sea.

24) Source of water and its sustainability even in lean season shall be provided along with details of ecological impacts arising out of withdrawal of water and taking into account inter-state shares (if any). Information on other competing sources downstream of the proposed project and commitment regarding availability of requisite quantity of water from the Competent Authority shall be provided along with letter / document stating firm allocation of water.

25) Detailed plan for rainwater harvesting and its proposed utilization in the plant shall be furnished.

26) Feasibility of near zero discharge concept shall be critically examined and its details submitted.

27) Optimization of Cycles of Concentration (COC) along with other water conservation measures in the project shall be specified.

28) Plan for recirculation of ash pond water and its implementation shall be submitted.

29) Detailed plan for conducting monitoring of water quality regularly with proper maintenance of records shall be formulated. Detail of methodology and identification of monitoring points (between the plant and drainage in the direction of flow of surface / ground water) shall be submitted. It shall be ensured that parameter to be monitored also include heavy metals. A provision for long-term monitoring of ground water table using Piezometer shall be incorporated in EIA, particularly from the study area.

30) Socio-economic study of the study area comprising of 10 km from the plant site shall be carried out through a reputed institute / agency which shall consist of detail assessment of the impact on livelihood of the local communities.

31) Action Plan for identification of local employable youth for training in skills, relevant to the project, for eventual employment in the project itself shall be formulated and numbers specified during construction & operation phases of the Project.

32) If the area has tribal population it shall be ensured that the rights of tribals are well protected. The project proponent shall accordingly identify tribal issues under various provisions of the law of the land.

33) A detailed CSR plan along with activities wise break up of financial commitment shall be prepared. CSR component shall be identified considering need based assessment study and Public Hearing issues. Sustainable income generating measures which can help in upliftment of affected section of society, which is consistent with the traditional skills of the people shall be identified. Separate budget for community development activities and income generating programmes shall be specified.

34) While formulating CSR schemes it shall be ensured that an in-built monitoring mechanism for the schemes identified are in place and mechanism for conducting annual social audit from the nearest

government institute of repute in the region shall be prepared. The project proponent shall also provide Action Plan for the status of implementation of the scheme from time to time and dovetail the same with any Govt. scheme(s). CSR details done in the past should be clearly spelt out in case of expansion projects.

35) R&R plan, as applicable, shall be formulated wherein mechanism for protecting the rights and livelihood of the people in the region who are likely to be impacted, is taken into consideration. R&R plan shall be formulated after a detailed census of population based on socio economic surveys who were dependant on land falling in the project, as well as, population who were dependant on land not owned by them.

36) Assessment of occupational health and endemic diseases of environmental origin in the study area shall be carried out and Action Plan to mitigate the same shall be prepared.

37) Occupational health and safety measures for the workers including identification of work related health hazards shall be formulated. The company shall engage full time qualified doctors who are trained in occupational health. Health monitoring of the workers shall be conducted at periodic intervals and health records maintained. Awareness programme for workers due to likely adverse impact on their health due to working in non-conducive environment shall be carried out and precautionary measures like use of personal equipments etc. shall be provided. Review of impact of various health measures undertaken at intervals of two to three years shall be conducted with an excellent follow up plan of action wherever required.

38) One complete season site specific meteorological and AAQ data (except monsoon season) as per latest MoEF Notification shall be collected and the dates of monitoring shall be recorded. The parameters to be covered for AAQ shall include PM10, PM2.5, SO2, NOx, CO and Hg. The location of the monitoring stations should be so decided so as to take into consideration the upwind direction, pre-dominant downwind direction, other dominant directions, habitation and sensitive receptors. There should be at least one monitoring station each in the upwind and in the pre - dominant downwind direction at a location where maximum ground level concentration is likely to occur.

39) In case of expansion project, air quality monitoring data of 104 observations a year for relevant parameters at air quality monitoring stations as identified/stipulated shall be submitted to assess for compliance of AAQ Standards (annual average as well as 24 hrs).

40) A list of industries existing and proposed in the study area shall be furnished.

41) Cumulative impacts of all sources of emissions including handling and transportation of existing and proposed projects on the environment of the area shall be assessed in detail. Details of the Model used and the input data used for modeling shall also be provided. The air quality contours should be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any. The windrose and isopleths should also be shown on the location map. The cumulative study should also include impacts on water, soil and socio-economics.

42) Radio activity and heavy metal contents of coal to be sourced shall be examined and submitted along with laboratory reports.

43) Fuel analysis shall be provided. Details of auxiliary fuel, if any, including its quantity, quality, storage etc should also be furnished.

44) Quantity of fuel required, its source and characteristics and documentary evidence to substantiate confirmed fuel linkage shall be furnished. The Ministry's Notification dated 02.01.2014 regarding ash content in coal shall be complied. For the expansion projects, the compliance of the existing units to the said Notification shall also be submitted

45) Details of transportation of fuel from the source (including port handling) to the proposed plant and its impact on ambient AAQ shall be suitably assessed and submitted. If transportation entails a long distance it shall be ensured that rail transportation to the site shall be first assessed. Wagon loading at source shall preferably be through silo/conveyor belt.

46) For proposals based on imported coal, inland transportation and port handling and rail movement shall be examined and details furnished. The approval of the Port and Rail Authorities shall be submitted.

47) Details regarding infrastructure facilities such as sanitation, fuel, restrooms, medical facilities, safety during construction phase etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase should be adequately catered for and details furnished.

48) EMP to mitigate the adverse impacts due to the project along with item - wise cost of its implementation in a time bound manner shall be specified.

49) A Disaster Management Plan (DMP) along with risk assessment study including fire and explosion issues due to storage and use of fuel should be carried out. It should take into account the maximum inventory of storage at site at any point of time. The risk contours should be plotted on the plant layout map clearly showing which of the proposed activities would be affected in case of an accident taking place. Based on the same, proposed safeguard measures should be provided. Measures to guard against fire hazards should also be invariably provided. Mock drills shall be suitably carried out from time to time to check the efficiency of the plans drawn.

50) The DMP so formulated shall include measures against likely Fires/Tsunami/Cyclones/Storm Surges/ Earthquakes etc, as applicable. It shall be ensured that DMP consists of both On-site and Off-site plans, complete with details of containing likely disaster and shall specifically mention personnel identified for the task. Smaller version of the plan for different possible disasters shall be prepared both in English and local languages and circulated widely.

51) Detailed scheme for raising green belt of native species of appropriate width (50 to 100 m) and consisting of at least 3 tiers around plant boundary with tree density of 2000 to 2500 trees per ha with a good survival rate of around 80% shall be submitted. Photographic evidence must be created and submitted periodically including NRSA reports in case of expansion projects. A shrub layer beneath tree layer would serve as an effective sieve for dust and sink for CO2 and other gaseous pollutants and hence a stratified green belt should be developed.

52) Over and above the green belt, as carbon sink, plan for additional plantation shall be drawn by identifying blocks of degraded forests, in close consultation with the District Forests Department. In pursuance to this the project proponent shall formulate time bound Action Plans along with financial allocation and shall submit status of implementation to the Ministry every six months.

53) Corporate Environment Policy

a. Does the company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.

b. Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.

c. What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions. Details of this system may be given.

d. Does the company has compliance management system in place wherein compliance status along with compliances / violations of environmental norms are reported to the CMD and the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism should be detailed in the EIA report.

All the above details should be adequately brought out in the EIA report and in the presentation to the Committee.

54) Details of litigation pending or otherwise with respect to project in any Court, Tribunal etc. shall invariably be furnished.

Additional TOR for Coastal Based Thermal Power Plants Projects (TPPs):

Over and above the TOR mentioned in Thermal Power Plants Projects, the following shall be strictly followed (as applicable):

a) Low lying areas fulfilling the definition wetland as per Ramsar Convention shall be identified and clearly demarcated w.r.t the proposed site.

b) If the site includes or is located close to marshy areas and backwaters, these areas must be excluded from the site and the project boundary should be away from the CRZ line. Authenticated CRZ map from any of the authorized agencies shall be submitted.

c) The soil leveling should be minimum with no or minimal disturbance to the natural drainage of the area. If the minor canals (if any) have to be diverted, the design for diversion should be such that the diverted canals not only drains the plant area but also collect the volume of flood water from the surrounding areas and discharge into marshy areas/major canals that enter into creek. Major canals should not be altered but their embankments should be strengthened and desilted.

d) Additional soil required for leveling of the sites should as far as possible be generated within the site itself in such a manner that the natural drainage system of the area is protected and improved.

e) Marshy areas which hold large quantities of flood water to be identified and shall not be disturbed.

f) No waste should be discharged into Creek, Canal systems, Backwaters, Marshy areas and seas without appropriate treatment. Wherever feasible, the outfall should be first treated in a Guard Pond and then only discharged into deep sea (10 to 15 m depth). Similarly, the Intake should be from deep sea to avoid aggregation of fish and in no case shall be from the estuarine zone. The brine that comes out from Desalinization Plants (if any) should not be discharged into sea without adequate dilution.

g) Mangrove conservation and regeneration plan shall be formulated and Action Plan with details of time bound implementation shall be specified, if mangroves are present in Study Area.

h) A common **Green Endowment Fund** should be created by the project proponents out of EMP budgets. The interest earned out of it should be used for the development and management of green cover of the area.

i) Impact on fisheries at various socio economic level shall be assessed.

j) An endowment **Fishermen Welfare Fund** should be created out of CSR grants not only to enhance their quality of life by creation of facilities for Fish Landing Platforms / Fishing Harbour / cold storage, but also to provide relief in case of emergency situations such as missing of fishermen on duty due to rough seas, tropical cyclones and storms etc.

k) Tsunami Emergency Management Plan shall be prepared wherever applicable and Plan submitted prior to the commencement of construction work.

l) There should not be any contamination of soil, ground and surface waters (canals & village pond) with sea water in and around the project sites. In other words necessary preventive measures for spillage from pipelines, such as lining of Guard Pond used for the treatment of outfall before discharging into the sea and surface RCC channels along the pipelines of outfall and intake should be adopted. This is just because the areas around the projects boundaries could be fertile agricultural land used for paddy cultivation.

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ANNEXURE –1B

No. J-13012/18/2015 - IA. I (T)
Government of India
Ministry of Environment, Forest and Climate Change

Indira Paryavaran Bhawan, Jor Bagh Road,
Aliganj, New Delhi-110003

Dated: 16.02.2016

To

M/s. Telangana State Power Generation Corpn. Ltd. (TSGENCO)
(A Government of Telangana State Undertaking)
Room No. 258, A Block, Vidyut Soudha
Hyderabad- 500 082

Tel. No. 040-23499417; Fax: 040-23499418

Sub: ***5x800 MW Super Critical Coal Based Thermal Power Project at Damaracherla, District Nalgonda, Telangana by M/s. Telangana State Power Generation Corporation Ltd. (TSGENCO) - reg. ToR***

Sir,

The undersigned is directed to refer your online application dated 19.09.2015 and subsequent documents/information submitted on the above subject.

2. The proposal was considered by the Expert Appraisal Committee (Thermal Power) during its 45th, 48th & 50th Meetings held during 29th -30th October, 2015, 18th December, 2015 and 28th-29th January, 2016 respectively for determination of the Terms of Reference (TOR) for undertaking detailed EIA and preparation of EMP in accordance with the provisions of the EIA Notification dated September 14, 2006. A sub-committee of the EAC has also visited the site on 05.12.2015.

3. After detailed deliberations, the Committee recommended the following ToR in addition to the standard TORs (as applicable) accorded vide Ministry's Online Portal on 02.11.2015 for undertaking detailed EIA study and preparation of EMP. The Committee agreed to the request of PP for using the baseline data being collected from 01.12.2015 in the EIA/EMP as the Standard ToR was already accorded.

(i) *The Tungapadu Vagu should not be diverted, but it should be preserved, protected and its flows enhanced.*
(ii) *The PP should leave a minimum of 100 m buffer on either side of its banks and this buffer should be developed into native forest.*
(iii) *No effluent should be discharged into the rivulet or River Krishna.*
(iv) *In areas where the banks are breached, the breaches should be plugged and strengthened.*
(v) *In areas where the riverbed is silted/partially blocked due to landslides, the blocks and silt should be removed in a way that the original gradient is maintained.*
(vi) *No water from the stream shall be extracted.*
(vii) *To sustain the downstream ecology of the Tungapadu Vagu, the Irrigation Department should release minimum ecological flows from the reservoirs constructed in the upstream.*
(viii) *The plateaus and their slopes within the project area, which are not used for the project purpose, are highly degraded. These should be restored to their original natural forest ecosystem and should be used for the conservation of rare and endemic plants and animals found in the plateaus of project area. These forests*

Ramesh

not only serve as green belt to mitigate fugitive emissions, CO_2 and other pollutants, but also serve as a conservation area.

(ix) The reserve forest that demarcates the project boundary on the South is also highly degraded. This intact patch should be restored to its original forest ecosystem and should be connected to the forest ecosystem of the project area and other reserve forest in the area. This would not only serve as buffer for the project but also acts as a corridor for wildlife and enhance stream flow. For this purpose, the PP should provide grants to the State Forest Department and work should start within a reasonable time of 1-2 years after preparing a detailed site specific action plan.

(x) The PP should create a permanent corpus fund for tribal welfare and also provide adequate compensation for the land losers irrespective of their status besides best possible R&R package and extending social welfare schemes and healthcare system for local communities.

(xi) Cumulative impact assessment of air, water, soil and socio-economics should be carried out in view of a number of cement plants already established/operating in the vicinity of the proposed plant.

(xii) As agreed by the PP, the area for ash pond shall be minimized by shifting it towards North. Further, a minimum distance of 500 m buffer shall be maintained between the proposed ash pond and Tungapadu Vagu. The buffer shall be developed into thick green belt/natural forest.

(xiii) As agreed, the impervious lining for the ash pond shall be over and above the clay lining.

4. Besides the above, the following general points shall be followed:
   a. All documents to be properly referenced with index, page numbers and continuous page numbering.
   b. Where data is presented in the report especially in table, the period in which the data was collected and the source should invariably be indicated.
   c. Where the documents provided are in a language other than English, an English translation should be provided.
   d. The Questionnaire for environmental appraisal of thermal power projects as devised earlier by the Ministry shall also be filled and submitted.
   e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI) / National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/ EMP reports prepared by them and data provided by other organization / Laboratories including their status of approvals etc. In this regard circular no. F.No. J-11013/77/2004-IA-II (I) dated 2nd December, 2009 is posted on the Ministry's website http://www.moef.nic.in may be referred.

In addition to the above, information on the following may also be incorporated in the EIA report.

1. Is the project intended to have CDM-intent?

   (i) If not, then why?
   (ii) If yes, then

   a. Has PIN (Project Idea Note) {or PCN (Project Concept Note)} submitted to the ?NCA? (National CDM Authority) in the MoEF?
   b. If not, then by when is that expected?
   c. Has PDD (Project Design Document) been prepared?
   d. What is the Carbon intensity? from your electricity generation projected (i.e. CO_2 Tons/MWH or Kg/KWH)

Ramesh

e. Amount of CO_2 in Tons/year expected to be reduced from the baseline data available on the CEA?s web-site (www.cea.nic.in)

2. Notwithstanding 1(i) above, data on (d) & (e) above shall be worked out and reported.

5. **The Environmental Clearance shall be applied only after fuel and water linkages are firmed up.**

6. After preparing the Draft EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned issues, the same shall be submitted to the SPCB for conducting the public hearing as per procedure of EIA notification 2006. The issues emerged during public hearing shall be further incorporated in the Draft EIA/EMP report. The final EIA/EMP report along with public hearing report and the requisite documents (*including written objections, if any*) shall be submitted to the Ministry for appraisal by the Expert Appraisal Committee for consideration of awarding environmental clearance under the provisions of Environmental Impact Assessment notification dated September 14, 2006.

7. The TORs prescribed shall be valid for a period of three years from the date of issue for submission of EIA/ EMP reports, after public consultation.

(Dr. M. Ramesh)
Scientist 'D'

Copy to:

1. The Chairman, Telangana State Pollution Control Board, Paryavaran Bhawan, A-3 Industrial Estate, Sanath Nagar, Hyderabad- 500 018.
2. The Additional PCCF (Central), Regional Office, Ministry of Environment, Forests and Climate Change, 1st & 2nd Floors, HEPC Building, 34, Cathedral Garden Road, Nungambakkam, Chennai- 600034.
3. The District Collector, Nalgonda District, Govt. of Telangana.
4. Guard file.
5. Website of MoEF&CC

(Dr. M. Ramesh)
Scientist 'D'

MINUTES OF THE 63rd MEETING OF THE RE-CONSTITUTED EXPERT APPRAISAL COMMITTEE (EAC) ON ENVIRONMENTAL IMPACT ASSESSMENT (EIA) OF THERMAL POWER & COAL MINING PROJECTS

The 63rd Meeting of the reconstituted EAC (Thermal Power) was held on 29th & 30th August, 2016 in the Ministry of Environment, Forest & Climate Change at Teesta Meeting Hall, Vayu Wing, First Floor, Indira Paryavaran Bhawan, Jorbagh Road, New Delhi. The following members were present:

1.	Shri Anil Kumar	-	Chairman
2.	Prof. C.R. Babu	-	Member
3.	Shri T.K. Dhar	-	Member
4.	Shri J.L. Mehta	-	Member
5.	Shri N.K. Verma	-	Member
6.	Shri A.K. Bansal	-	Member
7.	Shri G.S. Dang	-	Member
8.	Shri Shantanu Dixit	-	Member
9.	Dr. S. D. Attri	-	Member (Representative of IMD)
10.	Shri P. D. Siwal & N.S. Mondal	-	Member (Representative of CEA)
11.	Dr. S. Kerketta	-	Member Secretary

Dr. Ratnavel and Representatives of CPCB & WII could not be present.

Item No.1: CONFIRMATION OF THE MINUTES OF THE 60th EAC MEETING.

The Minutes of the 60th EAC (Thermal Power) meeting held on 27th July, 2016 were confirmed.

Item No. 2: CONSIDERATION OF PROJECTS

2.1 Setting up of 2x660 MW Coal Based Thermal Power Project near village Malwan, District Etah, Uttar Pradesh by M/s Jawaharpur Vidyut Utpadan Nigam Ltd (JVUNL) –regarding EC

(2.1.1) The Project Proponent (PP) along with their environmental consultant, M/s Desein Pvt. Ltd., New Delhi has made a presentation and inter-alia provided the following information:

(i) This project was earlier considered for EC by the EAC. Previously ToR was issued and EIA study carried out in 2010, earlier Public Hearing was held on 11.03.2011. The EAC recommended for EC in July, 2012, but MoEF did not issue EC & desired the proponent to submit concurrence of Ministry of Coal for diversion of coal from Chendipada coal block for the project so that further action can be taken by MoEF. Subsequently, the allocation of Chendipada coal block was cancelled vide order of Hon'ble Supreme Court/GoI. Later, Saharpur-Jamarpani coal block in Jharkhand was allotted on 13.08.2015. ToR was re-issued on 09.12.2015 by MoEF&CC. EIA report was updated as per fresh baseline data and fresh Public Hearing was held on 11.05.2016.

Till now, 40% of civil work has been completed. 15% of Permanent Way works completed. Contract awarded for Overhead Electric traction work. Contract awarded for Signalling and Telecom work. It is expected that the works will be completed in about two year's time. HNPCL has obtained the permission from the East Coast Railway to unload 2 rakes a day in NTPC Simhadri railway siding. HNPCL has also obtained the permission from NTPC Simhadri for movement of about 4 rakes per day from Jaggayapalem to Duvvada section & also for HNPCL siding taking off from NTPC siding at Chainage after 19.0 km to HNPCL plant premises.

(iii) The present proposal is to seek permission of MOEF&CC to transport the coal by road from Bayyavaram Railway siding (45 km to TPP), Kantakapally Railway siding (63 km to TPP) and NTPC Ltd Simhadri, Railway siding (8.5 km to TPP) for a period of three years until the private railway siding of HNPCL is commissioned. The Traffic Impact Assessment Study due to the movement of HNPCL coal trucks was studied and it is observed that there is no significant impact with the addition of HNPCL trucks on the traffic of the studied roads.

(2.4.2) The EAC, in this meeting on 29-30th Aug 2016 noted that:-

(i) as intimated by the PP {ref para 2.4.1 (i) above}, one unit each had already been commissioned, in March 2016, and in July 2016. However, permission for road movement of coal was being sought only now after commissioning of the units, rather than before commissioning.

(ii) the PP was asked to provide data regarding quality of the coal being used/ to be used so that the environmental impact of coal movement could be considered.

(iii) PP was asked to inform steps proposed to be taken to comply with the MoEFCC notification regarding supply and use of coal with ash content < 34% in view of the high ash content of proposed coal sources and distance from the coalfield to the project site, and

(iv) the PP was asked to provide concurrence of the Railways for use of their sidings mentioned in para 2.4.1 (iii) above.

(2.4.3) The proposal was ***accordingly deferred*** *for want of the above information. The EAC also recommended that the Ministry may look into the aspect of commissioning/ trial operations of the TPP by transporting coal through road before obtaining prior permission for the same.*

2.5 5x800 MW Super Critical Coal Based Yadadri Thermal Power Station at Village Veerlapalem, District Nalgonda, Telangana by M/s Telangana State Power Generation Corporation Ltd. (TSGENCO) – reg. EC.

(2.5.1) The proposal was earlier placed before the EAC in its 59th & 60th meetings held during 14th & 15th July, 2016 and 27th July, 2016, the minutes of which are as under:

Quote" The EAC noted that the background documents had not been received by some of the members, and where received, had been received only one day before or on the same day of EAC meeting, thus not giving an opportunity even to such Members to fully study the documents. As such, the EAC was not in a position to consider the case. The

proposal was, therefore, **deferred.** However, to save time for this proposal's consideration in the next EAC meeting, the PP was provided a copy each of the two representations received by the EAC for a detailed reply to be submitted by the PP to the Ministry well before the next EAC meeting, for action in line with the decision recorded under Agenda item 3.1 of this meeting.

Accordingly, the proposal was placed before the EAC in the 60th meeting held on 27th July, 2016. *However, the EAC was informed that vide letter dt 26th July 2016 addressed to the Member Secretary, the PP has requested for* ***deferment*** *in view of preparations required to be made for the PMs visit to Telangana.* **"Unquote**

(2.5.2) The EAC inter-alia observed/recommended the following:

1. Plagiarism, Irrelevant content, and absence of crucial site and plant specific analysis:

EAC received several complaints about issues such as plagiarism and 'copy-paste' sections of the EIA. On examination, EAC found several such instances. Some examples are reproduced in below table.

Extracts from Final EIA report (July 2016 – Submitted to EAC)	**Extracts from Original Document**
Final EIA Report - Section 7.6 Risk assessment	Hazards Identification and Risk Assessment in Thermal Power Plant. by Ruchi Shrivastava and Praveen Patel published in International Journal of Engineering Research & Technology (IJERT) Volume 3, Issue 4, April 2014
Introduction *"The thermal power plant is a large electricity generation industry. It consist a number of process to generate electricity by use of fossil fuel. It also consist several major equipment and operations involve in its process. The purpose of hazard identification and risk assessment in thermal power plant is to identify physical, chemical, biological and environmental hazards in the plant, analyse the event sequences leading to those hazards and calculate the frequency and consequences of hazardous events. Then risk level is assigned to each hazard for identifying required corrective action to minimize the risk or eliminate the Hazard."*	Abstract *"The thermal power plant is a large electricity generation industry. It consist a number of process by mean to generate electricity by use of fossil fuel. It also consist several major equipment and operations involve in its process. The purpose of hazard identification and risk assessment in thermal power plant is to identify physical, chemical, biological and environmental hazards in the plant, analyse the event sequences leading to those hazards and calculate the frequency and consequences of hazardous events. Then risk level is assigned to each hazard for identifying required corrective action to minimize the risk or eliminate the Hazard."*
"7.6.1 Plant Description *Thermal power plant is electricity generation plant which converts the fossil fuel stored energy to electrical energy by means of generating electricity. In other*	"III. PLANT DISCRIPTION *Thermal power plant is electricity generation plant which converts the fossil fuel stored energy to electrical energy by means of generating electricity. In other*

words, it is merely a chain of Energy conversion as follow: • *Chemical energy in the fuel is converted to Heat energy of steam.* • *Heat energy of steam is converted to Mechanical or rotating energy of a rotating wheel called Turbine.* • *The mechanical energy of Turbine is converted as Electrical Energy in a Generator."*	*words, it is merely a chain of Energy conversion as follow:* • *Chemical energy in the fuel is converted to Heat energy of steam.* • *Heat energy of steam is converted to Mechanical or rotating energy of a rotating wheel called Turbine.* • *The mechanical energy of Turbine is converted as Electrical Energy in a Generator."*
The plant description section mentions no project specific details at all.	
"***A. Coal Handling Plant*** *Coal transported to the plant by the rail line and carrier trucks. This coal is transfer from the underground bunker to crusher by series of conveyer belt. In coal crusher coal size reduced up to ¾" after that coal transfer to the boiler's coal bunker or coal yard. In the case of emergency the coal is fetch from coal yard. Coal feeder control the quantity of coal from coal bunker and send it to the ball mill or roll mill for pulverization process. Where coal crushed to the fine powder and mixed with preheated air come through the air from preheater. This process use for drying the coal and sends coal powder up to the burner of furnace. The rest of impure coal and rocks pass out to the bottom of mill and transfer to the clinker grinder then to the storage."*	"***A. Coal Handling Plant*** *Coal transported to the plant by the rail line and carrier trucks. This coal is transfer from the underground bunker to crusher by series of conveyer belt. In coal crusher coal size reduced up to ¾" after that coal transfer to the boiler's coal bunker or coal yard. In the case of emergency the coal is fetch from coal yard. Coal feeder control the quantity of coal from coal bunker and send it to the ball mill or roll mill for pulverization process. Where coal crushed to the fine powder and mixed with preheated air come through the air from preheater. This process use for drying the coal and sends coal powder up to the burner of furnace. The rest of impure coal and rocks pass out to the bottom of mill and transfer to the clinker grinder then to the storage."*
"***D. Turbine and Generator*** *The generated steam is passing through the super heater to the high pressure turbine. After driving the turbine a part of this steam sends to the H.P. heater 2 and left pass through the reheater then secondary super heater and regain its pressure to drive Intermediate turbine. Then the steam transfer to the H.P.H 2 and low pressure turbine. Then steam from low pressure turbine transfer to L.P.H 4-5-6 and condenser. In condenser steam is cooled by cooling water and then deaerator circulates it for steam generation. The three turbines used to drive one shaft which drives the rotor of the generator by mean to generate*	"***D. Turbine and Generator*** *The generated steam is passing through the super heater to the high pressure turbine. After driving the turbine a part of this steam sends to the H.P. heater 2 and left pass through the reheater then secondary super heater and regain its pressure to drive Intermediate turbine. Then the steam transfer to the H.P.H 2 and low pressure turbine. Then steam from low pressure turbine transfer to L.P.H 4-5-6 and condenser. In condenser steam is cooled by cooling water and then deaerator circulates it for steam generation. The three turbines used to drive one shaft which drives the rotor of the generator by mean to generate*

electricity. The various auxiliaries of turbine and generator is cooled by hydrogen gas and cooling oil."	*electricity. The various auxiliaries of turbine and generator is cooled by hydrogen gas and cooling oil."*
The text from the original paper refers to the acronyms (H.P.H 2 etc.) used in a diagram in the paper, which are absent / not relevant in the EIA report diagrams. Also sections B. D.M. Plant, C. Boiler, E. Switch Yard are also exact copy but have not been reproduced here for brevity.	
Section 7.6.3 HAZID *"Risk initiating event likelihood and consequences are assumed by taken reference of visited plant real activities. Risk Classification screening table is given below"*	IV RISK ASSESSMENT *"Risk initiating event likelihood and consequences are assumed by taken reference of visited plant real activities. Risk Classification screening table is given below"*
Table 7.80 :Risk Classification Screening	TABLE I: RISK CLASSIFICATION SCREENING TABLE
Table 7.81: Risk Classification	TABLE II: RISK CLASSIFICATION ASSOCIATED WITH TABLE I
Above tables are exact copy-paste of the same source cited above. They are not reproduced for brevity.	

In addition to above 'copy-paste' exercise, EAC also observed several **incorrect or irrelevant statements** in the Final EIA report. For example,

- Section 7.8, Occupational Health and Safety - "*As a **small business owner** one has certain rights and responsibilities regarding health and safety in the workplace.*" (a project of 4000 MW cannot be called 'small business').
- Section 7.6.3.1 subheading Handling of heavy bags -"***Handling of heavy bags of the final products** may lead to occupational injuries like strains, sprains and cramps. This can be avoided by going for mechanical handling of the product or minimising the weight for manual handling.*" (in case of this project final product is electricity !).

Further it is also observed that two important Sections of the EIA Report, namely 7.6 "Risk Assessment" and 7.7 "Disaster Management Plan" are almost entirely generic and contain hardly any site or project specific aspects. For example, though Tungapadu Vagu passes through the project site and EAC has directed specific measures for the protection of the same, there is no mention of Tungapadu Vagu in either section 7.6 or section 7.7. Instances such as possible effects of its flooding and /or embankment breach on the plant or impact of a disaster at plant on the Vagu and its environment / downstream, which should have been properly assessed in these two section, are completely missing.

Based on above observations, it is amply clear that several parts of the EIA/EMP have been prepared simply based on 'copy-paste' approach, without application of mind and considerations of site specific factors for crucial aspects such as Risk Assessment and Disaster Management. Above is a representative and not exhaustive list, indicating a casual approach towards the preparation of the EIA report on the Project Proponent's

part. *So, in light of the allegations of significant plagiarism and above mentioned observations, the MoEFCC may take necessary action on the relevant stakeholders.*

2. *Absence of FGD in plant layout, and consequent processes:*

   PP has contended that the plant will comply with MOEFCC notification dt. 7th December 2015 regarding stack emission, and that FGD will be installed. EAC asked PP about the location of FGD in the plant layout. In response to this query, PP admitted that FGD has not been included in the plant layout yet. Similarly, FGD and associated processes are also not covered in water balance, process flow and mass balance calculations.

   In light of this, the plant layout needs to be revised to include FGD and allied equipment / processes, and various plant processes need due consideration of issues like disposal of sludge in solid waste management, sulphur balance, water balance etc.

3. *Absence of crucial details and data regarding water withdrawal and availability:*

   In response to a query regarding specific water withdrawal point, PP informed that specific water withdrawal point has not been specified / considered in the EIA. In the absence of specific water withdrawal point, it would not be feasible to assess issues such as sustainability of water even in lean period, ecological impacts arising out of withdrawal of water, downstream uses and impact thereon etc. Further, the committee also observed that crucial data regarding water availability is quite dated and recent data, which is most relevant, has not been considered. For example, in Table 7 regarding monthly observed discharge at Pondugala G & D site, data only upto year 1999 – 2000 has been considered. *These deficiencies need to be addressed and adequate study of downstream impact of water withdrawal and water availability during lean period need to be included in the EIA.*

4. *Need for firm commitment from Irrigation Department to maintain minimum ecological flows in Tungapadu Vagu*

   Additional ToR#7 states that "To sustain the downstream ecology of the Tungapadu Vagu, the **Irrigation Department should release** minimum ecological flows from the reservoirs constructed in the upstream. (emphasis added). In response, the PP has merely stated that *"Irrigation Department will be informed ..... and will be requested to take necessary action...."* (Sld. 126 of the presentation). This clearly shows that as yet there is no firm commitment of the irrigation department to release minimum ecological flows. *Hence, a firm commitment from irrigation department needs to be obtained and the same should be included in the revised EIA.*

5. *Explore the feasibility of ACC instead of WCC.*

6. *Cumulative impact study of various industries in buffer zone has not been made with details on emission data, stack heights and distances from plant site.*

7. *The impact of fugitive emissions on ambient air quality, with prediction of PM_{10} and $PM_{2.5}$ has not been made from the sources such as Coal Handling Plant, Coal Storage yard, Ash Pond, lime handling and storage including gypsum that will be generated*

from FGD unit. Impact of fugitive emission due to transportation of material is also required to be assessed.

8. *The coal linkage documents for imported and domestic coal cannot be considered as firm coal linkage. Imported coal MoU says non-enforceable and also doesn't specify the quality of coal and source of coal is also not specified. The MoC allocation/approval for domestic coal is required.*

9. *Coal analysis report from BHEL regarding use of blended coal.*

10. *EIA report as well as subsequent responses by PP indicate substantial confusion and lack of details regarding actual coal unloading and transportation arrangements. Some places it is mentioned that coal will be transported from two ports and some other places four ports are mentioned. Hence, complete and specific details regarding coal import ports and coal transportation routes need to be provided. Clear permissions from Railways and Port Authorities for imported coal should be obtained.*

11. *ToR 17, details of the mineralogical map from the State Geology Dept. Accordingly, MoC permission.*

12. *The PP submitted a detailed response to all the recommendations made by the Sub-Committee in its report on the Site Visit in the 50th EAC (T&C) meeting held during 28–29 January, 2016. The PP should provide action plans on the recommendations relating to restoration of degraded forest areas in the project area and creation of a permanent corpus fund for tribal welfare and adequate compensation for land loosers irrespective of their status besides best possible R&R package and extending social welfare schemes and healthcare systems for local communities.*

13. *As per the EIA report, the soil characteristics suggest that the land in the study area is a fertile land. Therefore, provision should be made to collect the top soil from the project area and preserve for raising plantation, etc.*

14. *Approximately, 75% and 25% areas are having under the category of forest and non-forest land, respectively. The forest land (including degraded) proposed to be included in the minimum 33% green belt should be treated as rejuvenation of forestland, instead otherwise may be.*

15. *The PP should give proper & detailed response along with an Action Plan in respect of queries raised during the Public Hearing along with CSR budgetary details provided during the stage of commissioning of the Project.*

16. *In light of the major shortcomings as noted above, EIA/EMP needs to be redone (though currently used baseline data can be used) which needs to address above mentioned points, and public hearing is also to be conducted again based on the redone EIA/EMP.*

(2.5.3) The proposal was accordingly, ***deferred.***

2.6 Expansion of 4x250 MW by addition of 4x600 MW Coal Based Thermal Power Plant at Tamnar, Tehsil Gharghoda, District Raigarh, Chhattisgarh by M/s Jindal Power Ltd. - reg. amendment of EC.

MINUTES OF THE 1stMEETING OF THE RE-CONSTITUTED EXPERT APPRAISAL COMMITTEE (EAC) ON ENVIRONMENTAL IMPACT ASSESSMENT (EIA) OF THERMAL POWER PROJECTS

The 1stMeeting of the reconstituted EAC (Thermal Power) was held on 28thDecember, 2016 in the Ministry of Environment, Forest& Climate Change at Indus Meeting Hall, Jal Wing, Ground Floor, Indira Paryavaran Bhawan, Jorbagh Road, New Delhi under the Chairmanship of Dr. Navin Chandra. The following members were present:

1.	Dr. Navin Chandra	-	Chairman
2.	Dr. Narmada Prasad Shukla	-	Member
3.	Dr. N. Mohan Karnat	-	Member
4.	Shri P.D. Siwal & Shri N.S. Mondal	-	Member (Representative of CEA)
5.	Dr. R.K. Giri	-	Member (Representative of IMD)
6.	Dr. S.K. Paliwal	-	Member (Representative of CPCB)
7.	Prof. S.K. Sinha	-	Member (Representative of ISM Dhanbad)
8.	Dr. S. Kerketta	-	Member Secretary

Dr. Rajesh P. Gunaga and Dr. Sharachchandra Lele could not be present.

ITEM NO. 1: WELCOME NOTE BY MEMBER SECRETARY AND ADDRESS BY CHAIRMAN, EAC.

The Member Secretary welcomed the Chairman and all the Experts Members of the newly constituted Expert Appraisal Committee for Thermal and Coal Mine Projects and briefed the Committee about the salient features of the provisions of the EIA Notification, 2006 and its amendments thereof and the procedures adopted for appraisal of project proposals. He made a brief presentation to Committee regarding various policy decisions taken by the Ministry and issued through various Office Memorandums w.r.t Thermal Power Projects time to time.

The Member Secretary also expressed gratitude to the earlier EAC on behalf of the Ministry as the tenure of that EAC was ended on 01.09.2016.

The Chairman in his address highlighted the requirement of maintaining true spirit of neutrality while appraising a project proposal placed before the Committee and felt that in doing so, merit of the case shall be the sole criteria for recommendations by the Committee.

The detailed deliberations held among the Functional Experts on the individual project and the decisions taken are as under:

Item No. 2: CONSIDERATION OF PROJECTS

2.1 Proposed expansion of 3x660 MW, Phase-II, Coal based Thermal Power Plant Villages, Mirchwara & Buraugaon Tehsil Mahroni, District Lalitpur, Uttar Pradesh by M/s Lalitpur Power Generation Company Limited - reg. ToR

(2.1.1) The Project Proponent (PP) along with their environmental consultant, M/s Vimta Labs, Hyderabad has made a presentation and inter-alia provided the following information:

i. The present expansion proposal of 3x660 MW Super Critical Power Project will be set up in the existing premises of Phase-I (3x660 MW) Power Plant which is under operation.

viii. *As part of CSR, water supply provision shall be made for all the toilets which have already been constructed and also to be constructed in future under Swatchha Bharat Abhiyan.*

ix. *Environment Policy, details of Environment Cell with commitments of top management towards environment protection shall be submitted.*

x. *Details of court cases regarding land acquisition, if any, may be provided.*

2.7 5x800 MW Super Critical Coal Based Yadadri Thermal Power Station at Village Veerlapalem, District Nalgonda, Telangana by M/s. Telangana State Power Generation Corporation Ltd. (TSGENCO) - reg. Reconsideration of EC.

(2.7.1) The proposal was earlier placed before the EAC in its 59th, 60th& 63rd meetings held during 14th& 15thJuly, 2016, 27th July, 2016 and 29th&30th August, 2016, respectively the minutes of which are as under:

Quote" The EAC noted that the background documents had not been received by some of the members, and where received, had been received only one day before or on the same day of EAC meeting, thus not giving an opportunity even to such Members to fully study the documents. As such, the EAC was not in a position to consider the case. The proposal was, therefore, **deferred.** However, to save time for this proposal's consideration in the next EAC meeting, the PP was provided a copy each of the two representations received by the EAC for a detailed reply to be submitted by the PP to the Ministry well before the next EAC meeting, for action in line with the decision recorded under Agenda item 3.1 of this meeting.

Accordingly, the proposal was placed before the EAC in the 60th meeting held on 27th July, 2016. *However, the EAC was informed that vide letter dt 26th July 2016 addressed to the Member Secretary, the PP has requested for* ***deferment*** *in view of preparations required to be made for the PMs visit to Telangana.*

(2.5.2) The EAC inter-alia observed/recommended the following:

1. Plagiarism, Irrelevant content, and absence of crucial site and plant specific analysis:

EAC received several complaints about issues such as plagiarism and 'copy-paste' sections of the EIA. On examination, EAC found several such instances. Some examples are reproduced in below table.

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"7.6.1 Plant Description *Thermal power plant is electricity generation plant which converts the fossil fuel stored energy to electrical energy by means of generating electricity. In other words, it is merely a chain of Energy conversion as follow:* • *Chemical energy in the fuel is converted to Heat energy of steam.* • *Heat energy of steam is converted to Mechanical or rotating energy of a rotating wheel called Turbine.* • *The mechanical energy of Turbine is converted as Electrical Energy in a Generator."*	"III. PLANT DISCRIPTION *Thermal power plant is electricity generation plant which converts the fossil fuel stored energy to electrical energy by means of generating electricity. In other words, it is merely a chain of Energy conversion as follow:* • *Chemical energy in the fuel is converted to Heat energy of steam.* • *Heat energy of steam is converted to Mechanical or rotating energy of a rotating wheel called Turbine.* • *The mechanical energy of Turbine is converted as Electrical Energy in a Generator."*
The plant description section mentions no project specific details at all.	
"***A. Coal Handling Plant*** *Coal transported to the plant by the rail line and carrier trucks. This coal is transfer from the underground bunker to crusher by series of conveyer belt. In coal crusher coal size reduced up to ¾" after that coal transfer to the boiler's coal bunker or coal yard. In the case of emergency the coal is fetch from coal yard. Coal feeder control the quantity of coal from coal bunker and send it to the ball mill or roll mill for pulverization process. Where coal crushed to the fine powder and mixed with preheated air come through the air from preheater. This process use for drying the coal and sends*	"***A. Coal Handling Plant*** *Coal transported to the plant by the rail line and carrier trucks. This coal is transfer from the underground bunker to crusher by series of conveyer belt. In coal crusher coal size reduced up to ¾" after that coal transfer to the boiler's coal bunker or coal yard. In the case of emergency the coal is fetch from coal yard. Coal feeder control the quantity of coal from coal bunker and send it to the ball mill or roll mill for pulverization process. Where coal crushed to the fine powder and mixed with preheated air come through the air from preheater. This process use for drying the coal and sends*

coal powder up to the burner of furnace. The rest of impure coal and rocks pass out to the bottom of mill and transfer to the clinker grinder then to the storage."	*coal powder up to the burner of furnace. The rest of impure coal and rocks pass out to the bottom of mill and transfer to the clinker grinder then to the storage."*
*"**D. Turbine and Generator*** *The generated steam is passing through the super heater to the high pressure turbine. After driving the turbine a part of this steam sends to the H.P. heater 2 and left pass through the reheater then secondary super heater and regain its pressure to drive Intermediate turbine. Then the steam transfer to the H.P.H 2 and low pressure turbine. Then steam from low pressure turbine transfer to L.P.H 4-5-6 and condenser. In condenser steam is cooled by cooling water and then deaerator circulates it for steam generation. The three turbines used to drive one shaft which drives the rotor of the generator by mean to generate electricity. The various auxiliaries of turbine and generator is cooled by hydrogen gas and cooling oil."*	*"**D. Turbine and Generator*** *The generated steam is passing through the super heater to the high pressure turbine. After driving the turbine a part of this steam sends to the H.P. heater 2 and left pass through the reheater then secondary super heater and regain its pressure to drive Intermediate turbine. Then the steam transfer to the H.P.H 2 and low pressure turbine. Then steam from low pressure turbine transfer to L.P.H 4-5-6 and condenser. In condenser steam is cooled by cooling water and then deaerator circulates it for steam generation. The three turbines used to drive one shaft which drives the rotor of the generator by mean to generate electricity. The various auxiliaries of turbine and generator is cooled by hydrogen gas and cooling oil."*
The text from the original paper refers to the acronyms (H.P.H 2 etc.) used in a diagram in the paper, which are absent / not relevant in the EIA report diagrams. Also sections B. D.M. Plant, C. Boiler, E. Switch Yard are also exact copy but have not been reproduced here for brevity.	
Section 7.6.3 HAZID *"Risk initiating event likelihood and consequences are assumed by taken reference of visited plant real activities. Risk Classification screening table is given below"*	IV RISK ASSESSMENT *"Risk initiating event likelihood and consequences are assumed by taken reference of visited plant real activities. Risk Classification screening table is given below"*
Table 7.80 :Risk Classification Screening	TABLE I: RISK CLASSIFICATION SCREENING TABLE
Table 7.81: Risk Classification	TABLE II: RISK CLASSIFICATION ASSOCIATED WITH TABLE I
Above tables are exact copy-paste of the same source cited above. They are not reproduced for brevity.	

In addition to above 'copy-paste' exercise, EAC also observed several **incorrect or irrelevant statements** in the Final EIA report. For example,

- Section 7.8, Occupational Health and Safety - *"As a **small business owner** one has certain rights and responsibilities regarding health and safety in the workplace."* (a project of 4000 MW cannot be called 'small business').

- Section 7.6.3.1 subheading Handling of heavy bags -"***Handling of heavy bags of the final products*** *may lead to occupational injuries like strains, sprains and cramps. This can be avoided by going for mechanical handling of the product or minimising the weight for manual handling.*" (in case of this project final product is electricity !).

Further it is also observed that two important Sections of the EIA Report, namely 7.6 "Risk Assessment" and 7.7 "Disaster Management Plan" are almost entirely generic and contain hardly any site or project specific aspects. For example, though Tungapadu Vagu passes through the project site and EAC has directed specific measures for the protection of the same, there is no mention of Tungapadu Vagu in either section 7.6 or section 7.7. Instances such as possible effects of its flooding and /or embankment breach on the plant or impact of a disaster at plant on the Vagu and its environment / downstream, which should have been properly assessed in these two section, are completely missing.

Based on above observations, it is amply clear that several parts of the EIA/EMP have been prepared simply based on 'copy-paste' approach, without application of mind and considerations of site specific factors for crucial aspects such as Risk Assessment and Disaster Management. Above is a representative and not exhaustive list, indicating a casual approach towards the preparation of the EIA report on the Project Proponent's part. *So, in light of the allegations of significant plagiarism and above mentioned observations, the MoEFCC may take necessary action on the relevant stakeholders.*

2. *Absence of FGD in plant layout, and consequent processes:*

   PP has contended that the plant will comply with MOEFCC notification dt. 7th December 2015 regarding stack emission, and that FGD will be installed. EAC asked PP about the location of FGD in the plant layout. In response to this query, PP admitted that FGD has not been included in the plant layout yet. Similarly, FGD and associated processes are also not covered in water balance, process flow and mass balance calculations.

   In light of this, the plant layout needs to be revised to include FGD and allied equipment / processes, and various plant processes need due consideration of issues like disposal of sludge in solid waste management, sulphur balance, water balance etc.

3. *Absence of crucial details and data regarding water withdrawal and availability:*

   In response to a query regarding specific water withdrawal point, PP informed that specific water withdrawal point has not been specified / considered in the EIA. In the absence of specific water withdrawal point, it would not be feasible to assess issues such as sustainability of water even in lean period, ecological impacts arising out of withdrawal of water, downstream uses and impact thereon etc. Further, the committee also observed that crucial data regarding water availability is quite dated and recent data, which is most relevant, has not been considered. For example, in Table 7 regarding monthly observed discharge at Pondugala G & D site, data only upto year 1999 – 2000 has been considered. *These deficiencies need to be addressed and adequate study of downstream impact of water withdrawal and water availability during lean period need to be included in the EIA.*

4. *Need for firm commitment from Irrigation Department to maintain minimum ecological flows in Tungapadu Vagu*

   Additional ToR#7 states that "To sustain the downstream ecology of the Tungapadu Vagu, the **Irrigation Department should release** minimum ecological flows from the reservoirs constructed in the upstream. (emphasis added). In response, the PP has merely stated that *"Irrigation Department will be informed ..... and will be requested to take necessary action...."* (Sld. 126 of the presentation). This clearly shows that as yet there is no firm commitment of the irrigation department to release minimum ecological flows. *Hence, a firm commitment from irrigation department needs to be obtained and the same should be included in the revised EIA.*

5. *Explore the feasibility of ACC instead of WCC.*

6. *Cumulative impact study of various industries in buffer zone has not been made with details on emission data, stack heights and distances from plant site.*

7. *The impact of fugitive emissions on ambient air quality, with prediction of PM_{10} and $PM_{2.5}$ has not been made from the sources such as Coal Handling Plant, Coal Storage yard, Ash Pond, lime handling and storage including gypsum that will be generated from FGD unit. Impact of fugitive emission due to transportation of material is also required to be assessed.*

8. *The coal linkage documents for imported and domestic coal cannot be considered as firm* coal linkage. *Imported coal MoU says non-enforceable and also doesn't specify the quality of coal and source of coal is also not specified. The MoC allocation/approval for domestic coal is required.*

9. *Coal analysis report from BHEL regarding use of blended coal.*

10. *EIA report as well as subsequent responses by PP indicate substantial confusion and lack of details regarding actual coal unloading and transportation arrangements. Some places it is mentioned that coal will be transported from two ports and some other places four ports are mentioned. Hence, complete and specific details regarding coal import ports and coal transportation routes need to be provided. Clear permissions from Railways and Port Authorities for imported coal should be obtained.*

11. *ToR 17, details of the mineralogical map from the State Geology Dept. Accordingly, MoC permission.*

12. *The PP submitted a detailed response to all the recommendations made by the Sub-Committee in its report on the Site Visit in the 50th EAC (T&C) meeting held during 28–29 January, 2016. The PP should provide action plans on the recommendations relating to restoration of degraded forest areas in the project area and creation of a permanent corpus fund for tribal welfare and adequate compensation for land loosers irrespective of their status besides best possible R&R package and extending social welfare schemes and healthcare systems for local communities.*

13. *As per the EIA report, the soil characteristics suggest that the land in the study area is a fertile land. Therefore, provision should be made to collect the top soil from the project area and preserve for raising plantation, etc.*

14. *Approximately, 75% and 25% areas are having under the category of forest and non-forest land, respectively. The forest land (including degraded) proposed to be included in the minimum 33% green belt should be made as a part of rejuvenation of forestland, instead otherwise may be.*

15. *The PP should give proper & detailed response along with an Action Plan in respect of queries raised during the Public Hearing along with CSR budgetary details provided during the stage of commissioning of the Project.*

16. *In light of the major shortcomings as noted above, EIA/EMP needs to be redone (though currently used baseline data can be used) which needs to address above mentioned points, and public hearing is also to be conducted again based on the redone EIA/EMP.*

(2.5.3)The proposal was accordingly, ***deferred.*** **"Unquote**

(2.7.2) PP vide their letter dated 08.10.2016 and during the presentation along with their Environmental Consultant, viz.,M/s B.S. Envi-Tech Pvt. Ltd., Secunderabad inter-alia stated following:

i. Requests for exemption of re-conducting the Public Hearing as the Public Hearing was conducted recently on 31.05.2016 which was attended by 3,500 people from surrounding villages of which 54 persons spoke regarding environmental and social issues and a total 16 written representations received from the villagers.
ii. As EAC observed certain shortcomings in final EIA/EMP report prepared by M/s Bhagavathi Ana Labs Pvt. Ltd (a Bureau Veritas Group Company), PP terminated the contract of Bhagavathi Ana Labs Pvt Ltd. and appointed M/s B.S. Envi-Tech (P) Ltd for revising the EIA/EMP inline with EAC observations.
iii. Revised EIA/EMP report has been prepared incorporating the issues raised by EAC in its 63rd meeting held during 29th-30th August, 2016.
iv. Re-conducting of public hearing will cause substantial delay in project schedule and will have major impact on power starved new state of Telangana as it is now facing acute power problem.
v. Similar projects in the past were asked to upload the revised EIA/EMP report on website to seek the public comments and were subsequently considered for appraisal for grant of Environmental Clearance.
vi. In case of Odisha Thermal Power Corporation Ltd (3x 800 MW) in Denkanal Dist., Odisha, Committee held the validity of PH is same as validity of ToR. In case of KU Thermal Power Pvt. Ltd. (2x660 MW) in Thoothukudi Dist., Tamil Nadu, EAC recommended for grant of EC based on revised EIA/EMP after seeking Public Comments. In case of Chettinad Power Corp. Pvt. Ltd. (2x600MW) in Nagapattinam Dist., Tamil Nadu, Hon'ble NGT upheld the Public Hearing and asked the PP to revise and upload the EIA/EMP report.
vii. No change in location, capacity, extent of land and survey numbers of the project area, re-conducting of Public Hearing may be exempted.

(2.7.3) Committee noted that the Ministry has written to NABET to initiate necessary action against the M/. Bhagavathi Ana Labs Pvt. Ltd and inform the same in light of plagiarism/'copy-paste' approach in preparation of EIA/EMP.

(2.7.4) *Committee after detailed deliberations,* ***exempted M/s TSGENCO Ltd. for re-conducting the Public Hearing*** *subject to the following conditions:*

i. *New EIA consultant B.S. Envi-Tech Pvt. Ltd. should own the baseline data collected by the earlier consultant and revise the final EIA as per EAC observations. In this regards, a written commitment should be submitted to the Ministry.*
ii. *Revised EIA/EMP shall be submitted to Telangana State Pollution Control Board for puploading the revised EIA/EMP on their website for seeking public comments. Notice shall be published in two newspapers preferably one in vernacular language of the locality concerned and another one in English newspapers to seek the public comments/suggestions within 3 weeks from the date of notice.*
iii. *PP should address all the public comments received within 3 weeks, incorporate the issues & action plan in the revised EIA and submit the final EIA/EMP to the Ministry for further consideration.*

2.8 Enhancement of Captive Power Plant by installing Turbine (20 MW) at Birlasagar, Village Chhaya, District & Tehsil Porbandar, Gujarat by M/s Saurashtra Chemicals Division of Nirma Ltd. - reg. ToR

(2.8.1) Project Proponent (PP) vide their application and during the presentation provided the following information:

i. Proposal is for addition of 20 MW Power by installing a Turbine to the existing 20 MW Captive Power Plant.
ii. 20 MW Captive Power Plant located at Birlasagar, Village: Chhaya, Taluka & District: Porbandar, Gujarat which has been in operation since 1959 is catering to the manufacturing facility of Soda Ash (Light: 28,000 MT/month & Dense: 6,000 MT/ month), Sodium Bicarbonate (1100 MT/month), Caustic Lye (620 MT/month) and Liquid Bromine (20 MT/month).
iii. Co-ordinates of the plant are as below:
    a. 21°37'38.70"N, 69°37'35.20"E,
    b. 21°37'39.00"N, 39°37'36.00"E,
    c. 21°37'36.50"N, 69°37'36.00"E and
    d. 21°37'36.50"N, 69°37'37.20"E.
iv. Porbandar City is at 3.5 km and the Arabian sea is at 1.5 km. Project site boundary is well beyond minimum distance of 500 m from CRZ boundary. However, water intake pipeline of 1.2 km from Sea falls within CRZ area.
v. Since, the Unit has been in operations since 1959, Environment Clearance was not available. However, the Unit has valid Consent to Operate (CTO) from Gujarat Pollution Control Board (GPCB) vide Order No.AWH-66634 dated 02.12.2014 which is valid up to 08.09.2019.

ANNEXURE – 1E

VISION DOCUMENT

Telangana State Power Generation Corporation Limited (TSGENCO) is one of the pivotal organizations of Telangana, engaged in the business of Power Generation. With the formation of new State of Telangana, TSGENCO came into existence on 19.05.2014 and commenced operations from 02.06.2014. All the Generating Stations owned by erstwhile APSEB in Telangana area were transferred under the control of TSGENCO.

Apart from operation & maintenance of the power plants it has undertaken the execution of the ongoing & new power projects scheduled under capacity addition programme and is also taking up renovation & modernization works of the old power stations.

The installed capacity of TSGENCO as on 30.11.2016 is 5235.26 MW comprising of 2882.50 MW Thermal, 2351.76 MW Hydel and 1 MW from renewable energy sources thus contribute about 46% of the total energy requirement of Telangana.

Per capita energy consumption in Telangana was over 1,394 units (FY 2014-15, as per the data sets furnished by DISCOMs), which is high in comparison to the all India average of 1,010 units (as per CEA). Energy deficit in the state of Telangana was in the range of 4%-12% in the past and energy requirement is expected to significantly increase in the next five years owing to the some of the aforementioned key demand drivers

The Government of Telangana is planning significant investments towards development of urban centers in Karimnagar, Warangal, and Nizamabad. Other upcoming major projects in the state include, Hyderabad Metro Rail, Hyderabad ITIR region, Lift Irrigation Schemes, Water Grid Project and Hyderabad-Nagpur Industrial corridor

The State of Telangana requires substantial addition to its power generating capacity to meet power demand of its rapidly growing industrial, agricultural and other sectors. As per the 18th EPS, the installed capacity required by 2018-19 would be 17041 MW to meet the peak demand of 13108 MW. The capacity addition by TSGENCO to meet the increased demand for power in Telangana State is tabulated below

CAPACITY ADDITION ENVISAGED BY TSGENCO

S. No.	Project	MW
1	Kothagudem TPS Unit # 12 (1x800 MW)	800
2	Manuguru TPP (4x270 MW)	1080
3	Yadadri TPP (5x800 MW)	4000
	Capacity Addition Programmed	**5880**

YADADRI THERMAL POWER STATION

TSGENCO has envisaged development of ultimate capacity of 4000 MW (5 X 800 MW) Coal Based Thermal Power Plant based on Supercritical Technology near Veerlapalem Village, Damercherla Mandal, Nalgonda (Dist), Telangana.

TSGENCO will comply with all the conditions stipulated by MoEF & CC and TSPCB

TSGENCO will implement additional pollution control equipment to comply with the new norms of MoEF & CC stipulated for Thermal Power Stations.

VISION

- To commission the plant by implementing State of Art Technology
- To operate the plant in a sustainable manner protecting the environment.
- To operate the plant with professionally superior internal strength and resource to ensure high plant performance.
- To work together in close relationship with stake holders for sustainable society
- To review periodically and implement best practices in power generation.
- To utilize resources in optimal manner, reduce waste and to adopt waste utilization to the extent possible.
- To conserve natural resources and restore the habitat of the surrounding areas
- To facilitate periodic review and to put in place appropriate institutional arrangements to ensure environmental safeguards.
- To impart training for skill development and orientation to various work groups for employee participation with specific reference to environmental aspects.
- To communicate the vision statement and maintain the Environment through a dedicated Environmental Management Group (EMG) at station level.

ANNEXURE – 1 F

COMPLAINCE TO THE TERMS OF REFERENCE

Compliance To Standard Terms Of Reference issued by MoEF & CC, GoI vide letter No. J-13012/18/2015 - IA.I (T)s dated 2nd November, 2015

S.No.	ToR Points	Compliance Status
1	The proposed project shall be given a unique name in consonance with the name submitted to other Government Departments etc. for its better identification and reference.	The proposed Thermal Power Project is named as 4000 MW Yadadri Thermal Power Station (5 x 800 MW - Supercritical Coal Based Thermal Power Plant). The details of the same are provided in Cover Page and Chapter – 1, Para - 1.2.1, Page No. - 4
2	Vision document specifying prospective long term plan of the project shall be formulated and submitted.	Vision document of TSGENCO specifying long term plan is enclosed as Annexure – 1E
3	Latest compliance report duly certified by the Regional Office of MoEF&CC for the conditions stipulated in the environmental and CRZ clearances of the previous phase(s) for the expansion projects shall be submitted.	Not Applicable The proposed project is a Green Field Project.
4	The project proponent needs to identify minimum three potential sites based on environmental, ecological and economic considerations, and choose one appropriate site having minimum impacts on ecology and environment. A detailed comparison of the sites in this regard shall be submitted.	Details of three alternative sites evaluated are provided in Chapter – 5, Para – 5.2, Page No. – 305
5	Executive summary of the project indicating relevant details along with recent photographs of the proposed site (s) shall be	Executive summary with details of the project with recent photographs and response to the issues raised during Public Hearing and the written representations along with a time

S.No.	ToR Points	Compliance Status
	provided. Response to the issues raised during Public Hearing and the written representations (if any), along with a time bound Action Plan and budgetary allocations to address the same, shall be provided in a tabular form, against each action proposed.	bound Action Plan and budgetary allocations in tabular form is enclosed in the Revised EIA Report.
6	Harnessing solar power within the premises of the plant particularly at available roof tops and other available areas shall be formulated and for expansion projects, status of implementation shall also be submitted.	Solar Power will be generated by Roof Top Solar Power Panels. The total solar power generation is estimated to be approx. 2552 KW (@ 1kW/m^2). An amount of Rs 16.5 crores will be incurred for setting up the solar panels in the plant area. Details of the same are furnished in Chapter – 7, Para – 7.7, Page No. - 412
7	The geographical coordinates (WGS 84) of the proposed site (plant boundary), including location of ash pond along with topo sheet (1:50,000 scale) and IRS satellite map of the area, shall be submitted. Elevation of plant site and ash pond with respect to HFL of water body/nallah/River and high tide level from the sea shall be specified, if the site is located in proximity to them.	The geographical coordinates (WGS 84) of the proposed site are given in Chapter – 2 Para 2.3, Page – 9 Topo Map showing plant boundary including location of ash pond on topo sheet is shown in Chapter – 2, Fig – 2.2 Page - 12 IRS satellite map of the area plant boundary including location of ash pond is shown in Chapter – 3, Fig – 3.15 & 3.16, Page 112 & 115 Elevation of plant site and ash pond with respect to HFL of Krishna River are detailed in Chapter – 4, Para 4.2.3.11, Page -261. Details of the same are shown in Chapter – 4, Fig – 4.20, Page - 262
8	Layout plan indicating break-up of plant area, ash pond, green belt, infrastructure, roads etc.	Revised Layout Plan of the project alongwith break-up of plant area, ash pond, green belt, infrastructure, roads etc. are detailed in Chapter – 2,

S.No.	ToR Points	Compliance Status
	Shall be provided.	Para 2.7, Page – 25 Map of the Revised Layout Plan is shown in Chapter – 2, Fig – 2.8, Page - 26
9	Land requirement for the project shall be optimized and in any case not more than what has been specified by CEA from time to time. Item wise break up of land requirement shall be provided.	The total land requirement of the project is about 2800 acres complying with CEA norm of 0.7 acres/MW. Item wise break up of land requirement is provided in Chapter – 2, Para – 2.5.1 & 2.7, Page No. – 16 & 25
10	Present land use (including land class/kism) as per the revenue records and State Govt. records of the proposed site shall be furnished. Information on land to be acquired including coal transportation system, laying of pipeline, ROW, transmission lines etc. shall be specifically submitted. Status of land acquisition and litigation, if any, should be provided.	The total land requirement of the project is about 2800 acres. Of the total area, 2095.28 acres is Forest Land falling under Veerlapalem Forest Block and 704.12 acres consists of Patta Land, Government Land, Udafa patta Land and D-Patta Land under the jurisdiction of Damercherla Mandal, Nalgonda District, Telangana State. Details of the same along with status of Land acquisition are given in Chapter – 2, Para – 2.5.1 Page No. -16 Information on land required for external facilities like coal transportation system, laying of pipeline are provided in Chapter – 2, Para 2.7, Page – 25
11	If the project involves forest land, details of application, including date of application, area applied for, and application registration number, for diversion under FCA and its status should be provided along with copies of relevant documents	Forest land of 1892.35 Ha under Veerlapalem forest block, Damercherla Mandal, Nalgonda District is diverted in favour of TSGENCO vide Lr. No. F.No. 8-07/2015-FC, dated: 7th July 2015. Details of the same are provided in Chapter – 7,Para – 7.5, Page No. -405
12	The land acquisition and R&R scheme with time bound action plan should be formulated and addressed in the EIA report.	An amount of Rs. 198.59164 Crores was paid towards cost of NPV of forest land and cost of compensatory afforestation to an extent of 4676 Acres was deposited with Principal Chief Conservator of Forest,

S.No.	ToR Points	Compliance Status
		Hyderabad. An amount of Rs 285.81 Crores toward land compensation, R&R package and other charges was deposited with District Collector, Nalgonda on 4h January 2016 towards an extent of Acres 854-32 Guntas of Patta land and Acres 920-25 Guntas of ROFR land. For establishment of Rehabilitation Centre, an amount of Rs. 16.00 Crores is proposed for land acquisition, providing basic amenities, constructing Govt. Buildings, religious buildings and providing grave yard, etc. Details of the above are provided in Chapter – 7 Para – 7.5 & 7.5.1,Pages 405 – 411
13	Satellite imagery and authenticated topo sheet indicating drainage, cropping pattern, water bodies (wetland, river system, stream, nallahs, ponds etc.), location of nearest habitations (villages), creeks, mangroves, rivers, reservoirs etc. in the study area shall be provided.	Satellite imagery alongwith Landuse and Landcover Map is shown in Chapter – 3 Fig – 3.15 & 3.16 Page No. – 112 & 115
14	Location of any National Park, Sanctuary, Elephant/Tiger Reserve (existing as well as proposed), migratory routes / wildlife corridor, if any, within 10 km of the project site shall be specified and marked on the map duly authenticated by the Chief Wildlife Warden of the State or an officer	There are no wild life sanctuaries, national parks, elephant/tiger reserves within 10km radius of the study area. Amrabad Tiger Reserve is located at a distance of 14.03 km from project site. The Letter and Authenticated Map obtained from Principal Chief Conservator of Forests (WL) and Chief Wild Life Warden, Forest Department, Government of Telangana. Details of the same are given in Chapter – 2, Para – 2.3, Page No. – 9 and Annexure – 2 A

S.No.	ToR Points	Compliance Status
	authorized by him.	
15	Topography of the study area supported by toposheet on 1:50,000 scale of Survey of India, along with a large scale map preferably of 1:25,000 scale and the specific information whether the site requires any filling shall be provided. In that case, details of filling, quantity of required fill material; its source, transportation etc. shall be submitted.	Topography of the study area on toposheet is shown in Chapter – 2, Fig – 2.5, Page no. - 17 The project development will involve cut and fill quantities for achieving the required grades as per the layout design. Quantity of cutting is estimated about 80,00,000 m^3 and the quantity of filling required is about 66,00,000 m^3. The fill quantity required is less than the cut quantity. Hence, the material obtained from cutting will be used for filling low lying areas. No material will be required from outside the project area for grading. Cut and fill details are provided Chapter – 4, Para – 4.1, Page 209
16	A detailed study on land use pattern in the study area shall be carried out including identification of common property resources (such as grazing and community land, water resources etc.) available and Action Plan for its protection and management shall be formulated. If acquisition of grazing land is involved, it shall be ensured that an equal area of grazing land be acquired and developed and detailed plan submitted.	Detailed land use pattern in the study area is given in Chapter – 3, Para – 3.4.4 & Fig – 3.16 Page No. – 111 &115 Development of common property resources addressed under Chapter – 4 Para - 4.2.5.3 , Page - 283
17	A mineralogical map of the proposed site (including soil type) and information (if available) that the site is not located on potentially mineable mineral deposit shall be submitted.	Mineralogical map provided by Department of Mines and Geology, Govt of Telangana is shown in Chapter – 2, **Fig – 2.6, Page – 19.** As per map, there is no presence of coal deposits in the proposed project site. letter obtained. The letter obtained from Department of Mines and Geology, Govt of Telangana is enclosed as **Annexure –**

S.No.	ToR Points	Compliance Status
		2B. Also letter issued by the M/s SCCL in support of absence of coal projects is enclosed as **Annexure - 2B(I)**. The above details are furnished in Chapter – 2 Para – 2.5.1 & Fig – 2.6 Page No. – 16 & 19
18	Details of fly ash utilization plan as per the latest fly ash Utilization Notification of GOI along with firm agreements / MoU with contracting parties including other usages etc. shall be submitted. The plan shall also include disposal method / mechanism of bottom ash.	Fly ash utilization plan as per the latest fly ash Utilization Notification of GOI alongwith the plan of disposal method of bottom ash is detailed in Chapter – 4,Para – 4.2.6.1, Page No. 284 Tieup letters are provided in Annexure – 4 E
19	The water requirement shall be optimized (by adopting measures such as dry fly ash and dry bottom ash disposal system, air cooled condenser, concept of zero discharge) and in any case not more than that stipulated by CEA from time to time, to be submitted along with details of source of water and water balance diagram. Details of water balance calculated shall take into account reuse and recirculation of effluents.	The project is based on Zero Discharge Concept considering recycling of treated wastewater. Water requirement of the project is estimated to be 10,000 m^3/hr (97.8 cusecs/3.10 TMC per year) considering a COC of 5.0 and complying with the new norm of 2.5 m^3/MWHr. Details of water balance considering reuse and recycle are provided in Chapter – 4, Para – 4.2.3.4, Fig - 4.17 & Table – 4.8, Page No. 246, 249 & 251
20	Water body/Nallah (if any) passing across the site should not be disturbed as far as possible. In case any Nallah / drain is proposed to be diverted, it shall be ensured that the diversion does not disturb the natural drainage pattern of	Tungapahad Vagu (stream) passes through the project area. About 3.90 km of this Vagu passes through the project site taking south-easterly course and flows for a distance of 2.40 km before joining River Krishna. The project activities will not interfere with flow of Tungapahad Vagu since there is no extraction of water or

S.No.	ToR Points	Compliance Status
	the area. Details of proposed diversion shall be furnished duly approved by the concerned Department of the State	discharge. No diversion of Tungapadu vagu is proposed. Plant layout is designed to keep a minimum distance of 500 m buffer between ash pond and Tungapadu Vagu to prevent contamination. A 100 m barrier on either side of banks of the vagu will be left as barrier which will be developed under greenbelt. Details of the same are given in Chapter – 4, Para – 4.2.3.12 & 4.2.3.13, Fig – 4.21,Page No. 261, 263 & 266.
21	It shall also be ensured that a minimum of 500 m distance of plant boundary is kept from the HFL of river system / streams etc. and the boundary of site should also be located 500 m away from railway track and National Highways.	500 m minimum distance is maintained between the plant boundary and HFL of Krishna. Details of the same are provided in Chapter – 4, Para – 4.2.3.11 & Fig – 4.20, Page No. 261 & 262 Nearest railway line connecting Miryalaguda – Guntur of South Central Railway line is at a distance of 4.8 km to Eastern direction of project site. The State Highway (SH-2) connecting Narkatpally-Addanki is at a distance of 7.0 km in Southern Direction.
22	Hydro-geological study of the area shall be carried out through an institute/ organization of repute to assess the impact on ground and surface water regimes. Specific mitigation measures shall be spelt out and time bound Action Plan for its implementation shall be submitted.	Hydro-geological study of the area carriedout by M/s Vimta Labs Ltd through Hydro-Geosurvey Consultants Pvt. Ltd., Jodhpur (HCPL) is detailed in Chapter – 3, Para – 3.4.3 Page No.101 No ground water drawal is proposed Rainwater harvesting details are provided Chapter – 4, Para 4.2.3.14, Page No. - 265
23	Detailed Studies on the impacts of the ecology including fisheries of the River/Estuary/Sea due to the proposed withdrawal of water / discharge of treated wastewater into	The impact on fisheries will be reduced by considering the following measures: • R.C.C Intake well structure type is selected which will not disturb flow conditions that provide free movement to fishes.

S.No.	ToR Points	Compliance Status
	the River/Sea etc shall be carried out and submitted along with the EIA Report. In case of requirement of marine impact assessment study, the location of intake and outfall shall be clearly specified along with depth of water drawl and discharge into open sea	• Intake structures will be designed to minimize entrainment or impingement by providing strainers • No wastewater will be discharged into the River Krishna by TSGENCO. Details of the above are provided in Chapter – 4 Para – 4.2.3.9, Page No. 260
24	Source of water and its sustainability even in lean season shall be provided along with details of ecological impacts arising out of withdrawal of water and taking into account inter-state shares (if any). Information on other competing sources downstream of the proposed project and commitment regarding availability of requisite quantity of water from the Competent Authority shall be provided along with letter / document stating firm allocation of water.	Source of water is River Krishna. Krishna river is perennial in nature and even during the summer, just before the first monsoon rain, the minimum flow (June, 2005) has been measured as 25.72 Mm^3/month at Pondugala G/D station and the minimum flow (June, 2005) has been measured as 27.84 Mm^3/month at Wadenapalli station against the power plant requirement of 7.21 Mm^3/month. Thus the withdrawal percentage is less than 30% in lean season. the details of the same are given in Chapter – 4, Para – 4.2.3.8, Page No. 258 & Annexure – 4C Govt. of Telangana, Irrigation and CAD Department has allocated 208 cusecs of water (6.60 TMC/year) from Krishna River vide G.O. Ms No. 13 dated 30.01.2015 (Enclosed as **Annexure – 2F**). TSGENCO will utilize about 97.8 cusec (3.10 TMC per year) for the proposed 4000 MW from this allocation. Details of the same are furnished in Chapter – 2, Para – 2.5.3 Page No. 22
25	Detailed plan for rainwater harvesting and its proposed utilization in the plant shall be furnished.	Rainwater harvesting details are provided Chapter – 4, Para 4.2.3.14, Page No. - 265
26	Feasibility of near zero	Project is based on Zero Discharge

S.No.	ToR Points	Compliance Status
	discharge concept shall be critically examined and its details submitted.	Concept. No treated wastewater will be discharged into Krishna River or Tungapahad Vagu. Details of the same are provided inChapter – 4, Para – 4.2.3.6, Page No.- 254
27	Optimization of Cycles of Concentration (COC) along with other water conservation measures in the project shall be specified.	COC of 5 has been considered for estimation of cooling water requirement. Water conservation measures are given in Chapter – 4, Para – 4.2.3.7, Page No. -257
28	Plan for recirculation of ash pond water and its implementation shall be submitted.	Plan for recirculation of ash pond water is provided in Chapter – 2 Para – 2.10.3 & Fig – 2.11, Page No. 42 & 44
29	Detailed plan for conducting monitoring of water quality regularly with proper maintenance of records shall be formulated. Detail of methodology and identification of monitoring points (between the plant and drainage in the direction of flow of surface / ground water) shall be submitted. It shall be ensured that parameter to be monitored also include heavy metals. A provision for long-term monitoring of ground water table using Piezometer shall be incorporated in EIA, particularly from the study area.	Plan for conducting monitoring of water quality alongwith methodology and identification of monitoring points and parameter to be monitored are detailed in Chapter – 6, Para – 6.1.4 & Fig – 6.1, Page No. 312 & 310 Long-term monitoring of ground water table using Piezometer is detailed in Chapter – 6, Para – 6.1.5.2 & Fig – 6.1, Page No. 314
30	Socio-economic study of the study area comprising of 10 km from the plant site shall be carried out through a reputed institute / agency which shall consist of detail assessment of the impact on livelihood of the local communities.	Socio Economic study of the study area with detailed Primary Survey and Focus Group Discussions (FGD) was carriedout by Centre for Management and Social Research Development (CMSRD), Hyderabad. Details are funished in Chapter – 3, Para – 3.6, Page No. 133-202 The loss of livelihood is compensated in the R & R Package detailed under

S.No.	ToR Points	Compliance Status
		Chapter -7, Para – 7.5, Page No. -405
31	Action Plan for identification of local employable youth for training in skills, relevant to the project, for eventual employment in the project itself shall be formulated and numbers specified during construction & operation phases of the Project.	TSGENCO has earmarked budget of Rs 22.83 crores for training of local employable youth. Details of the same are provided in Chapter – 8, Para – 8.2.9, Page No. - 418
32	If the area has tribal population it shall be ensured that the rights of tribals are well protected. The project proponent shall accordingly identify tribal issues under various provisions of the law of the land.	TSGENCO has allocated an amount of Rs 100 Lakhs as permanent corpus fund for tribal welfare in addition to the compensation as per RRACT, 2013 for the land losers. Details of the same are provided in Chapter – 7, Para – 7.4.6, Page No. - 403
33	A detailed CSR plan along with activities wise break up of financial commitment shall be prepared. CSR component shall be identified considering need based assessment study and Public Hearing issues. Sustainable income generating measures which can help in upliftment of affected section of society, which is consistent with the traditional skills of the people shall be identified. Separate budget for community development activities and income generating programmes shall be specified.	A total of Rs. 100.40 Crores which is approximately 0.4% of the total cost of the project has been allocated. Details of the same are given in Chapter – 8 Para – 8.2, 8.3 Page No. 415- 420
34	While formulating CSR schemes it shall be ensured that an in-built monitoring mechanism for the schemes identified are	TSGENCO will form a Station Level Committee to review the progress of CSR initiatives once in every six months. Local Panchayat heads of the Villages will be involved to monitor

S.No.	ToR Points	Compliance Status
	in place and mechanism for conducting annual social audit from the nearest the nearest government institute of repute in the region shall be prepared. The project proponent shall also provide Action Plan for the status of implementation of the scheme from time to time and dovetail the same with any Govt. scheme(s). CSR details done in the past should be clearly spelt out in case of expansion projects.	implementation of the listed activities of CSR TSGENCO will appoint a leading Institute or University to conduct third party Audit once in a year for monitoring of the implementation of CSR activities. Details of the same are given in Chapter – 8, Para – 8.4, Page No. 424
35	R&R plan, as applicable, shall be formulated wherein mechanism for protecting the rights and livelihood of the people in the region who are likely to be impacted, is taken into consideration. R&R plan shall be formulated after a detailed census of population based on socio economic surveys who were dependant on land falling in the project, as well as, population who were dependant on land not owned by them.	R & R has been initiated in accordance with Section 45 of Right to Fair Compensation and Transparency (RFCT) in Land Acquisition (LA), Rehabilitation and Resettlement Act (RRACT), 2013 by Govt of Telangana through Rehabilitation and Resettlement Committee under the Chairmanship of District Collector. Details of the same are given in Chapter – 7, Para – 7.5, Page No. – 405
36	Assessment of occupational health and endemic diseases of environmental origin in the study area shall be carried out and Action Plan to mitigate the same shall be prepared.	Occupational health and endemic diseases of environmental origin along with action plan to mitigate the same is detailed in Chapter – 4 Para – 4.4 and sub paragraphs , Page 293 -298
37	Occupational health and safety measures for the workers including identification of work related health hazards shall be formulated. The	Occupational health and safety measures for the workers along with Health monitoring at periodic intervals are detailed in Chapter – 4, Para – 4.4 Page No.293-297 & Para – 4.4.4

S.No.	ToR Points	Compliance Status
	company shall engage full time qualified doctors who are trained in occupational health. Health monitoring of the workers shall be conducted at periodic intervals and health records maintained. Awareness programme for workers due to likely adverse impact on their health due to working in non-conducive environment shall be carried out and precautionary measures like use of personal equipments etc. shall be provided. Review of impact of various health measures undertaken at intervals of two to three years shall be conducted with an excellent follow up plan of action wherever required.	Page No.297
38	One complete season site specific meteorological and AAQ data (except monsoon season) as per latest MoEF&CC Notification shall be collected and the dates of monitoring shall be recorded. The parameters to be covered for AAQ shall include PM10, PM2.5, SO2, NOx, CO and Hg. The location of the monitoring stations should be so decided so as to take into consideration the upwind direction, pre-dominant downwind direction, other dominant directions, habitation and sensitive receptors. There should be at least one monitoring station each in the upwind and in the pre	The details of site specific meteorological and AAQ data is given in Chapter – 3, Para – 3.3.1 and 3.3.2 Page No. 64 - 75

S.No.	ToR Points	Compliance Status
	- dominant downwind direction at a location where maximum ground level concentration is likely to occur.	
39	In case of expansion project, air quality monitoring data of 104 observations a year for relevant parameters at air quality monitoring stations as identified/stipulated shall be submitted to assess for compliance of AAQ Standards (annual average as well as 24 hrs).	Not applicable. Present proposal is a Greenfield project.
40	A list of industries existing and proposed in the study area shall be furnished.	A list of industries existing in 15 km radius is given in Chapter – 2 Para – 2.3, Page No.- 9 And Chapter – 4 Table– 4.3, Page No.- 214
41	Cumulative impacts of all sources of emissions including handling and transportation of existing and proposed projects on the environment of the area shall be assessed in detail. Details of the Model used and the input data used for modeling shall also be provided. The air quality contours should be plotted on a location map showing the location of project site, habitation nearby, sensitive receptors, if any. The windrose and isopleths should also be shown on the location map. The cumulative study should also include impacts on water, soil and socio-economics.	Cumulative impacts of all sources of emissions including handling and transportation of existing and proposed projects has been assessed and detailed in Chapter – 4, Para – 4.2.1.4, Page No. 219 Details of the Model used is detailed in Chapter – 4, Para 4.2.1.2, page - 215 Emission data used for modeling is given in Chapter – 4, Para 4.2.1.1, Page - 211 – 215
42	Radio activity and heavy metal contents of coal to	The certified copy of the values obtained for radioactive elements in

S.No.	ToR Points	Compliance Status
	be sourced shall be examined and submitted along with laboratory reports.	coal from M/s Bhabha Atomic Research Centre and Heavy metal analysis from M/s Vimta Labs are given in Annexure – 2 D
43	Fuel analysis shall be provided. Details of auxiliary fuel, if any, including its quantity, quality, storage etc should also be furnished.	Details of fuel analysis are given in Chapter – 2 Para – 2.5.2, Page No. 20
44	Quantity of fuel required, its source and characteristics and documentary evidence to substantiate confirmed fuel linkage shall be furnished. The Ministry's Notification dated 02.01.2014 regarding ash content in coal shall be complied. For the expansion projects, the compliance of the existing units to the said Notification shall also be submitted	The quantity of coal required for the proposed project is 12.28 MTPA (50% domestic +50% indigenous) The MOU with M/s SCCL for supply of Indigenous coal is enclosed as **Annexure - 2E (I).** M/s SCCL has also furnished the commitment letter for supply of coal as per the MOU is enclosed as **Annexure - 2E (II)**. M/s MSTC for supply of imported coal is revised as directed by the EAC during the 63rd meeting is enclosed as **Annexure - 2E (III)**. The above details are provided in Chapter – 2, Para – 2.5.2, Page No. 20
45	Details of transportation of fuel from the source (including port handling) to the proposed plant and its impact on ambient AAQ shall be suitably assessed and submitted. If transportation entails a long distance it shall be ensured that rail transportation to the site shall be first assessed. Wagon loading at source shall preferably be through silo/conveyor belt.	Indigenous coal received will be transported from SCCL Mines using the Rail network. Imported coal will be received by ships at Krishnapatnam/Kakinada/Visakhapatnam ports. From the Ports, coal will be transported by Indian Railways to the plant site. Details of the same are given in Chapter – 2, Para – 2.10.1 & Fig – 2.10, Page No. – 35 & 36 & Annexure – 2 G & Chapter – 4 Para – 4.5 Page – 298-299
46	For proposals based on imported coal, inland transportation and port handling and rail movement shall be	Indigenous coal will be transported from SCCL Mines using the Rail network. Imported coal will be received by ships at Krishnapatnam/Kakinada/Visakhapa

S.No.	ToR Points	Compliance Status
	examined and details furnished. The approval of the Port and Rail Authorities shall be submitted.	tnam ports. From the Ports, coal will be transported by Indian Railways to the plant site. details of the same are provided in Chapter – 2, Para 2.10.1, Page – 35 and Letters obtained from Port and Railway Authorities for adequacy of facilities for coal handling is enclosed as **Annexure – 2G.**
47	Details regarding infrastructure facilities such as sanitation, fuel, restrooms, medical facilities, safety during construction phase etc. to be provided to the labour force during construction as well as to the casual workers including truck drivers during operation phase should be adequately catered for and details furnished.	Infrastructure facilities during construction phase are given in Chapter – 4, Para 4.1, Page -208
48	EMP to mitigate the adverse impacts due to the project along with item - wise cost of its implementation in a time bound manner shall be specified.	Environmental Management Plan budget of Rs 5597 Crores and Rs 430 crores/annum is earmarked towards capital cost and recurring cost respectively for implementing the various pollution control measures. Item - wise cost details are furnished in Chapter – 6, para 6.3, Page - 317
49	A Disaster Management Plan (DMP) along with risk assessment study including fire and explosion issues due to storage and use of fuel should be carried out. It should take into account the maximum inventory of storage at site at any point of time. The risk contours should be plotted on the plant layout map clearly showing which of the proposed activities would be affected in case of an accident taking place. Based on the same,	Risk assessment study is detailed in Chapter – 7, Para – 7.2 and subparagraphs, Page – 319-355 Disaster Management Plan is detailed in Chapter – 7, Para – 7.3 and sub paragraphs, page – 356-391

S.No.	ToR Points	Compliance Status
	proposed safeguard measures should be provided. Measures to guard against fire hazards should also be invariably provided. Mock drills shall be suitably carried out from time to time to check the efficiency of the plans drawn.	
50	The DMP so formulated shall include measures against likely Fires/Tsunami/Cyclones/ Storm Surges/ Earthquakes etc, as applicable. It shall be ensured that DMP consists of both On-site and Off-site plans, complete with details of containing likely disaster and shall specifically mention personnel identified for the task. Smaller version of the plan for different possible disasters shall be prepared both in English and local languages and circulated widely.	DMP formulated covered measures against Earthquakes. Details of the same are provided in Chapter – 7 Para – 7.3, Page No 387 Smaller version of the plan for different possible disasters will be prepared both in English and local languages for circulation before operation of the plant
51	Detailed scheme for raising green belt of native species of appropriate width (50 to 100 m) and consisting of at least 3 tiers around plant boundary with tree density of 2000 to 2500 trees per ha with a good survival rate of around 80% shall be submitted. Photographic evidence must be created and submitted periodically including NRSA reports in case of expansion projects. A shrub layer beneath tree layer would serve as an effective sieve for dust and	Greenbelt development will be taken up from the construction stage itself. Greenbelt will be developed in 1352 acres of the project area which will include restoration of the forest area of 1049 acres and development of greenbelt in non-forest area of 303 acres. It is proposed to develop an in-house nursery for developing greenbelt. Details of greenbelt development along with schedule, species of plantation and pattern of development are given in Chapter – 4, Para – 4.2.5 and sub paragraphs, Page No.275 - 282

S.No.	ToR Points	Compliance Status
	sink for CO2 and other gaseous pollutants and hence a stratified green belt should be developed.	
52	Over and above the green belt, as carbon sink, plan for additional plantation shall be drawn by identifying blocks of degraded forests, in close consultation with the District Forests Department. In pursuance to this the project proponent shall formulate time bound Action Plans along with financial allocation and shall submit status of implementation to the Ministry every six months.	TSGENCO will take up additional plantation in the Reserved Forest that demarcates the project boundary on the south. In this regard, TSGENCO has sought the recommendations of the Forest Department, Government of Telangana. Details of the same along with recommendations of the forest department are detailed in Chapter – 4, Para – 4.2.5.2, Page No. 282
53	Corporate Environment Policy	
	Does the company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be detailed in the EIA report.	Environmental Policy of TSGENCO is provided in Chapter – 10, Fig – 10.1 Page No. 431
	Does the Environment Policy prescribe for standard operating process / procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions? If so, it may be detailed in the EIA.	Procedure for handling the compliance and deviations are detailed in Chapter – 10, Para – 10.3.1, Page No.433
	What is the hierarchical system or Administrative order of the company to deal with the environmental issues and for ensuring compliance with the environmental clearance conditions.	Hierarchical system of the TSGENCO are given in Chapter – 10, Para – 10.1.1& 10.1.2 Page No. 426 & 428

S.No.	ToR Points	Compliance Status
	Details of this system may be given.	
	Does the company has compliance management system in place wherein compliance status along with compliances / violations of environmental norms are reported to the CMD and the Board of Directors of the company and / or shareholders or stakeholders at large? This reporting mechanism should be detailed in the EIA report. All the above details should be adequately brought out in the EIA report and in the presentation to the Committee	Compliance Management system is detailed in Chapter – 10, Para – 10.3.4 & 10.3.5, Page No.434 & 435
54.	Details of litigation pending or otherwise with respect to project in any Court, Tribunal etc. shall invariably be furnished.	None

Compliance to Additional Terms of Reference granted by MoEF&CC vide Lr. No. J-13012/18/2015-IA.I (T) Dt 16.02.2016

S. No.	ToR Points	Compliance Status
i.	The Tungapadu vagu should not be diverted but it should be preserved and protected, and enhanced it's flow.	The project activities will not interfere with flow of Tungapahad Vagu since there is no extraction of water or discharge. No diversion of Tungapadu vagu is proposed. Plant layout is designed to keep a minimum distance of 500 m buffer between ash pond and Tungapadu Vagu to prevent contamination. A 100 m barrier on either side of banks of the vagu will be left as barrier which will be developed under greenbelt. Details of the same are given in Chapter – 4, Para – 4.2.3.12, Page No. 261
ii.	The PP should leave a minimum of 100 m buffer on either side of the banks and this buffer should be developed into native forest.	A 100 m barrier on either side of banks of the vagu will be left as barrier which will be developed under greenbelt. Details of the same are given in Chapter – 4, Para – 4.2.3.12, Page No. 261 & Greenbelt development proposed is given in Table – 4.15 & Fig – 4.24 Page No. 275 & 277
iii.	No effluent should be discharged into the rivulet or Krishna River.	The Project is based on Zero Discharge Concept. There will be no discharge of wastewater into any surface water bodies.
iv.	In areas where the banks are breached, the breaches should be plugged and strengthened.	There are no breaches of bank on Tungapadu Vagu within the project area However budget allocated for plugging the breaches and strengthening is given Table – 6.8 Page 318
v.	In areas where the river bed is silted/ partial blocked due to land slides, the blocks and the silt should be removed in a way that the original gradient is maintained.	TSGENCO will request the Irrigation Department, Govt. of Telangana to monitor the flows at the tapping point and also to undertake desiltation if required. Details of the same are given in Chapter – 4, Para 4.2.3.10, Page 261
vi.	No water from the stream should be extracted	No water drawal from the stream is proposed
vii.	To sustain the downstream	Letter obtained from Irrigation &

S. No.	ToR Points	Compliance Status
	ecology of the Tungapadu vagu, the irrigation department should release minimum ecological flows from the reservoirs constructed in the upstream.	CAD Department, Government of Telangana assuring maintainance minimum flow in the Tungapahad Vagu is enclosed as **Annexure – 4C**
viii.	The plateaus and their slopes with in the project area, which are not used for the project purpose, are highly degraded. These should be restored to their original natural forest eco system and should be used for the conservation of rare and endemic plants and animals found in the plateaus of project area. These forests not only serve as green belt to mitigate fugitive emissions, CO2 and other pollutants but also serve as a conservation area.	TSGENCO will take up additional plantation in the Reserved Forest that demarcates the project boundary on the south. In this regard, TSGENCO has sought the recommendations of the Forest Department, Government of Telangana. Details of the same along with recommendations of the forest department are detailed in Chapter – 4, Para – 4.2.5.2, Page No. 282
ix.	The reserve forest that demarcates the project boundary on the south is also highly degraded. These intact patch should be restored to it's original forest ecosystem and should be connected to the forest ecosystem of the project area and other reserve forest in the area. This would not only serve as buffer for the project but also acts as a corridor for wildlife and enhance stream flow. For this purpose the PP should provide grants to the state forest department and work should start within a reasonable time of 1-2 years after preparing a detailed site specific action plan.	Same as above

S. No.	ToR Points	Compliance Status
x.	The PP should create a permanent corpus fund for tribal welfare and also provide adequate compensation for the land losers irrespective of their status besides best possible R&R package and extending social welfare schemes and health care system for local communities.	TSGENCO has allocated an amount of Rs 100 Lakhs as permanent corpus fund for tribal welfare in addition to the compensation as per RRACT, 2013 for the land losers. Details of the same are provided in Chapter – 7, Para – 7.4.6, Page No. - 403
xi.	Cumulative impact assessment of air, water, soil and socio-economics should be carried out in view of a number of cement plants already established/operating in the vicinity of the proposed plant.	Cumulative impact assessment of air, water, soil are detailed in Chapter – 4 Para – 4.2.1.4, 4.2.2, 4.2.3.6 (C) Page No. 219, 242 & 254
xii.	As agreed by the PP, the area for ash pond shall be minimized by shifting it towards North. Further, a minimum distance of 500 m buffer shall be maintained between the propsoed ash pond and Tungapadu Vagu. The buffer shall be developed into thick green belt/natural forest.	A minimum distance of 500 m is considered as barrier zone between ash pond and Tungapadu Vagu Greenbelt proposed is Given in Table – 4.15 & Fig – 4.24, Page No. 275 & 277
Xiii	As agreed, the impervious lining for the ash pond shall be over and above the clay lining.	HDPE film will be provided over the clay lining as per design standards. Details are given in Chapter – 4, Para – 4.2.6.3, Page No.287
4.	**General Points**	
i	Is the project intended to have CDM-intent	Chapter – 4 Para – 4.2.1.8 Page No. 241
	If Yes, then (a) Has PIN (Project Idea Note) [or PCN (Project Concept Note)] submitted to the NCA (National CDM Authority) in the MoE&F	PIN yet to be submitted
	If not, then by when is that expected	Before commissioning of the plant
	Has PDD (Project Design Document) been prepared	Yes

S. No.	ToR Points	Compliance Status
	What is the Carbon intensity from your electricity generation projected (i.e CO_2 Tons/MWH or Kg/KWH)	Chapter – 4 Para – 4.2.1.8 Page No. - 241
	Amount of CO2 in Tons/year expected to be reduced from the baseline data available on the CEA	Chapter – 4 Para – 4.2.1.8 Page No. 241

ANNEXURE-1G

COMPLIANCE TO THE MINUTES OF 63RD RECONSTITUTED EXPERT APPRAISAL COMMITTEE MEETING HELD ON 30.08.2016

S.No	Point	Compliance status
1.	Plagiarism, Irrelevant content, and absence of crucial site and plant specific analysis	This chapter is revised and incorporated under chapter 7 Para - 7.2 Page No - 319 - 413
2.	*Absence of FGD in plant layout, and consequent processes:* PP has contended that the plant will comply with MoEF&CC notification dt. 7th December 2015 regarding stack emission, and that FGD will be installed. EAC asked PP about the location of FGD in the plant layout. In response to this query, PP admitted that FGD has not been included in the plant layout yet. Similarly, FGD and associated processes are also not covered in water balance, process flow and mass balance calculations. *In light of this, the plant layout needs to be revised to include FGD and allied equipment / processes, and various plant processes need due consideration of issues like disposal of sludge in solid waste management, sulphur balance, water balance etc.*	Revised Plant Layout duly incorporating the FGD is given in Chapter – 2 Para – 2.7 & Fig – 2.8 Page No.25 & 26 Details of FGD are given in Chapter – 4 Para – 4.2.1.5, Fig – 4.13 & 4.18 Page No. 231, 237& 250 Sulphur Balance is shown in Fig – 4.12, Page No.- 236
3.	*Absence of crucial details and data regarding water withdrawal and availability:* In response to a query regarding specific water withdrawal point, PP informed that specific water withdrawal point has not been specified / considered in the EIA. In the absence of specific water withdrawal point, it would not be feasible to assess issues such as sustainability of water even in lean period, ecological impacts arising out of withdrawal of water, downstream uses and impact	Water withdrawal point is given in Chapter – 4 Para – 4.2.3.1& Fig – 4.16 Page 246 & 247 & Water Flow Data of River Krishna is given under Chapter – 3 Para 3.3.4.4, Page No. - 91 & Impact of water drawl is addressed under Chapter – 4, Para – 4.2.3.8, Page No. 258

S.No	Point	Compliance status
	thereon etc. Further, the committee also observed that crucial data regarding water availability is quite dated and recent data, which is most relevant, has not been considered. For example, in Table 7 regarding monthly observed discharge at Pondugala G & D site, data only upto year 1999 – 2000 has been considered. *These deficiencies need to be addressed and adequate study of downstream impact of water withdrawal and water availability during lean period need to be included in the EIA.*	
4.	*Need for firm commitment from Irrigation Department to maintain minimum ecological flows in Tungapadu Vagu* Additional ToR#7 states that "To sustain the downstream ecology of the Tungapadu Vagu, the Irrigation Department should release minimum ecological flows from the reservoirs constructed in the upstream. (emphasis added). In response, the PP has merely stated that *"Irrigation Department will be informed... and will be requested to take necessary action...."* (Sld. 126 of the presentation). This clearly shows that as yet there is no firm commitment of the irrigation department to release minimum ecological flows. *Hence, a firm commitment from irrigation department needs to be obtained and the same should be included in the revised EIA.*	Letter obtained from Irrigation & CAD Department, Government of Telangana assuring maintaining minimum flow in the Tungapahad Vagu is enclosed as Annexure – 4C.
5.	*Explore the feasibility of ACC instead of WCC.*	Chapter – 5 Para – 5.1.1 Page No.- 304
6.	*Cumulative impact study of various industries in buffer zone has not been made with details on emission data, stack heights and distances from plant site.*	Chapter – 4 Para – 4.2.1.4 Page No. 219

S.No	Point	Compliance status
7.	*The impact of fugitive emissions on ambient air quality, with prediction of PM10 and PM2.5 has not been made from the sources such as Coal Handling Plant, Coal Storage yard, Ash Pond, lime handling and storage including gypsum that will be generated from FGD unit. Impact of fugitive emission due to transportation of material is also required to be assessed.*	Chapter – 4 Para – 4.2.1.1, 4.2.1.5 Page No. 211 & 231
8.	The coal linkage documents for imported and domestic coal cannot be considered as firm coal linkage. Imported coal MoU says non-enforceable and also doesn't specify the quality of coal and source of coal is also not specified. The MoC allocation/approval for domestic coal is required.	Annexure - 2E (I, II & III).
9.	*Coal analysis report from BHEL regarding use of blended coal.*	Annexure – 2C
10.	*EIA report as well as subsequent responses by PP indicate substantial confusion and lack of details regarding actual coal unloading and transportation arrangements. Some places it is mentioned that coal will be transported from two ports and some other places four ports are mentioned. Hence, complete and specific details regarding coal import ports and coal transportation routes need to be provided. Clear permissions from Railways and Port Authorities for imported coal should be obtained.*	Chapter – 2 Para – 2.10.1 Page No. 35
11.	*ToR 17, details of the mineralogical map from the State Geology Dept. Accordingly, MoC permission.*	Chapter – 2 Fig – 2.6 Page No. - 19 Annexure – 2B
12.	*The PP submitted a detailed response to all the recommendations made by the Sub- Committee in its report on the Site Visit in the 50th EAC (T&C)*	Action plan for Restoration of degraded forest areas in the project area is given under Chapter – 4, Para 4.2.5.2, Page - 282

S.No	Point	Compliance status
	meeting held during 28–29 January, 2016. The PP should provide action plans on the recommendations relating to restoration of degraded forest areas in the project area and creation of a permanent corpus fund for tribal welfare and adequate compensation for land loosers irrespective of their status besides best possible R&R package and extending social welfare schemes and healthcare systems for local communities.	Tribal welfare fund details are given in Chapter – 7, Paras – 7.4.6, Page - 403 R & R in Para 7.4, 7.5 & 7.5.1 Page 391-411
13.	*As per the EIA report, the soil characteristics suggest that the land in the study area is a fertile land. Therefore, provision should be made to collect the top soil from the project area and preserve for raising plantation, etc.*	Chapter – 4 Para – 4.1 Page No. 209
14.	*Approximately, 75% and 25% areas are having under the category of forest and non- forest land, respectively. The forest land (including degraded) proposed to be included in the minimum 33% green belt should be treated as rejuvenation of forestland, instead otherwise may be.*	Chapter – 4 Para – 4.2.5.2 Page No. 282
15.	*The PP should give proper & detailed response along with an Action Plan in respect of queries raised during the Public Hearing along with CSR budgetary details provided during the stage of commissioning of the Project.*	Public Hearing response along with an Action Plan is detailed in Chapter – 7, Para 7.1 Page – 319 and Annexure – 7B & CSR details are furnished in Chapter – 8, Para – 8.2, 8.3 Page No 415-420
16.	*In light of the major shortcomings as noted above, EIA/EMP needs to be redone (though currently used baseline data can be used) which needs to address above mentioned points, and public hearing is also to be conducted again based on the redone EIA/EMP*	TSGENCO represented to MOEF & CC for Exemption of reconducting the Public hearing vide letter no. 08.10.2016. Public hearing was exempted vide minutes of Meeting of 1st EAC (Thermal Power) MoEF&CC, GoI dated 28.12.2016

ANNEXURE – 1H

TELANGANA STATE POLLUTION CONTROL BOARD
REGIONAL OFFICE, NALGONDA

H.No. 8-15, 1st floor, Sri Laxmi Complex, Near RTO Office,
Sri Vinayaka Nagar, Hyderabad Road, Nalgonda - 508001,
Ph:08682-248005

PUBLIC NOTICE

In accordance with the minutes of the 1st meeting of the re-constituted Expert Appraisal Committee (Thermal power) on Environmental Impact Assessment (EIA) of Thermal Power Projects of the Ministry of Environment, Forests & Climate Change, Government of India, New Delhi held on 28.12.2016, it is hereby notified that the **REVISED EIA/EMP** report of the proposed 4000 "(5x800MW) Yadadri Thermal Power Station" at Veerlapalem village, Damercherla Mandal, Nalgonda District, Telangana state by **M/s. Telangana State Power Generation Corporation Limited** is available in the website of Telangana state Pollution Control Board (TSPCB) i.e., **http://tspcb.cgg.gov.in** and also available in TSGENCO website: i.e. **http://tsgenco.telangana.gov.in**.

The details of the project activities as given by the proponent are as follows.

1. Name of the Company with Address & Phone Number	M/s. Telangana State Power Generation Corporation Limited (A Government Company), Vidyut Soudha, Khairatabad, Hydeabad - 500 082, Phone No: 040-23499417, Fax No.040-23499418.
2. Name of the proposed Project, Location with Survey Numbers and extent of land	**4000 (5x800MW) Yadadri Thermal Power Station** **Location** : Veerlapalem (V), Damercherla (M), Nalgonda Dist. Total land required for the project : 2800.00 Acres Non Forest Land (Govt. & Provate): 705.00 Acres Forest Land : 2095.00 Acres **Non forest land - D-Form Patta Land:** Veerlapalem Village, Damaracherla Mandal. Survey No.96 **Non forest land - Udata Patta and Kharaj Khatta:** 1 **Veerlapalem Village, Damaracherla Mandal.** Survey Nos: 1 to 7 and 9 to 41. 2. Talla Veerappagudem Village, Dameracherla Mandal. Survey Nos. 3 & 4 **Non forest land - Government Land** 1. Veerlapalem Village, Damaracherla Mandal. Survey Nos: 71, 76, 80, 90, 92, 93,94 & 95. **Non forest land - Private Patta Land** 1 Veerlapalem Village, Damaracherla Mandal. Survey Nos. 66, 67, 68, 69, 70, 72, 73, 74, 77, 78, 79, 81, 82, 83, 84, 85, 86, 87, 88, 89 & 91. **Forest land** 2095 Acres in Veerlapalem forest block area
3) Name of the authorized person to be contacted with address, phone number and Email.	**Sri A.Ajay,** Chief Engineer/Civil/Thermal, M/s.Telangana State Power Generation Corporation Limited Vidyut Soudha, Hyderabad - 500 082, Telangana State. Ph.No.040-23499417, Fax No.040-23499418 Email: cecthermal2@yahoo.com
4) Capital cost of the project	**Rs.25099.42 Crores**
5) Line of activity & capacity	Thermal Power generation and capacity : 4000 MW
6) Proposed Environment Protection Measures in the Project	High Efficiency Electro Static Precipitators, 275 M high Chimneys, Flue gas desulphurisation system (FGD), Selective Catalytic Reduction (SCR) System, Effluent Treatment Plant with zero discharge concept, Sewage Treatment and Ash water recovery system with recycling arrangemnet for re-using the treated water. Dust Suppression using water spraying and green belt development.
7) Places of the availability of Revised Draft EIA/EMP of the proposed project including soft copy	1) Collector & District Magistrate Office, Nalgonda. 2) District Industries Centre, Nalgonda. 3) CEO, Zilla Parishad Office, Nalgonda. 4) Forest Development Office, Nalgonda. 5) Regional Office, MoEF & Cc, South Eastern Zone, 1st & 2nd Floor HEPC Building, No.34, Cathedral Garden Road, Nungambakkam, Chennai - 600034. 6) Telangana State Pollution Control Board, Head Office, Paryavaran Bhawan, A-3 industrial Estate, Sanathnagar, Hyderabad - 18 7) Telangana State Pollution Control Board, Zonal Office, Ramachandrapuram, Medak Dist. 8) Dept. of Environment, Forest, Science & Technology, GoTS, Telangana State Secretariat, Hyderabad. 9) Telangana State Pollution Control Board, Regional Office, Nalgonda. 10) Revenue Divisional Office, Miryalaguda, Nalgonda Dist. 11) Tahsildar Office, Damaracherla Mandal, Nalgonda Dist. 12) Gram Panchayat Office, Veerlapalem Village, Dameracherla Mandal, Nalgonda District. 13) Gram Panchayat Office, Talla Veerappagudem Village, Damaracherla Mandal, Nalgonda District. 14) Gram Panchayat Office, Thimmapur Village, Damaracherla Mandal, Nalgonda District. 15) Gram Panchayat Office, Kothapalli Village, Dameracherla Mandal, Nalgonda District. 16) Gram Panchayat Office, Kallepalli Village, Dameracherla Mandal, Nalgonda District.

In this connection, comments/suggestions of the public located at project site likely to be affected by the proposed project, if any are invited within three (3) weeks from the date of publication of this public notice and the same shall be submitted to the undersigned officer.

Sd/-
Environmental Engineer,

పత్రికల నుండి పొందబడ్డది.

తెలంగాణ రాష్ట్ర కాలుష్య నియంత్రణ మండలి

ప్రాంతీయ కార్యాలయము, నల్లగొండ

ఇ.నెం.8-15, మొదటి అంతస్తు, శ్రీలక్ష్మి కాంప్లెక్స్, ఆర్.బి.ఓ. ఆఫీస్ దగ్గర,
శ్రీ సనాయక నగర్, హైదరాబాద్ రోడ్డు, నల్లగొండ - 508001. ఫోన్ నెం.08682-248005

ప్రజా ప్రకటన

ఇందుమూలంగా తెలియజేయునది ఏమనగా భారత ప్రభుత్వ పర్యావరణ అటవీ మంత్రిత్వ మరియు వాతావరణ మార్పు శాఖ, న్యూ ఢిల్లీ వారు పునర్వ్యవస్థీకరించిన నిపుణుల అంచనా కమిటి (థర్మల్ పవర్) మొదటి సమావేశం తేది:28.12.2016 యొక్క ఆదేశాలకు అనుగుణంగా తెలంగాణ రాష్ట్ర విద్యుత్ ఉత్పాదక సంస్థ వారు ప్రతిపాదించిన నల్లగొండ జిల్లాలోని దామరచర్ల మండలం, వీర్లపాలెం గ్రామ పరిధిలోని కొత్తగా విద్యుదుత్పత్తిపెట్టిన 4000 మెగావాట్లు (5x800 మెగావాట్లు)యాదాద్రి థర్మల్ పవర్ స్టేషన్ ప్రాజెక్ట్ యొక్క సవరించిన పర్యావరణ ప్రభావిత అధ్యయన మరియు పర్యావరణ ఉపశమన ప్రతిపాదిక వివరములను తెలంగాణా రాష్ట్ర కాలుష్య నియంత్రణ మండలి వారి వెబ్ సైట్ http://tspcb.cgg.gov.in మరియు తెలంగాణా రాష్ట్ర విద్యుత్ ఉత్పాదక సంస్థ వారి వెబ్‌సైట్ http://tsgenco.telangana.gov.in నందు పొందుపరచడమైనది. కావున ఈ ప్రతిపాదిత ప్రాజెక్ట్ నిమిత్తం ఈ ప్రకటన జారీ చేయడమైనది. సదరు ప్రతిపాదికులు ఇచ్చిన ప్రాజెక్ట్ కార్యకలాపాలకు చెందిన వివరములు ఈ క్రింద పొందుపరచడమైనది.

1) కంపెనీ పేరు, చిరునామా మరియు టెలిఫోన్ ఫోన్ నెం.	తెలంగాణా రాష్ట్ర పవర్ జనరేషన్ కార్పొరేషన్ లిమిటెడ్, విద్యుత్ సౌధ, ఖైరతాబాద్, హైదరాబాద్ - 82, ఫోన్ నెం 040 -23499417, ఫ్యాక్స్ నెం. 040-23499418
2) ప్రతిపాదిత ప్రాజెక్ట్ పేరు, ప్రదేశము మరియు కార్యకలాపాల నిర్వహణకు అవసరమైన భూమికి సంబంధించిన పూర్తి వెంబడి వివరములు.	4000 మెగావాట్లు (5x800 మెగావాట్లు) యాదాద్రి థర్మల్ పవర్ స్టేషన్, వీర్లపాలెం గ్రామము, దామరచర్ల మండలం, నల్లగొండ జిల్లా, తెలంగాణ రాష్ట్రము. ప్రతిపాదిత అవసరమైన మొత్తం భూమి : 2800.00 ఎకరములు అటవీయేతర భూమి (ప్రభుత్వ మరియు ప్రైవేటు) : 705.00 ఎకరములు అటవీ భూమి : 2095.00 ఎకరములు
	అటవీయేతర భూమి – పి – పార్శ్వ పట్టా భూమి:
	వీర్లపాలెం గ్రామము, దామరచర్ల మండలం, సర్వే నెంబరు:86
	అటవీయేతర భూమి – ఉదాపా పట్టా మరియు ఖరాబ్ ఖాతా భూమి:
	1. వీర్లపాలెం గ్రామము, దామరచర్ల మండలం. సర్వే నెంబర్లు :1 నుండి 7 మరియు 9 నుండి 41. 2. కాళ్ల వీరప్పగూడెం గ్రామము, దామరచర్ల మండలం. సర్వే నెంబర్లు: 3 మరియు 4
	అటవీయేతర భూమి – ప్రభుత్వ భూమి 1. వీర్లపాలెం గ్రామము, దామరచర్ల మండలం. సర్వే నెంబర్లు : 71, 76, 80,90, 92, 93, 94 మరియు 95.
	అటవీయేతర భూమి – ప్రైవేట్ భూమి 1. వీర్లపాలెం గ్రామము, దామరచర్ల మండలం. సర్వే నెంబర్లు:66, 67, 68, 69, 70, 72, 73, 74, 75, 77, 78, 79, 81, 82, 83, 84, 85, 86, 87, 88, 89 మరియు 91.
	అటవీ భూమి
	వీర్లపాలెం గ్రామము, దామరచర్ల మండలం పరిధిలోని 2095 ఎకరముల అటవీ భూమి
3) ప్రాజెక్ట్ వివరములు తెలుసుకొనుటకు సంప్రదించాల్సిన కంపెనీ అధికారి పేరు, చిరునామా మరియు టెలిఫోన్ నెంబర్	శ్రీ.ఎ.అజయ్, చీఫ్ ఇంజనీర్/సివిల్/థర్మల్, విద్యుత్ సౌధ, ఖైరతాబాద్, హైదరాబాద్ - 82. ఫోన్ నెం. 040-23499417, ఫ్యాక్స్ నెం.040-23499418 ఈ మెయిల్ : cecthermal2@yahoo.com
4) ప్రాజెక్ట్ విలువ	రూ.25099.42 కోట్లు
5) కార్యకలాపాల స్వభావం మరియు ఉత్పత్తి వర్గము	థర్మల్ విద్యుత్ ఉత్పత్తి – 4000 మెగావాట్లు (5x800 మెగావాట్లు)
6) ప్రాజెక్ట్ ప్రతిపాదించిన పర్యావరణ వర్గము	అధిక సామర్థ్యమైన భూగ్ నియంత్రణ పరికరములు (ఎలెక్ట్రో స్టాటిక్ ప్రెసిపిటేటర్స్), 275 మీటర్ల ఎత్తు గల పొగ గొట్టములు (చిమ్నీలు), ఫ్లూగ్యాస్ డిసల్ఫరైజేషన్ (ఎఫ్.జి.డి) యూనిట్, సెంట్రిలైజ్డ్ వాటాలిటిక్ రిడక్షన్ (ఎస్.సి.ఆర్) విధానం, వ్యర్థ నీటిని మరియు మురుగు నీటిని శుద్ధి చేయు వ్యవస్థను (జీరో డిశ్చార్జ్ కాన్సెప్ట్‌తో) (జి.టి.పి – ఎస్.టి.పి) ఏర్పాటు చేయడము మరియు బూడిద నిల్వ చేయు ప్రదేశములో గల నీటిని రీసైక్లింగ్ చేయు వ్యవస్థ ద్వారా తిరిగి ఉపయోగించడం, బొగ్గు మరియు బూడిద నిల్వ చేయు ప్రదేశములో భూగ్ నివారణకు పొగమంచు రకము నీటిని చల్లడము మరియు మొక్కలను విరివిగా పెంచడం ద్వారా.
7) ప్రాజెక్ట్ యొక్క సవరించిన పర్యావరణ ప్రభావిత అధ్యయన మరియు పర్యావరణ ఉపశమన ప్రతిపాదిక నివేదికలను ప్రజల కొరకు అందుబాటులో ఉంచిన కార్యాలయములు (సాఫ్ట్ కాపీలో ఇవ్వబడినవి)	1) కలెక్టర్ మరియు జిల్లా మెజిస్ట్రేట్ వారి కార్యాలయము, నల్లగొండ. 2) జిల్లా పరిశ్రమల కేంద్రం, నల్లగొండ 3) మండల కార్యనిర్వహణ అధికారి, జిల్లా పరిషత్ కార్యాలయము, నల్లగొండ. 4) అటవీ అభివృద్ధి అధికారి వారి కార్యాలయము, నల్లగొండ. 5) పర్యావరణ అటవీ మరియు వాతావరణ మార్పు మంత్రిత్వ శాఖ, ప్రాంతీయ కార్యాలయము, 1&2వ అంతస్తు, హెచ్.ఇ.పి.సి. భవనము నెంబర్-34, కాథెడ్రల్ ఉద్యానవన మార్గము, నుంగమ్ బాకమ్, చెన్నై - 600034 6) తెలంగాణా రాష్ట్ర కాలుష్య నియంత్రణ మండలి, ప్రధాన కార్యాలయము, ఎ-3, ఇండస్ట్రియల్ ఎస్టేట్, సనత్ నగర్, హైదరాబాద్ 7) తెలంగాణా రాష్ట్ర కాలుష్య నియంత్రణ మండలి, జోనల్ కార్యాలయము, రామచంద్రాపురం, మెదక్ జిల్లా. 8) తెలంగాణా రాష్ట్ర పర్యావరణ, అటవీ శాఖ మరియు సాంకేతిక విభాగము, రాష్ట్ర సచివాలయము, హైదరాబాద్. 9) తెలంగాణా రాష్ట్ర కాలుష్య నియంత్రణ మండలి, ప్రాంతీయ కార్యాలయము, నల్లగొండ. 10) రెవిన్యూ డివిజన్ కార్యాలయము, మిర్యాలగూడ, నల్లగొండ జిల్లా 11) తహసీల్దార్ కార్యాలయము, దామరచర్ల మండలం, నల్లగొండ జిల్లా 12) గ్రామ పంచాయతీ కార్యాలయము, వీర్లపాలెం గ్రామము, దామరచర్ల మండలం, నల్గొండ జిల్లా 13) గ్రామ పంచాయతీ కార్యాలయము, కాళ్ల వీరప్పగూడెం గ్రామము, దామరచర్ల మండలం, నల్లగొండ జిల్లా. 14) గ్రామ పంచాయతీ కార్యాలయము, తిమ్మాపూర్ గ్రామము, దామరచర్ల మండలం, నల్లగొండ జిల్లా. 15) గ్రామ పంచాయతీ కార్యాలయము, కొత్తపల్లి గ్రామము, దామరచర్ల మండలం, నల్లగొండ జిల్లా. 16) గ్రామ పంచాయతీ కార్యాలయము, కర్ధనపల్లి గ్రామము, దామరచర్ల మండలం, నల్లగొండ జిల్లా.

కావున ప్రతిపాదిత ప్రాజెక్ట్ కార్యకలాపాల వలన పర్యావరణ సంబంధిత సమస్యలు ఎదుర్కొనబోవు వారు తమ అభిప్రాయాలు మరియు సూచనలు ఏమైనా ఉన్నయెడల ఈ ప్రకటన ప్రచురించిన తేదీ నుండి మూడు (3) వారాల లోగా ఈ క్రింది సంతకం దారునకు తెలియపరచమని కోరడమైనది.

ANNEXURE – 1 I

REPLIES TO THE ISSUES/COMMENTS RAISED ON REVISED EIA REPORT

ANNEXURE – 1I

REPLY TO THE LETTER OF SRI. Y CHENNA KESHAVA REDDY, VANASTHALIPURAM, HYDERABAD dated 18.02.2016

Point Raised	Response of TSGENCO
In my opinion it is not required to establish the project, and seeking that MoEF&CC ,GoI should not recommend for environmental clearance for the project as there will be an impact of change in environment due to loss of extent 2095 acres of forest land.	The project is site specific. The MoEF & CC, GoI has accorded final clearance for diversion of forest land in favour of TSGENCO vide Lr.No. F.No.8-07/2015/FC, dated 07th July, 2015 after considering all the aspects of the project.
Also due to existence of Krishna river near by project, there will be also a chance of pollution of water.	Project is based on Zero liquid discharge. There is no discharge of even treated wastewater to River Krishna or Tungapahad Vagu. TSGENCO will regularly monitor the water quality during the construction and operational phase of the project
Further there are different categories of tribes like "Boya, Erukala,&yaanadi" are living in that forest area. Because of that as an a alternate, the plant should be constructed in Adilabad District.	After due diligence by the Govt. this site is selected, which is site specific.
An important issue to note that, it has been decided by the world wide countries, not to take up such plants which directly impact on the people. As such it is requested that, the Telangana State Government should not establish such project as it will cause direct impact instead of indirect impact. Hence it is requested MoEF&CC,GoI should not grant Clearance for the project.	After due diligence by the Govt. this site is selected, which is site specific.
The Government of India, in the year 2009 has passed a G.O that, not to establish non critical/critical plants. Hence It is desired that, Telangana State Government should not encourage such projects. On other side it is also requested to establish Solar power project for not to have any impact on environment. It is therefore requested that not to establish such thermal plant.	The Office Memorandum No. 8/3/2002 – Th-II (Vol-V), dated 13.11.2009 of Ministry of Power, GoI is only an advisory to establish supercritical plants only in 13th plan period. Accordingly, this project is proposed.

POINT WISE RESPONSE TO THE ISSUES RAISED BY Dr K BABU RAO, CHIEF SCIENTIST (RETD), H NO 1-50/2, ROAD NO 3, SNEHAPURI COLONY, HYDERABAD - 500076

SNO	QUERY RAISED	TSGENCO RESPONSE
1.	Earlier EIA report was cancelled by the EAC due to extensive plagiarism. The current revised report is submitted in image format as a mean tactic to prevent any checking for plagiarism. Using technology for cover up of crime is an unethical practice. Will the proponent undertake to certify that the revised EIA has no plagiarism?	TSGENCO wishes to state it did not make attempts to camouflage behind technology. The maximum file size that can be uploaded on the website is 20 MB. We had to convert the document to pdf format, compress to ensure that the file size is less than 20 MB. This is a technical limitation and not any attempt to camouflage. We hope the author being a scientist will appreciate this technical aspect. Though MOEF & CC has instructed to upload the revised EIA Report on TSPCB website, TSGENCO additionally has also placed hard copies of the documents at the following locations. 1) Collector and District Magistrate Office, Nalgonda 2) District Industries Center, Nalgonda 3) CEO, ZillaParishad Office, Nalgonda 4) Divisional Forest Office, Nalgonda 5) Department of Environment, Forest, Science and Technology, GoTS, Telangana State Secretariat, Hyderabad 6) Telangana State Pollution Control Board, Head Office, PariyavaranBhawan, A-1, Industrial estate, Sanath Nagar, Hyderabad 7) Telangana State Pollution Control Board, Zonal Office, Ramachandrapuram, Medak District, Telangana 8) Telangana State Pollution Control Board, Regional Office, Nalgonda 9) Revenue Divisional Office, Miryalaguda, Nalgonda District 10) Tehsildar Office, Damarecharla Mandal, Nalgonda District

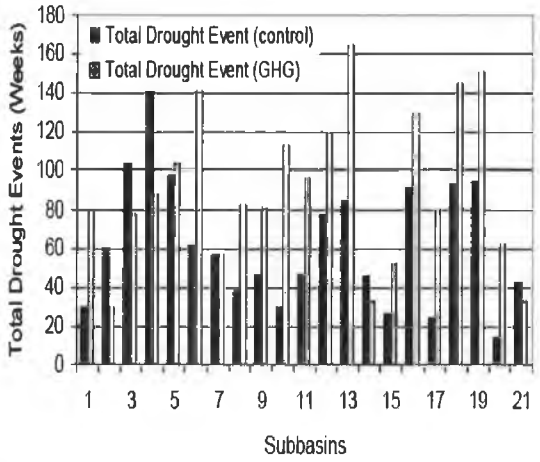
SNO	QUERY RAISED	TSGENCO RESPONSE
		11) Gram Panchayat Office, TallaVeerlapalem Village, Damaracherla Mandal, Nalgonda District 12) Gram Panchayat Office, TallaVirappagudem Village, Damaracherla Mandal, Nalgonda District 13) Gram Panchayat Office, Timmapur Village, Damaracherla Mandal, Nalgonda District 14) Gram Panchayat Office, Kotupalli Village, Damaracherla Mandal, Nalgonda District 15) Gram Panchayat Office, Kalepalli Village, Damaracherla Mandal, Nalgonda District TSGENCO hereby undertakes that there is no plagiarism
2.	Prime environmental impact of a coal fired power plant is on climate, but the Revised EIA is completely silent on the climate impacts of the project. Environmental Integrity is non-negotiable under any pretext of shortages. When the proposed action is pushing the planet to death, will the wants survive? India has signed the Paris Agreement and confirmed its commitment at Marrakech. Do the emissions from the plant have any impact on climate change according to proponent/consultant? Do you deny climate change?	The project is designed to comply with the new emissions norms as per the Gazette Notification S.O. 3305 (E) dated 07.12.2015. The project utilizes super critical technology to reduce the CO2 generation. The emissions from the plant after flue gas treatment system will not have significant impact on climate change. The proposed project is redesigned to comply with the new emission norms of MOEF where in a flue gas treatment system comprising High Efficiency ESPs for control of Particulate emissions and Flue Gas Desulphurization (FGD) for control of Sulphur dioxide emissions. Flue Gas Desulphurization (FGD) technology with wet lime stone process is considered for implementation and Selective Catalytic Reduction Unit (SCR) for control of NOx emissions. SCR is proposed which will be located between the economizer outlet and APH inlet.
3.	Based on 50-50 blended coal, the annual emissions of CO2 are about	TSGENCO had adopted the supercritical technology which

SNO	QUERY RAISED	TSGENCO RESPONSE
	24 MTPA. Is this extent of carbon pollution not harmful to climate? Why is the EIA silent on impacts of carbon pollution?	reduces the CO2 generation followed by implementation of flue gas treatment system to significantly reduce the SO2 and NOx pollutants at an additional cost of 0.9 crore/MW. Currently, the Carbon Capture technologies for coal based power plants are at R&D stage only.
4.	Coal Analysis given in section 2.5.2 shows an ash content of 30% for SCCL coal. Coal composition given does not fit into any of the grades of coal given on SCCL website. It is G10 grade coal as per the website that matches the GCV. But composition of 30% ash for that coal is questionable. Will the SCCL produce a special grade coal for TSGENCO?	The boilers are designed for 100% imported/indigenous coal. The grade of coal will be G9 and above grades of coal. Ash content in G9 grade coal will be less than 30%. SCCL had committed to supply G9 and above grade of coal to this project.
5.	Study area covers a part of AP state. Is any opportunity given to them to present their views on the impacts of the project on their lives? Does the MoEF notification 2006 deny them the right of public consultation? Pollution does not respect any geographical or political boundaries. People affected anywhere have a right to seek remedy.	The Public hearing for the project was conducted as per SO 1533 Notification duly giving paper notification one in vernacular language of the area covering the entire state and also in Hindu daily English paper covering the entire nation. About 3500 members from the surrounding villages of the proposed project have attended the public hearing. Out of which 54 members expressed their view openly. Almost all the people attended the public hearing have welcomed the project. TSGENCO had now adopted the flue gas treatment system with FGD technology will minimize the flue gas emissions significantly and in compliance with the proposed emission standards. It may be seen from the isopleths given in Fig 4.3 to 4.11 that the emissions have significantly reduced within the 15 km radius due to use of flue gas treatment system.
6.	Water requirement for the power plant is 10000 m3/hr that is	Water has been allotted by the Irrigation and CAD Department,

SNO	QUERY RAISED	TSGENCO RESPONSE
	240,000 m3/day. With that water 240000/1300 = about 185 acres of land will produce irrigated paddy crop in a season. For 330 operating days in a year, the land deprived of irrigation water = 330 x 185 = 61050 acres per year. Is it not an impact on agriculture? How is it that the proponent/consultant overlooked a direct impact?	Govt of Telangana duly considering the requirements of agriculture and other users.
7.	Fig 4.18 On page 250 of revised EIA for YTPS presents "Flue gas desulphurization (FGD) water balance" that shows 12408 m3/hr as evaporation loss of water that goes to chimney along with exhaust gases. It is clearly written at the bottom of the figure that "All quantities are cu.m/hr". Water requirement is shown as 10,000 m3/hr.If the FGD alone is consuming 12,408 m3/hr, how will the plant run with 10,000 m3/hr of fresh water? In Table 4.8 the same quantity is shown as m3/day. Why this mixing up of units? Even after the EIA report was cancelled once, the proponent has carelessly prepared the report again indicates that the compliance to regulations after the permissions is doubtful.	The values shown in the Fig – 4.18 under FGD water balance may please be read as m^3/day instead of m^3/hr. The FGD water requirement is 620 m^3/hr i.e 14880 m^3/day. Details of the same are provided in Fig - 4.17 and Table – 4.8 Total Plant water requirement is 10,000 m^3/hr i.e 2,40,000 m^3/day. Details of the same are shown in Fig – 4.17 and Table – 4.8
8.	Every hour 517 tonnes of water evaporates and joins flue gases in the FGD unit. That is a substantial increase in the flue gas flow rate through the chimney. The entire basis for air quality modeling has changed and the EIA has not considered this increase in flow of flue gas while using AERMOD. All the results presented are meaningless and do not represent the reality. Is it not a reflection on the proponent/consultants inability to fathom the changes in technology with the introduction of FGD unit?	With FGD, Flue gas from each unit will be 730 Nm3/sec and without FGD it is 698.6 Nm3/sec. These factors have been considered and for modeling studies, worst case emissions have been calculated based on velocity of 24.3 m/sec and diameter of 7.6 m which gives flow rate of 917 Nm3/sec which is higher than 730 Nm3/sec.

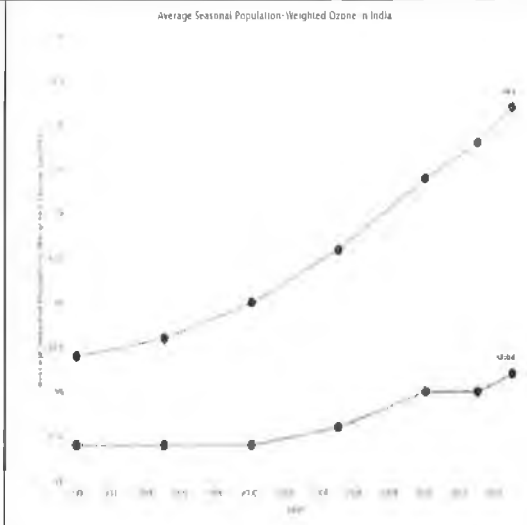
SNO	QUERY RAISED	TSGENCO RESPONSE
	They appear to be more aligned with political power to push through the project irrespective of the quality and consequences of the project. Proponent should explain the clear lapse.	
9.	"Krishna river is perennial in nature and even during the summer, just before the first monsoon rain, the minimum flow (June, 2005) has been measured as 25.72 Mm3 /month at Pondugala G/D station and the minimum flow (June, 2005) has been measured as 27.84 Mm3 /month at Wadenapalli station against the power plant requirement of 7.21 Mm3 /month. Thus the withdrawal percentage is less than 30% in lean season." [Page 260] Why is the Pondugala G/D station flow data not available for the period 2007 - 2016? In 2016 summer some units of Raichur Thermal Power Station in Karnataka on the bank of Krishna River had to be closed down due to paucity of water. Several other plants in other parts of India went through the same fate. A review of published literature on quantitative analysis of ecological response to flow alteration by Poff, N. L. and Zimmerman, J. K. H concludes, "Our analyses do not support the use of the existing global literature to develop general, transferable quantitative relationships between flow alteration and ecological response; however, they do support the inference that flow alteration is associated with ecological change and that the risk of ecological change increases with increasing magnitude of flow alteration." [Freshwater Biology (2010) 55, 194-205] "Most rivers are running below the	15 % of minimum flow is considered as minimum ecological flow required for the Krishna River. TSGENCO drawl is 30 % of the minimum flow and 70 % of the minimum flow is available for sustaining the ecology of the river stretch TSGENCO has proposed R.C.C Intake well structure type which will not disturb flow conditions and also provide free movement to fishes. Intake structures will be designed to minimize entrainment or impingement by providing strainers. Above details are provided in Chapter -4 of the Revised EIA Report. TSGENCO will regularly monitor the water quality of River Krishna and Tungapaduvagu. Never in the Telangana state the thermal units were shut down for want of water. In case of any poor rain fall in the catchment area of water sources may result such situation in some of the areas. Act of God is beyond prediction.

SNO	QUERY RAISED	TSGENCO RESPONSE
	norm. At this time, the lean rainfall season, the Krishna in southern India has no flow at Vijayawada and is just a medley of scattered stagnant pools of water. The Yamuna in Delhi is down to only 16 per cent of its flow and is reduced to cesspools of sewage. The Ganga, after Haridwar, is not doing much better." - VikramSoni, Emeritus professor of physics and ecological wisdom at JamiaMilliaIslamia and Jawaharlal Nehru University, New Delhi, April 2016. [http://www.dnaindia.com/analysis/column-do-not-kill-a-river-2201895] EIA report is concerned about the availability of water and not about the ecological impacts of drawing huge quantities of water from Krishna River. What is the minimum ecological flow that is required for the Krishna River in the affected stretch? What are the ecological impacts of drawing the water on aquatic life and vegetation? Why is no attempt made to study these aspects?	
10.	With the climate change advancing rapidly, there is every likelihood of water stress for basic requirements of life. A study done at IIT Delhi on "Climate change impact assessment on hydrology of Indian river basins" predicts severe drought in the Krishna basins with an attendant reduction in water yields to the extent of 50%. "The Krishna river basin has been predicted to undergo severe drought conditions under GHG scenario." "A close examination of the results reveals that this river basin is expected to receive reduced level of precipitation in future. Reduction has also been predicted in evapotranspiration and water yield	This is all imaginary.

SNO	QUERY RAISED	TSGENCO RESPONSE
	of the basin." "The variation in mean annual water balance components from control to GHG scenario, both in terms of change in individual values of these components as well as percentage of change over control, show that reduction in precipitation by about 20% of the current value has been predicted in the sub-basins of Krishna. The corresponding decrease in water yield over the sub-basins is predicted to vary from 30% to 50%. The actual evapotranspiration is also predicted to reduce by about 5% over most of the sub basins."  **Figure 6.** Number of drought weeks in sub-basins of Krishna for control to GHG scenarios. Plant area comes under sub basin 8, and as per the above figure the drought weeks in this area would double. Drought week, as defined by IMD, is a week in which rainfall is less than half of its normal. [A. K. Gosain, Sandhya Rao and DebajitBasuray; Climate change impact assessment on hydrology of Indian river basins, CURRENT SCIENCE, VOL. 90, NO. 3, 10 FEBRUARY 2006] How can the EIA study be complete without appropriately presenting all the impacts? Why is it that no attempt is made at scientific	

SNO	QUERY RAISED	TSGENCO RESPONSE
	assessment of impacts on water availability due to this project?	
11.	Revised EIA has not considered the impact of the plant on agriculture holistically. It is limited to socio-economic impacts of acquiring agricultural land from farmers. Environmental impacts on the agriculture due to the proposed plant emissions are missing. Proponents are able to get away with half baked reports as the whole appraisal process at MoEF& CC is bogus. There are large numbers of research publications and governmental reports on the loss of crop yield due to coal fired power plant pollution. USA has constituted a National Crop Loss Assessment Network (NCLAN) that published a number of reports and scientific publications quantifying the loss based on Ozone concentration prevalent. Ozone is a secondary pollutant generated from NOx and VOCs in presence of sunlight. The entire report has no word Ozone. A joint publication of NBRI, Lucknow; National Physical laboratory, Delhi and University of East Finland on "Impacts of increasing ozone on Indian plants" in Environmental Pollution in 2013. It is a review of published work on Ozone impact on crop yields in India. "The aim of this review is to present the current understanding of the magnitude of a potential ozone issue in India, considering the plant productivity and food production." Data presented in the paper shows how the crops are affected with increasing ozone concentration. Table 2 Estimated relative crop productions losses (%) due to current and near-	Flue gas treatment system proposed which is in compliance with the new norms of MOEF & CC stipulated for thermal power plants will be implemented by TSGENCO. The proposed project is redesigned to comply with the new emission norms of MOEF where in a flue gas treatment system comprising High Efficiency ESPs for control of Particulate emissions and Flue Gas Desulphurization (FGD) for control of Sulphur dioxide emissions(Flue Gas Desulphurization (FGD) technology with wet limestone process is considered for implementation) and Selective Catalytic Reduction Unit (SCR) for control of NOx emissions, SCR is proposed which will be located between the economizer outlet and APH inlet. The above system will ensure that there is no significant impact on agriculture and crop production. Till December, 2015, no standard is specified for NOx emission which is the primary pollutant leading to formation of Ozone. The Power plants are permitted to emit NOx concentrations in the range of 500 - 600 mg/Nm^3 and cement plants are permitted to emit NOx concentrations in the range of 900-1000 mg/Nm^3 without control technologies. The subject project is designed to meet outlet concentration of NOx of 100 mg/Nm^3 which will reduce formation of ozone by 5 times TSGENCO will include ozone monitoring in the operational phase to check compliance with NAAQ

SNO	QUERY RAISED	TSGENCO RESPONSE
	future (year 2030) ozone concentrations according to different modeling approaches* for major Indian crop plants. Table 2 Estimated relative crop productions losses (%) due to current and near-future (year 2030) ozone concentrations according to different modeling approaches[a] for major Indian crop plants. Crop | Present [O_3] | Future [O_3] Wheat 5–48% 10–48% Rice 3–18% 5–28% Soybean 3–19% 8–32% Bean 13–26% 27–52% Barley 4–14% 5–22% Maize 2–8% 3–16% Potato 2–9% 7–16% [a] Van Dingenen et al., 2009; Emberson et al., 2009; Feng and Kobayashi 2009; Avnery et al., 2011a,b. Loss of crop yield is an externality hitting the farmers who are already being forced to commit suicide and part with the land due to development policies that are pro-market. Who will compensate the farmers for the harm to their crops? Will the proponent accept or deny externalities on agriculture from the project? If deny, present scientific evidence of absence of any impact on crop yield. Latest Report on Status of Global Air released by Health Effects Institute this month presents average Ozone concentrations in India in comparison to global average. Ozone is quite high in India and any activity that promotes production of Ozone impacts agriculture production.	norm of 100 ug/m^3 @ 8 hour interval. TSGENCO is of considered opinion that with the implementation of Flue Gas Treatment System, the impacts on air quality will not be significant.

SNO	QUERY RAISED	TSGENCO RESPONSE
		
12.	Public health impacts from the plant emissions is absent in the revised EIA. Occupational Health and Safety presented is sketchy. In a Writ Petition (Civil) No 79 of 2005 filed by Occupational Health and Safety Association on occupational health and safety at industrial work places and in particular the serious deceases suffered by the workers of coal fired thermal power plants, Supreme court delivered a judgment on 31 January 2014. The Government of India submitted a Report of the Committee of Experts of the National Institute of Occupational Health (NIOH) titled "Environment, Health and Safety Issues in Coal Fired Thermal Power Plants" of the year 2011 to the court. The report considered health and safety issues associated with a) dust b) heat c) noise d) vibration e) radiation and f) waste disposal in thermal power plants. The judgment notes "the Committee has stated that the hazards associated with inhalation of coal dust might result in development of dust related morbidity in the form of pneumoconiosis (coal workers pneumoconiosis, silicosis) and non-pneumoconiosis persistent	Flue gas treatment system proposed which is in compliance with the new norms of MOEF & CC stipulated for thermal power plants will be implemented by TSGENCO. The emissions from the plant will be 3.3 times less with respect to particulate matter, 5-6 times less with respect to Sulphur dioxide and oxides of nitrogen when compared with the operating power plants which will reduce the Public health impact. TSGENCO has addressed the Occupational Health and Safety to its level best

SNO	QUERY RAISED	TSGENCO RESPONSE
	respiratory morbidities, such as chronic bronchitis, emphysema, asthma, etc. Further, it also pointed out that whenever asbestos fibres are used for insulation and other purposes, the possibility of asbestosis among workers due to inhalation of asbestos fibres cannot be ruled out. The Report also says that other morbidities because of exposure to fly ash, including metallic constituents such as lead, arsenic, and mercury might also be present. Due to exposure to other chemicals used in different operations of CFTPP, the Report says, may also be responsible to adversely affect human health." After perusal of that report, the judgment noted: "...it would not be practicable for this Court to examine whether CFTPPs are complying with safety standards and the rules and regulations relating to the health of the employees working in various CFTPPs throughout the country. We feel that these aspects could be better examined by the respective High Courts in whose jurisdiction these power plants are situated." "We, therefore, feel that it is appropriate to relegate it to the various High Courts to examine these issues with the assistance of the State Governments after calling for necessary Reports from the CFTPPs situated in their respective States." "We make it clear that the Report is not at all comprehensive in certain aspects and the respective High Courts can examine the issues projected in this Judgment independently after calling for the reports about the CFTPPs functioning in their respective States." The case is now being heard by several High courts.	
13.	A number of epidemiological studies	The proposed project is redesigned

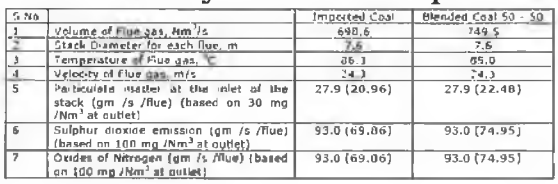
SNO	QUERY RAISED	TSGENCO RESPONSE
	conducted in several countries are available. Hundreds of medical research publications are also available confirming the harm from coal fired power plant pollution. Physicians for Social Responsibility, a Nobel Peace Prize winning body of physicians compiled reports on the health effects of air pollution from coal combustion and coal ash on humans. Their Report "Coal's Assault on Human Health" is available free on the Internet. It begins with the sentence "Coal pollutants affect all major body organ systems and contribute to four of the five leading causes of mortality in the U.S.: heart disease, cancer, stroke, and chronic lower respiratory diseases." The principal author of this report Dr Alan H Lockwood wrote a book "The Silent Epidemic: Coal and the Hidden Threat to Health" published by The MIT Press in 2012. It covers hundreds of research studies on human health impacts from coal and its combustion products. The following quote is from Chapter 1, Page2 of the book. "The evidence linking coal and decease is strong and getting stronger each year. Recent peer-reviewed articles in major medical journals provide surprising estimates of the morbidity and mortality associated with burning coal. European data reported in the prestigious medical journal, show that 24.5 deaths are expected for each Terra Watthour (TWh = 1012 Watthours) of electricity generated (95% CI= 6.1-98), in addition to 225 serious illnesses (95% CI = 56.2-899), and 13,288 minor illnesses (95% CI = 3,222-53,150) [Markandaya A, Wilkinson P. Energy and Health 2: Electricity Generation, Lancet 2007; 370, P 979-90] ..... To give these data	to comply with the new emission norms of MOEF where in a flue gas treatment system comprising High Efficiency ESPs for control of Particulate emissions and Flue Gas Desulphurization (FGD) for control of Sulphur dioxide emissions(Flue Gas Desulphurization (FGD) technology with wet limestone process is considered for implementation) and Selective Catalytic Reduction Unit (SCR) and For control of NOx emissions, SCR is proposed which will be located between the economizer outlet and APH inlet. Flue gas treatment proposed will comply with the following outlet ESP outlet dust concentration : 30 mg/Nm3 SOx : 100 mg/Nm3 NOx : 100 mg/Nm3 Mercury : 0.03 ppm An additional budget of Rs 0.9 crore/MW will be incurred to comply with above new emission norms of MoEF& CC stipulated for Thermal Power Plants as per the Gazette Notification S.O. 3305 (E) dated 07.12.2015. Flue gas treatment system will ensure that there is no significant impact on Human Health due to emissions from the plant The project will comply with the 2009 NAAQ standards and the proposed Emission standards prescribed for power plants.

SNO	QUERY RAISED	TSGENCO RESPONSE
	perspective, consider the fact that nearly half of the electricity generated in the united states in 2007 came from coal fired power plants. If these European estimates are applied to the United States, as many as 50,000 deaths per year may be attributable to burning coal. Although differences in population density between Europe and the United States are substantial, and there are large boundaries on the 95% confidence limits associated with these data, it is clear that burning coal has major adverse health effects that must not be ignored." The global burden of disease (GBD) for 1990-2010 quantified the trends of more than 200 causes of death and listed outdoor air pollution among the top 10 risks for India, with the outdoor PM2.5 and ozone pollution contributing to an estimated 695,000 premature deaths. PM2.5 refers to particulate matter less than 2.5μm in aerodynamic diameter. The ambient PM pollution was ranked 6th in 1990 with 440,000 annual deaths, which moved to 5th overall in 2010. The morbidity and mortality burden of outdoor air pollution is particularly costly in terms of work days lost, lost productivity, and loss in terms of gross domestic product (GDP), which was approximately USD 23.4 billion and 1.7% of national GDP in 2009. [Coal Kills Health Impacts of Air Pollution from India's Coal Power Expansion, a joint report of Conservation Action Trust and Urban Emissions published in 2013] Latest report by Greenpeace that MoEF& CC rejects calling it inconclusive says "Global Burden of Disease (GBD), a comprehensive regional and global research program including 500 researchers	

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	representing over 300 institutions and 50 countries, has estimated that 3283 Indians died per day due to outdoor air pollution in India in 2015, making the potential number of deaths due to outdoor air pollution in India in 2015 to 11.98 lakh. On the economic front, loss of productivity and the forced closures of schools and industries have already started impacting our economy. The World Bank estimates that India loses around 3% of its GDP due to air pollution. This makes air pollution one of the biggest issues to fight if we are to protect peoples' lives, public health and our economy." [Airpocalypse: Assessment of Air Pollution in Indian Cities, January 2017] EIA report is completely silent on the human health impacts of air pollution from the proposed power plant. What is the basis on which the proponent excluded any adverse health impacts from this plant? Is there any evidence in medical research that precludes any harm from air pollution within the NAAQS?	
14.	Externalities from the coal fired power plant pollution have been a concern and several studies have estimated the burden from these. National Academies of USA assessed what economists call external effects caused by various energy sources over their entire life cycle at the request of US Congress. In case of coal fired power plants the estimates showed: In 2005 the total annual external damages from sulfur dioxide, nitrogen oxides, and particulate matter created by burning coal at 406 coal-fired power plants, which produce 95 percent of the nation's coal-generated electricity, were about $62 billion; these non-climate	This aspect is a policy related aspect. Such studies / externalities shall have to be conducted by independent organizations / MOEF and frame guidelines. MOEF had issued the new emission standards for power plants to be commissioned from 01.01.2017. The use of super critical technology with FGD and flue gas treatment have been made mandatory to control air pollution from the proposed power plants. TSGENCO is complying the same at an estimated additional cost of 0.9 crore/MW.

SNO	QUERY RAISED	TSGENCO RESPONSE
	damages average about 3.2 cents for every kilowatt-hour (kWh) of energy produced. In 2005 damages per kWh from SO2, NOx, and PM emissions were an order of magnitude higher for coal than for natural gas plants: on average, approximately 3.2 cents per kWh for coal and 0.16 cents per kWh for natural gas (2007 USD). Full cost accounting for the life cycle of coal done by Harvard School of Public Health team published in "Ecological Economics Reviews." Robert Costanza, Karin Limburg & Ida Kubiszewski, Eds. Ann. N.Y. Acad. Sci. 1219: 73–98 estimated the external costs for the health and the environment. Results of their estimates for all coal use in USA are presented here. **Estimated Cost (2008 US $)** EIA has not considered this aspect. Are there no externalities from the proposed power plant? If so, how are they avoided?	
15.	Data given in Table 4.1 is reproduced below to illustrate the careless approach in EIA preparation. Data for the first four parameters is given as obtained from BHEL. How are the flue gas velocities for different coals same while the volumetric flow rate of flue gas generated in each case is different? Please explain. For different volumetric flow rates of flue gas for imported and blended coals how did the EIA report arrive at same fluxes for both cases for particulate matter, sulphur dioxide and nitrogen oxides? Even the values presented for all the cases are erroneous, even though what is involved is simple arithmetic.	It may be noted that to provide buoyancy, velocity of the flue gas is maintained at 24.3 m/sec for any type of coal burnt. Worst case emissions have been calculated based on velocity of 24.3 m/sec and diameter of 7.6 m with flue gas volume at normal temperature of 25°C i.e about 917 Nm^3/sec and the same has been considered for estimation of emissions. It may please be noted that values considered are higher than the values marked in red.

	Low	Best	High
Total (in Billions $)	175	345	523
Additional cost per unit (in cents)	9	18	27

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	How to trust a proponent/consultant's ability to deal with complex environmental impacts of modern technology, when they cannot even do simple school level arithmetic right? It is key input part for air quality monitoring and all the numbers are wrong. Calculated values are presented in brackets in red. With key data erroneous, what is the credibility of the EIA report? 	
16.	Fate of mercury and other heavy metals present in coal is not considered in the EIA Report except mentioning the new permitted mercury concentration in the stack gas. Taking the lowest mercury concentration in the Indian coal as per CPCB data of 0.272 ppm, the total quantity of mercury released works out to 12. 18 x 106 x 0.272 = 3312.96 kg/year = 3.313 tpa. What is the fate of that mercury?	The heavy metals analysis report of domestic coal indicates no presence of mercury in the coal to be sourced. Mercury emission released from the coal in oxidized form and condensed on ash particles will be removed by the proposed flue gas treatment comprising of High Efficiency ESPs, Flue Gas Desulphurization (wet FGD) and Selective Catalytic Reduction Unit (SCR). The above system will ensure that there will be no significant emission of heavy metals including mercury.
17.	"Feed water will be heated by uncontrolled turbine extraction steam from turbine inter -stage tap-offs and cold reheat line in feed water heaters." [Page 35] I sought the opinion of a former power plant design engineer on the "uncontrolled turbine extraction steam" and his comment is as follows: "Feed water heaters are employed to limit the quantity of expanded steam going to lower pressure stages. It is a normal process in all large turbines. Unless you bleed some of the steam, the design of the turbine becomes	As per CEA guidelines, the steam turbines shall have seven uncontrolled extractions based on optimized cycle and shall be suitable for satisfactory operation under tropical conditions. (Ref: CEA Standard Technical features of BTG system for Supercritical 660/800 MW Thermal units).

S.No		Imported Coal	Blended Coal 50 - 50
1	Volume of Flue gas, Nm³/s	698.6	749.5
2	Stack Diameter for each flue, m	7.6	7.6
3	Temperature of Flue gas, °C	86.1	85.0
4	Velocity of Flue gas, m/s	24.3	24.3
5	Particulate matter at the inlet of the stack (gm /s /flue) (based on 30 mg /Nm³ at outlet)	27.9 (20.96)	27.9 (22.48)
6	Sulphur dioxide emission (gm /s /flue) (based on 100 mg /Nm³ at outlet)	93.0 (69.86)	93.0 (74.95)
7	Oxides of Nitrogen (gm /s /flue) (based on 100 mg /Nm³ at outlet)	93.0 (69.86)	93.0 (74.95)

SNO	QUERY RAISED	TSGENCO RESPONSE
	unviable. But the bleeding of steam is done in a very controlled manner, decided in the basic design stage itself. I fail to understand the term "uncontrolled" as the bleeding proceeds according to design conditions only, the quantity of steam bled is according to the steam flow and heat balance daigrams provided by the manufacturer." Is it thoughtlessly copied? Explain the reasons for choosing the word uncontrolled. It could not be a typographical error.	
18.	"Tall Stacks - discharge flue gas at high altitude to ensure wider dispersal of flue gas." [Page 295] Tall stacks facilitate shifting of pollution to wider area and not reduce pollution. USEPA stopped giving credit to tall stacks before 1978 and the final rule came out in June 1985 as a result of a case filed by the state of Pennsylvania and environmental groups. [http://www.nytimes.com/1985/06/28/us/epa-aims-to-curb-tall-smokestacks.html] The final rule announced was considered inadequate and further legal battles ensued. Nearly forty years after that new emission standards for coal plants are announced in India and still some new plants are being exempted from the new standards. No old plant has made any serious effort to comply with the new standards and the news is that date of compliance may be shifted further in to the future. "Tall stacks will reduce the actual ground level concentrations in the vicinity of the plant, although the areas affected by low level concentrations are increased. The USEPA no longer gives credit for tall stacks in calculating concentrations resulting from plant operations." [A	Point noted. TSGENCO has no comments on the view expressed in the point. The implementation of the new standards is incorporated in the project and TSGENCO has committed in the revised EIA to comply with the new standards at an additional cost of 0.9 Crore /MW.

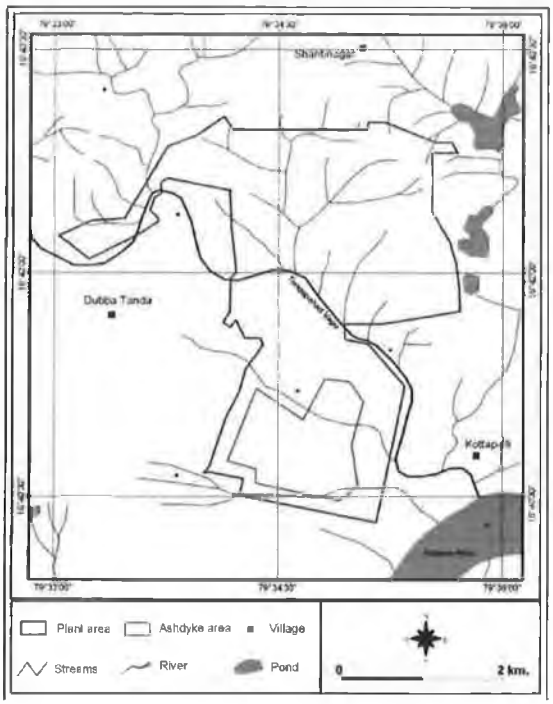
SNO	QUERY RAISED	TSGENCO RESPONSE
	Biologist's Manual for evaluation of Impacts of Coal Fired Power Plants on Fish, Wildlife, and their habitats, August 1978]	
19.	"Crystalline Solar Photo Voltaic technology will be adopted. Considering 80% roof top area available for solar panel installations, the total solar power generation is estimated to be approx. 2552 KW (@ 1 kW/m2)" [Page 412] At 1 kW/m2 considering 3000 m2/acre of land available for solar panels excluding pathways for approach and maintenance, the total solar power that can be generated using 2800 acres of land = 1 x 3000 x 2800 /1000 MW = 8400 MW. Then why opt for a dirty coal plant?	Point noted. TSGENCO has no comments on the view expressed in the point. There is a technological limitation in renewable power generation (i.e) storage of power for which the battery technology has not matured till date. The roof top area required for generating 1kW electric power by using solar PV panels is 10 m^2 but not 1 m^2. Hence it may be read as 10 m^2/kW in place of 1m^2/1kW in the EIA report.
20.	Compliance to the minutes of 63rd Reconstituted Expert Appraisal Committee meeting held on 30.08.2016 is presented in Annexure 1G of revised EIA for YTPS. The first point is about, Plagiarism, irrelevant content and absence of crucial site and plant specific analysis. Compliance status is given as: This chapter is revised and incorporated under chapter 7 Para – 7.2, page No 319 – 413. There is no possibility to verify the content for plagiarism as the document is submitted in image format with a malicious intent of preventing plagiarism detection. My complaints to Ministry and EAC have not produced any result as yet. Why is the proponent/consultant not following professional ethics and depending on technology to hide the crime?	TSGENCO wishes to state it did not make attempts to camouflage behind technology. The maximum file size that can be uploaded on the website is 20 MB. We had to convert the document to pdf format, compress to ensure that the file size is less than 20 MB. This is a technical limitation and not any attempt to camouflage or dirty tactics. We hope the author being a scientist will appreciate this technical aspect. Apart from this it is pertinent to mention that MOEF&CC had asked TSGENCO to display the revised report on the website of TS Pollution Control Period. However, TSGENCO had kept the hard copies of the Report at all the locations as mentioned in the advertisement. These were the locations where the initial report was kept. 1) Collector and District Magistrate Office, Nalgonda 2) District Industries Center, Nalgonda 3) CEO, ZillaParishad Office, Nalgonda 4) Divisional Forest Office, Nalgonda

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		5) Department of Environment, Forest, Science and Technology, GoTS, Telangana State Secretariat, Hyderabad 6) Telangana State Pollution Control Board, Head Office, PariyavaranBhawan, A-1, Industrial estate, Sanath Nagar, Hyderabad 7) Telangana State Pollution Control Board, Zonal Office, Ramachandrapuram, Medak District, Telangana 8) Telangana State Pollution Control Board, Regional Office, Nalgonda 9) Revenue Divisional Office, Miryalaguda, Nalgonda District 10) Tehsildar Office, Damarecharla Mandal, Nalgonda District 11) Gram Panchayat Office, TallaVeerlapalem Village, Damaracherla Mandal, Nalgonda District 12) Gram Panchayat Office, TallaVirappagudem Village, Damaracherla Mandal, Nalgonda District 13) Gram Panchayat Office, Timmapur Village, Damaracherla Mandal, Nalgonda District 14) Gram Panchayat Office, Kotupalli Village, Damaracherla Mandal, Nalgonda District 15) Gram Panchayat Office, Kalepalli Village, Damaracherla Mandal, Nalgonda District
21.	"The study result for the period 2017-22 indicated that no coal based capacity addition is required. Considering this as input for the studies for the period 2022-27 and committed capacity addition of Nuclear - 4,800 MW, Hydro-12,000 MW and RES 100,000 MW during 2022-27 and demand projections for the year 2026-27, study for the period 2022-27 reveals that a coal based capacity addition of 44,085	Coal/Nuclear based thermal power plants are only considered as base load stations and renewable energy cannot be considered as a base load. Energy from renewable sources is only supplementary to the base load. Further, in accordance with Paris agreement, the upcoming coal based thermal power plants shall have to comply with revised emission norms notified by MoEF & CC, Govt. of

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	MW is required. However, as coal based capacity of 50,025 MW is already under construction which is likely to yield benefits during 2017-22; this coal based capacity would fulfill the capacity requirement for the years 2022-27." [National Electricity Plan, December 2016] "Indicating a significant shift in the Indian power sector, the Central Electricity Authority (CEA) has, in its National Electricity Plan (2017-2022), said the country does not need any more coal-based capacity addition till 2022. CEA said India would add massive renewable-based capacity." [http://www.business-standard.com/article/economy-policy/india-does-not-need-more-coal-based-capacity-addition-till-2022-central-electricity-authority-116121300042_1.html] What is the justification in opting for coal fired power plant with imported coal that is not supported by national Electricity Plan or Climate Science? Latest Solar bid in MP was for Rs2.97 per kWh and this price is still rapidly declining. It is quite likely that the project becomes a financial burden within its lifetime. Power sector is already in deep financial crisis. Private investments dried out. Most of the projects being proposed are in government sector.	India vide its gazette notification dated 07.12.2015.
22.	"Total Roof top area available from Power house, Admin building, Service building, CW pump house and Clarified water pump house is 23,600 m2." [Page 268] "The estimated roof top area of the project area available for installation of Solar Panels is about 31900 m2." [Page 412] Roof top rain water utilization potential in plant area calculation used only 23,600 m2 roof top area while the actual available area is	Recharge potential of Rainwater harvesting at the Project Site is less as it is located in the tail end of the watershed. The formations are near horizontal sedimentary bedded Shale deposits occurring at the top and are impermeable in nature. In order to compensate and to maintain the equivalent over-land flow in the area, only part of the Roof Top Rain Water Collection has been considered.

<table>
<tr><th>SNO</th><th>QUERY RAISED</th><th>TSGENCO RESPONSE</th></tr>
<tr><td></td><td>31,900 m2.
Why are the other buildings with 8600 m2 roof top area excluded from RWH consideration? Any specific reason?</td><td>However as pointed, the same will be increased after detailed engineering</td></tr>
<tr><td>23.</td><td>ToR 42: “Radioactivity and heavy metal contents of coal to be sourced shall be examined and submitted along with laboratory reports.”
The radioactivity test certificate presented for 4 x 270 MW BTPS project and 5 x 800 MW YTPS is the same: Ref.: BARC: HPD: LLCL: D: 43: C: 02: 2015/1180 dated September 18, 2015 issued by Dr P. M. Ravi, Head, ESS.
This is clear deception and deliberate falsification of data. No data
<table>
<tr><th>S No</th><th>Heavy Metal</th><th>Units</th><th>Coal Sample for BTPS</th><th>Coal sample for KTPS</th></tr>
<tr><td>1</td><td>Cadmium as Cd</td><td>mg/kg</td><td><0.1</td><td><0.1</td></tr>
<tr><td>2</td><td>Chromium as Cr</td><td>mg/kg</td><td>151.2</td><td>132.3</td></tr>
<tr><td>3</td><td>Copper as Cu</td><td>mg/kg</td><td>14.6</td><td>14.2</td></tr>
<tr><td>4</td><td>Iron as Fe</td><td>mg/kg</td><td>0.25</td><td>1.75</td></tr>
<tr><td>5</td><td>Cobalt as Co</td><td>mg/kg</td><td>9.7</td><td><0.1</td></tr>
<tr><td>6</td><td>Manganese as Mn</td><td>mg/kg</td><td>53.7</td><td>254.4</td></tr>
<tr><td>7</td><td>Nickel as Ni</td><td>mg/kg</td><td>87.8</td><td>61.1</td></tr>
<tr><td>8</td><td>Lead as Pb</td><td>mg/kg</td><td><0.1</td><td><0.1</td></tr>
<tr><td>9</td><td>Zinc as Zn</td><td>mg/kg</td><td>48.8</td><td>35.6</td></tr>
<tr><td>10</td><td>Arsenic as As</td><td>mg/kg</td><td><0.1</td><td><0.1</td></tr>
<tr><td>11</td><td>Mercury as Hg</td><td>mg/kg</td><td><0.1</td><td><0.1</td></tr>
<tr><td>12</td><td>Titanium as Ti</td><td>mg/kg</td><td>631.2</td><td>607.6</td></tr>
<tr><td>13</td><td>Antimony as Sb</td><td>mg/kg</td><td><0.1</td><td><0.1</td></tr>
<tr><td>14</td><td>Vanadium as V</td><td>mg/kg</td><td>14.6</td><td>10.2</td></tr>
<tr><td>15</td><td>Thallium as Tl</td><td>mg/kg</td><td><0.1</td><td><0.1</td></tr>
<tr><td>16</td><td>Tin as Sn</td><td>mg/kg</td><td><0.1</td><td><0.1</td></tr>
</table>
The above analysis done by Vimta labs is presented as part of Annexure 2D of the revised EIA report for YTPS. It is to be noted that two neighboring plants of TSGENCO for which coal is to be sourced from SCCL mines nearby have substantial variation in heavy metal content. Also all highly toxic heavy metals such as Cadmium, Lead, Arsenic and Mercury are shown as less than 0.1 mg/kg for both the samples. The credibility of analysis presented is questionable based on data presented in other</td><td>The test reports of the coal from SCCL had been furnished. TSGENCO will monitor the same during operation stage. There is no deception of deliberate falsification. The actual data can be generated during operation phase when the actual coal samples can be sent for analysis.</td></tr>
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SNO	QUERY RAISED	TSGENCO RESPONSE
	EIA reports for SCCL coal. There is no firm linkage for coal from SCCL and the mine from which the coal will be delivered is unknown. So the analysis data for previous EIA reports has no relevance for the present case and is not a compliance with ToR 42.	
24.	ToR 44: "Quantity of fuel required, its source and characteristics and documentary evidence to substantiate confirmed fuel linkage shall be furnished. The M'inistry's notification dated 02.01.2014 regarding ash content in coal shall be complied. For the expansion projects, the compliance of the existing units to the said Notification shall also be submitted." Coal requirement for blended coal is changed from 13.81 MTPA (previous EIA) to 12.18 MTPA (Revised EIA) by tweaking with GCV values. Will such quality coal be really available is a big question? No documentary evidence of firm fuel linkage is presented. MoU with SCCL is not same a firm coal linkage that Ministry of Coal only can give.	M/s. SCCL have given firm commitment for supply of 7.00 MTPA of G9 and above grade coal from cost plus mines. With regard to imported coal, MoU has been entered with M/s. MSTC for supply of 7.00 MTPA of imported coal. Further, the requirement of blended coal is reduced from 13.81 MTPA to 12.18 MTPA due to considering the higher quality of domestic coal (GCV 4600 - 4900 Kcal/Kg) offered by M/s. SCCL. The ash content in coal proposed to be utilized is less than 30% which is in compliance to the MoEF notification dated 02.01.2014.
25	I am repeating here the comment made on the previous EIA report with regard to feeder channels for Thungapaduvagu.	The point is referring to the earlier EIA Report. The report has been revised now and the point raised has been addressed in detail under paragraphs 4.2.3.12 and 4.2.3.13i.e impact on Tungapahadvagu and protection measures and impact due to diversion of streamlets and control measures.

SNO	QUERY RAISED	TSGENCO RESPONSE
	 Thungapaduvagu and its feeding channels pass through the site chosen for the power plant. A subcommittee visited the site on 5 December 2015 and made a visit report based on which ToR was issued on 16 February 2016. "The Vagu has a catchment area of 267 sq. miles (694 sq. kms) including the NSLC command area and yields 1,234 Mc ft. (1.234 TMC) including 328. 98 Mc ft. as regenerated flow from the ayacut." Hydrogeological character map taken from the hydrogeological studies report annexed to draft EIA is presented above showing the contours of drain channels on the proposed site connecting to Thungapaduvagu. Once the site is developed for construction all these natural channels will be leveled and eliminated. That is an ecological damage not considered in the EIA or the subcommittee visit report. Ash pond also is located over drain channels and disrupts natural drainage. What are measures proposed to mitigate the hydrological impacts?	

Conclusion:

The following expressions by respected Dr. K. Babu Rao, Chief Scientist are unwarranted and not appreciated, that too against the Govt. Company i.e. TSGENCO.

i) The whole appraisal process of MoEF & CC is bogus.
ii) Aligned with political power to push through the project.
iii) Mean tactics, cover up of crime, unethical practices, half baked reports, careless approach, thoughtlessly copied, clear deception, deliberate falsification of data.

TSGENCO earnestly requests the learned retired Scientist to desist from ascribing motives to it, since the project is built in public interest.

POINT WISE RESPONSE TO ISSUES RAISED BY SHRI N. Harinder, Vill: Mutyalammagudem, Mandal – Kattangur, District – Nalgonda, Telangana – 508205, vide letter dated 19th Feb, 2017

S.No	QUESTION	TS GENCO RESPONSE
	COAL AND ITS TRANSPORATION	
1.	What is the Coal grade of SCCL?	The grade of coal will be G9 and above grades.
2.	EIA report says that the Ash Content in the SCCL Coal is 30%. Does it mean that Ash Content will be brought to 30% after beneficiation?	Maximum Ash content in G9 grade coal as declared by M/s. SCCL is less than 30%. No coal beneficiation is required.
3.	If yes to the above question, please provide the name of the Coal Washery from which washed coal will be supplied by the SCCL.	Does Not arise.
4.	What is the Coal grade of Imported Coal?	Equivalent to G6 grade.
5.	EIA report says that the Ash Content in the Imported Coal is 15%. Does it mean that Ash Content will be brought to 15% after beneficiation?	No. It is the maximum ash content in imported coal.
6.	If yes to the above question, please provide the name of the Coal Washery from which washed coal will be supplied by the SCCL.	Not applicable.
7.	What is the Country from which Imported Coal will be obtained? The EIA Report does not precisely say it.	The imported coal will be taken from MSTC who import coal from different countries like Indonesia, Australia and South Africa.
8.	What is the port to which Imported coal be brought? The EIA Report does not precisely say it.	The imported coal will be received by sea at Krishnapatnam, Visakhapatnam and Kakinada ports as the case may be.
9.	What is the train route by which imported coal will be brought to the project site. The EIA report does not precisely say it.	The train route will be from these ports to plant site via Vishnupuram Railway station.
10.	What is the impact of train transportation of imported coal on Ambient Air Quality?	The impact of coal transportation by train will be mitigated by covering the wagons with tarpaulins at the port.
11.	What is the total quantity of Imported Coal which will be transported to the project site?	It is estimated that about 6.0 million tons per annum will be transported to the project site by rail.
12.	What is the total cost of the transportation of the imported coal	TSGENCO will pay the Railways as per the freight charges notified by them from time to time.
13.	How many numbers of trips are	It is estimated that about 4.80 rakes

S.No	QUESTION	TS GENCO RESPONSE
	needed every day for transportation of imported coal?	are required daily.
14.	What is the name of the mine from which indigenous SCCL coal will be brought?	SCCL basket of mines of Kothagudem area.
15.	What is the train route by which indigenous coal will be brought to the project site? The EIA report does not precisely say about it.	The train route is from Motumarri end (on Vijayawada – Dornakal station) to plant site via, Vishnupuram Railway station.
16.	What is the impact of train transportation of indigenous coal on Ambient Air Quality?	The impact of coal transportation by train on Ambient air quality will be negligible.
17.	What is the total quantity of Indigenous Coal which will be transported to the project site?	About 7 million tons per annum
18.	How many number of trips are needed every day for transportation of imported coal?	Already addressed at Sl.No. 13.
19.	What is the Total cost of the indigenous Coal transportation per year?	TSGENCO will have to pay the Railways as per the prevailing freight charges notified by the Railways from time to time.
	ASH POND AND FLY ASH UTILIZATION	
20.	Please specify the total length, breadth and depth of Ash Pond. (Note: I'm not asking the total area of Ash Pond, which is very clearly specified that it is 400 acres. I'm asking specifically asking the length, breadth and depth of 400 acres Ash Pond)	This will be finalised during detailed engineering stage based on geo-technical investigations.
21.	You say that TSGENCO is committed to utilize 1.2 MTPA Fly Ash and 0.56 MTPA Bottom Ash generated every year for the purpose of construction of Roads, buildings, Dams, etc. Please give us the following details in this regard.	The fly ash will be issued to the cement plants located in Nalgonda district and other districts whoever come forward. TSGENCO had received willingness from 9 cement plants located within 50 km to lift about 0.864 MTPA of fly ash.
a	What is the total quantum of Ash which will be needed for lying of say about 5 kilometres of road?	Generally, the ash requirement in construction of roads will be in the formation of embankments, levelling and grading of the area. In case of RCC roads the ash can be mixed directly in the concrete based on the design mix of the concrete. The quantum of ash required will depend on the topography of the area.

S.No	QUESTION	TS GENCO RESPONSE
b	What is the total quantum of Ash which will be needed for construction of say about 5 floors and 10 flats each floor building	In manufacturing of fly ash bricks, the ash content will vary from 60% to 70%. In building construction TSGENCO is using PP cement. In manufacturing of PP cement 15%-35% of fly ash will be used. The quantum of cement and bricks required for construction of any building depends on its size. As such it is not possible to quantify the ash required for construction of any building without its measurements.
c	List of Dams which are coming up in the state of Telangana and the assurance which has been given by them that they will build the dams with Ash produced from the plant	TSGENCO will coordinate with the Irrigation department, R&B and PWD departments, to use the bottom ash as per the MOEF&CC notification.
22.	What is the precise depth to groundwater in the exact area of the Ash Pond?	The water table is at a depth of 14 – 35 m below ground level during pre-monsoon period and 8 – 26 m during post monsoon period.
23	The EIA contains no construction details regarding the Ash Pond. Provide details concerning the following:	
A	*Structural engineering:* The EIA does not address how the walls of the ash dyke will be engineered and maintained to ensure structural stability and to avoid a failure of the dyke. Explain how the dyke will be constructed, including the method and materials to be used in its construction.	TSGENCO has already constructed ash ponds at Kothagudem Thermal Power Station of 1720 MW, Kakatiya Thermal Power Plant of 1100 MW and 62.5 MW Ramagundam Thermal Power station and maintaining. The ash pond construction will be done by the reputed design engineers and will be maintained by TSGENCO engineers in consultation with expert engineers.
B	*Ash Pond Liner:* The EIA states that a single HDPE liner will be placed at the bottom of the Ash Pond. What is the thickness of this liner? What is its permeability? Will the HDPE liner be installed with any other liner (e.g., an underlying clay liner)? If so, how thick will the underlying clay liner be and what will be the permeability of the clay liner?	The thickness of the HDPE liner will be 1000 microns with zero permeability. No. Underlying clay liner not required.
C	*Drains*: Will the Ash Pond be constructed with a garland drain or	Toe drains will be provided all along the ash pond bunds to drain off de-

S.No	QUESTION	TS GENCO RESPONSE
	toe drain? If so, how will the wastewater be collected, what will be the quantity of the wastewater and where will the wastewater be diverted and disposed?	canted water from the pond and brick masonry cross drains will be provided on the slopes of bunds to drain off the rain water. The decanted water from ash pond both from toe drains and from decantation well will be collected in the sump of ash water recovery pump house and pumped to the treatment plant for using the same in the ashing purpose. The quantity of water will be finalised at the time of detailed engineering.
D	*Emergency spillway*: Will the Ash Pond be constructed with an emergency spillway in the event of overflow or failure of the dyke? If so, how will this emergency spillway be constructed and to what waterbody will it drain?	Yes. It will be finalised at the time of detailed engineering of the ash pond.
E	*Monitoring of Ash Dyke:* Describe the instrumentation, such as piezometers, that will monitor the level of water in the dyke. If piezometers will be installed to monitor the pore water pressure in the dyke, describe the number of piezometers that will be installed and how frequently they will be monitored. Note that this question is not referring to groundwater quality monitoring wells, which differ from piezometers in their placement and function.	Piezometers will be provided along the toe of the ash pond bunds to monitor the contamination of ground water if any due to seepage of water from ash pond. The size and actual number of piezometers to be provided will be finalised at the time of detailed engineering of the ash pond.
23.	Provide specific details concerning the streamlets and tributaries that run through the area of the Ash Pond and how the Ash Pond will be constructed on top or adjacent to the streams.	The details regarding diversion of two streamlets are given in the EIA report along with map. The northern side streams will be diverted via drains to the Tungapahadvagu. The western side stream has limited catchment area entering the ash pond area which will be diverted to join another stream flowing in the south. Another streamlet just passes through the southern part of the ash pond and will be allowed to flow undisturbed. Proposed diversion of the streams in ash pond area is shown in Figure – 4.21 (B) of

S.No	QUESTION	TS GENCO RESPONSE
		EIA/EMP report.
24.	The EIA states that the Ash Pond will be constructed with dykes that are 15 meters tall. The fly ash, bottom ash and scrubber sludge generated by TSGENCO will fill up the pond long before the predicted 25-year lifespan estimated in the EIA. Will the dikes be vertically extended to contain the waste, and if so, to what height after 25 years?	The dykes will be raised vertically. The maximum height of the dyke etc will be decided during detailed engineering of the ash pond.
	AIR:	
25.	The previous rejected EIA has clearly mentioned that there are 22 cement industries within 15 kilometers radius of the project site. However, the present EIA mentions only a few of the cement industries. What happened to the rest? Therefore, give us a clear list of all the existing and proposed cement plants within 15 kilometers radius of the project site, along with their production capacities and the types and amount of air pollution they emit each year on average.	**Its not correct statement made by Sri. N. Harindar.** In the EIA report prepared by the earlier consultant also, it is mentioned as 5 cement plants located within the radius of 15 Km under section 1.4.2 of chapter -1. Further, under section 4.8.4. of Chapter 4 of earlier EIA report, it is mentioned as there are about 12 cement industries within the radius of 50 Km and 10 more cement industries within the radius of 200 Km. Similarly, in the revised EIA/EMP report it is given that there are 5 operating cement plants within 15 km radius and one is proposed. The same is furnished in the revised EIA in Table 4.3 including production capacities. The rest of the cement plants are in a radius of 150 – 200 km. The details of emissions have been given in Table 4.3.
26.	The revised EIA is completely silent on the number of mines which are within 15 kilometers of the site. Therefore, give us the complete list of all the existing and proposed mines within 15 kilometers of the project site.	Not true. The same is mentioned in Table 4.3
27.	The revised EIA is also silent on the impact of the existing and proposed mines within 15 kilometers of project	The impact of the existing and proposed industries including the mines are given in Table – 4.5 of

S.No	QUESTION	TS GENCO RESPONSE
	site. Therefore, give us the complete list of all of the types and amount of air pollutants which are released each year on average by the mining activity (both existing and proposed) which are within 15 kilometers radius of the project site.	revised EIA report.
28.	In continuation to the above question, please also provide complete details and explanation on the impact of the existing and proposed mines on the air pollution within 15 kilometers radius of the project site, since the revised EIA is also silent on the impact of these mines.	The detailed air quality modelling has been carried out vide Table 4.5. The impact due to existing and proposed industries along with the proposed 5X800 MW Yadadri Thermal Power Station is presented. As could be seen from the above table 4.5, the overall scenario is well within the limits of NAAQ standards.
29.	What will be total emission of Carbon Dioxide every year from the proposed power plant?	The estimated CO_2 generation is about 0.831 tonne/MWh.
30.	The revised EIA does not anywhere talk about the cumulative release of Carbon Dioxide from all the Cement industries and other industries within 15km of the project site. Therefore, give us complete details of carbon dioxide which is released every year by each and every cement and other industry within 15 kilometres of the project site.	This data is not available in public domain. However, the average CO_2 generation from a cement plant is about 0.80 t/t of clinker production.
31.	What is the source document reporting the Baseline Carbon Dioxide Emissions from Power Sector data presented therein.	The source document is published by Central Electricity Authority
32.	How does the TSGENCO intends to "avail the CDM benefits." Has any application for such CDM benefits been filed?	So far CDM benefits for thermal power plants without FGD are not available.
33.	The Project releases SO_2 even with the usage of FGD. What will be total amount of Sulphur Dioxide which will be released by the project per year, after the FGD utilization?	The SO_2 released after FGD per unit in an annum will be 2460 Tonnes.
34.	What will the SO_2 removal efficiency of the FGDs be; i.e., by what percent will the FGDs reduce SO2 emissions that would otherwise be emitted by the plant?	The SO_2 removal efficiency is 92.60 %.
35.	The revised EIA does not anywhere	The SO_2 is absorbed to an extent of

S.No	QUESTION	TS GENCO RESPONSE
	talk about the cumulative release of SO2 from all the Cement industries and other industries within 15km of the project site. Therefore, give us complete details of SO_2 which is released every year by each and every cement and other industry within 15 kilometers of the project site.	90% in the cement kilns. The balance is released to the atmosphere. The same has been captured in the baseline ambient air quality.
36.	The Project releases NOx even with the usage of SCR. What will be total amount of NOx which will be released by the project per year, after the SCR utilization?	The NOx release with the usage of SCR is estimated at 2460 Tonnes per annum.
37.	What will the NOx removal efficiency of the SCRs be; i.e., by what percent will the SCRs reduce NOx emissions that would otherwise be emitted by the plant?	The NOx removal efficiency of SCR will be in the order of 80% that will help in complying with the new emission standards.
38.	The revised EIA does not anywhere talk about the cumulative release of NOx from all the Cement industries and other industries within 15km of the project site. Therefore, give us complete details of NOx which is released by each and every cement and other industry within 15 kilometers of the project site.	The release of NOx from the existing cement plants is captured in the baseline status of ambient air quality. However, for the purpose of modelling the emission rates from each plant is shown in Table 4.4 of the revised EIA report.
39.	The EIA does not also differentiate and provide details of quantum of Particulate Matter 10 and Particulate Matter 2.5 pollution which will be produced by the proposed project. Please give us details of total quantum of PM10 and PM2.5 pollution which will be produced by the power project per year.	The Particulate matter emission is 27.9 gm/sec/flue after ESP conforming to new standard of 30 mg/Nm^3 at outlet. With this the PM10 emission will be 8.43 t/day(2617.5 tonnes/year) and PM2.5 emission will be 3.61 t/day (1121.8 tonnes/year)
40.	Refer to page 3 of the Revised EIA. What qualifies the Yadadri plant proposal as being "based on Super-Critical Technology."? What is the pressure, temperature, and efficiency at which the Yadadri plant would operate.	The pressure and temperature are given under section 2.9.1.1, page No. 31 of revised EIA report. However, the efficiency is 40.76 %.
41.	Refer to page 11 of the Revised EIA. What is the time period you intend to average emissions from the Yadadri plant in assessing compliance with the 7 December 2015 Thermal Power	The revised norms of the MOEF & CC will be in place in this plant from the date of commercial operation of the plant.

S.No	QUESTION	TS GENCO RESPONSE
	Plant standards for PM, SO2, NOx, and mercury.	
42.	The revised EIA is also completely silent on quantum of Mercury which will be released every year by the present project. What is the total quantum of Mercury which will be released by the proposed project per year?	Mercury emission released from the coal in oxidized form and condensed on ash particles will be removed by the proposed flue gas treatment comprising of High Efficiency ESPs, Flue Gas Desulphurization (wet FGD) and Selective Catalytic Reduction Unit (SCR). The above system will ensure that there will be no significant emission of heavy metals including mercury. Based on the new emission norm of 0.03 mg/Nm^3, the quantum of mercury release is estimated at 3.68 t/year.
43.	The revised EIA is also completely silent on quantum of other Heavy Metals which will be released every year by the present project. Please give us the list of all the heavy metals which will be released by the proposed project and the quantum of each such pollutant which will be released into atmosphere per year.	The proposed flue gas treatment comprising of High Efficiency ESPs, Flue Gas Desulphurization (wet FGD) and Selective Catalytic Reduction Unit (SCR) will ensure the removal of heavy metals.
44.	What is the Radioactive content in the imported and indigenous coal proposed to be used for the project?	The radioactive content of the indigenous coal has been furnished as Annexure – 2 D in the Revised EIA Report. They are within the limits.
45.	The revised EIA is also silent on different kinds of Volatile Organic Compounds (VOCs) which will be released by proposed project every year. Please provide the list of VOCs which will be released by the power project and the total quantum of each of the VOC released by the project per year.	The proposed flue gas treatment comprising of High Efficiency ESPs, Flue Gas Desulphurization (wet FGD) and Selective Catalytic Reduction Unit (SCR) will ensure the trapping of VOC (if any). TSGENCO will analyse the flue gas samples for any presence of any VOC during operation of the power plant.
46.	The health impacts relating to air pollutants released by Thermal Power Plants cannot be denied. The science has produced indisputable evidence of number of health impacts due to coal-fired Thermal Power Plants.	Flue gas treatment system proposed which is in compliance with the new norms of MOEF & CC stipulated for thermal power plants will be implemented by TSGENCO.

S.No	QUESTION	TS GENCO RESPONSE
	Right to Health is an integral part of Article 21 of the constitution of India. It is unfortunate that revised EIA has not any impact assessment study of the health impacts of none of the air pollutants which will be released by the proposed project. Why has the TSGENCO not any done any health impacts assessment study of the proposed project? (Note: We are not asking occupation health assessment detailed given in EIA. The query is clearly about impact of air pollutants which are released by the proposed project and their impact on the people).	The emissions from the plant will be 3.3 times less with respect to particulate matter, 13.5 times less with respect to Sulphur dioxide and 5 times less with respect to oxides of nitrogen when compared with the operating power plants. The implementation of flue gas treatment system at an additional cost of Rs 0.9 crore/MW will ensure that there is no significant impact on Public health impact.
47.	It is also unfortunate that TSGENCO has not done Environmental Impact Assessment study of many of the air pollutants, except PM, SOx and NOx. Why has the EIA failed to study the environmental impacts of many other air pollutants which are released by the proposed project?	TSGENCO has done environmental impact assessment as per the guidelines of MoEF & CC and as per the approved ToR.
48.	It is also unfortunate that the TSGENCO has not done Carrying Capacity study of the ecosystem, given that there are number of cement and other industries within 15 kilometers of the project, the project is located on a dry area with no sufficient vegetation to mitigate the pollution, and the project is going to draw water from water-stricken river like Krishna, etc. Why has TSGENCO failed to do a Carrying Capacity study of the ecosystem?	The cumulative impact on the air quality has been addressed in the revised EIA report which clearly states the emissions from the proposed power plant will comply with the National Ambient Air Quality Standards. The Irrigation department has accorded the firm allocation of water of 6.60 TMC per Annum from the Telangana share of 299 TMC of Krishna waters vide G.O. Ms. No. 13, dated. 30.01.2015 and the same is reiterated by the Engineer-in-Chief (I),, Irrigation & CAD department, Govt. of Telangana vide Lr. No. ENC (I)/DCE-I/OT1/AEE5/YTPS (5X800 MW)/2016, dt. 24.12.2016.
49.	Refer to Section 4.2.1 of the Revised EIA. Has TSGENCO provided to the Expert Appraisal Committee, in an electronic machine readable format, the modelling input and output files used in the AERMOD air quality modelling the results of which are	All the model inputs, meteorological data sets, etc., have been presented in the revised EIA report. The same will be provided to the Expert Appraisal Committee for independent evaluation which is a standard practice.

S.No	QUESTION	TS GENCO RESPONSE
	presented in the Revised EIA? If not, why not? And how can the Expert Appraisal Committee independently evaluate and verify the accuracy and reasonableness of that air quality modelling without access to the input and output files?	
50.	Refer to Section 4.2.1 of the Revised EIA. Is TSGENCO willing to provide to interested members of the public, in an electronic machine readable format, the modelling input and output files used in the AERMOD air quality modelling the result of which are presented in the Revised EIA? If so, please explain how interested members of the public can obtain such modelling files. If not, why not? And how can the public independently evaluate and verify the accuracy and reasonableness of that air quality modelling without access to the input and output files?	The data and other modelling inputs have been given in the EIA report and made available in the websites of TSGENCO and TSPCB. The same can be utilised to run the air quality model by the members of the public and compare with the isopleths which are also provided in the EIA report.
51.	Refer to Table 3.3 in the Revised EIA. Explain why you evaluated current ambient air quality conditions only in comparison to the 24-hour NAAQ standards for PM10, PM2.5, SO2, and NOx, and not in comparison to the annual NAAQ standards. Explain whether current conditions comply with the annual NAAQ standards.	The compliance to NAAQ standard is for 24 hour values. Hence the comparison is for the 24 Hr value. The comparison can be done for the annual value provided one has collected the ambient air quality data for one year including the meteorological data. This will provide inputs to predict the air quality during the one year period wherein the baseline data (annualised) can be used for comparison. However, periodical monitoring will be done by TSPCB.
52.	Refer to Table 4.6 in the Revised EIA. Explain why you evaluated the modelled air quality impacts of the proposed Yadadri plant only in comparison to the 24-hour NAAQ standards for PM10, SO2, and NOx, and not in comparison to the annual NAAQ standards for those pollutants. Explain whether the modelled air quality impacts would comply with the annual NAAQ standards.	As explained above, this is the standard practice. Yes. the incremental cumulative concentrations from the power plant will be well within the limits due to implementation of flue gas treatment system. However, the variations in the baseline ambient air quality needs to be monitored which will be taken up by TSGENCO during the construction phase of the project.

S.No	QUESTION	TS GENCO RESPONSE
	WATER:	
53.	What is total amount of water required for the construction of power plant (Note: I'm not asking about the water required for the operation of the project, which has been specified in the EIA. I'm only asking about the total required for the construction of the project, since the EIA does not specify it)?	The total water requirement during construction phase will be about 4 lakh litres per day.
54.	What is the source of water required for the construction of the project?	The source of water is Krishna river.
55.	It is inevitable that the proposed project will lead to the contamination of the ground water and the TungapaduVagu. The following are the reasons for it.	
A	The TungapahadVagu flows for a distance of 3.9 km through the center of the proposed site, just a few hundred meters from both the proposed plant and the ash dyke. Despite the proximity of the stream to these polluting structures, the EIA claims, irrelevantly and erroneously, that the project activities will not interfere with the TungapahadVagu "since there is no extraction of water or discharge." EIA at 263. The Proponent wholly ignores the discharge to the Vagu from contaminated groundwater, which, according to the EIA, flows southeast, directly into TungapahadVagu. There are several reasons why the Vagu is particularly vulnerable to receiving contaminated leachate (groundwater discharge) from the ash dyke.	No plant effluent will be discharged into Tungapaduvagu and the plant effluents will be treated in the effluent treatment plant and reused for the plant requirement. The ash dyke is being provided with a HDPE liner to ensure that there is no contamination of the ground water. Adequate care will be taken during construction to ensure that there is no impact on Tungapahadvagu. The buffer zone of 100 m on either side of vagu in the plant premises will be developed with thick green belt which will act as a barrier to the vagu. The water quality of vagu will be monitored during the construction phase also. This is as per the recommendations of the Subcommittee of MoEF & CC, GoI visited the project site on 05.12.2015.
B	First, the ash dyke sits just several hundred meters from the Vagu. Any leaching of coal ash contaminants from the ash disposal area will travel with the groundwater to the nearest receiving stream, which is the TungapahadVagu.	As recommended by the Sub Committee of MoEF& CC, GoI during their site visit on 05.12.2015, the ash pond is shifted 500 m away from the vagu. The formation on the sides of the vagu is completely rocky terrain and there is no possibility of seepage of any water from the ash pond into the vagu area. Further, the ash disposal will be in slurry form. The

S.No	QUESTION	TS GENCO RESPONSE
		provision of impervious liner will prevent any leaching.
C	Furthermore, the proponent plans to divert and bury at least one natural stream to construct the Ash Pond. The natural course of this stream is to join the TungapahadVagu prior to its entry into the Krishna River. The construction of an ash dyke on top of the natural drainage that enters the ash dyke from the north will surely facilitate the flow of contaminants to groundwater and provide an especially efficient conduit for contaminants to travel quickly to the TungapaduVagu. When ash dykes are built on top of natural drainage ways, the intersection point of the dyke and the former streambed is a common location where discharges of contaminated coal ash water occur. The high-permeability sediments present in buried streambeds facilitate the formation of such seeps or discharges. Even if a liner is placed above the bed of the former stream, any tears in the liner, which are inevitable, will allow contaminants to flow along the former streambed.	The detailed diversion plan of the streams in the ash pond area are given in the EIA report. All the streamlets flowing in the ash pond area will be suitably diverted as shown in the Figure – 4.21 (B) of EIA/EMP report. This was also examined by the Sub-Committee of MoEF & CC and given certain recommendations to strengthen Tungapadu vagu.
D	Next, the EIA does not accurately describe all the streams and streamlets that traverse the proposed site, particularly in the ash dyke area. While the map (Fig. 4.21(A) purports to show the "Drainage Pattern of Project Site Before Diversion of Rain Water Streamlets," this map only indicates two streams that cross the ash dyke area. EIA at 265. In contrast, the "Hydrogeological Map of Study Area" indicates at least five streams not depicted on Fig, 4.21(A). (See Fig – 3.13 on page 104. These additional streams are also depicted on the map on page 105 of the EIA, Fig. 3.14(A). The EIA's	The statement is not correct since the author himself quotes that the Hydrogeological map (Fig 3.13) given in the EIA shows all the streams. The streams in the Northern portion will be disturbed since the main plant is coming up in the area. With respect to the ash pond area, the diversion of streams has been given.

S.No	QUESTION	TS GENCO RESPONSE
	omission of a description and discussion of the complete extent of the TungapahadVagu tributaries in the ash dyke area represents a very serious deficiency of the EIA. The omission calls into question the Proponent's accuracy and forthrightness in reporting critical surface water features of the site.	
E	In addition, the Proponent plans to allow at least one stream (actually consisting of the confluence of four streamlets) to flow right across the southern boundary of the ash dyke (See Fig. 4.21(B). According to the EIA map, the ash dyke will be built directly on top of the stream, which will lead not only to contamination of the stream but gross instability of the dyke impounding the ash. The unnamed stream flowing in from the north is to be diverted to join the stream (three tributaries) entering the ash dyke area from the west. So the stream flowing across the southern portion of the ash dyke will contain the combined flows of four streams, according to the map in the EIA. This stream also discharges into the TungapahadVagu. Whether the stream flows under the ash dyke or adjacent to it, it is certainly likely carry coal ash contaminants from the ash dyke directly to the Vagu.	The EIA had mentioned clearly " The western side stream has limited catchment area entering the ash pond area which has to be diverted to join another stream flowing in the south. Another streamlet just passing through the southern part of the ash pond and will be allowed to flow undisturbed and the ash pond will be formed away from this streamlet" (Para 4.2.3.13)
	Please give us the detailed scientific explanation of how the proposed project will not contaminate the ground water and TungapahadVagu in the light of the reasons given above. Any contamination of TungapahadVagu will eventually flow into the Krishna River as the Vagu joins the river a short distance downstream.	The ash dyke will be provided with a impervious lining and leachate collection system. The main plant will have a proper storm water drainage system. The Tungapahadvagu will have a buffer zone of 100 m which will be developed into a green belt. Regular monitoring of the water quality of the vagu will be undertaken by TSGENCO.
56.	Further, the Project is located on several tributaries of the TungapaduVagu, as evident from Fig. 4.21(A) and (F). As described above,	There are no tributaries. These are streamlets with limited catchment. The project activities will not interfere with the flow of Tungapahadvagu

S.No	QUESTION	TS GENCO RESPONSE
	the confluence of four of these tributaries flows directly across, under or adjacent to the ash dyke. It is certain that there exists no buffer of 500 meters between the stream and the ash dyke. Hence, the TOR No. 21 is completely violated. How could it be that a project this magnitude could be located on number of streams which are flowing through the project site?	since there is no extraction of water or discharge. No diversion of Tungapahadvagu is proposed. The plant layout is designed to keep a minimum distance of 500 m between ash pond and the Tungapahadvagu to prevent any accidental contamination. A 100 m barrier on either side of the vagu flowing within the plant site will be developed into greenbelt. Lastly, the Subcommittee of MOEF&CC had visited the site before issuing the TOR and stipulated certain additional conditions to be complied.
57.	Furthermore, it is clear as per your submission in the EIA that the project is located within 500 meters distance from the Krishna River. This is a further violation of TOR No.21 which mandates that the project should be "away from HFL plus 500 meters distance of Krishna River". Therefore, where is the HFL of the Krishna River? Why has site not been kept away from HFL of Krishna River?	The HFL of the River Krishna has been officially obtained from the Chief Engineer, KG Basin Organisation, CWC, Govt. of India. The same was depicted clearly in Fig 4.20. The elevation of the nearest point of the ash pond is at 12 m above HFL and its distance is around 790 m w.r.t ash pond boundary. This is confirmed by the Sub-Committee of MoEF & CC during their site visit.
58.	In the light of above questions nos. 42 and 43, where is the justification for site selection for the present project?	The project is site specific (MoEF & CC after due diligence has allocated the forest land for establishment of only thermal power project). The above points have been adequately answered and also the justification for site selection.
59.	There is no separate study called Hydro-geological impact assessment study in the Revised Study. In spite of which, the EIA claims that the Hydro-geological impact assessment study has been done by Vimta Labs. Why has a separate Hydro-geological impact assessment study not been done?	A separate study was conducted and the same was reported in the EIA vide Para 3.4.3.
60.	Further, Hydro-geological impacts presented in the EIA are not based on any proper study conducted, but are very generic details and superficial	A detailed comprehensive hydro geological study as per the scope of TOR given has been carried out.

S.No	QUESTION	TS GENCO RESPONSE
	assessment. This assessment is inadequate to access the risk to groundwater and surface water posed by the plant's construction, operation and waste disposal. Specifically, among the deficiencies of the hydro-geological study are the following failures to gather critical information concerning groundwater. The lack of data prevents the proponent from accurately accessing risk to groundwater and from designing effective mitigation measures:	
A.	It appears that only one groundwater well was installed or tested in the proposed project site. No groundwater well was established or tested in the ash dyke area. Therefore, absolutely no site-specific hydro-geologic data were collected in the area most likely to receive coal ash contaminant releases. No map was included in the EIA providing the location of the wells sampled pre- and post-monsoon, so it is impossible to determine the adequacy of the regional testing.	Inside the ash dyke area 10 permeability and 6 infiltration tests were conducted. The location of these is marked in **Fig-4.25**. Based on the values of permeability it is concluded and recommended to put the HDPE lining in the ash pond to prevent the pollution of water and soil.
B.	The assessment of groundwater quality near the project site is wholly inadequate. The assessment consisted of testing ten existing groundwater wells located from 0.9 km to 7.0 km from the site. These wells were tested only once, post-monsoon in 2016. Numerous groundwater wells should have been established on the 2800-acre project site and measurements of the full suite of chemical parameters, including radioactivity, should have been tested in various seasons (at least quarterly for one year). According to the EIA, only pH, total dissolved solids, total hardness, chlorides, sulphates, fluoride and e-coli were tested in the single sampling. A key function of a hydro-geologic study is to establish a	Complete assessment studies by collecting hydro geological data of key wells by visiting them in the field, studying the present ground water conditions, estimating the long term ground water recharge, present ground water withdrawal and status of ground water development has been done very preciously The pre-monsoon and post monsoon hydrological data from 30 key wells was collected for the year 2015-16. The fluctuation of water levels in the surrounding area of plant as recorded through monitoring wells was interpreted in relation to ground water recharge. Although, the entire Nalgonda District lies in the safe zone and has surplus ground water potential for future ground water development, a rain water harvesting

S.No	QUESTION	TS GENCO RESPONSE
	baseline of water quality data (including heavy metals and radioactivity) for the site that can be used to determine whether a change in groundwater quality has occurred after construction, operation and waste disposal begins.	program has been designed for the plantarea so that there is no depletion of static ground water reserves during thedrought years or due to extensive ground water exploitation for irrigation andindustrial use in future. The present report embodies the findings of detailed chemical analysis. A detailed chemical analysis as on now has been given in **Annexure – 3B** This assessment will be taken up during the construction phase of the project to establish the baseline status and will help in monitoring of the ground water quality
C.	Site-specific data should have been collected to evaluate the hydraulic connection (e.g., river inflow rates) between the TungapaduVagu and the underlying aquifer system in the proposed ash dyke area. A key objective of the EIA should have been to identify possible coal-ash contaminant migration pathways from the proposed ash pond to the adjacent river. No discussion or analysis of these issues were presented in the EIA.	The permeability values at the site have been calculated and low hydraulic conductivity in the area establishes the poor hydraulic connection. The ash pond will be provided with an impervious liner. Suitable monitoring mechanism including piezometers will be implemented. The ash pond will be constructed with proper lined dyke to prevent leaching.

S.No	QUESTION	TS GENCO RESPONSE
D.	The EIA did not measure the TungapaduVagu riverbed permeability or thickness; characterize the river bathymetry (depth and floor); monitor water surface elevation variations at more than one location; collect riverbed hydraulic gradient data; measure horizontal or vertical overburden or bedrock permeability beneath or near the river; characterize the geology beneath or near the river; or measure hydraulic heads in the overburden or bedrock aquifers beneath or near the river. All of these data are critical to a hydro-geological study and to characterizing the risk to the Tungapadu Vagu and Krishna River. Please give us a scientific explanation of how each and every issue mentioned above has been addressed in the EIA.	This study was not specified in the TOR. However the findings of the present report based on groundwater flow maps, HFL values clearly shows no adverse impact on Krishna river and TungpadaVagu. A review of the topography and drainage pattern in the major part of the bufferzone reveals that the general slope of the area is towards south and south east.e. river Krishna. The ground water flow in the buffer zone is also towards southand south east with hydraulic gradient as 5.88 m/km **(Fig-3.14(A))** during pre-monsoonand 6.05 m/km **(Fig-3.14(B))** during post monsoon as calculated from themonitoring of wells of the area. Thus the bathymetric studies and evaluation of permeability of river bed is not required. The points raised regarding the data to be collected has no basis with respect to this project since there is no extraction of water or discharge of treated wastewater into TungapahadVagu.
61.	The impact of the project on the aquatic ecology has not been studied. The EIA did not contain any information regarding potential impact on the aquatic life in the unnamed streams, TungapaduVadu or Krishna River. The EIA identifies only aquatic life in the "study area" and does not specify whether this includes the streams and Vagu. The EIA only specifically mentions a list of fish in the Krishna River, but it does not discuss any impacts to their health or habitat. Please give us detailed explanation on why it has not been done and scientifically explain how the project will not affect Fish, their health and aquatic ecology.	The plant is based on zero liquid discharge concept. Hence there is no discharge of any water / waste water stream either into the Tungapaduvagu or the river Krishna. However, during construction and operation phase, TSGENCO will undertake the monitoring of the River and Vagu water quality.
62.	In addition, there are serious discrepancies in the numbers	There are no serious discrepancies. The flow data of the gauging stations

S.No	QUESTION	TS GENCO RESPONSE
	depicting the flow of the Krishna River. Specifically, on pages 259-260 of the EIA, the Proponent states that in lean season the withdrawal from the Krishna River at Pondugala is about 30% of the flow, which is significant. However in the next section, the Proponent provides a different figure for minimum flow at Pondugala. That section states that the minimum daily flow would be about 4.34 million m3/day (approximately 130.2 million m3/month), which is much greater than the 25.72 million m3/month quoted in the previous section. Please give us detailed explanation on the discrepancies in the water flow data provided in the EIA report.	was provided by CWC. The explanation is clear with respect to the minimum flow in River Krishna as measured by Pondugala gauging station is 4.34 to 31018 million cum/day with an average of 617 million cum/day. It is mentioned that the water drawl of 0.24 million cum/day by the project amounts to 0.03% of average flow and hence does not have significant impact on River Krishna.
63.	The EIA claims that the plant will employ the concept of zero liquid discharge and consequently no wastewater will be discharged to surface waters. But, the EIA does not take into many of the crucial aspects and scientific evaluation required for understanding the feasibility of Zero Liquid Discharge for the proposed project. Following are our detailed submissions. As per the EIA, "zero liquid discharge" means that all liquid waste streams are recycled, and no liquid waste migrates past the lateral or vertical boundaries of the facility. However, the explanation of waste water generation, treatment and reuse provided in the EIA raises following serious issues:	
A.	**The projected recycling rate of wastewater is only 23%:** The actual recycling of the largest use of water at the plant (cooling water) is relatively small. According to Table 4.10, the daily use of 39,360 m3/day for cooling water results in only 9,240 m3/day being recycled to the cooling water system (CWS).	The Blow down water from cooling water system is reused in Ash handling system, coal handling system and balance water is treated in effluent treatment plant and reused in the cooling water system. This reused water of 9240 cum/day is shown in water balance diagram to achieve zero liquid discharge.

S.No	QUESTION	TS GENCO RESPONSE
B.	**The projected volume of water disposed to the ash pond is immense**: According to Table 4.10, most of the wastewater that is not recycled (over 75%) will be disposed in the ash dyke. This includes 19,080 m3/day of wastewater from the cooling tower blow down, 2,640 m3/day RO reject wastewater, and 1,440 m3/day from the flue gas desulphurisation system. Consequently, a total of at least 23,160 m3/day of wastewater will be disposed in the ash dyke. The Proponent does not explain how it is sustainable to dispose of this large volume of water daily in the ash dyke without any discharges of wastewater from the dyke. For example, adding this much wastewater alone, without discharge, to the 400-acre pond would fill the pond to a height of more than 5 meters per year. Thus this wastewater alone would fill the 400-acre ash pond, with dikes 15 meter high, in less than three years. This does not account for the million tons of scrubber sludge, fly ash and bottom ash that will be disposed in the ash dyke annually.	As per the standard design of the Equipment supplier, the FGD waste water of 12 cum/hr per unit is calculated to maintain chloride content in the system less than 20000 ppm. The FGD waste water for all the five units is of reasonable quantity. The water along with ash going to ash dyke is not stored in the ash dyke. This water is recycled again after treating in clarifiers for reuse in the ash handling system. Please refer the water balance diagram for further details. Please also note that due to recovery of ash water, the fresh water consumption of ash handling is also reduced.
C.	**High evaporation rate for FGD wastewater may significantly under estimate volume:** The Proponent states that the water requirement of the flue gas desulphurisation unit is estimated at 14,880 m3/day. The Proponent claims that the evaporation loss in FGD with flue gas is 13,440 m3/day and thus the wastewater generation is 1,440 m3/day. This represents a projected evaporation loss of over 90%. Such a high rate is inconsistent with U.S. FGD systems, where the evaporation loss is approximately 60-70%.	As per the equipment supplier, the evaporation loss in FGD for all 5 units is 517 cum/hr = 12408 cum/day which is around 83% of the total water requirement and not 90% as mentioned. The comparison with US FGD systems can be done once there is data generated in our country.
D.	The Proponent does not account for all wastewater streams: Several major	

S.No	QUESTION	TS GENCO RESPONSE
	types of wastewater generation are either not addressed or appear to be significantly underestimated in the EIA report, including the following:	
	I. Average annual and storm event direct rainfall and watershed runoff into the ash pond.	
	No design or hydraulic details (e.g., daily water storage and inflow/outflow curves) of the ash pond were presented in the EIA to show what the expected maximum outflow rate of contaminated water from the pond would be during the monsoon season. Further, these runoff events were not included in the wastewater budget or evaluated for zero liquid discharge viability.	This will be done during the detailed engineering stage.
	II. Surface runoff collection with garland drains (ditches).	
	The EIA states that surface water runoff will be collected throughout the plant and ash pond areas using garland drains (basically ditches). However, the EIA does not include any runoff rate calculations to quantify what the maximum and average runoff rates will be in order to design the garland drains (e.g., depth and width) and to determine how much contaminated surface water (e.g., fuel oil storage and unloading areas; coal pile runoff, coal pond runoff) will have to be handled. The EIA indicates that the total plant area will be about 2,800 acres. Assuming a runoff coefficient of 0.5, the average runoff rate from the total facility will be on the order of 2,000 m3/hr during the monsoon season (assuming 1,000 mm of rainfall). On many days the plant area runoff rate will be ten times greater (i.e., ~20,000 m3/hr) based on a 100 mm daily rainfall. The wastewater flow rate from precipitation runoff will be greater than the total plant usage rate on many days, and this runoff	A proper storm water design with garland drains will be designed and not ditches. The detailed calculations have been presented in Table 4.13

S.No	QUESTION	TS GENCO RESPONSE
	component was not included in the wastewater budget or considered for zero liquid discharge.	
	III. Wastewater recharge to groundwater.	
	The EIA wastewater budget and zero liquid discharge analyses also do not account for recharge of contaminated water to the underlying aquifer either throughout the plant area or through the ash pond liner. Assuming one-third of the rainfall in the plant area infiltrates to the groundwater table, the average recharge of contaminated water due to precipitation will be more than 1,000 m3/hr during monsoon season (assuming 1,000 mm of rainfall). Therefore, recharge to groundwater is another important wastewater source that needs to be added to the zero liquid discharge analyses.	Recharge potential of Rainwater harvesting at the Project Site is less as it is located in the tail end of the watershed. The formations are near horizontal sedimentary bedded Shale deposits occurring at the top and are impermeable in nature. In order to compensate and to maintain the equivalent over-land flow in the area, only part of the Roof Top Rain Water Collection has been considered.
	IV. Ash pond leakage to groundwater	
	The design details are not presented in the EIA, but the proposed HDPE liner will develop leaks due to deterioration (e.g., weathering, geochemical degradation due to interaction with coal ash, rip or tears during coal ash disposal), construction problems, soil consolidation, etc. Moreover, the ash pond liner will likely have a large hydraulic pressure on its surface due to the thick overlying layer of saturated waste materials. This high pressure on the liner will create a large hydraulic gradient (i.e., "driving force") in the liner system. The problem is further compounded because the underlying aquifer is limestone, which is subject to high degrees of weathering due to dissolution that creates cracks and uneven cavities below the surface. If an area of liner failure coincides with a cavity or crack in the limestone, the	The design details will be done during the detailed engineering. The ground water quality around the ash pond area will be monitored for any contamination.

S.No	QUESTION	TS GENCO RESPONSE
	resultant leakage rate of contaminated fluids into the aquifer could be quite large. In view of the above, please give us detailed scientific explanation on the feasibility of Zero Liquid Discharge.	
64.	Why does the Risk Assessment study not contain anything about the risk of Ash Dyke breaching? As you would agree, if the Ash Pond breaches, the first and foremost body which will be contaminated is River Krishna, due to its proximity to the site.	TSGENCO is maintaining the ash ponds for last 50 years and have got well experienced engineers to face all the eventualities. The ash pond bunds will be designed by the experienced structural engineers considering all the aspects of the design. There is an elevated rocky terrain between ash pond and Krishna river.
65.	The Risk Assessment study also does not consider the impact of Ash Pond water contaminants which will be released into water bodies, Tungapadu Stream and Krishna River. Why have these not been into account in the Risk Assessment study?	There is no discharge of supernatant from the ash pond to Tungapahad stream of River Krishna.
66.	The EIA is completely silent on the amount of Krishna River water which is already utilized by number of cement plants and other industries within the project site. Therefore, give us details of quantum of Krishna River water which is utilized by each and every industry within 15 kilometres radius of the project site.	The State Government has allocated the water to the above project from the share of Telangana state of Krishna waters considering all other users.
67.	The EIA is also miserably silent on the impact of the water utilization by various industries within 15 Kilometers radius on the Krishna River. A specific question was asked during the last public hearing on the same issue. The response provided to it in the updated EIA is vague and not related to site specific cumulative impact. Therefore, the question again is what is the cumulative ecological impact of water utilization by the industries within 15 kilometers of the project area?	15 % of minimum flow is considered as minimum ecological flow required for the Krishna River. TSGENCO drawl is 30 % of the minimum flow and 70 % of the minimum flow is available for sustaining the ecology of the river stretch. TSGENCO has proposed R.C.C Intake well structure type which will not disturb flow conditions and also provide free movement to fishes. Intake structures will be designed to minimize entrainment or

S.No	QUESTION	TS GENCO RESPONSE
		impingement by providing strainers. Above details are provided in Chapter -4 of the Revised EIA Report. TSGENCO will regularly monitor the water quality of River Krishna and Tungapaduvagu. The State Government has allocated the water to the above project from the share of Telangana state of Krishna waters considering all other users.
	It is reiterated that the revised EIA has not any cumulative water impact assessment study. Without the evaluation of details sought in the questions nos. 52 and 53, it cannot be said that you have done the site-specific Cumulative Impact Assessment study on Krishna River.	Answered above
68.	The TOR requires that no water should be drawn from Tungapadu stream and EIA says that the water will be drawn from the confluence point of Tungapadu Stream and Krishna River. Does this not mean that you are drawing the water from Tungapadu stream only?	No water will be drawn from Tungapaduvagu. It will be drawn only from allocated water from Krishna river. Intake structure is proposed on Krishna river only.
69.	If your claim that there is sufficient water in the Krishna River, with no impacts, is correct, why can't the water intake point be shifted to some other place other than the confluence point of Tungapadu Stream and Krishna River?	TSGENCO has carried out reconnaissance Survey for locating the intake structure on River Krishna. The intake point is selected near Madachelu considering the following • Location of intake structure on upstream of Tungapahad Vagu at 1 km from confluence point to avoid disturbed flow. • The intake is proposed away curve near the project site. • No navigation is observed at this point. The implementation of the intake well structure will be done in consultation

S.No	QUESTION	TS GENCO RESPONSE
		with the Irrigation Department, Govt of Telangana
	FLORA AND FAUNA:	
70.	What is the impact of the project on Schedule-I species in the project area?	The details are provided in Chapter – 4 of the Revised EIA Report.
71.	The previous rejected EIA specifically stated that there are no Schedule-I species in the project area. However, the new revised EIA states that the Schedule-I species are presented in the project area. Is this not the falsification of information in the previous EIA Report?	The report is based on the data collected from Forest Department and other Secondary sources.
72.	What is the impact of the project on Amrabad Tiger Reserve?	Amrabad Tiger Reserve is located at an aerial distance of 14.03 km from project site. There will be no impact on the Tiger Reserve due to the project.
73.	The previous rejected EIA did not even disclose this fact that the Amrabad Tiger Reserve is present within 15 kilometres of the project area. Is this not the falsification of information in the previous EIA Report?	There is no falsification. The previous EIA Report had clearly mentioned that there are no National Park, Sanctuary, Elephant/ Tiger Reserve, migratory routes/wildlife corridor, within 10 km of the project site. Also an authenticated map from the Chief Wildlife Warden is provided as Figure 3.20 in Chapter-3 where in Amrabad Tiger Reserve is located shown at an aerial distance of 14.03 km
	FINANCIAL DETAILS:	
74.	What is the capital cost and recurring cost of FGD and its ancillary machines and infrastructure?	The capital cost of the FGD plant varies from Rs.0.40 to Rs.0.5 crore/MW. Recurring cost will be for lime stone usage, gypsum disposal and maintenance of the plant.As this is the first time TSGENCO is proposing to install FGD and also new in the country and its recurring expenditure will be known only when it comes into Operation & maintenance.
75.	What is the capital cost and recurring cost of SCR and its ancillary machines and infrastructure?	The capital cost of the SCR varies from Rs.0.25 to Rs.0.30 crore/MW. Recurring cost will be towards Anhydrous ammonia, catalyst and maintenance of the SCR system. As this is the first time TSGENCO is

S.No	QUESTION	TS GENCO RESPONSE
		proposing to install SCR and also new in the country and its recurring expenditure will be known only when it comes into Operation & maintenance.
76.	The REC is funding the Yadadri Power Project. What is the total amount of loan which has been/will be taken by the TSGENCO from REC?	Rs. 16,070.54 crores by REC Rs. 4009.00 crores by PFC
77.	What is the interest rate at which the loan has been obtained TSGENCO?	10.90 % to 11.15 % since reduced to 9.95%.
78.	What is the economic feasibility of this project, given the fact that existing Thermal Plants currently average an approximately 60% PLF?	The plant is economically feasible. The contention of the author is far from truth.
79.	What would be the approximate cost per kWh of generating electricity at the Yadadri plant?	Approximate cost would be Rs. 4.57 per kWh.
80.	What is the approximate cost per kWh at which you expect or forecast you will be able to sell the electricity produced by the Yadadri plant?	The cost will be decided by TS ERC, Govt, of Telangana.
81.	From which year does this project start making profit?	Return on capital employed will be recovered from first year onwards.
82.	What will be the profit of this project every year?	As per the ERC regulation it is ROCE.
83.	By which year the TSGENCO will be in a position to completely pay off the loan taken from REC?	REC- 15 years from the date of COD PFC- 15 years from the date of COD
84.	In case the project becomes economically unviable, who will have to pay the loan and interest to the REC?	Does not arise.
85.	Did TSGENCO evaluate whether any energy or capacity need in Telangana could be satisfied in part or in total by obtaining electricity from other states, such as Andhra Pradesh? If not, why not? If so, explain the results of that evaluation.	Even as per CEA power survey report further capacity addition is required.
	EIA CONSULTANT	
86.	What action has been taken on the M/s Bhagavati Ana Labs for the charge of Plagiarism and copy-paste EIA produced for the project?	The consultancy services placed on M/s Bhagavati Ana Labs was terminated vide Lr. No CE/C/SE/TCD-I/EE/TCD-I/F.YTPS/D.no.235/2016 dated 21.10.2016 and retention amount of

S.No	QUESTION	TS GENCO RESPONSE
		Rs.27,135/- available with TSGENCO was forfeited.
87.	How is it that the TSGENCO has not verified information furnished in the previous EIA report on plagiarism and cut and paste information?	TSGENCO in good faith and belief on the earlier consultant as they are accredited by NABET, the EIA report submitted by them was accepted and uploaded in the TSPCB/MoEF&CC websites.
88.	Is the current consultant, the B.S. Envi Tech, independent from the previous consultant or is it associated with M/s Bhagavati Ana Labs?	The current consultant M/s. B S ENVI-TECH PVT LTD is independent from the previous consultant.
	FLUE GAS DE-SULPHERISATION (FGD):	
89.	The EIA estimates that the water requirement for FGD is 14,880 m3/day. Is this water requirement separate from total water requirement figure presented in the EIA? If no, what is the source of water for FGD?	The water requirement for FGD plant is included in the total water requirement of the Power Plant.
90.	The EIA does not discuss in detail about the disposal of the waste from the FGD unit. Gypsum generation from the Flue Gas Desulphurisation unit is estimated to be about 3600 tons/day (1.11 MTPA @ 85% PLF). The EIA claims that the "gypsum generated will be disposed to various cement plants." However, there are no agreements or expressions of interest by the cement plants to take the FGD sludge. There is absolutely no mention of willingness to take gypsum in the letters included in Annexure 4E. Despite absolutely no evidence of demand from the cement plants, the EIA states that "the requirement of Gypsum of the existing cement plants... and proposed cement plant... located within 50 km is 1.06 MTPA."	TSGENCO will initiate discussion with various users including cement manufacturers at appropriate time during construction phase of the project to lift the gypsum once the plant is made operational. The various uses of FGD gypsum is mentioned below. Any user will definitely ask about the quality and composition of the product which can only be provided during the operation phase of the project. Thus it is not a conjecture on the part of TSGENCO rather it is confident of finding users for the offtake of gypsum.
	This is pure conjecture on the part of TSGENCO and purely contrary to fact. In reality, the use of gypsum in cement production is a very minor component of the cement. A very	

S.No	QUESTION	TS GENCO RESPONSE
	small amount of gypsum (3 percent to 5 percent of the total ingredients of cement) is added to the clinker to regulate how the cement will set. The mixture is then very finely ground to obtain "pure cement." (See Lafarge North America, Cement Manufacturing Process at http://www.lafarge-na.com/wps/portal/na/en/2_2_1-Manufacturing_process. See also, Bhanumthidas, N. and N. Kalidas, "Dual role of gypsum: Set retarder and strength accelerator, The Indian Concrete Journal (2004), available athttp://www.fal-g.com/nattach/files/Dual%20role%20of%20Gypsum.pdf.) According to the latter article, "Gypsum plays a crucial role in cement. Though it is used in a small quantity, in the range of 2.5-3.0 percent."	
	Consequently, the EIA has failed to present a reasonable plan for FGD sludge utilization. Use of gypsum by cement manufacturers will never reach 1.06 MTPA. Yet TSGENCO has no other plans for more than 1 MTPA of FGD sludge produced by the plant, and the EIA is silent as to the disposal of the toxic waste. FGD gypsum contains heavy metals in similar concentrations as fly ash, and thus the disposal of FGD sludge presents high risk to groundwater and surface water.	The main consumers for gypsum are the cement plants and particle board manufacturers. The various applications for FGD gypsum are given below: • Wallboard • Water resistant gypsum • Wood chip boards • Structural Fill • Mining Applications o Neutralization or encapsulation of acid-producing materials o Barrier to acid mine drainage formation o Alkaline amendment to neutralize acid-producing rock o Subsidence control in underground mines • Soil amendment • Synthetic soil component • Set retarder in portland cement • Plaster • Agriculture o Acid soil amelioration

S.No	QUESTION	TS GENCO RESPONSE
		○ Sodic soil reclamation ○ Surface crust reduction ○ Runoff and erosion reduction ○ Feedlot surface stabilization ○ Fertilizer • Glass Making • Pigments and/or Fillers (Source: fgdproducts.org) TSGENCO will interact with various consumers to ensure that the maximum quantity of FGD gypsum is recycled as raw material during the operation phase of the project.
	Please give us detailed explanation about the above-mentioned issue.	
91.	The EIA also fails to account for fugitive dust emissions from the FGD process that may result from the dewatering of the gypsum. The EIA states:	
	Gypsum generation for the flue gas handling plant is mainly in slurry form. Gypsum generated is dewatered and the Cake generated will be discharged through a Hopper to a Belt conveyor. The Belt Conveyor will transport the Gypsum to the Gypsum storage shed. No fugitive emissions are anticipated from Gypsum handling or storage area.	Gypsum contains normally 10% of water after dewatering, and therefore gypsum solid is in relatively wet condition and hence there will be no fugitive emissions
	Dewatered gypsum may create fugitive dust. Please give us detailed explanation on this.	As mentioned above.
	ROCKY NATURE OF THE PROJECT AREA:	
92.	Please give us the details of the minerals existing in the project. The EIA vaguely states that there are no coal reserves in the project area. But, what about other minerals in the project area. Are there no other minerals in the project area?	This is discussed under section 2.5.1 of EIA report.
93.	There are several types of rocks which are found within the project area. Please also provide us following details in relation to rocky nature of	This is discussed under section 2.5.1 of EIA report.

S.No	QUESTION	TS GENCO RESPONSE
	the land and mining required in the project for the purpose of construction of the project.	
i.	Please give us the list of all types of rocks in the project area.	Refer section 2.5.1 of EIA report.
ii	What is the geological significance of rocks in the project area?	Refer section 2.5.1 of EIA report.
ii	What is the ground level depth of rocks in the project area?	This is discussed in the hydro geological studies incorporated in the EIA report.
iv	What is the depth at which ground water is available in the project area?	The depth of water table in power plant area ranges from 14 m to 35 m below land surface during pre-monsoon period and 8 m to 26 m during post monsoon period.
v.	What is the extent of mining required for the rocks?	This will be assessed at the time detailed engineering of the project.
vi	By what method will the mining of rocks in the project area be carried out for the purpose of construction of the project?	By using earth work excavators (Proclains) ,Rock breakers and if required by controlled blasting.
vi	Is there a need for blasting for the purpose of mining the rocks in the project area?	If required the excavation will be carried out by controlled blasting.
vi	What are the different kinds of machines will be used for purpose of clearing rocks/mining the rocks in the project area?	By using earth work excavators (Proclains) and Rock breakers.
ix	What is the end use of the rocks which will be mined out from the project area?	The excavated earth will be utilized for back filling the foundations and also for levelling & grading of the site as per the finished ground level (FGL) fixed for the project at the time of detailed engineering.
x	What is the geological impact of rock mining in the project area?	No impact.
94.	What will happen to the plateaus in the project area? What is the extent of cutting/mining required of the plateaus of the project area?	The project development will involve cut and fill quantities for achieving the required grades as per the layout design. Quantity of cutting is estimated about 80,00,000 m^3 and the quantity of filling required is about 66,00,000 m^3. The fill quantity required is less than the cut quantity. Hence, the material obtained from cutting will be used for filling low lying areas. No material will be required from outside the project area

S.No	QUESTION	TS GENCO RESPONSE
		for grading.
95.	Damarcharla area has been recently identified by Archaeological department as consisting of graveyards of forefathers. Does the project site and buffer zone fall within the same area?	Not applicable.

Point Wise Response To Issues Raised By Shri N. Harinder, Vill Mutyalammagudem,Mandal – Kattangur,District – Nalgonda,Telangana – 508205, vide letter dated 21st Feb, 2017

S.No	Issue raised by Sri N.Harinder	TSGENCO Response.
1.	"During arguments it was common case of the parties that development cannot be divorced from environmental issues and that development has to be compatible with the need to preserve, protect rather improve environment. I think I am right in saying that it was at no point in dispute that development has to co-exist and not endanger or cause irreversible damage to nature. I therefore need not go into any lengthy discussion on this aspect of the matter or on what the courts have said, for they have also not said anything different." – Justice Rekha Sharma, Delhi High Court in a judgment in WP(C) No.7506 of 2007. Does the proponent undertake to state that the present proposal has no adverse impacts on climate, public health and environment in general? No evidence towards that is presented in the EIA report from peer reviewed science. What is the authenticity of claims of no harm; insignificant impacts etc by a paid consultant of the proponent without a basis in science?	TSGENCO wishes to state that the suitable mitigation measures have been incorporated in the revised EIA to comply with the proposed new standards promulgated by MOEF&CC. This being site specific thermal power project, the MOEF & CC have examined all the aspects in detail with due diligence and allocated the land for establishing the thermal power project.
2.	Previous YTPS Report was rejected as it was found to contain copied content. All the EIA consultants without any exception including NEERI, Ernst & Young, a multinational were found to plagiarize. Higher Courts passed remarks on the quality of the EIA reports. For example, in the case of DDA obtaining EC for Common wealth games, Delhi High Court remarked on NEERI, "From an institution of this repute, it was not expected that report of this kind would be submitted". Ernst and Young plagiarized the EIA report for Dandeli Mini Hydro Electric Project	TSGENCO and the present consultant have taken adequate steps to ensure that Revised report is in compliance to MOEF&CC guidelines. The issue of BTPS is not relevant to the present case.

S.No	Issue raised by Sri N.Harinder	TSGENCO Response.
	from Tattahalli Augmentation Scheme is presented with evidence on the website of ESG India [http://static.esgindia.org/campaigns/ dandeli/docs.html]. EIA Report of Tata Energy Research Institute, Bangalore for the Dandeli Mini Hydel project is found fault with by an ecologist in respect of flora and fauna of the area. The present consultant is familiar to the Nalgonda people for the shoddy EIA for the Uranium Processing Plant of UCIL proposed at Seripally. A primary observation made on that EIA Report was **"REIA report is full of errors. Data inconsistencies, erroneous water balances, verbatim repetition of text and data tables, and contradicting statements are a common occurrence."** Why TSGENCO chose this consultant after debacle with two other consultants found extensively plagiarizing in the EIA reports is a unclear. Does TSGENCO, a publicly owned corporation value its ethical responsibilities to its owners, the people of Telangana? If so, why is the proponent keener on denying information to the people and pushing the project harmful to life on the planet by falsely projecting it as an essential requirement for development? Will the proponent give a legal undertaking to the MoEF & CC as demanded in case of BTPS?	
3.	Why the report is submitted in a format that people cannot check for its integrity, and originality. I am a computer engineer and worked in USA for more than a decade and returned home with a public service motive. My father was a participant in the Telangana Peasant Uprising and served as an MLA in the AP Assembly. With this background, I am unable to have the facilities to check the report that attempts to camouflage its errors	TSGENCO wishes to state it did not make attempts to camouflage behind technology. The maximum file size that can be uploaded on the website is 20 MB. We had to convert the document to pdf format, compress to ensure that the file size is less than 20 MB. This is a technical limitation and not any attempt to camouflage or dirty tactics.

S.No	Issue raised by Sri N.Harinder	TSGENCO Response.
	behind technology, how can ordinary citizens of Nalgonda area most of whom cannot read and understand the EIA report, react to this report with their comments? Using technology to prevent people from questioning the authenticity of the EIA is a dirty tactic on the part of the proponent. Proponent to explain why they have resorted to such a technique while the very purpose of public hearing process is to encourage public participation and open the doors to democracy as envisaged in various UN conferences? Does the proponent really care for public participation in development?	We hope the author being a computer engineer will appreciate this technical aspect. Apart from this it is pertinent to mention that MOEF&CC had asked TSGENCO to display the revised report on the website of TS Pollution Control Period. However, TSGENCO had kept the hard copies of the Report at all the locations as mentioned in the advertisement. These were the locations where the initial report was kept. 1) Collector and District Magistrate Office, Nalgonda 2) District Industries Center, Nalgonda 3) CEO, ZillaParishad Office, Nalgonda 4) Divisional Forest Office, Nalgonda 5) Department of Environment, Forest, Science and Technology, GoTS, Telangana State Secretariat, Hyderabad 6) Telangana State Pollution Control Board, Head Office, PariyavaranBhawan, A-1, Industrial estate, Sanath Nagar, Hyderabad 7) Telangana State Pollution Control Board, Zonal Office, Ramachandrapuram, Medak District, Telangana 8) Telangana State Pollution Control Board, Regional Office, Nalgonda 9) Revenue Divisional Office, Miryalaguda, Nalgonda District 10) Tehsildar Office, Damarecharla Mandal, Nalgonda District 11) Gram Panchayat Office, TallaVeerlapalem Village, Damaracherla Mandal, Nalgonda District 12) Gram Panchayat Office, TallaVirappagudem Village, Damaracherla Mandal, Nalgonda District 13) Gram Panchayat Office, Timmapur Village, Damaracherla Mandal, Nalgonda District 14) Gram Panchayat Office, Kotupalli Village, Damaracherla Mandal, Nalgonda District 15) Gram Panchayat Office, Kalepalli Village, Damaracherla Mandal, Nalgonda District

S.No	Issue raised by Sri N.Harinder	TSGENCO Response.
		The Public hearing for the project which was conducted on 31-05-2016 also attended by Shri Harinder. He spoke during the public hearing and had submitted a written response. The very fact that the author has written this representation after reading the revised EIA report implies that there was no deliberate dirty tactics have been resorted by TSGENCO
4.	"Plagiarism by Indians is a matter of serious concern, next only to that by China. About 100 journal papers by Indian authors are being withdrawn or retracted due to plagiarized content every year. SSV receives many complaints from interested whistle-blowers. We examine only those cases (about 15-20 a year) which are important and are accompanied by credible supporting evidence. We analyze the evidence, re-check if it is possible, and then write to the author(s) for their views. If we do not hear from the authors, which is most likely the case, we report to the heads of the institutions. Most heads (close to 80 per cent) do not respond despite reminders. Those who do, seek our help or advice to take some action, ranging from warning to dismissal, as happened in the cases of two faculty members of Pondicherry University and two directors of national research institutes." [Prof K L Chopra, Society for Scientific Values in an interview with Latha Jishnu http://www.downtoearth.org.in/interviews/top-scientists-misuse-power-funds-48988] What are the measures the proponent took to prevent the scourge of plagiarism from the EIA Reports made for it in view of the past experience?	TSGENCO had reviewed and vetted the revised EIA report prepared by the consultant before uploading the same on the website of TSPCB.

S.No	Issue raised by Sri N.Harinder	TSGENCO Response.
5.	No Telugu version is made available to people in several panchayats. Thimmapuram and Narsapuram Panchayats are not given even the English version. What is the basis for providing information to people? Is it selectively done with a motive to push the project due to institutional vested interests of TSGENCO?	TSGENCO had complied with the directive of MOEF&CC. The people have welcomed the establishment of the project during the public hearing conducted on 31-05-2016. The local people are aware about the proposed project. Thus there is no vested interests of TSGENCO.
6.	Undivided Nalgonda district is a drought prone area and climate change is likely to make it worse. Proposed coal based power plant will worsen the situation. Water is essential for producing electricity, but water cannot be generated by having electricity. Large consumption of water by the proposed power plant takes away precious water from the poor peasants and people depriving them of a basic necessity. Proponent got 6.60 TMC of water allotted from Krishna River, that is about 21,300 m^3/hr and more than twice the requirement given in the EIA report. The minimum flow of water in Krishna River in the lean season of June 2005 was 25.72 Mm^3/month. While the requirement for the plant is 7.21 Mm^3/month and the water allotted is about 15.35 Mm^3/month. That is equivalent to 15.35/25.72 = 0.60, meaning that 60 % of flow in the river is allotted thoughtlessly by the irrigation department to the proponent company. It is in contravention of the fiduciary obligation of the Irrigation and CAD department to conserve the Krishna River. It is vested interests colluding for temporary gains for the officials in terms of career growth and financial interests in managing huge sums of public money. It against the interests of people and their future. What is the explanation of the proponent for such nature plunder ignoring the past historical experiences	The water requirement is 7.21 Mm^3/month. The minimum flow during lean season of june 2005 was 25.72 Mm^3/month. This works out to 28% and not 60% as stated by the author. The Irrigation department had looked into the availability and accordingly the required water for the above project was allocated to TSGENCO.

S.No	Issue raised by Sri N.Harinder	TSGENCO Response.
	of the various civilizations?	
7.	EIA has not presented any adverse impacts from toxics released into the environment by the proposed plant. Even the analysis of the heavy metals and radioactive components present in coal is not given. Some old data for other plants is given. Are there no health effects on the people living in the neighbourhood of the plant? If there are why they are not presented? If there are no effects on public health, what is the basis in science and published research literature for such a conclusion?	Flue gas treatment system proposed which is in compliance with the new norms of MOEF & CC stipulated for thermal power plants will be implemented by TSGENCO. The emissions from the plant will be 3.3 times less with respect to particulate matter, 5-6 times less with respect to Sulphur dioxide and oxides of nitrogen when compared with the operating power plants which will reduce the Public health impact.
8.	Proposed area is predominantly agricultural and the people living there are mostly displaced by Nagarjuna sagar dam. They have brought the area under cultivation and using the Thungapadu vagu as source of irrigation water have established pumped irrigation systems over the years with considerable investment. All that is becoming infructuous with the takeover of the land for the project. This is a direct impact and it cannot be mitigated by paying a little money. A way of life is being eliminated with attendant social costs. Elsewhere in the Krishna River water irrigation systems withdrawal of large water quantities for plant use will impact the availability for agriculture. What is the impact of the loss of this water to irrigation?	The proposed plant is in the degraded forest land. It is not an agricultural land to say that the people have lost their livelihood due to taking up of this project. Only an extent of 704.12 acres of patta land is acquired as it is sandwiched between the forest land and is inevitable. Suitable compensation including R&R amount fixed as per the guideline given in the new LA and R&R act 2013, totaling to Rs.285 crores was paid. No water will be drawn from Tungapadu vagu for the project use. As such there won't be any effect on the irrigation system even though vagu is passing through the proposed project site. It is not correct to say that the pumped irrigation systems existing on the Tungapadu vagu will become infructuous due to acquiring of forest land for establishing of power plant and the statement made by the author is baseless. In fact TSGENCO has appraised the Irrigation Department about

S.No	Issue raised by Sri N.Harinder	TSGENCO Response.
		the EAC condition of maintaining the minimum flow in the Tungapahad Vagu. The Irrigation Department has given in writing that the minimum flow will be maintained which is enclosed in the Revised EIA Report as Annexure – 4 C.
9.	Data for the emissions presented in table 4.1 is funny and attributed to BHEL. Is BHEL incapable of calculating stack gas velocity from the gas flow rate? How did they get the same gas velocity for two different gas flow rates? Is it the folly of the consultant? What is the credibility of the data presented in Table 4-1? The change in boiler exhaust flow due to inclusion of FGD unit is not represented in the data used for air quality modeling. Present the material and energy balance data for the FGD. What is the heat of reaction for limestone, sulphur dioxide reaction? Air oxidation to gypsum is integral to the FGD unit chosen or a separate unit?	The flue gases after FGD are reheated and sent to chimney to maintain the temperature above dew point of sulphur dioxide. With FGD, Flue gas from each unit will be 730 Nm^3/sec and without FGD it is 698.6 Nm^3/sec. These factors have been considered and for modeling studies, worst case emissions have been calculated based on velocity of 24.3 m/sec and diameter of 7.6 m which gives flow rate of 917 Nm^3/sec which is higher than 730 Nm^3/sec.
10.	Extensive modification of the site will be carried out for the construction of the proposed plant eliminating all natural discharge channels that feed to Thungapadu vagu. "The project development will involve cut and fill quantities for achieving the required grades as per the layout design. Quantity of cutting is estimated about 80,00,000 m^3 and the quantity of filling required is about 66,00,000 m^3. .The fill quantity required is less than the cut quantity. Hence, the material obtained from cutting will be used for filling low lying areas. No material will be required from outside the project area for grading." [Page 209] with such levels of excavation and filling the natural drainages cannot be left intact. EIA	The Revised EIA had dealt at length the Tungapahad basin. The streams which will be disturbed and the streams which will be realigned have been clearly presented. The Tungapahad vagu flow through the plant site will not be disturbed and a buffer zone of 100m has been left in the layout. There is no deliberate misleading of the people nor any false information has been presented. The statement made by the author that 'due to levelling and grading of the project site

S.No	Issue raised by Sri N.Harinder	TSGENCO Response.
	presents a wrong picture of not affecting the inflows to Thungapadu vagu. Is it not a deliberate misleading of the people through false information? Proponent to explain. What is the role of the proponent in the preparation of the EIA? Is it limited to hiring and paying a consultant to get a favourable EIA or has taken the responsibility to check a priori the correctness and integrity of the report before putting it up for public consultation process? If the EAC finds it as irrelevant as the previous one, will not be a failure of the proponent who has been concentrating on accusing people opposing coal fired power plants as evil forces and preventing dissenting voices from participating in public hearings using the state apparatus, instead of setting their own house in order to present a truthful scientific report?	to the required level by cutting and filling will effect the natural drainage' which is not correct. While designing the project, the storm water drains within the plant area will be designed to lead the surface runoff as per the existing natural drainage pattern. The proponent had taken adequate care by vetting the report at various stages of preparation before putting up for public consultation process.

Conclusion:

The expression such as falsification, misrepresentation, institutional vested interest, deliberate misleading, etc., used by respected Sri. N. Harindar that too against a Govt. company are neither warranted nor appreciated and the project is in public interest only.

ANNEXURE – 2A

GOVERNMENT OF TELANGANA
FOREST DEPARTMENT

From
Sri A.K.Srivastava, I.F.S.,
Prl. Chief Conservator of Forests (WL)
& Chief Wildlife Warden
Telangana,
Aranya Bhavan, Hyderabad

To
The Chief Engineer / Civil / Thermal,
Telangana State
Power Generation Corporation Ltd.
Vidyut Soudha, Khairatabad,
Hyderabad – 500 082.

Rc. No.3401/2016/WL-1, Dt:05-05-2016

Sir,

Sub: - TSGENCO – 5 x 800 MW Super critical coal based Yadadri Thermal Power station at Veeralpalem village, Dameracherla Tehsil, Nalgonda District, Telangana State – Preparation of Environmental Impact Assessment report for getting Environmental Clearance (EC) – Regarding.

Ref: - 1. CE, TSGENCO, Lr. No. CE/C/T/SE/C/TD-I/EE/C/TCD-1/D.No. 310/16, dt. 19.02.2016
2. C.C.F FD ATR Rc. No. 425/2016/ATR/W6, dt. 26.04.2016.

-o0o-

I. As per the information furnished by the Chief Conservator of Forests & Field Director, Amrabad Tiger Reserve, this is to inform that:-

1. The Amrabad Tiger Reserve does not fall within 10 kms of the boundary of the proposed Yadadri Thermal Power Station at Veerapalem Village.

2. No Wild animal migratory path or Wild animal corridor is located within 10 kms of the boundary of the proposed Yadadri Thermal Power Station.

II. The Topographical map showing the location of the proposed Yadadri Thermal Power Station, the boundaries of Amrabad Tiger Reserve and the boundary of proposed Eco-sensitive Zone around the Tiger Reserve duly authenticated by Divisional Forest Officer, Wildlife Management Division, Nagarjunasagar is enclosed.

Encl: As above.



Yours faithfully
Sd/- A.K. Srivastava,
Prl. Chief Conservator of Forests (WL)
& Chief Wildlife Warden

//True copy//

for Prl. Chief Conservator of Forests

MAP SHOWING AMRABAD TIGER RESERVE WITH ECO SENSITIVE ZONE PROPOSED AND PROPOSED YADADRI THERMAL POWER PLANT AT VEERLAPALEM (V), NALGONDA,Dist .

N

1:222000

Plant Site

10 KM

NAGARJUNASAGAR RANGE

DEVARAKONDA RANGE

ACHAMPET RANGE

AMRABAD RANGE

LINGAL RANGE

MANNANUR RANGE

KOLLAPUR RANGE

DEVARAKONDA

HIRIALGUDA

GURAJALA

Macherla

Divisional Forest Officer
Wildlife Management
Nagarjunasagar.

Legend

- YTPP Plant Extent Points
- AOI of Proposed Project Site
- ATR Circle
- Eco senstive zone 1KM with Encl
- 10KM Project Site Extent
- Proposed Plant Boundary (2800 Acres)
- Proposed 10 KM Eco Sensitive Zone
- Forest Boundary Diverted to TSGENCO
- Reserve Forest
- ATR Core and Buffer boundary
- NSTR Boundary

Kilometers
10 5 0 10 20 30

ANNEXURE –2B

GOVERNMENT OF TELANGANA
DEPARTMENT OF MINES & GEOLOGY, NALGONDA

From
A. Surender, M.Sc., Tech.,
Asst. Director of Mines &
Geology, Nalgonda,

To
The Chief Engineer,
Civil / Thermal, Telangana State
Generation Corporation Ltd.,
Vidyut Soudha, Khairatabad,
Hyderabad – 500 082

Lr.No. 3089/Misc/2010, Dt: 13-12-2016

Sir,

Sub :Mines and Minerals – O/o. Asst. Director of Mines & Geology, Nalgonda– Setting up of 5 x 800 MW coal based super critical Yadadri Thermol Power Station at Veerlapalem Village, Dameracherla Mandal, Nalgonda District – Information submitted - Regarding.

Ref : Lr.No. CF/C/Th/SE/C/TCD-I/EE/C/TCD-I/D. No.271/16, Dt. 08.12.2016 from the Chief Engineer, Civil / Thermal, Telangana State Generation Corporation Ltd., Hyderabad.

* * *

I invite kind attention to the subject and reference cited wherein the Chief Engineer, Civil / Thermal, Telangana State Generation Corporation Ltd., Hyderabad has requested this office to furnish the information pertains to presence of coal deposits and economically feasible mineable deposits in the proposed site as required by MoEF & CC., GOI for obtaining Environmental Clearance from MoEF & CC., GOI.

In this regard, it is submitted that as per Geological pattern, there is no presence of Coal deposits in the proposed site for setting up of coal based super critical Yadadri Thermol Power Station at Veerlapalem Village, Dameracherla Mandal, Nalgonda District.

This is submitted for favour of information.

Yours faithfully,

Asst. Director of Mines and Geology, Nalgonda

Copy submitted to the Director of Mines and Geology, Hyderabad for favour of kind information.

Copy submitted to the Deputy Director of Mines and Geology, Hyderabad for favour of kind information.

ANNEXURE – 2B (I)

THE SINGARENI COLLIERIES CO. LTD
(A GOVT.COMPANY)
CIN: U10102TG1920SGC000571
EXPLORATION DIVISION
(ISO 9001:2008 CERTIFIED)
CORPORATE OFFICE
KOTHAGUDEM - 507 101
BHADRADRI DIST., TELANGANA (INDIA)
Phone:08744-242418
Fax:08744-245968
Email: gm_exp@scclmines.com
gmexplrn@yahoo.com

Ref.No.CRP/EXP/B-2/ 1017 Dt.22.12.2016.

To
The Chief Engineer/Civil/Thermal,
TSGENCO, Vidyut Soudha,
Hyderabad – 500 082.

Sir,

Sub: TSGENCO – Setting up of 5x800MW Yadadri Thermal Power Station, Veerlapalem (V), Dameracherla (M), Nalgonda Dist – Information on existence of coal deposits in the proposed project site – Requested – Reg.

Ref: Your Lr.No.CE/C/T/SE/TCD-I/EE/TCD-I/F.YTPS Mines/ D.No.273/ 2016, dt.16.12.2016.

***

SE/TCDE
22/12
CGL-

Please refer to the subject cited above.

It is to Inform that the Village Veerlapalem, Dameracherla (M), Nalgonda Dist., is not located in the sedimentary terrain of Gondwana formation.

EE-I
22/12/2016

Hence, it is to confirm that there will not be any presence of coal deposits in that area.

This is for your kind information.

Yours faithfully,

GM (Exploration)

भारत हेवीइलेक्ट्रिकल्स लिमिटेड
(भारत सरकार का उपकम)
पावर सेक्टर- विपणन, बीएचईएल हाउस, सिरी फोर्ट, नई दिल्ली-110049
फोन/Phone 66337000
फैक्स/Fax 26493561

Bharat Heavy Electricals Limited
(A Govt. of India Undertaking)
Power Sector – Marketing, BHEL House, Siri Fort, New Delhi – 110049

5x800 MW Yadadri TPS

Coal analysis Report regarding use of blended coal

Column no.		1	2	3
DESCRIPTION	**UNIT**	**Indian Coal** (based on SCCL coal)	**Imported Coal** (based on MSTC's imported coal data)	**Blended Coal** (50% Indian Coal & 50% Imported Coal)
PROXIMATE ANALYSIS				
Fixed carbon	%	33.00	42.94	37.97
Volatile matter	%	27.00	28.92	27.96
Moisture	%	10.00	13.14	11.57
Ash	%	30.00	15.00	22.5
Total	%	100.00	100.00	100.00
HHV	kcal / kg	4530	5700	5115
ULTIMATE ANALYSIS				
Carbon	%	49.41	57.75	53.58
Hydrogen	%	2.83	3.53	3.18
Sulphur	%	0.42	0.8	0.61
Nitrogen	%	0.85	1.08	0.97
Oxygen (difference)	%	6.49	8.70	7.59
Moisture	%	10.00	13.14	11.57
Ash	%	30	15	22.5
HARD GROVE INDEX		50	50	50

Blend ratio of 50% Indian coal and 50% Imported coal has been considered. However the boiler is capable of handling blend ratio up to 70% Indian coal considering CEA guidelines.

/ Tel. : 022 - 2559 2685 (कार्या./Off.)
022 - 2560 8278 (लैब/Lab)
Grams:BARC-MUMBAI, CHEMBUR
तार : बार्क - मुंबई, चेंबुर
फैक्स / Fax : 91-22-2550 5151
91-22-2560 5313

क्र.सं. / SR.NO. : M 142 14107

ट्रॉम्बे, मुंबई - 400 085.
TROMBAY,
Mumbai - 400 085.

भारत सरकार / GOVERNMENT OF INDIA

भाभा परमाणु अनुसंधान केंद्र / BHABHA ATOMIC RESEARCH CENTRE

स्वास्थ्य भौतिकी प्रभाग / HEALTH PHYSICS DIVISION

विकिरणसक्रियता परीक्षण प्रमाणपत्र / RADIOACTIVITY TEST CERTIFICATE

Dr. P. M. Ravi
Head, ESS

Ref.: BARC: HPD: LLCL: D: 43: C: 02: 2015/1180 **September 18, 2015**

This is regarding the sample of Coal received from TSGENCO, sent for analysis vide your letter ref. no. coal sample/D.No.312/15 dated 29.07.2015.

The sample was analysed for Uranium-238, Radium-226, Thorium-232, Potassium-40, Cesium-137 activities. The result of the analysis is given below:

S.No.	Sample Id.	Sample Name.	ACTIVITY (Bq/kg)				
			^{238}U	^{226}Ra	^{232}Th	^{40}K	^{137}Cs
1.	D – 43_2015	Coal	≤ 3.2	≤ 2.1	≤ 2.1	8.2 ± 0.9	≤ 0.3

(P. M. RAVI)

TELANGANA STATE POWER GENERATATION CORPORATION LTD.
3rd Floor, Vidyut Soudha,
TSGENCO,
Hyderabad – 500 082.

Vimta

Driven by Quality Inspired by Science

Test Report

ISSUED TO:
CHIEF ENGINEER/COAL/COMMERICAL
TSGENCO,VIDYUT SOUDHA,
HYDERABAD-500 082
PH : 040-23499417

Report Number : **14086/15/VLL/000/01**
Issue Date : **2016-03-15**
Your Ref : **TRF**
And Date : **2016-01-30**

Sample Particulars: Coal Samples

Sample Registration Date 2016-01-30
Analysis starting 2016-02-04 Analysis Completion date. 2016- 02-26

Sample Details: Coal Samples
Tests required: Cd ,Cr ,Cu ,Fe ,Co ,Mn Ni ,Pb ,Zn ,As Hg, Ti, Sb ,V ,Tl ,Sn.

SAMPLES NOT COLLECTED BY VIMTA LABS LIMITED LAB REF. EC

TEST RESULTS

S.No	Parameters	Units	Coal Sample (Manuguru site)	Coal Sample (KTPS Site)
Heavy Metals				
1	Cadmium as Cd	mg/kg	<0.1	<0.1
2	Chromium as Cr	mg/kg	151.2	132.3
3	Copper as Cu	mg/kg	14.6	14.2
4	Iron as Fe	%	0.25	1.76
5	Cobalt as Co	mg/kg	9.7	<0.1
6	Manganese as Mn	mg/kg	53.7	254.4
7	Nickel as Ni	mg/kg	87.8	61.1
8	Lead as Pb	mg/kg	<0.1	<0.1
9	Zinc as Zn	mg/kg	48.8	35.6
10	Arsenic as As	mg/kg	<0.1	<0.1
11	Mercury as Hg	mg/kg	<0.1	<0.1
12	Titanium as Ti	mg/kg	631.2	607.6
13	Antimony as Sb	mg/kg	<0.1	<0.1
14	Vanadium as V	mg/kg	14.6	10.2
15	Thallium as Tl	mg/kg	<0.1	<0.1
16	Tin as Sn	mg/kg	<0.1	<0.1

Method Of Testing: As per USEPA 3050B
Instrument Used: ICP - MS(Agilent 7500),Detection Limit - 0.1 mg/kg

Dr. Subba Reddy Mallampati
Sr.Scientist-Environment

Note: This report is subject to the terms and conditions mentioned overleaf
Vimta Labs Ltd., Analytical Division, Life Sciences Campus, # 5, Alexandria Knowledge Park
Genome Valley, Hyderabad - 500 078. INDIA. T: +91 40 6748 4043

NO: LSF-B401193



తెలంగాణ तेलंगाना TELANGANA A 580450

Date:27/04/2016, 03:36 PM Serial No: 5.044 Denomination: 100

Purchased By:
K.VENKATESHWARLU
S/O K.R.L.SHARMA
R/O HYD

For Whom
TSGENCO,VIDYUT SOUDHA ,HYD

27/4/16
Sub Registrar
Ex. Officio Stamp Vendor
SRO: S.R.Nagar

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding is made on this 27th day of **April 2016** (the "MOU") at Hyderabad.

BETWEEN

A. **The Singareni Collieries Company Limited,** an existing company under the Companies Act, 2013, having its registered office at Kothagudem Collieries (PO) 507 101, Khammam District, Telangana (hereinafter referred to as the **"Seller"** which expression shall, unless the context otherwise specifies mean and include its successors and permitted assigns) of the FIRST PART

AND

G.M. (Mktg.)
SCCL, Hyderabad

B. **The Telangana State Power Generation Corporation Limited (TSGENCO),** a Company registered under the Companies Act, 2013 and having its Registered Office at Vidyut Soudha, Hyderabad, Telangana and herein after called the PURCHASER (which expression shall unless repugnant to the context shall include its legal representatives and successors) on the OTHER PART.

(The Seller and the Purchaser are hereinafter collectively referred to as the **"Parties").**

Whereas the Seller is a Government Company engaged in mining and sale of coal including coal exploration, design, construction, project management development, operations and allied consultancy services.

Whereas the Purchaser is in requirement of **G9 grade coal** for their proposed Yadadri Thermal Power Station (4000 MW), Damaracherla, Nalgonda (dt) and requested the Seller to supply coal to meet the generation requirement of this unit.

And whereas the Seller have agreed in principle to supply coal to the Purchaser from **cost plus mines after necessary approvals and guidelines as per the Ministry of Coal, Govt. of India, applicable for long term linkage/LoA/cost plus mines.**

NOW THEREFORE, in consideration of the premises and mutual covenants herein contained, the Parties hereto agree as follows:

1.0 The Seller shall supply 7.00 Million Tonnes per Annum (7 MMTPA) of G9 & above grades coal / WG-G9 grade for operation of Yadadri Thermal Power Station (5x800 MW) subject to the obtaining linkage from SLC (LT) of Ministry of Coal, Govt. of India for such supplies as per NCDP 2007 and cost plus policy guidelines 2008.

2.0 The Seller shall issue LoA after approval of application by SLC (LT), MOC, GoI, on successfully achieving the milestones stipulated in LoA, SCCL would execute Fuel Supply Agreement (FSA) with the TSGENCO covering commercial arrangement for supply of coal which shall include price and other details on mutually agreed terms and conditions.

G.M. (Mktg.)
SCCL, Hyderabad

Chief Engineer
(Coal & Commercial)
TSGENCO, Vidyut Soudha,
HYDERABAD - 500 082.

3.0 SCCL shall open new cost plus mines for this power plant and the schedule of opening of such mine shall link to the commissioning of TSGENCO Power Plant which is expected to be commissioned by March 2019 and also Washeries to wash the raw coal as per the requirement of Yadadri TPS. The supply of coal shall commence from January 2019 tentatively. Upon delay in commissioning of the cost plus mines and washery, due to force majeure reasons, coal shall be supplied from other sources on weighted average e-auction prices, on best effort basis.

4.0 The Purchaser shall intimate exact date of commissioning of the plant to Seller in advance (i.e 3 months) so that SCCL shall initiate proposal for entering into FSA which shall indicate the modalities for supply of coal.

5.0 The Purchaser shall furnish year wise requirement of coal to Seller sufficiently in advance to supply of coal.

6.0 **Settlement of Disputes:** In the event of any dispute or difference touching the MOU between the parties shall be settled in accordance with the following guidelines.

ARBITRATION: In the event of any difference or dispute between the parties thereto, such dispute or difference shall be resolved amicable by mutual consultation. Any difference or dispute arising between the parties under this agreement shall be settled through Arbitration in accordance with the provisions of the Arbitration and Conciliation Act 1996. In such event the Tribunal shall consist of three Arbitrators, one each to be nominated by the Seller and Purchaser and the Third Arbitrator shall be nominated by the two Arbitrators nominated by the Purchaser and the Seller. The venue of Arbitration shall be decided mutually between the parties.

7.0 Severability and Renegotiation: In the event any part or provision of this Agreement becomes, for any reason, unenforceable or is declared invalid by a Competent Court of Law or Tribunal the rest of this agreement shall remain in full force and effect as if the unenforceable or invalid portions had not been part of this agreement and in such eventuality the parties agree to negotiate with a view to amend or modify this agreement for achieving the original intent of the parties.

G.M. (Mktg.)
SCCL, Hyderabad

8.0 Termination of MOU: The MOU shall stand terminated after payment of consequential damages liable to Seller or Purchaser, as the case may be. Such consequential damages shall be as per the decision of competent authority of Seller / Purchaser as the case may be.

9.0 Effective Date: This MOU will be effective from the date of signing and can be amended/ supplemented or replaced by another document signed by the Parties.

IN WITNESS WHEREOF THE PARTIES THORUGH THEIR AUTHORISED REPRSENTATIVES HAVE SET THEIR HANDS ON THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.

For and on behalf of Seller
(SCCL)

(J.NAGAIAH)
G.M. (Marketing)

G.M. (Mktg.)
SCCL, Hyderabad

GENERAL MANAGER (MKTG) * S.C.C.L. HYDERABAD *

Witness:

(N.V.K. SRINIVAS)
DGM (Marketing)

For and on behalf of Purchaser
(TSGENCO)

Telangana State Power Generation Corporation Ltd. * Vidyut Soudha, Hyd-82.

(K.VENKAESWARLU)
CE (Coal & Commercial)

Chief Engineer
(Coal & Commercial)
TSGENCO, Vidyut Soudha,
HYDERABAD - 500 082.

Witness:

(Cg. Srinivasa Rao)
SE(Rly).

The Singareni Collieries Company Limited
(A Government Company)

Regd. Office :
Kothagudem Collieries - 507 101,
Bhadradri Kothagudem District,
Telangana State, India.

Singareni Bhavan, Red Hills,
P.B. No. 18, Khairatabad (P.O.)
Hyderabad-500 004, Telangana State
CIN : U10102TG1920SGC000571

ANNEXURE – 2E (II)

CMD/PS/H/144 2374 Dt.09.12.2016

To
The Chairman & Managing Director
TSGENCO,
Vidyut Soudha, Khairatabad
HYDERABAD – 500 082
Fax: 040-23499166

Sir,

Dir(Fin) CE/Comml

Sub: Supply of coal to Yadadri Thermal Power Station - Reg.
Ref: Your Lr.No. CMD/CE(C&C)/SE(C&C)/F.IC/D.NO.530/2016, Dt. 8.12.2016.

Kindly refer to the above cited letter. It is to inform that SCCL is committed to supply 7.00 Million Tonnes/annum coal to Yadadri TPS as per MoU dt. 27.4.2016 signed between SCCL & TSGENCO. The above supplies will be as per the commercial terms and conditions between SCCL & TSGENCO.

Office of the Chief Engineer
(Coal & Commercial)
TSGENCO, V.S. Hyd-82.
Inward No:.....1512.....
10 9 DEC 2016
SE/Commercial & Coal
DE/Commercial & Coal
SE/Planning
Chief Engineer
(Coal & Commercial)

Def cee Cashy

Yours faithfully,

Chairman & Managing Director

ANNEXURE – 2E (III)



తెలంగాణ तेलंगाना TELANGANA 23 NOV 2016

F 171269

MD. ABDUL KHAL
STAMP VENDOR
L.No. 16-07-047/2013, RL.No. 16-07-
5-9-20/A, Hotel Anmol Continen
Opp. Secretariat, Hyd. Ph : 92957

Sl.No. 8267 Date: 23/11/16 Rs. 100
Sold to: K. Amaidam
S/o/W/o: K. Pochaiah R/o. Hyd.
For Whom: Self

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (hereinafter referred to as "the **MOU**") entered into on this 09th Day of December 2016 at Hyderabad by and between :

MSTC Limited, a Government of India Enterprise having its office at 225C, A.J.C. Bose Road, Kolkata-700020, (hereinafter referred to as 'MSTC") of the **First Part**

and

TELANGANA STATE POWER GENERATION CORPORATION LIMITED, a Govt Company incorporated under Companies Act, 2013, having its office at Vidyut Soudha, Khairthabad, Hyderabad. – 500 082, (hereinafter called as "TSGENCO") of the **Second Part.**

WHEREAS:

a) TSGENCO has proposed to establish Yadadri Thermal Power Station of 5x800 MW coal based thermal power project (hereinafter referred to as "the **Project**") at Veerlapalem Village, Nalgonda District,

Telangana to improve the power supply situation in Telangana and the project is scheduled to be commissioned in the year 2018-19.

b) TSGENCO proposes to operate and run the Project plant by using imported coal in blend with indigenous coal.

c) MSTC, a Govt. of India Enterprise, is having wide experience in supplying of imported coal to various thermal Plants in India;

d) MSTC has agreed to supply such imported coal of about 7 Million tonnes per annum (7.0 MTPA) for the above proposed project at the request of TSGENCO.

e) Whereas it is necessary to record the preliminary intentions aforesaid of the parties by way of and as a memorandum being these presents subject however to further agreement/s as may be entered into by them.

NOW THEREFORE THIS MEMORANDUM OF UNDERSTANDING (MOU) WITNESSTH AS FOLLOWS:

1. <u>INDENT/S :</u>

a) MSTC shall supply upon placement of the indent/s by TSGENCO imported coal on Long term basis for operation of the Yadadri Thermal Power Station (5x800 MW). Such imported coal shall be non- coking coal(steaming) as per the following characteristics :

i)	GCV (ADB)	: 5700-6000 Kcal/Kg.
ii)	Total Moisture (ARB)	: 15-25%
iii)	Ash Content (ADB)	: 15%
iv)	Sulphur	: < 0.8%
v)	Volatile matter	: 25 -45
vi)	HGI	: 45-60
vii)	Size of coal	: 0-50mm

b) <u>Quantity:</u>

The quantity of imported coal shall be 7.00 MTPA, more or less if the power plant is operated with blended coal of 50% indigenous and 50% imported coal.

c) MSTC shall source imported coal from Indonesia/Australia/South Africa and supply as per the specifications to be stipulated..

09/12/16

d) TSGENCO shall intimate exact date of commissioning of the Project to MSTC in advance (i.e. three months) so that MSTC shall arrange necessary logistics.

e) The imported coal shall be supplied from Kakinada/Krishnapatnam port/ any other nearest ports in India.

f) MSTC and TSGENCO shall mutually discuss and agree upon the price of coal to be supplied and other commercial terms at the time of supply of imported coal.

g) The quantity of imported coal to be supplied may vary depending on the Plant load factor of the power plant of TSGENCO as well as the allocation of indigenous coal based on the long term coal linkage, if any, granted by the Ministry of Coal. TSGENCO shall not responsible for any variation in the quantity of imported coal that may be imported.

2. REPRESENTATION AND WARRANTIES:

Neither party shall have the right or power to bind the other party to any agreement without the prior written consent of the other party. Unless specifically agreed in writing, no party is authorized to make commitments, representations, and warranties to agreements on behalf of the other party and each party agrees that it will not hold itself out as having such authority. If any party acts in violation of the foregoing, the said party agrees to indemnify, defend and hold the other parties harmless from and against any and all claims, demands, losses, damages, liabilities, law suits and other proceedings, judgments and awards, the reasonable cost and expenses, (including but not limited to reasonable attorneys fee) arising directly or indirectly in whole or in part, out of the breach of this article by such party whether committed by the indemnifying party, its employees, agents, successors or assigns.

3. LIMITATION OF LIABILITY:

Neither party shall be liable to each other for any financial liability or any consequential loss incurred by the party individually in respect of this MOU. Notwithstanding anything stated in these presents to the contrary, the parties hereto agree that pursuant to the preliminary understanding of the parties hereto as recorded in these presents , the parties shall enter into agreement/s, on the broad terms recorded herein, to give effect to such understanding and intention of the parties hereto.

09/12/16

4. **ASSIGNMENT:**

The assignment by any party of all its rights and obligations under this MOU to a third party shall be subject to the written consent of the other party provided that such assignee shall also specifically agree in writing to be bound by the terms of this MOU and further terms as may be agreed by the parties hereto.

5. **NOTICE:**

Any notice to be given under this MOU shall be in writing and shall be deemed to have been duly and properly served upon the Parties hereto if delivered against acknowledgement or by registered mail with acknowledgement or by registered mail with acknowledgement due, addressed to the Parties herein at the following addresses or such changed addresses as will be duly notified by the Parties from time to time.

Attention	**Address**
MSTC Limited,	represented by A. Rajamanickam BM
Attention	
TSGENCO	represented by K Anandam, Chief Engineer (coal & comml)

6. **CONFIDENTIALITY:**

a. Both the parties, to the extent of their respective rights and obligations to do so, shall exchange or disclose such technical information and data as is reasonably required of each party to perform its responsibilities under this MOU and/or laws. Each party agrees to keep in confidence and to use the same degree of care as it uses with respect to its own proprietary data to prevent the disclosure to third parties of all technical information, data and confidential business information (hereinafter referred to as "Data").

b. Exchange, use and maintenance of confidential data shall be mutually discussed and agreed to by the parties.

c. The preceding provisions of confidentially and restriction on use of data shall not apply to by the Parties.

- Information in the public domain of information, which subsequently enter into private domain without committing breach of this clause.
- Information in possession of the party at the time of disclosure and was not acquired, directly or indirectly, from the other party.

- Information which a party is required to disclose under law, rules or regulations to any judicial or other authorities.
- Consultants / advisors provided they, in turn, sign undertaking of confidentially.

7. EFFECTIVE DATE:

This MOU shall come into force as soon as it is signed but shall remain in force for the period as mentioned hereunder at Clause No. 8 , subject to termination as provided for hereinbefore by either party without any recourse or any liability on account of such termination.

8. VALIDITY & TERMINATION:

The validity of this MoU shall be deemed to be in force till formal agreement for supply of Coal is executed between the parties hereto or till 16.05.2018 whichever is earlier.

This MoU may be terminated in the event of failure of any party to fulfill the terms and conditions of the MoU substantially vitiating the intents and purpose thereof, by giving three months notice in writing but only after one year of signing of this MoU. Further, during this period the MoU can be terminated by mutual consent of the Parties if it is jointly agreed that due to certain insurmountable reasons it is not possible to proceed further with the Project. Any notice for termination of the MOU may be delivered by hand or sent by first class airmail delivery/courier at the address specified above for each party and if posted shall be deemed to have been served within seven days after posting. During this one year period from the date of signing of this MoU, any one of the Parties shall not enter into negotiations with any other private or public entity without the written consent of the other Party relating to the construction, ownership and operation of the Project at the said Site.

9. Non-Liability of Govt. of India

It is clearly understood by the parties hereto that Government of India is not a party in any way with regard to execution or otherwise of this MOU and as such Government of India has no liability, any way, arising out of this MoU.

10. INTERGRITY PACT

This MoU between the parties shall be also governed by the Integrity Pact as available in the Supplier's Website www.mstcindia.co.in and the parties hereto hereby accept the same.

11. SETTLEMNT OF DISPUTES:

Any dispute or difference, whatsoever arising between the parties hereto out of or relating to the construction, meaning, scope, operation or effect of this non-binding MOU or the validity or the breach thereof shall be amicably settled by the parties hereto.

IN WITNESS WHEREOF, the parties hereto have signed this Memorandum of Understanding at Hyderabad on the date first mentioned above in the presence of witnesses as mentioned hereunder.

For and behalf of MSTC Limited

09/12/16

A. RAJAMANICKAM, DGM/BM.

For and behalf of Telangana State Power Generation Corporation Limited

Chief Engineer
(Coal & Commercial)
TSGENCO, Vidyut Soudha,
HYDERABAD - 500 082.

WITNESSES:

1. G. Srinivasa
SE/Plg/TSGENCO

MSTC LIMITED
D. No: 6-3-635 & 637, 2nd Floor, Akash Ganga Complex, Khairatabad, Hyderabad-4.
Govt. of India Enterprise

2. Jamil Akhtar
Manager – MSTC Ltd.

ABSTRACT

ANNEXURE – 2F

I & CAD Department – TSGENCO – Establishment of Thermal Power Plants of 5200 MW at Veerlapalem village of Dameracherla Mandal of Nalgonda District, TS – Allocation of 208 Cusecs (i.e 6.60 TMC per year) of water throughout the year from River Krishna – Permission – Accorded – Orders – Issued.

IRRIGATION AND CAD (REFORMS) DEPARTMENT

G.O.Ms.No. **13** Dated: 30-01-2015

Read the following:

1. From the Chairman & Managing Director,TSGENCO, Hyd., Lr.No. CMD/ CE/C/Ther./TS GENCO/F./ D.No. 81/14, dt. 27.12.2014.
2. Govt. Memo.No. 94/Reforms/A2/2015, Dated: 07.01.2015.
3. From ENC (Irrigation) Hyderabad, Lr. No. ENC(I)/DCE-I/ OT2/AEE3 /NSP/TSGENCO/ Damarcherla/2014, Dt: 13-01-2015
4. G.O.Ms.No.124, I&CAD(PW:REFORMS)Department, Dt: 15-11-2010

@@@@@

ORDER:

In the reference 1st read above, the Chairman & Managing Director, Telangana State Power Generation Corporation Limited, Hyderabad has requested the Government to arrange to allocate 208 cusecs (i.e. 6.60 TMC per year) of water throughout the year from the nearest and feasible location of river Krishna to meet the requirement of water for the proposed 5200 MW power plant at Veerlapalem village of Dameracherla Mandal of Nalgonda District.

2. In the reference 3rd read above the Engineer-in-Chief (Irrigation) Hyderabad has stated that the requirement of 6.6 TMC can be met out of the savings and replacement of surface water by ground water as per requirement of irrigation after completion of modernisation of NSP and he has requested the Government may allocate 6.6 TMC of water per year from Krishna River to TSGENCO for their proposed thermal power projects of 5200 MW at Veerlapalem village of Dameracherla (M) of Nalgonda District subject to normal conditions of G.O.Ms.No.39 and its amendments. He has further stated that the feasible location point for drawl of water may be near Veerlapalem village of Damerachela Mandal or any suitable point that can be decided in consultation with the officials of TGENCO as per their convenience.

3. Government after careful examination of the matter hereby accord permission for drawl of 208 cusecs (i.e. 6.60 TMC per year) of water throughout the year from the nearest and feasible location of river Krishna to meet the requirement of water for the proposed 5200 MW power plant at Veerlapalem village of Dameracherla Mandal of Nalgonda District, Telangana State, subject to payment of water charges and with usual terms and conditions. The feasible location point for drawl of water should be near Veerlapalem village of Damerachela Mandal or any suitable point that can be decided in consultation with the officials of TGENCO as per their convenience.

P.T.O

4. The Engineer- in- Chief (Irrigation), Hyderabad shall take further necessary action accordingly.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF TELANGANA)

Dr. SHAILENDRA KUMAR JOSHI
PRINCIPAL SECRETARY TO GOVERNMENT

TO
The Engineer-in-Chief (Irrigation), I & CAD Department, Hyderabad.
The Chief Engineer, Irrigation Projects, Khammam.
The CMD, TS GENCO, Hyderabad.
Copy to :
The Chief Engineer, Hydrology, Hyderabad.
The Managing Director, TS Pollution Control Board, Hyderabad.
The P.S. to Prl.Secy to Government (I&CAD Department)
The P.S. to Prl.Secy to Government (Energy)
The P.S. to Minister (Irrigation)
The P.S. to Prl Secy to CM
Sf/Sc.

//FORWARDED::BY ORDER//

SECTION OFFICER

ANNEXURE – 2 G

KRISHNAPATNAM PORT COMPANY LTD.

- 1 NOV 2016
Ref.No.KP/TSGENCO/165

Dated: 31st October, 2016

Office of the Chief Engineer
(Coal & Commercial)
TSGENCO, V.S. Hyd-82.
Inward No:.....2137.....
04 NOV 2016
SE/Commiercial & Coal
DE/Commiercial & Coal
SE/Planning
Chief Engineer
(Coal & Commercial)

The Chairman and Managing Director
M/s.Telangana State Power Generation Corporation Limited
Vidyut Soudha, Khairatabad
Hyderabad-500 082

Sub: **TSGENCO - Utilisation of facilities at Krishnapatnam Port for importing Coal – Reg.**

Ref: CMD/CE(C&C)/SE(Plg.)/DE(C&C)/F.Coal/D.No.433/2016 dated 22.10.2016

Dir/FM

Dear Sir,

As directed by our Chairman, we convey our sincere thanks to TSGENCO for the proposal to utilize Krishnapatnam Port for importing of Coal for the proposed 5 X 800 MW Yadadri Thermal Power Project in Telangana State.

In this regard, it is to mention that Krishnapatnam Port is one of the most efficient bulk material handling Ports in India with the state-of-the-art equipments and technologies. KPCL have also established a single window clearance system with full transparency for the advantage of valued customers to provide end to end Port Services.

We understand that the TSGENCO's coal import requirement will be around 7.0 MTPA from the F.Y. 2019-2020. We are pleased to inform that KPCL is agreeable to your proposal to utilize our port facilities for handling of Coal to the 5 X 800 MW Yadadri Thermal Power Project and are ready to enter into the long term Port Service Agreement (PSA) in this regard. Upon hearing from you, we shall submit a Draft PSA for your acceptance.

Thanking you,

Yours faithfully,
for **KRISHNAPATNAM PORT CO. LTD.,**

DIRECTOR (FUEL MANAGEMENT)
TSGENCO, V. S, HYD-82.
C.No:.....23.....Inward
03 NOV 2016
CE/Coal & Comml.
SE/Planning
DE/Coal & Comml.
DE/Planning
PO
Director
(Fuel Management)

(ANIL YENDLURI)
Director and Chief Executive Officer

DE/Cc
Cashier
ADE/Cc

Corp. Off: # 8-2-293/82/A/379 & 379/A, Ground Floor, Plot No. 379, Road No.10, Jubilee Hills, Hyderabad - 500 033. India.
Tel: +91-40-2333 9990 /91 /92 **Fax:** +91-40-2333 7789 **E-mail:** info@krishnapatnamport.com

Regd. Off: 1st Floor, 48-9-17, Dwarakanagar, Visakhapatnam - 530 016 INDIA
Tel: +91-891-2754602 / 2747335 / 2748084 **Fax:** +91-891-2747362 www.krishnapatnamport.com
CIN: U45203AP1996PLC023529

ISO 9001, ISO 14001
OHSAS - 18001

विशाखपट्टणम पोर्ट ट्रस्ट
VISAKHAPATNAM PORT TRUST

No.ITRA/SHP/FMKT/2016/2213
Dt. 10-11-2016

To
The Chairman & Managing Director,
Telangana State Power Generation Corporation Ltd.
(A Govt. of Telangana Undertaking)
Vidyuth Soudha,
Hyderabad – 500 082
Fax : 040-23499827

Dear Sir,

Sub: TSGENCO – Utilization of facilities at Visakhapatnam Port for importing Coal – reg

Ref: TSGENCO Lr. No. CMD/CE(C&C) / SE (Plg) / DE (C&C) F. Coal, D. No. 433(a)/2016, Dt. 22-10-2016

We sincerely acknowledge the interest evinced by TSGENCO for utilizing the coal handling facilities at the Port of Visakhapatnam to meet your Coal Imports.

The Port of Visakhapatnam (VPT), one of the leading ports in the Country is situated on the East Coast and efficiently caters to the requirements of various Exporters and Importers. During the past few years, the Port has augmented its infrastructure in terms of deepening of channels and berths, development of state of art mechanized cargo handling facilities, installation of higher capacity equipment, enhancing evacuation facilities etc. Thus, VPT is a Major Port, with a total handling capacity of 100 Million Metric Tonnes Per Annum, cost effective by providing customer friendly service 24/7.

Port of Visakhapatnam is the only major port having Supercape handling facility of 200,000 DWT and draft upto 18.1 m in the outer harbour. The inner harbor of the port is capable of handling fully laden Panamax vesseis of draft upto 14.5 m. The salient features of coal handling terminals at the port are furnished below:

Vizag General Cargo Berth (VGCB):

This is a State of Art integrated Mechanized Coal Unloading Terminal operated by Vedanta Group, capable of handling Supercape vessels with draft upto 18.1 m. The Terminal has a capacity of 10.18 MTPA with Grab Type Ship Unloader designed to discharge 70,000 TPD. It has a Rapid Wagon Loading System which can load a rake in less than an hour with in-motion weigh bridges on the two full length railway sidings. The Terminal has a stacking area 1.30 lakh sq. meters.

विशाखपट्टणम पोर्ट ट्रस्ट, विशाखपट्टणम - ५३० ०३५, दूरभाष : 91-891-2565456, 2873104, फेक्स : 91-891-2564522, तार : पोट्रस्ट
Visakhapatnam Port Trust, Visakhapatnam - 530 035, Phone : 91-891-2565456, 2873104, Fax 91-891-2564522
Grams : "PORTRUST", E-mail : deputychairmanvpt@gmail com Web : www.vizagport.com

Berths in Inner Harbour :

EQ-1(AVCTPL) is a fully mechanized coal terminal of 280 meters length capable of handling 6.41 MMTPA of Steam Coal. It is designed for handling Panamax vessels with 14.5 m draft. It has a storage area 1,01,200 sqm with a capacity to store 300,000 MT of Coal. The Terminal has a Rapid wagon loading system with silo capacity of 3,000MT and can handle 8 Rakes per day. It has a world class Dust Suppression System & Fire Fighting System. The Terminal has 2 Nos., Mobile Harbour Cranes – 1600 TPH each attached to Mobile Hoppers, Stacker/reclaimers, Conveyor etc.

Another two berths (EQ-8 & 9) operated by M/s Vizag Seaport Pvt. Ltd, in the inner harbor can cater to Panamax vessels of draft upto 14.5 m. The above Terminal's capacity is 7.70 MTPA. The Terminal has 4 Nos HMC each capable of handling 18000 TPD. The berths have concrete paved back up area capable of storing 2 Lakh MT. It has two full length railway sidings with attached in-motion weigh bridges.

This Port is well connected to the Indian Railway Network and sufficient rakes will be made available for movement of Coal towards South Central Railway. Further to have a seamless flow of traffic, Port had proposed for electrification of Internal Railway Network for the Mechanical Loading Systems, which is likely to be completed by Dec 2016. Engine on Load Scheme of Railways is also expected to be operational by the next financial year at the VGCB Terminal, which will further increase the operational efficiency and seamless flow of rakes.

As pointed out above, VPT has adequate capacity to handle the cargo projected by TSGENCO. We are hereby convey our consent to handle the import cargo projected by TGENCO for the Yadadri Power Project.

Yours sincerely,

DY. CHAIRMAN



Dy cee
Coal
21/11/2016

Kakinada Seaports Ltd.

CIN : U24239AP1996PLC026093
Registered Office : Flat No. 202, Trendset Harmony, Gayatrinagar,
Vijayawada, Krishna District - 520 008, Andhra Pradesh
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ISO 9001 : ISO14001 & OHSAS 18001 Certified

19th December 2016

The Chairman & Managing Director
Telangana State Power Generation Corporation Ltd
Vidyut soudha,
Hyderabad - 500082

Fax; 040 23499827

Sir,

Sub: TSGENCO – Utilization of facilities of Kakinada Seaports (Kakinada Deep Water Port) for handling of import coal consignments at Port – Reg
Ref; Your Lr.No.CMD/CE(C&C)/SE (Plg)/DE(C&C)/F.Coal/D.No.527/2016 dtd 7.12.16

****

It is heartening to learn that Telangana State Power Generation Corporation Ltd is establishing a new 'Yadadri thermal Power Project (5 x800MW)' and considering to use Kakinada Seaport as gateway port for the coal imports for the TPP.

We shall be very happy to serve TSGENCO in this regard and welcome you to use the state of the art coal import Terminal at our Kakinada Deep Water Port (KDWP) which is handling Panamax/Kamsarmax vessels and till date handled largest bulk vessel is 92,270 DWT. KDWP has potential to develop Cape size vessels as per your requirements.

In last 3 years, the Terminal has handled over 300 Vessels and 16.5 Million MT of Coal. Reputed IPPs and Coal importers such as Emco Energy, Vidarbha Power (ADAG), Hindalco, NTPC, Adani's, Dhariwal Infrastructure, Century Cements etc patronize our Kakinada Coal Terminal.

Excellent standards in Performance, Quality, Quantity, HSE and Customer care are the hallmark of the Terminal which has attracted the Coal import industry as above to Kakinada. In addition we also offer other value added services such as effective coordination with Railways, Customs and various regulatory authorities to make port experience seamless. In fact we distinguish ourselves from other ports by offering end to end tailor made logistics to suit each customer's needs.

SE/Coal
DE
CE/C&C

Office of the Chief Engineer
(Coal & Commercial)
TSGENCO, V.S. Hyd-82.
Inward No: 1560
19 DEC 2016
Chief Engineer
Coal & Commercial

Corporate Office : # 8-2-418, Meenakshi House, 3rd Floor, Road No. 7, Banjara Hills, HYDERABAD - 500 034
Phones : 040-23357733, 040-23357744, Fax : 040-23357755, E-mail : mailhyd@kakinadaseaports.in
Port Office : 2nd Floor, Port Administrative Building, Beach Road, KAKINADA - 533 007
Ph: +91-884-6601111, 2365089, 2349619, 2368246, Fax: +91-884-2385402, 03, 04, E-mail : mailkkd@kakinadaseaports.in

EE-I
7-12-2016

To SE/Coal & Comml.
Re SE(Plg)

Kakinada Seaports Ltd. Continuation Sheet

Most compelling commercial reason for you to consider Kakinada Deep Water Port is that it offers the natural distance and on-land logistics advantage to TSGENCO's Yadadri TPP. In fact in terms of rail distance at 387Kms, Kakinada is the closest to the Yadadri TPP. It may also be noted that Telangana State & Andhra Pradesh in JV partnership with Ministry of Railways have undertaken construction of Kovuuru Bhadrachalam (KB) rail route which is an approved Plan project of the Railways. KB line is going to minimize the distance between Telangana state and Kakinada port and Kakinada port will be the natural gateway port for Telangana state.

Combined with the least rail freight, large vessel handling capability, high rates of unloading and dispatch to TPP and a Milllon MT of stockyard space, we are sure Kakinada Seaport shall be able to extend an unmatched import logistics to TSGENCO seen from any commercial and technical angle.

We will be very happy to address to develop any additional requirements you choose in terms of infrastructure facilities at port viz., Berthing, Shore handling, Railway siding etc. We confirm our acceptance of your proposal for utilization of the KDWP for import of TSGENCO TPP coal on long term basis.

We invite you to visit our Terminal and Port Facilities and provide us an opportunity to showcase and explain to you firsthand the natural advantages of using state of art Kakinada Coal Terminal and the immense advantage of using Kakinada Port as the Gate-way Port for Yadadri Coal imports.

Thanking You,

Yours faithfully,
For Kakinada Seaports Limited

(KV Rao)
Chairman & Managing Director

SOUTH CENTRAL RAILWAY

Headquarters Office
Transportation Branch
Secunderabad.
Date: 07.12.2016

No.T.80/Coal/Projections/2016

Director (Fuel Management)
M/s TSGENCO
Vidyut Soudha,
Khairatabad,
Hyderabad 500082

Sub: Planning of additional movement of imported Coal in the railway logistic plan to the upcoming Thermal power plant of TSGENCO at Yadadiri (GNT Division).

Ref:(i)Director(FM)No.Dir.(F.M.)CE/C&C/SE(Plg)/DE(C&C/F.Coal /D. No.528/2016 dt.07-12-2016.
(ii) DTT/(G) /NDRB Lr.No.2015/TT-V/58/Imp.Coal dt.22-9-2016.

.....

Reference to your letter cited, operational feasibility is given for movement of imported coal rakes to TSGENCOs upcoming thermal power plant at Yadadiri (GNT Division). Krishnapatnam and Vishakapatnam ports are already included in the logistic plan.

Board vide Reference (ii) has instructed to keep the railway logistic plan in abeyance till 31st March 2017.

(Dr.J.Allwyn
Dy.COM/Freight
For Chief Freight Traffic Manager

ANNEXURE –2H

LAND REQUIREMENT FOR DISPOSAL OF ASH

Coal Consumption of the plant : 12.28 Million TPA @ 85 % PLF Ash Content in blend coal : 22.5 % Total Ash Generation : 2.76 MTPA			
Flyash		**Bottom Ash**	
80 % of Total Ash, MTPA	2.20	20 % of Total Ash, MTPA	0.56
Density of Flyash, kg/m^3	0.86	Density of Bottom Ash, kg/m^3	0.70
Assuming bund height of 15 m, Area requirement, Acres	42	Assuming bund height of 15 m, Area requirement, Acres	13.14
Land Requirement for first three years	**Area (acres)**	**Land Requirement for 25 years**	**Area (acres)**
1st year : 50 % Ash disposal, 2.2 million tonnes	20.90	25 X 0.56 = 14 million tonnes = 20 million m^3	328.5
2nd year : 30 % Ash disposal, 0.66 million tonnes	12.54		
3rd year : 10 % Ash disposal, 0.22 million tonnes	4.18		
Total	**37.62**		**328.5**
Summary of Land requirement in acres			
Area required for bottom ash	328.50		
Area required for flyash	37.62		
Area required for bunds and decanting	33.00		
Total	**399.12**		
Total land required for Ash pond for 25 years = 400 acres			

ANNEXURE – 3A

AMBIENT AIR QUALITY DATA (µg/m³)

Project : TSGENCO
Season : Post Monsoon Season-16
Period : October'16
Station : Project Site **Code : A-1**

Date of sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO (ppm)	Hg
October– 2016						
03/10/2016	48.5	13.6	7.9	8.7	<1	<0.1
04/10/2016	47.6	12.8	8.4	9.5	<1	<0.1
10/10/2016	48.2	13.1	7.5	8.6	<1	<0.1
11/10/2016	47.3	12.6	10.2	11.1	<1	<0.1
17/10/2016	49.7	13.9	8.3	9.4	<1	<0.1
18/10/2016	50.9	14.5	9.1	10.8	<1	<0.1
24/10/2016	51.8	16.4	7.8	9.6	<1	<0.1
25/10/2016	48.9	15.3	9.6	10.7	<1	<0.1

Station : Veerappagudem **Code : A-2**

Date of sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO (ppm)	Hg
October– 2016						
03/10/2016	39.2	11.1	9.2	10.3	<1	<0.1
04/10/2016	38.9	11.4	8.5	9.8	<1	<0.1
10/10/2016	39.8	12.5	10.1	11.4	<1	<0.1
11/10/2016	39.3	11.2	9.3	10.2	<1	<0.1
17/10/2016	40.2	12.6	11.0	12.7	<1	<0.1
18/10/2016	41.9	11.8	9.6	10.8	<1	<0.1
24/10/2016	40.4	13.3	10.0	11.2	<1	<0.1
25/10/2016	39.6	12.4	9.5	10.4	<1	<0.1

ANNEXURE – 3A (CONTD)

AMBIENT AIR QUALITY DATA (µg/m³)

Project : TSGENCO
Season : Post Monsoon Season-16
Period : October'16
Station : Wazirabad **Code : A-3**

Date of sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO (ppm)	Hg
October– 2016						
03/10/2016	58.6	24.7	13.4	15.2	<1	<0.1
04/10/2016	61.5	26.1	15	17.3	<1	<0.1
10/10/2016	59.3	25.2	12.5	14.8	<1	<0.1
11/10/2016	58.4	24.5	13.2	15.4	<1	<0.1
17/10/2016	60.6	26.7	12.7	14.6	<1	<0.1
18/10/2016	58.9	25	13.8	16.2	<1	<0.1
24/10/2016	62.2	27.9	14.1	15.7	<1	<0.1
25/10/2016	60.7	25.6	12.8	14.9	<1	<0.1

Station : Daida **Code : A-4**

Date of sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO (ppm)	Hg
October– 2016						
03/10/2016	33.4	10.3	7.2	8.9	<1	<0.1
04/10/2016	34.2	11.4	9.8	11.3	<1	<0.1
10/10/2016	33.5	9.9	7.0	8.7	<1	<0.1
11/10/2016	32.8	10.2	6.5	8.4	<1	<0.1
17/10/2016	34.6	11.6	8.1	10.5	<1	<0.1
18/10/2016	35.3	10.9	7.4	9.3	<1	<0.1
24/10/2016	36.4	12.6	8.3	10.2	<1	<0.1
25/10/2016	33.7	10.7	7.6	9.8	<1	<0.1

ANNEXURE – 3A (CONTD)

AMBIENT AIR QUALITY DATA (μg/m³)

Project : **TSGENCO**
Season : **Post Monsoon Season-16**
Period : **October'16**
Station : **Gottimukkala** **Code : A-5**

Date of sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO (ppm)	Hg
October– 2016						
03/10/2016	47.6	19.7	11	12.9	<1	<0.1
04/10/2016	46.3	18.8	10.6	12.4	<1	<0.1
10/10/2016	48.6	19.2	12.5	14.8	<1	<0.1
11/10/2016	46.5	18.9	9.7	11.6	<1	<0.1
17/10/2016	47.4	19.5	11.3	12.7	<1	<0.1
18/10/2016	49.8	21.4	9.8	11.5	<1	<0.1
24/10/2016	46.7	20.2	10.1	12	<1	<0.1
25/10/2016	48.2	19.9	10.8	13.1	<1	<0.1

Station : **Adividevulapalli** **Code : A-6**

Date of sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO (ppm)	Hg
October– 2016						
06/10/2016	40.4	14.6	9.3	11.4	<1	<0.1
07/10/2016	41.2	13.5	8.7	10.5	<1	<0.1
13/10/2016	40.7	14.8	9.0	11.1	<1	<0.1
14/10/2016	41.8	13.7	8.4	10.3	<1	<0.1
20/10/2016	39.9	15.5	10.1	12.2	<1	<0.1
21/10/2016	40.1	16.3	9.8	12.6	<1	<0.1
27/10/2016	40.9	15.1	11.2	13.5	<1	<0.1
28/10/2016	39.7	13.2	9.7	11.9	<1	<0.1

ANNEXURE – 3A (CONTD)

AMBIENT AIR QUALITY DATA (µg/m³)

Project : TSGENCO
Season : Post Monsoon Season-16
Period : October'16
Station : Veerlapalem **Code : A-7**

Date of sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO (ppm)	Hg
October– 2016						
06/10/2016	38.4	12.7	8.5	10.9	<1	<0.1
07/10/2016	42.6	13.1	9.1	11.2	<1	<0.1
13/10/2016	38.9	14.0	8.9	10.8	<1	<0.1
14/10/2016	39.4	13.7	9.4	12.0	<1	<0.1
20/10/2016	38.7	15.3	8.6	10.5	<1	<0.1
21/10/2016	39.8	12.4	8.3	9.8	<1	<0.1
27/10/2016	38.1	14.2	7.9	9.5	<1	<0.1
28/10/2016	40.7	12.9	8.0	9.9	<1	<0.1

Station : Ragadappa **Code : A-8**

Date of sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO (ppm)	Hg
October– 2016						
06/10/2016	37.4	11.7	9.2	10.9	<1	<0.1
07/10/2016	39.8	10.8	7.3	9.1	<1	<0.1
13/10/2016	38.2	10.5	8.1	9.3	<1	<0.1
14/10/2016	41.0	12.3	7.8	9.7	<1	<0.1
20/10/2016	38.9	11.2	8.5	10.3	<1	<0.1
21/10/2016	39.5	11.9	6.8	8.5	<1	<0.1
27/10/2016	37.6	10.3	8.7	10.1	<1	<0.1
28/10/2016	38.4	9.9	7.2	8.8	<1	<0.1

ANNEXURE – 3A (CONTD)

AMBIENT AIR QUALITY DATA (µg/m³)

Project : TSGENCO
Season : Post Monsoon Season-16
Period : October'16
Station : Kallepalli **Code : A-9**

Date of sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO (ppm)	Hg
October– 2016						
06/10/2016	40.7	15.2	9.5	11.4	<1	<0.1
07/10/2016	42.6	16.4	8.7	10.7	<1	<0.1
13/10/2016	40.9	15.7	9.9	12.0	<1	<0.1
14/10/2016	41.8	16.2	10.1	11.8	<1	<0.1
20/10/2016	40.5	14.9	9.3	11.5	<1	<0.1
21/10/2016	42.2	16.7	9.0	12.2	<1	<0.1
27/10/2016	41.3	15.9	11.5	13.4	<1	<0.1
28/10/2016	43.1	17.8	9.7	11.9	<1	<0.1

Station : Damaracherla **Code : A-10**

Date of sampling	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO (ppm)	Hg
October– 2016						
06/10/2016	62.4	26.8	11.7	13.2	<1	<0.1
07/10/2016	64.0	28.1	11.1	12.7	<1	<0.1
13/10/2016	63.9	27.9	12.3	14.5	<1	<0.1
14/10/2016	64.2	29.7	11.6	13.0	<1	<0.1
20/10/2016	65.0	28.3	13.1	15.9	<1	<0.1
21/10/2016	63.7	27.4	11.4	12.8	<1	<0.1
27/10/2016	62.9	26.9	12.5	14.2	<1	<0.1
28/10/2016	63.4	27.1	11.9	14.8	<1	<0.1

ANNEXURE – 3B

WATER SAMPLING LOCATIONS

S.No	Sample Code	Sample Description	Sample point
GROUND WATER			
01	GW1	Project Site (Modugulakunta)	Near Govt. Primary School
02	GW2	Virappagudem	Near Govt. High School
03	GW3	wazirabad	Near Govt. High School
04	GW4	Daida	SC-Colony
05	GW5	Gottimukkala	Near GP Building
06	GW6	Adividevulapalli	Near Anganvadi Kendram
07	GW7	Veerlapalem	Near Venkatanarasanaa Shop
08	GW8	Ragadappa	Kanakadurgamma temple
09	GW9	Kallepalli	Near d. Dibla Home
10	GW10	Damaracherla	Near Govt. High School
SURFACE WATER			
11	SW1	Tungapadu Vagu	UP Stream near to Kappur Thanda)
12	SW2	Tungapadu Vagu	Middle Stream (Near to Tanda.
13	SW3	Tungapadu Vagu	Down Stream (Near to Kothapalle Village)
14	SW4	Vadapalli/Wazirabad	Krishana River
15	SW5	Krishna River	Down Stream-1 (Near to Irikigudem)
16	SW6	Krishna River	UPStream-2 (Near to Kothapalle Village)
17	SW7	Krishna River	UPStream-1 (Near to Kothapalle Village)
18	SW8	Krishna River	Down Stream-2 (Near to Irikigudem Village)
19	SW9	Krishna River & Tungapadu Vagu	Merging Point (Near to Kothapalii Village)
20	SW10	Krishna River	Near to Plant (Near to Kothapalii Village)

ANNEXURE – 3B

WATER QUALITY DATA

S. NO.	TESTS	RESULTS		IS 10500 -2012 [DRINKING WATER STANDARD]	
		(GW-1)	(GW-2)	ACCEPTABLE LIMITS	MAX. PERMISSIBLE LIMITS IN ABSENCE OF ALTERNATE SOURCE
1	Colour (Hazen Units / Colour Units)	5	< 5	5	15
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3	pH	7.25	7.13	6.5 to 8.5	No Relaxation
4	Turbidity, NTU	< 1	< 1	1	5
5	Total Dissolved Solids @ 105°C, mg/l	718	1006	500	2000
6	Total Hardness as $CaCO_3$, mg/l	323	515	200	600
7	Calcium as Ca , mg/l	91	166	75	200
8	Magnesium as Mg , mg/l	23	25	30	100
9	Total Alkalinity as $CaCO_3$, mg/l	337	371	200	600
10	Chlorides as Cl, mg/l	93	148	250	1000
11	Sulphate as SO_4^{2-}, mg/l	38	151	200	400
12	Fluoride as F^-, mg/l	1.32	1.18	1.0	1.5
13	Nitrate as NO_3, mg/l	42	38	45	No Relaxation
14	Iron as Fe, mg/l	0.09	< 0.05	0.3	No Relaxation
15	Boron as B, mg/l	0.10	0.35	0.5	1.0
16	Sodium as Na, mg/l	101.8	117.8	---	
17	Potassium as K, mg/l	4.8	3.4	---	
18	Aluminium as Al, mg/l	< 0.02	< 0.02	0.03	0.2
19	Copper as Cu, mg/l	< 0.01	< 0.01	0.05	1.5
20	Manganese as Mn, mg/l	< 0.01	< 0.01	0.1	0.3
21	Selenium as Se , mg/l	< 0.01	< 0.01	0.01	No Relaxation
22	Zinc as Zn, mg/l	< 0.01	0.08	5	15
23	Cadmium as Cd, mg/l	< 0.003	< 0.003	0.003	No Relaxation
24	Lead as Pb, mg/l	< 0.01	< 0.01	0.01	No Relaxation
25	Mercury as Hg, mg/l	< 0.001	< 0.001	0.001	No Relaxation
26	Total Arsenic as As, mg/l	< 0.01	< 0.01	0.01	0.05
27	Total Chromium as Cr. Mg/l	< 0.01	< 0.01	0.05	No Relaxation
28	Cyanide as CN, mg/l	< 0.02	< 0.02	0.05	No Relaxation
29	Total Coliforms, Cfu/100ml	Absent	Absent	---	

ANNEXURE – 3B

WATER QUALITY DATA

S. NO.	TESTS	RESULTS		IS 10500 -2012 [DRINKING WATER STANDARD]	
		(GW-3)	(GW-4)	ACCEPTABLE LIMITS	MAX. PERMISSIBLE LIMITS IN ABSENCE OF ALTERNATE SOURCE
1	Colour (Hazen Units / Colour Units)	5	< 5	5	15
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3	pH	7.32	6.92	6.5 to 8.5	No Relaxation
4	Turbidity, NTU	< 1	< 1	1	5
5	Total Dissolved Solids @ 105°C, mg/l	1102	774	500	2000
6	Total Hardness as $CaCO_3$, mg/l	490	460	200	600
7	Calcium as Ca , mg/l	140	140	75	200
8	Magnesium as Mg , mg/l	34	27	30	100
9	Total Alkalinity as $CaCO_3$, mg/l	332	262	200	600
10	Chlorides as Cl, mg/l	176	153	250	1000
11	Sulphate as SO_4^{2-}, mg/l	213	73	200	400
12	Fluoride as F^-, mg/l	1.25	1.14	1.0	1.5
13	Nitrate as NO_3, mg/l	43	41	45	No Relaxation
14	Iron as Fe, mg/l	0.15	0.18	0.3	No Relaxation
15	Boron as B, mg/l	0.15	0.23	0.5	1.0
16	Sodium as Na, mg/l	159.8	58.4	---	
17	Potassium as K, mg/l	9.6	6.5	---	
18	Aluminium as Al, mg/l	< 0.02	< 0.02	0.03	0.2
19	Copper as Cu, mg/l	< 0.01	< 0.01	0.05	1.5
20	Manganese as Mn, mg/l	< 0.01	< 0.01	0.1	0.3
21	Selenium as Se , mg/l	< 0.01	< 0.01	0.01	No Relaxation
22	Zinc as Zn, mg/I	0.01	0.02	5	15
23	Cadmium as Cd, mg/l	< 0.003	< 0.003	0.003	No Relaxation
24	Lead as Pb, mg/l	< 0.01	< 0.01	0.01	No Relaxation
25	Mercury as Hg, mg/l	< 0.001	< 0.001	0.001	No Relaxation
26	Total Arsenic as As, mg/l	< 0.01	< 0.01	0.01	0.05
27	Total Chromium as Cr. Mg/l	< 0.01	< 0.01	0.05	No Relaxation
28	Cyanide as CN, mg/l	< 0.02	< 0.02	0.05	No Relaxation
29	Total Coliforms, Cfu/100ml	Absent	Absent	---	

ANNEXURE – 3B

WATER QUALITY DATA

S. NO.	TESTS	RESULTS		IS 10500 -2012 [DRINKING WATER STANDARD]	
		(GW-5)	(GW-6)	ACCEPTABLE LIMITS	MAX. PERMISSIBLE LIMITS IN ABSENCE OF ALTERNATE SOURCE
1	Colour (Hazen Units / Colour Units)	< 5	< 5	5	15
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3	pH	7.19	7.38	6.5 to 8.5	No Relaxation
4	Turbidity, NTU	< 1	< 1	1	5
5	Total Dissolved Solids @ 105°C, mg/l	882	1086	500	2000
6	Total Hardness as $CaCO_3$, mg/l	455	439	200	600
7	Calcium as Ca , mg/l	136	107	75	200
8	Magnesium as Mg , mg/l	28	42	30	100
9	Total Alkalinity as $CaCO_3$, mg/l	277	332	200	600
10	Chlorides as Cl, mg/l	166	191	250	1000
11	Sulphate as SO_4^{2-}, mg/l	125	202	200	400
12	Fluoride as F^-, mg/l	1.12	1.22	1.0	1.5
13	Nitrate as NO_3, mg/l	38	17	45	No Relaxation
14	Iron as Fe, mg/l	0.10	0.12	0.3	No Relaxation
15	Boron as B, mg/l	0.28	0.33	0.5	1.0
16	Sodium as Na, mg/l	96.2	177	---	
17	Potassium as K, mg/l	12.6	9	---	
18	Aluminium as Al, mg/l	< 0.02	< 0.02	0.03	0.2
19	Copper as Cu, mg/l	0.01	0.02	0.05	1.5
20	Manganese as Mn, mg/l	0.09	0.01	0.1	0.3
21	Selenium as Se , mg/l	< 0.01	< 0.01	0.01	No Relaxation
22	Zinc as Zn, mg/l	0.03	6.6	5	15
23	Cadmium as Cd, mg/l	< 0.003	< 0.003	0.003	No Relaxation
24	Lead as Pb, mg/l	< 0.01	< 0.01	0.01	No Relaxation
25	Mercury as Hg, mg/l	< 0.001	< 0.001	0.001	No Relaxation
26	Total Arsenic as As, mg/l	< 0.01	< 0.01	0.01	0.05
27	Total Chromium as Cr, Mg/l	< 0.01	< 0.01	0.05	No Relaxation
28	Cyanide as CN, mg/l	< 0.02	< 0.02	0.05	No Relaxation
29	Total Coliforms, Cfu/100ml	Absent	Absent	---	

ANNEXURE – 3B

WATER QUALITY DATA

S. NO.	TESTS	RESULTS		IS 10500 -2012 [DRINKING WATER STANDARD]	
		(GW-7)	(GW-8)	ACCEPTABLE LIMITS	MAX. PERMISSIBLE LIMITS IN ABSENCE OF ALTERNATE SOURCE
1	Colour (Hazen Units / Colour Units)	< 5	< 5	5	15
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3	pH	7.29	7.08	6.5 to 8.5	No Relaxation
4	Turbidity, NTU	< 1	< 1	1	5
5	Total Dissolved Solids @ 105°C, mg/l	1286	554	500	2000
6	Total Hardness as $CaCO_3$, mg/l	591	328	200	600
7	Calcium as Ca , mg/l	172	97	75	200
8	Magnesium as Mg , mg/l	39	21	30	100
9	Total Alkalinity as $CaCO_3$, mg/l	366	257	200	600
10	Chlorides as Cl, mg/l	284	68	250	1000
11	Sulphate as SO_4^{2-}, mg/l	170	36	200	400
12	Fluoride as F^-, mg/l	1.19	1.03	1.0	1.5
13	Nitrate as NO_3, mg/l	42	34	45	No Relaxation
14	Iron as Fe, mg/l	0.08	0.07	0.3	No Relaxation
15	Boron as B, mg/l	0.38	0.13	0.5	1.0
16	Sodium as Na, mg/l	178.4	42.8	---	
17	Potassium as K, mg/l	10.2	4.3	---	
18	Aluminium as Al, mg/l	< 0.02	< 0.02	0.03	0.2
19	Copper as Cu, mg/l	< 0.01	< 0.01	0.05	1.5
20	Manganese as Mn, mg/l	0.02	0.02	0.1	0.3
21	Selenium as Se , mg/l	< 0.01	< 0.01	0.01	No Relaxation
22	Zinc as Zn, mg/l	0.02	0.77	5	15
23	Cadmium as Cd, mg/l	< 0.003	< 0.003	0.003	No Relaxation
24	Lead as Pb, mg/l	< 0.01	< 0.01	0.01	No Relaxation
25	Mercury as Hg, mg/l	< 0.001	< 0.001	0.001	No Relaxation
26	Total Arsenic as As, mg/l	< 0.01	< 0.01	0.01	0.05
27	Total Chromium as Cr. Mg/l	< 0.01	< 0.01	0.05	No Relaxation
28	Cyanide as CN, mg/l	< 0.02	< 0.02	0.05	No Relaxation
29	Total Coliforms, Cfu/100ml	Absent	Absent	---	

ANNEXURE – 3B

WATER QUALITY DATA

S. NO.	TESTS	RESULTS		IS 10500 -2012 [DRINKING WATER STANDARD]	
		(GW-9)	(GW-10)	ACCEPTABLE LIMITS	MAX. PERMISSIBLE LIMITS IN ABSENCE OF ALTERNATE SOURCE
1	Colour (Hazen Units / Colour Units)	< 5	< 5	5	15
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3	pH	6.90	7.16	6.5 to 8.5	No Relaxation
4	Turbidity, NTU	< 1	< 1	1	5
5	Total Dissolved Solids @ 105°C, mg/l	1436	821	500	2000
6	Total Hardness as $CaCO_3$, mg/l	581	419	200	600
7	Calcium as Ca , mg/l	154	115	75	200
8	Magnesium as Mg , mg/l	48	32	30	100
9	Total Alkalinity as $CaCO_3$, mg/l	351	292	200	600
10	Chlorides as Cl, mg/l	362	128,	250	1000
11	Sulphate as SO_4^{2-}, mg/l	191	115	200	400
12	Fluoride as F^-, mg/l	1.20	1.14	1.0	1.5
13	Nitrate as NO_3, mg/l	42	39	45	No Relaxation
14	Iron as Fe, mg/l	0.06	< 0.05	0.3	No Relaxation
15	Boron as B, mg/l	0.38	0.20	0.5	1.0
16	Sodium as Na, mg/l	228	95.6	---	
17	Potassium as K, mg/l	18.5	3.2	---	
18	Aluminium as Al, mg/l	< 0.02	< 0.02	0.03	0.2
19	Copper as Cu, mg/l	< 0.01	< 0.01	0.05	1.5
20	Manganese as Mn, mg/l	0.02	0.05	0.1	0.3
21	Selenium as Se , mg/l	< 0.01	< 0.01	0.01	No Relaxation
22	Zinc as Zn, mg/l	2.37	0.15	5	15
23	Cadmium as Cd, mg/l	< 0.003	< 0.003	0.003	No Relaxation
24	Lead as Pb, mg/l	< 0.01	< 0.01	0.01	No Relaxation
25	Mercury as Hg, mg/l	< 0.001	< 0.001	0.001	No Relaxation
26	Total Arsenic as As, mg/l	< 0.01	< 0.01	0.01	0.05
27	Total Chromium as Cr. Mg/l	< 0.01	< 0.01	0.05	No Relaxation
28	Cyanide as CN, mg/l	< 0.02	< 0.02	0.05	No Relaxation
29	Total Coliforms, Cfu/100ml	Absent	Absent	---	

ANNEXURE – 3B

WATER QUALITY DATA

S. NO.	TESTS	RESULTS		IS 10500 -2012 [DRINKING WATER STANDARD]	
		(SW-1)	(SW-2)	ACCEPTABLE LIMITS	MAX. PERMISSIBLE LIMITS IN ABSENCE OF ALTERNATE SOURCE
1	Colour (Hazen Units / Colour Units)	< 5	< 5	5	15
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3	pH	7.94	7.86	6.5 to 8.5	No Relaxation
4	Turbidity, NTU	4.1	4.8	1	5
5	Total Dissolved Solids @ 105°C, mg/l	685	669	500	2000
6	Total Hardness as $CaCO_3$, mg/l	308	298	200	600
7	Calcium as Ca , mg/l	89	87	75	200
8	Magnesium as Mg , mg/l	21	19.6	30	100
9	Total Alkalinity as $CaCO_3$, mg/l	208	223	200	600
10	Chlorides as Cl, mg/l	118	113	250	1000
11	Sulphate as SO_4^{2-}, mg/l	128	112	200	400
12	Fluoride as F^-, mg/l	0.80	0.82	1.0	1.5
13	Nitrate as NO_3, mg/l	14.3	12.9	45	No Relaxation
14	Iron as Fe, mg/l	0.15	0.15	0.3	No Relaxation
15	Boron as B, mg/l	0.23	0.18	0.5	1.0
16	Sodium as Na, mg/l	98.2	95.8	---	
17	Potassium as K, mg/l	2.6	6.6	---	
18	Aluminium as Al, mg/l	< 0.02	< 0.02	0.03	0.2
19	Copper as Cu, mg/l	< 0.01	0.01	0.05	1.5
20	Manganese as Mn, mg/l	< 0.01	< 0.01	0.1	0.3
21	Selenium as Se , mg/l	< 0.01	< 0.01	0.01	No Relaxation
22	Zinc as Zn, mg/l	0.12	0.03	5	15
23	Cadmium as Cd, mg/l	< 0.003	< 0.003	0.003	No Relaxation
24	Lead as Pb, mg/l	< 0.01	< 0.01	0.01	No Relaxation
25	Mercury as Hg, mg/l	< 0.001	< 0.001	0.001	No Relaxation
26	Total Arsenic as As, mg/l	< 0.01	< 0.01	0.01	0.05
27	Total Chromium as Cr. Mg/l	0.03	0.04	0.05	No Relaxation
28	Cyanide as CN, mg/l	< 0.02	< 0.02	0.05	No Relaxation
29	Total Coliforms, Cfu/100ml	170	220	---	

ANNEXURE – 3B

WATER QUALITY DATA

S. NO.	TESTS	RESULTS		IS 10500 -2012 [DRINKING WATER STANDARD]	
		(SW-3)	(SW-4)	ACCEPTABLE LIMITS	MAX. PERMISSIBLE LIMITS IN ABSENCE OF ALTERNATE SOURCE
1	Colour (Hazen Units / Colour Units)	< 5	< 5	5	15
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3	pH	7.92	8.01	6.5 to 8.5	No Relaxation
4	Turbidity, NTU	3.9	4.6	1	5
5	Total Dissolved Solids @ 105°C, mg/l	702	418	500	2000
6	Total Hardness as $CaCO_3$, mg/l	323	177	200	600
7	Calcium as Ca , mg/l	93	43	75	200
8	Magnesium as Mg , mg/l	22	17	30	100
9	Total Alkalinity as $CaCO_3$, mg/l	213	153	200	600
10	Chlorides as Cl, mg/l	113	65	250	1000
11	Sulphate as SO_4^{2-}, mg/l	133	54	200	400
12	Fluoride as F^-, mg/l	0.88	0.60	1.0	1.5
13	Nitrate as NO_3, mg/l	12.2	12.8	45	No Relaxation
14	Iron as Fe, mg/l	0.10	< 0.05	0.3	No Relaxation
15	Boron as B, mg/l	0.20	0.10	0.5	1.0
16	Sodium as Na, mg/l	93.4	63.2	---	
17	Potassium as K, mg/l	7.2	4.1	---	
18	Aluminium as Al, mg/l	< 0.02	< 0.02	0.03	0.2
19	Copper as Cu, mg/l	< 0.01	< 0.01	0.05	1.5
20	Manganese as Mn, mg/l	< 0.01	< 0.01	0.1	0.3
21	Selenium as Se , mg/l	< 0.01	< 0.01	0.01	No Relaxation
22	Zinc as Zn, mg/l	< 0.01	0.02	5	15
23	Cadmium as Cd, mg/l	< 0.003	< 0.003	0.003	No Relaxation
24	Lead as Pb, mg/l	< 0.01	< 0.01	0.01	No Relaxation
25	Mercury as Hg, mg/l	< 0.001	< 0.001	0.001	No Relaxation
26	Total Arsenic as As, mg/l	< 0.01	< 0.01	0.01	0.05
27	Total Chromium as Cr. Mg/l	0.04	0.04	0.05	No Relaxation
28	Cyanide as CN, mg/l	< 0.02	< 0.02	0.05	No Relaxation
29	Total Coliforms, Cfu/100ml	350	430	---	

ANNEXURE – 3B

WATER QUALITY DATA

S. NO.	TESTS	RESULTS		IS 10500 -2012 [DRINKING WATER STANDARD]	
		(SW-5)	(SW-6)	ACCEPTABLE LIMITS	MAX. PERMISSIBLE LIMITS IN ABSENCE OF ALTERNATE SOURCE
1	Colour (Hazen Units / Colour Units)	5	5	5	15
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3	pH	8.05	7.96	6.5 to 8.5	No Relaxation
4	Turbidity, NTU	3.4	4.7	1	5
5	Total Dissolved Solids @ 105°C, mg/l	443	408	500	2000
6	Total Hardness as $CaCO_3$, mg/l	192	177	200	600
7	Calcium as Ca , mg/l	47	43	75	200
8	Magnesium as Mg , mg/l	18	17	30	100
9	Total Alkalinity as $CaCO_3$, mg/l	139	144	200	600
10	Chlorides as Cl, mg/l	68	60	250	1000
11	Sulphate as SO_4^{2-}, mg/l	84	69	200	400
12	Fluoride as F^-, mg/l	0.72	0.69	1.0	1.5
13	Nitrate as NO_3, mg/l	11.2	8.9	45	No Relaxation
14	Iron as Fe, mg/l	0.15	0.13	0.3	No Relaxation
15	Boron as B, mg/l	0.10	< 0.10	0.5	1.0
16	Sodium as Na, mg/l	64.5	59.9	---	
17	Potassium as K, mg/l	4.5	3.9	---	
18	Aluminium as Al, mg/l	< 0.02	< 0.02	0.03	0.2
19	Copper as Cu, mg/l	< 0.01	< 0.01	0.05	1.5
20	Manganese as Mn, mg/l	< 0.01	< 0.01	0.1	0.3
21	Selenium as Se , mg/l	< 0.01	< 0.01	0.01	No Relaxation
22	Zinc as Zn, mg/l	0.01	0.01	5	15
23	Cadmium as Cd, mg/l	< 0.003	< 0.003	0.003	No Relaxation
24	Lead as Pb, mg/l	< 0.01	< 0.01	0.01	No Relaxation
25	Mercury as Hg, mg/l	< 0.001	< 0.001	0.001	No Relaxation
26	Total Arsenic as As, mg/l	< 0.01	< 0.01	0.01	0.05
27	Total Chromium as Cr. Mg/l	< 0.01	< 0.01	0.05	No Relaxation
28	Cyanide as CN, mg/l	< 0.02	< 0.02	0.05	No Relaxation
29	Total Coliforms, Cfu/100ml	240	140	---	

ANNEXURE – 3B

WATER QUALITY DATA

S. NO.	TESTS	RESULTS		IS 10500 -2012 [DRINKING WATER STANDARD]	
		(SW-7)	(SW-8)	ACCEPTABLE LIMITS	MAX. PERMISSIBLE LIMITS IN ABSENCE OF ALTERNATE SOURCE
1	Colour (Hazen Units / Colour Units)	5	5	5	15
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3	pH	7.93	8.07	6.5 to 8.5	No Relaxation
4	Turbidity, NTU	4.0	4.5	1	5
5	Total Dissolved Solids @ 105°C, mg/l	416	430	500	2000
6	Total Hardness as $CaCO_3$, mg/l	182	187	200	600
7	Calcium as Ca , mg/l	45	45	75	200
8	Magnesium as Mg , mg/l	17	18	30	100
9	Total Alkalinity as $CaCO_3$, mg/l	139	144	200	600
10	Chlorides as Cl, mg/l	63	65	250	1000
11	Sulphate as SO_4^{2-}, mg/l	71	80	200	400
12	Fluoride as F^-, mg/l	0.73	0.66	1.0	1.5
13	Nitrate as NO_3, mg/l	9.3	9.8	45	No Relaxation
14	Iron as Fe, mg/l	0.20	0.16	0.3	No Relaxation
15	Boron as B, mg/l	< 0.10	0.10	0.5	1.0
16	Sodium as Na, mg/l	59.2	63.2	---	
17	Potassium as K, mg/l	3.7	4.3	---	
18	Aluminium as Al, mg/l	< 0.02	< 0.02	0.03	0.2
19	Copper as Cu, mg/l	< 0.01	< 0.01	0.05	1.5
20	Manganese as Mn, mg/l	< 0.01	< 0.01	0.1	0.3
21	Selenium as Se , mg/l	< 0.01	< 0.01	0.01	No Relaxation
22	Zinc as Zn, mg/l	0.01	0.01	5	15
23	Cadmium as Cd, mg/l	< 0.003	< 0.003	0.003	No Relaxation
24	Lead as Pb, mg/l	< 0.01	< 0.01	0.01	No Relaxation
25	Mercury as Hg, mg/l	< 0.001	< 0.001	0.001	No Relaxation
26	Total Arsenic as As, mg/l	< 0.01	< 0.01	0.01	0.05
27	Total Chromium as Cr. Mg/l	< 0.01	< 0.01	0.05	No Relaxation
28	Cyanide as CN, mg/l	< 0.02	< 0.02	0.05	No Relaxation
29	Total Coliforms, Cfu/100ml	118	164	---	

ANNEXURE – 3B

WATER QUALITY DATA

S. NO.	TESTS	RESULTS		IS 10500 -2012 [DRINKING WATER STANDARD]	
		(SW-9)	(SW-10)	ACCEPTABLE LIMITS	MAX. PERMISSIBLE LIMITS IN ABSENCE OF ALTERNATE SOURCE
1	Colour (Hazen Units / Colour Units)	5	5	5	15
2	Odour	Agreeable	Agreeable	Agreeable	Agreeable
3	pH	8.10	8.02	6.5 to 8.5	No Relaxation
4	Turbidity, NTU	3.6	4.3	1	5
5	Total Dissolved Solids @ 105°C, mg/l	412	421	500	2000
6	Total Hardness as $CaCO_3$, mg/l	177	182	200	600
7	Calcium as Ca , mg/l	43	43	75	200
8	Magnesium as Mg , mg/l	17	18	30	100
9	Total Alkalinity as $CaCO_3$, mg/l	149	134	200	600
10	Chlorides as Cl, mg/l	60	63	250	1000
11	Sulphate as SO_4^{2-}, mg/l	69	86	200	400
12	Fluoride as F^-, mg/l	0.63	0.67	1.0	1.5
13	Nitrate as NO_3, mg/l	8.8	8.6	45	No Relaxation
14	Iron as Fe, mg/l	0.13	0.10	0.3	No Relaxation
15	Boron as B, mg/l	0.13	0.10	0.5	1.0
16	Sodium as Na, mg/l	61.5	63.5	---	
17	Potassium as K, mg/l	3.6	3.8	---	
18	Aluminium as Al, mg/l	< 0.02	< 0.02	0.03	0.2
19	Copper as Cu, mg/l	< 0.01	< 0.01	0.05	1.5
20	Manganese as Mn, mg/l	< 0.01	< 0.01	0.1	0.3
21	Selenium as Se , mg/l	< 0.01	< 0.01	0.01	No Relaxation
22	Zinc as Zn, mg/l	0.01	0.01	5	15
23	Cadmium as Cd, mg/l	< 0.003	< 0.003	0.003	No Relaxation
24	Lead as Pb, mg/l	< 0.01	< 0.01	0.01	No Relaxation
25	Mercury as Hg, mg/l	< 0.001	< 0.001	0.001	No Relaxation
26	Total Arsenic as As, mg/l	< 0.01	< 0.01	0.01	0.05
27	Total Chromium as Cr. Mg/l	< 0.01	< 0.01	0.05	No Relaxation
28	Cyanide as CN, mg/l	< 0.02	< 0.02	0.05	No Relaxation
29	Total Coliforms, Cfu/100ml	230	116	---	

Appendix I Hydrological data of key wells of core and buffer zone of Ash Pond, Yadadri Thermal power plant, Nalagonda monitored During pre and post monsoon period, 2016

S.N.	VILLAGE	LATITUDE	LONGITUDE	DEPTH OF WELL (M)	POST MONSOON WATER LEVEL (M)	PRE MONSOON WATER LEVEL (M)	AQUIFER	YIELD m^3/hr	PUMP CAPACITY (HP)	PURPOSE
1	Damaracherla	16°43'10.9"	79°37'37.1"	7.21	8.85	12.50	Limestone	6 to 10	5.00	Irrigation
2	Virappagodem	16°42'35.5"	79°37'10.6"	65.00	10.54	14.74	Limestone	6 to 10	5.00	Irrigation
3	Virappagodem	16°41'44.0"	79°35'09.2"	40.00	15.81	17.35	Limestone	4 to 8	3.00	Irrigation
4	Dubbatanda	16°41'33.9"	79°33'40.8"	80.00	8.68	12.68	Limestone	6 to 10	5.00	Irrigation
5	Dubbatanda	16°41'47.5"	79°33'19.8"	14.25	9.24	13.15	Limestone	-	-	Drinking
6	Virlapalem	16°41'32.4"	79°32'08.8"	75.00	7.87	12.66	Limestone	6 to 10	5.00	Irrigation
7	Kalwakutta	16°42'17.4"	79°31'08.3"	85.00	12.78	18.64	Sandstone/ limestone	6 to 10	5.00	Irrigation
8	Ulihapalam	16°42'43.9"	79°30'55.1"	7.30	23.36	27.70	Sandstone/ limestone	-	1.00	Drinking
9	Pedatanda	16°44'08.1"	79°30'36.8"	40.00	1.58	3.44	Granite	4 to 8	3.00	Irrigation
10	Matur	16°45'07.7"	79°30'13.3"	80.00	7.65	10.85	Granite	6 to 10	5.00	Irrigation
11	Palugutanda	16°45'10.3"	79°29'55.9"	9.10	4.15	6.56	Granite	4 to 8	3.00	Drinking
12	Matur	16°45'41.7"	79°30'22.9"	8.10	1.20	4.50	Granite	5 to 9	4.00	Drinking
13	Dilawarpur	16°47'00.8"	79°34'35.9"	9.10	1.10	4.08	Granite	6 to 10	5.00	Drinking
14	Bandrotanda	16°46'21.0"	79°35'21.5"		2.20	5.28	Granite	-	-	Drinking
15	Bothalpalem	16°45'35.9"	79°36'54.9"	70.00	2.34	5.68	Granite	6 to 10	5.00	Irrigation
16	Srinagar	16°39'40.2"	79°41'02.1"	75.00	32.26	36.61	Limestone	-	-	Monitoring
17	India cement mines	16°41'20.5"	79°38'33.3"	40.00	13.54	18.26	Limestone	-	-	Monitoring
18	Tallaveerapagudam	16°41'40.8"	79°36'20.6"	85.00	12.76	17.25	Limestone	4 to 8	3.00	Irrigation
19	Tallaveerapagudam	16°42'25.7"	79°35'05.0"	80.00	10.55	15.80	Limestone	6 to 10	5.00	Irrigation
20	Mojulakunta	16°42'41.9"	79°34'57.3"	105.00	26.74	30.78	Limestone	6 to 10	5.00	Irrigation
21	Shantinagar	16°43'28.8"	79°35'06.4"	105.00	12.36	16.78	Sandstone/ limestone	6 to 10	5.00	Irrigation
22	Virlapalem	16°41'20.5"	79°31'42.0"	90.00	12.80	16.46	Limestone	8 to 12	7.50	Irrigation
23	Adividevulapalli	16°41'02.7"	79°31'27.3"	135.00	15.29	19.28	Limestone	8 to 12	7.50	Irrigation
24	Jktanda	16°40'15.9"	79°30'03.3"	105.00	14.95	19.56	Limestone	8 to 12	7.50	Irrigation
25	Badampalli	16°40'01.6"	79°28'13.8"	94.00	13.66	18.84	Limestone	8 to 12	7.50	Irrigation
26	Damaracherla	16°42'24.4"	79°37'47.1"	60.00	8.95	13.20	Limestone	4 to 8	3.00	Irrigation
27	Samdhanapeta	16°37'18.9"	79°32'33.9"	74.00	12.55	16.50	Limestone	6 to 10	5.00	Irrigation
28	Telukutla	16°37'57.6"	79°35'50.1"	75.00	14.26	18.40	Limestone	6 to 10	5.00	Irrigation
29	Cherla Tand	16°40'25.7"	79°31'36.4"	90.00	13.67	18.54	Limestone	6 to 10	5.00	Irrigation
30	Kotur	16°40'31.4"	79°29'05.8"	92.00	14.76	19.56	Limestone	8 to 12	7.50	Irrigation

ANNEXURE-3C

SOIL QUALITY DATA

S. No	Parameters	RESULTS									
		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
1	pH Value of 1:2 aqueous extract Solution	7.79	7.62	8.05	7.84	7.64	7.45	7.92	6.95	7.86	7.23
2	E.C, µS/cm of 1:2 aqueous extract Solution	197	324	241	323	299	453	390	103	153	308
3	Total Soluble Salts mg/kg	260	410	320	410	380	570	490	150	210	390
4	Mineralized Nitrogen (Available Nitrogen) , kg/ha	292	394	360	397	441	335	338	165	314	292
5	Available Phosphorous as P_2O_5, kg/Ha	120	102	44	149	120	97	38	176	27	102
6	Available Sodium as Na_2O mg/kg	54	161	49	170	109	131	38	36	67	78
7	Available Potassium as K_2O, Kg/Ha	212	625	423	815	386	508	244	190	176	262
8	Available Calcium as Ca ,mg/kg	1283	2826	1463	3928	2745	2465	1022	641	942	1743
9	Available Magnesium as Mg, mg/kg	134	462	182	377	426	255	109	97	146	182
10	Available Chlorides as Cl, mg/Kg (Water soluble)	60	90	75	95	85	126	110	35	50	80
11	Total Organic Carbon, %	0.59	0.82	0.74	0.84	0.92	0.77	0.68	0.28	0.63	0.60
12	Sodium Absorption Ratio (SAR)	0.09	0.17	0.08	0.16	0.12	0.16	0.07	0.09	0.13	0.11
13	Texture:	Sandy Loam	Sandy Clay Loam	Sandy Loam	Sandy Clay	Sandy Clay Loam	Sandy Clay Loam	Loamy Sand	Loamy Sand	Loamy Sand	Sandy Loam
	a) Sand %	80	56	77	45	58	55	84	89	85	74
	b) Silt %	9	19	10	23	18	19	7	5	7	11
	c) Clay %	11	25	13	32	24	26	9	6	8	15

S-1	Plant Site	S-6	Adividevulapalli Village
S-2	Veerappagudem	S-7	Veerlapalem
S-3	Wazirabad Village	S-8	Ragadappa Village
S-4	Daida Village	S-9	Kallepalli Village
S-5	Gottimukkala Village	S-10	Dhamaracherla Village

ANNEXURE – 3D

ANNEXURE – 3E

LIST OF AGRICULTURAL CROPS, COMMERCIAL CROPS (INCLUDING VEGETABLES), NATURAL VEGETATION/FOREST TYPE AND HERBACEOUS AQUATIC PLANTS SPECIES FOUND IN THE STUDY AREA (Buffer Zone)

Sl. No	Scientific Name	Family Name	Vernacular name
Staple crops and commercial crops			
1	*Allium cepa*	Amaryllidaceae	Onion
2	*Coriandrum sativum*	Apiaceae	Coriander
3	*Carica papaya*	Caricaceae	Papaya
4	*Gossypium sp.*	Malvaceae	Cotton
5	*Abelmoschus esculentus*	Malvaceae	Ladies Finger
6	*Moringa oleifera*	Moringaceae	Drumstick
7	*Psidium guajava*	Myrtaceae	Guava
8	*Oryza sativa*	Poaceae	Paddy, Batta
9	*Zea mays*	Poaceae	Maize
10	*Citrus limon*	Rutaceae	Lemon
11	*Solanum melongena*	Solanaceae	Brinjal
12	*Lycopersicon esculentum*	Solanaceae	Tomato
13	*Capsicum frutescens*	Solanaceae	Chilli
14	*Curcuma longa*	Zinziberaceae	Turmeric
Trees			
1	*Acacia arabica*	Mimosaceae	Nalla tumma
2	*Acacia auriculiformis*	Mimosaceae	
3	*Acacia leucophloea*	Mimosaceae	Tella tumma
4	*Acacia sundra*	Mimosaceae	Sundra
5	*Aegle marmelos*	Rutaceae	Maredu
6	*Agave americana*	Asparagaceae	Sentry plant
7	*Ailanthus excelsa*	Simaroubaceae	Peddamaanu
8	*Alangium salvifolium*	Cornaceae	Ooduga
9	*Albizia lebbek*	Mimosaceae	Dirisanam
10	*Annona squamosa*	Annonaceae	Custard apple
11	*Azadirachta indica*	Meliaceae	Vepa
12	*Bauhinia racemosa*	Caesalpiniaceae	Ari
13	*Bauhinia variagata*	Caesalpiniaceae	Mandari
14	*Benkara malabarica*	Rubiaceae	Pedda manga
15	*Bombax ceiba*	Bombacaceae	Booruga
16	*Borassus flabellifer*	Arecaceae	Taati / Taadi

17	*Breynia retusa*	Phyllanthaceae	Chinna purugudu
18	*Breynia vitis-ideae*	Euphorbiaceae	Nalla purugudu
19	*Butea monosperma*	Fabaceae	Modugu
20	*Canthium dicoccum*	Rubiaceae	Nalla balusu
21	*Canthium parviflorum*	Rubiaceae	Balusu
22	*Cassia fistula*	Caesalpiniaceae	Rela
23	*Casuarina equisetifolia*	Casuarinaceae	Sarvi (Sarugudu)
24	*Catunaregam spinosa*	Rubiaceae	Manga / Chinna manga
25	*Chloroxylon sweitenia*	Rutaceae	Billudu
26	*Cocos nucifera*	Arecaceae	Coconut
27	*Dalbergia sisso*	Fabaceae	Sisso or seesum
28	*Desmodium pulchellum*	Fabaceae	Deyyapu mokka
29	*Diospyros melanoxylon*	Ebenaceae	Tunki
30	*Eucalyptus spp.*	Myrtaceae	Jama oil
31	*Euphorbia caducifolia*	Euphorbiaceae	Brahma jemudu
32	*Feronia elephantum*	Rutaceae	Velaga
33	*Ficus benghalensis*	Moraceae	Marri
34	*Ficus religiosa*	Moraceae	Raavi
35	*Hardwickia binata*	Caesalpiniaceae	Yepi
36	*Hibiscus platanifolius*	Malvaceae	--
37	*Holoptelia integrifolia*	Ulmaceae	Nemali naara
38	*Lagerstroemia parviflora*	Lythraceae	Chennangi
39	*Leucaena leucocephala*	Fabaceae	Subabul
40	*Mangifera indica*	Anacardiaceae	Mamidi
41	*Maytenus emerginata*	Celastraceae	Danti
42	*Mimusops elengi*	Sapotaceae	Pogada
43	*Morinda pubescens*	Rubiaceae	Togaru
44	*Moringa oleifera*	Moringaceae	Munaga
45	*Muntingia calabura*	Muntingiaceae	Wild cherry
46	*Phoenix sylvestris*	Arecaceae	Eetha
47	*Phyllanthus emblica*	Phyllanthaceae	Usiri
48	*Phyllanthus eticulates*	Phyllanthaceae	Pulasari / Puliseru
49	*Pithecellobium dulce*	Mimosaceae	Seema chinta
50	*Polyalthia longifolia*	Annonaceae	Ashoka
51	*Polyalthia pendula*	Annonaceae	Asoka
52	*Pongamia pinnata*	Fabaceae	Ganuga
53	*Prosopis juliflora*	Fabaceae	English tumma
54	*Prosopis spicigera*	Mimosaceae	Jammi chettu
55	*Samanea saman*	Mimosaceae	Nidrabhangi
56	*Sapindus emarginatus*	Sapindaceae	Kunkundu
57	*Spathodea companulata*	Bignoniaceae	Flame of the forest

58	*Sterculia foetida*	Sterculiaceae	Adavi badam
59	*Syzygium cumini*	Myrtaceae	Neradu
60	*Tamarindus indica*	Caesalpiniaceae	Chinta
61	*Tectona grandis*	Verbenaceae	Teku
62	*Terminalia arjuna*	Combretaceae	Tella maddi
63	*Thespesia populnea*	Malvaceae	Ganga Raavi
64	*Vitex negundo*	Verbenaceae	Vaavili
65	*Ziziphus nummularia*	Rhamnaceae	Gotti
66	*Ziziphus rugosa*	Rhamnaceae	Regu
Herbs / Grasses			
67	*Abutilon crispum*	Malvaceae	--
68	*Acalypha lanceolata*	Euphorbiaceae	--
69	*Acanthospermum hispidum*	Asteraceae	Palleru
70	*Achyranthes aspera*	Amaranthaceae	Uttareni
71	*Aerva lanata*	Amaranthaceae	Pindidonda
72	*Ageratum conyzoides*	Asteraceae	Pumpullu
73	*Almania longipedunculata*	Amaranthaceae	
74	*Allmania nodiflora*	Amaranthaceae	Gurugu koora
75	*Alloteropsis cimicina*	Poaceae	Neeru sajjae hullu
76	*Alternanthera pungens*	Amaranthaceae	Mullu
77	*Alternanthera sessilis*	Amranthaceae	Ponna Ganti-Kura
78	*Althaea rosea*	Malvaceae	--
79	*Alysicarpus monilifer*	Fabaceae	--
80	*Amaranthus roxburghianus*	Amaranthaceae	--
81	*Amaranthus spinosus*	Amaranthaceae	Yerra Mullu-Gorinta
82	*Amaranthus viridis*	Amaranthaceae	Chilaka-thotakoora
83	*Amiscophacelus axillaris*	Commelinaceae	Golla gundi, Kodi kalu
84	*Ammannia baccifera*	Lythraceae	
85	*Argemone Mexicana*	Papavaraceae	Balurakkisa, Brahmadandi
86	*Bacopa monnieri*	Srophulariaceae	Sambranichettu, Chilukakura
87	*Bergia capensis*	Elantinaceae	--
88	*Biophytum nervifolium*	Oxalidaceae	Pulicenta
89	*Bothriochloa pertusa*	Poaceae	--
90	*Brachiaria eruciformis*	Poaceae	--
91	*Brachiaria reptans*	Poaceae	--
92	*Brachiaria romosa*	Poaceae	Eduruqaddi
93	*Bulbostylis barbata*	Cyperaceae	--
94	*Caesulia axillaris*	Asteraceae	Erra gobbi, Thella jiluga
95	*Cassia absus*	Caesalpinaceae	Chanupala-vittulu
96	*Cassia occidentalis*	Caesalpinaceae	Benukaku, Kasinta,

			Kasinda
97	*Cassia tora*	Caesalpinaceae	Tagarisa, Tantepu, Tantiyamu
98	*Catharanthus pusillus*	Apocyanaceae	Errimirapa, Guluvidi
99	*Celosia argentea*	Amaranthaceae	Adavithurai, Gurugu
100	*Chamaesyce hirta*	Euphorbiaceae	--
101	*Chamaesyce indica*	Euphorbiaceae	--
102	*Chamaesyce serpens*	Euphorbiaceae	--
103	*Chamaesyce thymifolia*	Euphorbiaceae	--
104	*Chloris barbata*	Poaceae	Uppu gaddi
105	*Chloris Montana*	Poaceae	--
106	*Chloris villosa*	Poaceae	--
107	*Chrozophora rottleri*	Euphorbiaceae	Erra miriyamu
108	*Cleome aspera*	Cleomaceae	--
109	*Cleome gynandra*	Cleomaceae	Atakura, Tellavaminta, Vaminta
110	*Cleome viscosa*	Cleomaceae	Kukkavaminta, Vaminta
111	*Commalina benghalensis*	Commelinaceae	Amruthakeda, Kancherakanteri
112	*Corchorus tridens*	Tiliaceae	--
113	*Croton bonplandianus*	Euphorbiaceae	Errimirapa, Galivana, Vanachettu
114	*Cynodon dactylon*	Poaceae	Garikagaddi, Gurkaharial!
115	*Cyperus compressus*	Cyperaceae	--
116	*Cyperus difformis*	Cyperaceae	--
117	*Cyperus exaltatus*	Cyperaceae	--
118	*Cyperus iria*	Cyperaceae	--
119	*Cyperus rotundus*	Cyperaceae	--
120	*Dactyloctenium aegyptium*	Poaceae	--
121	*Desmodium pulchellum*	Fabaceae	Deyyapu mokka
122	*Digera muricata*	Amaranthaceae	Chencheli-kura
123	*Digitaria ciliaris*	Poaceae	--
124	*Dinebra retroflexa*	Poaceae	--
125	*Echinochloa colona*	Poaceae	Bonthakammalu, Kaprodagaddi
126	*Echinochloa crusgalli*	Poaceae	--
127	*Echinochlpa procera*	Poaceae	--
128	*Eclipta alba*	Asteraceae	Galagara
129	*Enocostemma axillare*	Gentianaceae	Golimidi, Gulvidi
130	*Euphorbia heterophylla*	Euphorbiaceae	--
131	*Evolvulus alsionoides*	Convolvulaceae	Vishnukrantha

132	*Fimbristylis bisumbellata*	Cyperaceae	--
133	*Fimbristylis miliacea*	Cyperaceae	--
134	*Fimbristylis ovate*	Cyperaceae	--
135	*Fimbristylis quinquangularis*	Cyperaceae	--
136	*Fuirena ciliaris*	Cyperaceae	--
137	*Gomphrena celosioides*	Amaranthaceae	Neeru Bogada
138	*Gomphrena globosa*	Amaranthaceae	--
139	*Goniogyna hirta*	Fabaceae	--
140	*Hedyotis puberula*	Rubiaceae	Chiruveru
141	*Heliotropium ovalifolium*	Boraginaceae	--
142	*Hibiscus lobatus*	Malvaceae	--
143	*Indigofera linifolia*	Fabaceae	Gudlaku
144	*Indigofera linnaei*	Fabaceae	Yerra palleru, Cheragadam
145	*Indoneesiella echinoids*	Acanthaceae	--
146	*Justicia procumbens*	Acanthaceae	--
147	*Kyllinga bulbosa*	Cyperaceae	--
148	*Lagascea mollis*	Asteraceae	--
149	*Leucas aspera*	Lamiaceae	Tellathummi, Tummachettu
150	*Limnophyton obtusifolium*	Alismataceae	Urrapu dekka chettu
151	*Ludwigia perennis (=L.parviflora)*	Onagraceae	Lavanga kaaya
152	*Malachra capitata*	Malvaceae	--
153	*Malvastrum coromandelianum*	Malvaceae	--
154	*Melochia corchorifolia*	Tiliaceae	Ganugapindikura
155	*Monochoria vaginalis*	Pontederiaceae	Nirakancha
156	*Oxalis corniculata*	Oxalidaceae	Ambotikura, Pulichinta
157	*Paspalum distichum*	Poaceae	--
158	*Pavonia zeylanica*	Malvaceae	Peramutti, Karubenda
159	*Phyla nodiflora*	Verbenaceae	Bokkenaku, Gajapippalakada,
160	*Phyllanthus amarus*	Euphorbiaceae	Usiri
161	*Phyllanthus maderaspatensis*	Euphorbiaceae	Nalla usirika
162	*Phyllanthus virgatus*	Euphorbiaceae	--
163	*Physalis minima*	Solanacae	Kupanti
164	*Polygala arvensis*	Polygalaceae	--
165	*Portulaca oleracea*	Portulacaceae	Pappukura
166	*Portulaca quadrifida*	Portulacaceae	Chinnapavalikura, Goddupavali
167	*portulaca tuberosa*	Portulacaceae	--
168	*Psoralea corylifolia*	Fabaceae	--
169	*Schoenoplectus auriculatus*	Cyperaceae	--

170	*Schoenoplectus lacustris*	Cyperaceae	--
171	*Setaria pumila*	Poaceae	Gkkakora
172	*Sida corifolia*	Malvaceae	Suvarnamu, Tellaantisa
173	*Sida rhombifolia*	Malvaceae	--
174	*Solanum nigrum*	Solanacae	Kamanchi, Gdiukura, Kamakshi
175	*Solanum surattense*	Solanacae	Errivanga, Nelamulaka, Vakudu
176	*Sopubia delphinifolia*	Scrophulariaceae	--
177	*Spermacoce articularis*	Rubiaceae	Madanaku, Madana Katti
178	*Spermacoce pusilla*	Rubiaceae	Tsukka-kada
179	*Sphaeranthus indicus*	Asteraceae	Boddatarapu
180	*Sphenoclea zeylanica*	Sphenocleaceae	--
181	*Stemodia viscosa*	Scrophulariaceae	Bodasaramamu, Gunta Kaamin
182	*Striga angustifolia*	Scrophulariaceae	--
183	*Tephrosia procumbens*	Fabaceae	--
184	*Tephrosia purpurea*	Fabaceae	Bonthavempali, Nelavempali
185	*Tephrosia villosa (=T.hirta)*	Fabaceae	Nuguvempali
186	*Tragia plukenetii*	Euphorbiaceae	Chinnadulagondi, Dulagondi
187	*Tragus roxburghii*	Poaceae	--
188	*Trianthema portulacastrum*	Aizoaceae	Galiieru
189	*Trianthema triquetra*	Aizoaceae	--
190	*Tribulus terrestris*	Zygophyllaceae	Palleru
191	*Trichodesma sedgwickianum*	Boraginaceae	--
192	*Tridax procumbens*	Asteraceae	Gaddichamanthi, Palakaku
193	*Urochloa panicoides*	Poaceae	--
194	*Vernonia cinerea*	Asteraceae	Sahadevi
195	*Vigna trilobata (Phaseolus trilobatus)*	Fabaceae	Pillipesalu
196	*Withania somnifera*	Solanacae	Vajigandha
197	*Xanthium strumarium*	Asteraceae	Marulutige
Shrubs			
198	*Abutilon indicum*	Malvaceae	--
199	*Acacia caesia*	Mimosaceae	Kirintha
200	*Alhagi camelorum*	Fabaceae	Camel thorn
201	*Calotropis gigantea*	Asclepiadaceae	Tella Jilledu
202	*Calotropis procera*	Asclepiadaceae	Jilledu
203	*Carissa spinarum*	Apocynaceae	Apocynaceae

204	*Cassia auriculata*	Caesalpiniaceae	Caesalpiniaceae
205	*Hygrophila auriculata*	Acanthaceae	Kokilakshi, Neetigobbi
206	*Indigofera tinctoria*	Fabaceae	--
207	*Lantana camara*	Verbenaceae	Lantana
208	*Mimosa rubicaulis*	Mimosaceae	Pariki kampa
209	*Parthenium hysterophorus*	Asteraceae	--
210	*Phyllanthus reticulatus*	Phyllanthaceae	Pulasari / Puliseru
211	*Sida acuta*	Malvaceae	Chittemu, Nelabenda
212	*Triumfetta rhomboidea*	Tiliaceae	Oekki. Chirusitrika
213	*Triumfetta rotundifoli*	Tiliaceae	--
214	*Waltheria indica*	Tiliaceae	Nallabenda
Climbers			
215	*Aristolochia bracteolata*	Aristolochiaceae	Gadidagadapaku, Gadaparaku
216	*Cardiospermum helicacabum*	Sapindaceae	Buddakakara, Budduva
Aquatic Plants Reported from Buffer zone of the Project Area			
S. No.	**Scientific Name**	**Family**	**Distribution Status**
1	*Alternanthera philoxeroides*	Solanaceae	Predominant
2	*Aponogeton natans*	Aponogetonaceae	Common
3	*Azolla pinnata*	Azollaceae	Scattered and common
4	*Brachiaria mutica*	Poaceae	Sporadic
5	*Carex cruciata*	Cyperaceae	Occasional
6	*Centella asiatica*	Apiaceae	In localized patches
7	*Chrysopogon aciculatus*	Poaceae	Occasional
8	*Colocassia esculenta*	Araceae	Occasional
9	*Cynodon dactylon*	Poaceae	Extensive and widespread
10	*Cyperus arenarius*	Cyperaceae	Locally abundant
11	*Cyperus exaltatus*	Cyperaceae	Locally abundant
12	*Echinochloa colona*	Poaceae	Occasional
13	*Echinochloa stagnina*	Poaceae	Occasional
14	*Eichhornia crassipes*	Pontederiaceae	Extensive and widespread
15	*Hydrilla verticillata*	Hydrocharitaceae	Prevalent
16	*Ipomoea aquatica*	Convolvulaceae	Extensive and widespread
17	*Ludwigia perennis*	Onagraceae	Occasional
18	*Marsilia quadrifoliata*	Marsiliaceae	Very common Pteridophyte
19	*Nelumbo nucifera*	Nelumbiaceae	Very common
20	*Nymphaea nauchali*	Nympheaceae	Widely scattered
21	*Nymphoides hydrophylla*	Nympheaceae	Scattered
22	*Nymphoides indica*	Nympheaceae	Scattered

23	*Ottelia alismoides*	Hydrocharitaceace	Widely scattered
24	*Oxalis corniculata*	Oxalidaceae	Occasional
25	*Paspalidium geminatum*	Poaceae	Common
26	*Phragmites karka*	Cyperaceae	Dominant along boundaries
27	*Pistia stratoides*	Araceae	Widespread
28	*Salvinia auriculata*	Salviniaceae	Widespread
29	*Salvinia cucullata*	Salviniaceae	Common
30	*Typha angustata*	Typhaceae	Extensive and widespread
31	*Vallisneria spiralis*	Hydrocharitaceae	Widespread

LIST OF FLORA SPECIES RECORDED IN PLANT AREA (CORE ZONE)

Sl. No	Scientific Name	Family Name	Vernacular name
	Trees		
1	*Acacia arabica*	Mimosaceae	Nalla tumma
2	*Acacia leucophloea*	Mimosaceae	Tella tumma
3	*Acacia sundra*	Mimosaceae	Sundra
4	*Aegle marmelos*	Rutaceae	Maredu
5	*Agave americana*	Asparagaceae	Sentry plant
6	*Ailanthus excelsa*	Simaroubaceae	Peddamaanu
7	*Alangium salvifolium*	Cornaceae	Ooduga
8	*Albizia lebbek*	Mimosaceae	Dirisanam
9	*Annona squamosa*	Annonaceae	Custard apple
10	*Azadirachta indica*	Meliaceae	Vepa
11	*Bauhinia racemosa*	Caesalpiniaceae	Ari
12	*Bauhinia variagata*	Caesalpiniaceae	Mandari
13	*Benkara malabarica*	Rubiaceae	Pedda manga
14	*Bombax ceiba*	Bombacaceae	Booruga
15	*Borassus flabellifer*	Arecaceae	Taati / Taadi
16	*Breynia retusa*	Phyllanthaceae	Chinna purugudu
17	*Breynia vitis-ideae*	Euphorbiaceae	Nalla purugudu
18	*Butea monosperma*	Fabaceae	Modugu
19	*Canthium dicoccum*	Rubiaceae	Nalla balusu
20	*Canthium parviflorum*	Rubiaceae	Balusu
21	*Cassia fistula*	Caesalpiniaceae	Rela
22	*Casuarina equisetifolia*	Casuarinaceae	Sarvi (Sarugudu)
23	*Catunaregam spinosa*	Rubiaceae	Manga / Chinna manga
24	*Chloroxylon sweitenia*	Rutaceae	Billudu

25	*Cocos nucifera*	Arecaceae	Coconut
26	*Eucalyptus spp.*	Myrtaceae	Jama oil
27	*Euphorbia caducifolia*	Euphorbiaceae	Brahma jemudu
28	*Ficus benghalensis*	Moraceae	Marri
29	*Ficus religiosa*	Moraceae	Raavi
30	*Mangifera indica*	Anacardiaceae	Mamidi
31	*Maytenus emerginata*	Celastraceae	Danti
32	*Morinda pubescens*	Rubiaceae	Togaru
33	*Moringa oleifera*	Moringaceae	Munaga
34	*Phoenix sylvestris*	Arecaceae	Eetha
35	*Pongamia pinnata*	Fabaceae	Ganuga
36	*Prosopis juliflora*	Fabaceae	English tumma
37	*Spathodea companulata*	Bignoniaceae	Flame of the forest
38	*Syzygium cumini*	Myrtaceae	Neradu
39	*Tamarindus indica*	Caesalpiniaceae	Chinta
40	*Tectona grandis*	Verbenaceae	Teku
41	*Ziziphus rugosa*	Rhamnaceae	Regu
Herbs			
42	*Acanthospermum hispidum*	Asteraceae	Palleru
43	*Achyranthes aspera*	Amaranthaceae	Uttareni
44	*Aerva lanata*	Amaranthaceae	Pindidonda
45	*Alternanthera pungens*	Amaranthaceae	Mullu
46	*Alternanthera sessilis*	Amranthaceae	Ponna Ganti-Kura
47	*Amaranthus spinosus*	Amaranthaceae	Yerra Mullu-Gorinta
48	*Amaranthus viridis*	Amaranthaceae	Chilaka-thotakoora
49	*Amiscophacelus axillaris*	Commelinaceae	Golla gundi, Kodi kalu
50	*Ammannia baccifera*	Lythraceae	
51	*Bergia capensis*	Elantinaceae	--
52	*Biophytum nervifolium*	Oxalidaceae	Pulicenta
53	*Brachiaria romosa*	Poaceae	Eduruqaddi
54	*Caesulia axillaris*	Asteraceae	Erra gobbi, Thella jiluga
55	*Cassia absus*	Caesalpinaceae	Chanupala-vittulu
56	*Cassia occidentalis*	Caesalpinaceae	Benukaku, Kasinta, Kasinda
57	*Cassia tora*	Caesalpinaceae	Tagarisa, Tantepu, Tantiyamu
58	*Celosia argentea*	Amaranthaceae	Adavithurai, Gurugu
59	*Chamaesyce hirta*	Euphorbiaceae	--
60	*Chamaesyce thymifolia*	Euphorbiaceae	--
61	*Chloris barbata*	Poaceae	Uppu gaddi
62	*Chloris Montana*	Poaceae	--

63	*Chloris villosa*	Poaceae	--
64	*Chrozophora rottleri*	Euphorbiaceae	Erra miriyamu
65	*Cleome aspera*	Cleomaceae	--
66	*Commalina benghalensis*	Commelinaceae	Amruthakeda, Kancherakanteri
67	*Corchorus tridens*	Tiliaceae	--
68	*Cynodon dactylon*	Poaceae	Garikagaddi, Gurkaharial!
69	*Desmodium pulchellum*	Fabaceae	Deyyapu mokka
70	*Digitaria ciliaris*	Poaceae	--
71	*Dinebra retroflexa*	Poaceae	--
72	*Echinochloa crusgalli*	Poaceae	--
73	*Echinochlpa procera*	Poaceae	--
74	*Eclipta alba*	Asteraceae	Galagara
75	*Enocostemma axillare*	Gentianaceae	Golimidi, Gulvidi
76	*Euphorbia heterophylla*	Euphorbiaceae	--
77	*Gomphrena celosioides*	Amaranthaceae	Neeru Bogada
78	*Gomphrena globosa*	Amaranthaceae	--
79	*Goniogyna hirta*	Fabaceae	--
80	*Hedyotis puberula*	Rubiaceae	Chiruveru
81	*Heliotropium ovalifolium*	Boraginaceae	--
82	*Hibiscus lobatus*	Malvaceae	--
83	*Indigofera linifolia*	Fabaceae	Gudlaku
84	*Indigofera linnaei*	Fabaceae	Yerra palleru, Cheragadam
85	*Leucas aspera*	Lamiaceae	Tellathummi, Tummachettu
86	*Limnophyton obtusifolium*	Alismataceae	Urrapu dekka chettu
87	*Malachra capitata*	Malvaceae	--
88	*Malvastrum coromandelianum*	Malvaceae	--
89	*Melochia corchorifolia*	Tiliaceae	Ganugapindikura
90	*Monochoria vaginalis*	Pontederiaceae	Nirakancha
91	*Paspalum distichum*	Poaceae	--
92	*Pavonia zeylanica*	Malvaceae	Peramutti, Karubenda
93	*Phyla nodiflora*	Verbenaceae	Bokkenaku, Gajapippalakada,
94	*Phyllanthus amarus*	Euphorbiaceae	Usiri
95	*Phyllanthus maderaspatensis*	Euphorbiaceae	Nalla usirika
96	*Phyllanthus virgatus*	Euphorbiaceae	--
97	*Physalis minima*	Solanacae	Kupanti
98	*Polygala arvensis*	Polygalaceae	--
99	*Portulaca oleracea*	Portulacaceae	Pappukura
100	*Sida corifolia*	Malvaceae	Suvarnamu, Tellaantisa

101	*Sida rhombifolia*	Malvaceae	--
102	*Sopubia delphinifolia*	Scrophulariaceae	--
103	*Spermacoce pusilla*	Rubiaceae	Tsukka-kada
104	*Sphaeranthus indicus*	Asteraceae	Boddatarapu
105	*Sphenoclea zeylanica*	Sphenocleaceae	--
106	*Tephrosia procumbens*	Fabaceae	--
107	*Tephrosia villosa (=T.hirta)*	Fabaceae	Nuguvempali
108	*Tragus roxburghii*	Poaceae	--
109	*Trianthema portulacastrum*	Aizoaceae	Galiieru
110	*Tridax procumbens*	Asteraceae	Gaddichamanthi, Palakaku
111	*Urochloa panicoides*	Poaceae	--
112	*Xanthium strumarium*	Asteraceae	Marulutige
Shrubs			
113	*Abutilon indicum*	Malvaceae	--
114	*Acacia caesia*	Mimosaceae	Kirintha
115	*Alhagi camelorum*	Fabaceae	Camel thorn
116	*Calotropis gigantea*	Asclepiadaceae	Tella Jilledu
117	*Calotropis procera*	Asclepiadaceae	Jilledu
118	*Carissa spinarum*	Apocynaceae	Apocynaceae
119	*Cassia auriculata*	Caesalpiniaceae	Caesalpiniaceae
120	*Hygrophila auriculata*	Acanthaceae	Kokilakshi, Neetigobbi
121	*Indigofera tinctoria*	Fabaceae	--
122	*Lantana camara*	Verbenaceae	Lantana
123	*Mimosa rubicaulis*	Mimosaceae	Pariki kampa
124	*Parthenium hysterophorus*	Asteraceae	--
125	*Phyllanthus reticulatus*	Phyllanthaceae	Pulasari / Puliseru
126	*Sida acuta*	Malvaceae	Chittemu, Nelabenda
127	*Triumfetta rhomboidea*	Tiliaceae	Oekki. Chirusitrika
128	*Triumfetta rotundifoli*	Tiliaceae	--
129	*Waltheria indica*	Tiliaceae	Nallabenda
Climbers			
130	*Aristolochia bracteolata*	Aristolochiaceae	Gadidagadapaku, Gadaparaku
131	*Cardiospermum helicacabum*	Sapindaceae	Buddakakara, Budduva
Aquatic Plants			
S. No.	**Scientific Name**	**Family**	**Distribution Status**
1	*Aponogeton natans*	Aponogetonaceae	Common
2	*Azolla pinnata*	Azollaceae	Scattered and common
3	*Centella asiatica*	Apiaceae	In localized patches

4	*Chrysopogon aciculatus*	Poaceae	Occasional
5	*Cynodon dactylon*	Poaceae	Extensive and widespread
6	*Cyperus arenarius*	Cyperaceae	Locally abundant
7	*Echinochloa stagnina*	Poaceae	Occasional
8	*Eichhornia crassipes*	Pontederiaceae	Extensive and widespread
9	*Ipomoea aquatica*	Convolvulaceae	Extensive and widespread
10	*Marsilia quadrifoliata*	Marsiliaceae	Very common Pteridophyte
11	*Nelumbo nucifera*	Nelumbiaceae	Very common
12	*Nymphaea nauchali*	Nympheaceae	Widely scattered
13	*Nymphoides indica*	Nympheaceae	Scattered
14	*Ottelia alismoides*	Hydrocharitaceace	Widely scattered
15	*Paspalidium geminatum*	Poaceae	Common
16	*Phragmites karka*	Cyperaceae	Dominant along boundaries
17	*Salvinia auriculata*	Salviniaceae	Widespread
18	*Salvinia cucullata*	Salviniaceae	Common
19	*Vallisneria spiralis*	Hydrocharitaceae	Widespread

LIST OF FAUNA RECORDED IN PLANT AREA (CORE ZONE)

S. No.	Scientific name	Common name	Vernacular name	IUCN Status	IW(P)A, 1972, Schedule
Avifauna/Birds					
1	*Egretta garetta*	Little Egret	Karchi Eagle	LC	Schedule-IV
2	*Milvus migrans*	Black Kite	Black Kite	LC	Schedule-IV
3	*Columbia livia*	Blue Rock Pigeon	Kabuther	LC	Schedule-IV
4	*Streptopelia decactao*	Ring Dove	Kapothamu	LC	Schedule-IV
5	*Streptopelia Chinensis*	Spotted Dove	Kapothamu	LC	Schedule-IV
6	*Psittacula krameri*	Rose-ringed Parakeet	Ramachiluka	LC	Schedule-IV
7	*Eudynamys scolopacea*	Asian Koel	Kokila	LC	Schedule-IV
8	*Apus affinis*	House Swift	Babila	LC	Schedule-IV
9	*Merops orientals*	Green Bee-eater		LC	Schedule-IV
10	*Coracias benghalensis*	Indian Roller	Palapitta	LC	Schedule-IV
11	*Acridothers trists*	Common Myna	Saada goruvanka	LC	Schedule-IV

12	*Corvus splendens*	Common Crow	Kaaki	LC	Schedule-V
13	*Dicrurus macrocercus*	Black Drongo	Chemda kaaki	LC	Schedule-IV
14	*Pycnonotus cafef*	Red-vented Bulbul		LC	Schedule-IV
15	*Passer domesticus*	House Sparrow	Pichuka	LC	Schedule-IV
16	*Ploceus philippinus*	Common Weaver Bird	Baya	LC	Schedule-IV
17	*Lonchura striata*	Spotted Munia	Tetai Munia	LC	Schedule-IV
18	*Saxicoloides fulicata*	Indian Robin	Kalchuri	LC	Schedule-IV
Mammals					
19	*Macaca mulatta*	Monkey	Kothi	LC	Schedule-II
20	*Herpestes edwardsii*	Common Mongoose	Mungisa	LC	Schedule-II
21	*Sus scroffa*	Wild boar	Adivi pandi	LC	Schedule-III
22	*Funambulus palmarum*	Three striped squirrel	Ground squirrel	LC	Schedule-IV
23	*Mus booduga*	Indian field rat	Yeluka	LC	Schedule-V
24	*Bandicota bengalensis*	Lesser Bandicoot	Pandikokku	LC	Schedule-IV
25	*Lepus nigricollis*	Indian hare	Kundelu	LC	Schedule-IV
Reptiles					
26	*Ptyas mucosus*	Rat snake	Jerripothu	LC	Schedule-II
27	*Bungarus caeruleus*	Krait	Katla pamu	LC	Schedule-IV
28	*Naja naja*	Common Cobra	Nagupamu	LC	Schedule-II
29	*Vipera russseli*	Russell's viper	Raktha pinjari	LC	Schedule-IV
Lizards					
30	*Caloductyloides aureus*	Golden Gecko	Nallikeechu	LC	Schedule-IV
31	*Hemidactylus brookii*	Brooke's House Gecko	Balli	LC	Schedule-IV
32	*Hemidactylus flaviviridis*	Wall lizard	Balli	LC	Schedule-IV
33	*Mabuya carinata*	Common Skink	Palabindhey	LC	Schedule-IV
34	*Calotes versicolor*	Garden lizard	Tonda	LC	Schedule-IV

Amphibians					
35	*Duttaphrynus melanostictus*	Common Indain Toad	Kappa	Common	Schedule-IV
36	*Euphlyctis hexadactylus*	Indian Pond Frog	Godrukuppa	Common	Schedule-IV
Butterflies					
37	*Castalius rosimon*	Common Pierrot		Common	Schedule-IV
38	*Tarucus nara*	Rounded Pierrot		Common	Schedule-IV
39	*Danaus chrysippus chrysippus*	Plain Tiger		Common	Schedule-IV
40	*Euploea core core*	Common Crow		Common	Schedule-IV
41	*Junonia almana almana*	Peacock Pansy		Common	Schedule-IV
Fishes					
42	*Catla catla*	Catla		LC	Schedule-IV
43	*Labeo rohita*	Rohu		LC	Schedule-IV
44	*Channa striatus*	Murrel		LC	Schedule-IV
45	*Mastecembalus armatus*	Spiny eel		LC	Schedule-IV
46	*Silonia silonia*	Silonia		LC	Schedule-IV
47	*Platycephalus sp.*	Gobids		LC	Schedule-IV
48	*Mystus vittatus*	Cat fish		LC	Schedule-IV

LIST OF FAUNA RECORDED IN BUFFER ZONE

S. No.	Scientific name	Common name	Vernacular name	IUCN Status	IW(P)A, 1972, Schedule
Avifauna/Birds					
1	*Phalacrocorax niger*	Little Cormorant	Cheruvukkai	Least Concern	Schedule-IV
2	*Bubulcus ibis*	Cattle Egret	Egret	LC	Schedule-IV
3	*Egretta garetta*	Little Egret	Karchi Eagle	LC	Schedule-IV
4	*Amauromis phoenicurus*	Water hen	Neeti kodi	LC	Schedule-IV
5	*Pseudibis papilosa*	Black Ibis	Kala Baz	LC	Schedule-IV
6	*Milvus migrans*	Black Kite	Black Kite	LC	Schedule-IV

7	*Pavo cristatus*	Indian Peafowl	Nemali	LC	Schedule-I
8	*Centrpus sinesis*	Crow pheasant	Mohka	LC	Schedule-IV
9	*Cuculus varus*	Cuckoo	Kokila	LC	Schedule-IV
10	*Columbia livia*	Blue Rock Pigeon	Kabuther	LC	Schedule-IV
11	*Treron pheoenicoptera,*	Green Pigeon	Pavuramu	LC	Schedule-IV
12	*Streptopelia decactao*	Ring Dove	Kapothamu	LC	Schedule-IV
13	*Streptopelia Chinensis*	Spotted Dove	Kapothamu	LC	Schedule-IV
14	*Psittacula eupatria*	Alexandrine Parakeet	Ramachiluka	LC	Schedule-IV
15	*Psittacula krameri*	Rose-ringed Parakeet	Ramachiluka	LC	Schedule-IV
16	*Eudvnamvs scolopacea*	Asian Koel	Kokila	LC	Schedule-IV
17	*Athene brama*	Spotted Owl	Gudlaguba	LC	Schedule-IV
18	*Apus affinis*	House Swift	Babila	LC	Schedule-IV
19	*Cypsiurus balasiensis*	Asian Palm-Swift	Babila	LC	Schedule-IV
20	*Lonchura malabarica*	White-Throated Munia	Sar munia	LC	Schedule-IV
21	*Merops philippinus*	Blue-tailed Bee-eater		LC	Schedule-IV
22	*Merops orientals*	Green Bee-eater		LC	Schedule-IV
23	*Coracias benghalensis*	Indian Roller	Palapitta	LC	Schedule-IV
24	*Hirando rustica*	Common Swallow	Babil or Vanakovela	LC	Schedule-IV
25	*Acridotheres fuscus*	Jungle Myna	Goruvanka	LC	Schedule-IV
26	*Acridothers trists*	Common Myna	Saada goruvanka	LC	Schedule-IV
27	*Corvus splendens*	Common Crow	Kaaki	LC	Schedule-V
28	*Corvus macrohyuchos*	Jungle Crow	Advikaki	LC	Schedule-IV
29	*Dicrurus macrocercus*	Black Drongo		LC	Schedule-IV
30	*Pycnonotus cafef*	Red-vented Bulbul		LC	Schedule-IV
31	*Prinia socialis*	Ashy Prinia		LC	Schedule-IV
32	*Passer domesticus*	House Sparrow	Pichuka	LC	Schedule-IV
33	*Ploceus philippinus*	Common Weaver Bird	Baya	LC	Schedule-IV

34	*Lonchura striata*	Spotted Munia	Tetai Munia	LC	Schedule-IV
35	*Saxicoloides fulicata*	Indian Robin	Kalchuri	LC	Schedule-IV
36	*Lonchura malacca*	Black-headed Munia		LC	Schedule-IV
37	*Lonchura punctulataik*	Scaly-breasted Munia		LC	Schedule-IV
38	*Galuciddum radiatuum*	Owlet Barred Jungle	Adavi gudlaguba	LC	Schedule-IV
39	*Francolinus pondicerianus*	Grey Partridge	Chakoramu or Kouju	LC	Schedule-IV
Mammals					
40	*Pteropus giganteus*	Indian flying fox	Gabbilam	LC	Schedule-IV
41	*Macaca mulatta*	Monkey	Kothi	LC	Schedule-II
42	*Vulpes bengalensis*	Indin Fox	Nakka	LC	Schedule-II
43	*Herpestes edwardsii*	Common Mongoose	Mungisa	LC	Schedule-II
44	*Sus scroffa*	Wild boar	Adivi pandi	LC	Schedule-III
45	*Axis axis*	Spotted Deer	Chukkajinka	LC	Schedule-III
46	*Funambulus palmarum*	Three striped squirrel	Ground squirrel	LC	Schedule-IV
47	*Bandicota indica*	Greater Bandicoot	Pandikokku	LC	Schedule-IV
48	*Mus muscuius*	House rat	Yeluka	LC	Schedule-V
49	*Mus booduga*	Indian field rat	Yeluka	LC	Schedule-V
50	*Bandicota bengalensis*	Lesser Bandicoot	Pandikokku	LC	Schedule-IV
51	*Lupus nigricollis*	Indian hare	Kundelu	LC	Schedule-IV
Reptiles					
52	*Eryx johni*	Sand boa	Rendu pamu	LC	Schedule-IV
53	*Python molurus*	Indian Rock Python	Konda Chiluva	Near Threatened	Schedule-I
54	*Ptyas mucosus*	Rat snake	Jerripothu	LC	Schedule-II
55	*Bungarus caeruleus*	Krait	Katla pamu	LC	Schedule-IV
56	*Naja naja*	Common Cobra	Nagupamu	LC	Schedule-II
57	*Vipera russseli*	Russell's viper	Raktha pinjari	LC	Schedule-IV
58	*Echis carinatus*	Saw scaled viper	Moddu pinjari	LC	Schedule-

					IV
59	*Dryphis sp.*	Tree Snake	Chettu pamu	LC	Schedule-IV
60	*Typholops sp.*	Blind Snake	Guddi pamu	LC	Schedule-IV
Lizards					
61	*Hemidactylus brookii*	House Lizard	Balli	LC	Schedule-IV
62	*Hemidactylus reticulatus*	Rock Gecko	Balli	LC	Schedule-IV
63	*Hemidactylus flaviviridis*	Wall lizard	Balli	LC	Schedule-IV
64	*Caloductyloides aureus*	Golden Gecko	Nallikeechu	LC	Schedule-IV
65	*Calotes versicolor*	Garden lizard	Tonda	LC	Schedule-IV
66	*Mabuya carinata*	Common Skink	Palabindhey	LC	Schedule-IV
67	*Varanus bengalensis*	Common Monitor Lizard	Udumu	LC	Schedule-I
68	*Chameleon zeylanicus*	Chameleon	Usaravilli	LC	Schedule-IV
Turtle					
69	*Trionyx gangeticus*	Ganges Soft-shelled Turtle	Neetitabelu	VU	Schedule-I
70	*Testudo elegans*	Indian star tortoise	Mettatabelu	LC	Schedule-IV
Amphibians					
71	*Duttaphrynus melanostictus*	Common Indain Toad	Kappa	LC	Schedule-IV
72	*Duttaphrynus scaber*	Ferguson's Toad	Chettu kappa	LC	Schedule-IV
73	*Euphlyctis hexadactylus*	Indian Pond Frog	Godrukuppa	LC	Schedule-IV
74	*Sphaerotheca rolandae*	Indian Burrowing Frog	Burada kappa	LC	Schedule-IV
75	*Fejervarya limnocharis*	Indian Cricket Frog	Kappa	LC	Schedule-IV
76	*Euphlyctis cyanophlyctis*	Skittering Frog	Kappa	LC	Schedule-IV
Butterflies					
Sl. No	**Scientific name**	**Common name**	**IUCN Status**	**IW(P)A, 1972, Schedule**	
77	*Castalius rosimon*	Common Pierrot	LC	Schedule-IV	
78	*Tarucus nara*	Rounded Pierrot	LC	Schedule-IV	
79	*Catochrysops strabo strabo*	Forget-me-not	LC	Schedule-IV	
80	*Chilades lajus lajus*	Indian Lime Blue	LC	Schedule-IV	
81	*Phalanta phalantha phalantha*	Common Leopard	LC	Schedule-IV	

82	*Danaus chrysippus chrysippus*	Plain Tiger	LC	Schedule-IV
83	*Euploea core core*	Common Crow	LC	Schedule-IV
84	*Junonia almana almana*	Peacock Pansy	LC	Schedule-IV
85	*Junonia hierta hierta*	Yellow Pansy	LC	Schedule-IV
		Fishes		
S. No.	**Scientific Name**	**Common name**	**IUCN Status**	**IW(P)A, 1972, Schedule**
86	*Catla catla*	Catla	LC	Schedule-IV
87	*Labeo rohita*	Rohu	LC	Schedule-IV
88	*Channa striatus*	Murrel	LC	Schedule-IV
89	*Channa punctatus*	Murrel	LC	Schedule-IV
90	*Wallago attu*	Wallago	LC	Schedule-IV
91	*Mastecembalus armatus*	Spiny eel	LC	Schedule-IV
92	*Macrobrachium rosenberghii*	Prawn	LC	Schedule-IV
93	*Macrobrachium malcolmsonii*	Prawn	LC	Schedule-IV
94	*Silonia silonia*	Silonia	LC	Schedule-IV
95	*Etroplus suratensis*	Pearl spot	LC	Schedule-IV
96	*Glossogobius giuris*	Gobids	LC	Schedule-IV
97	*Platycephalus sp.*	Gobids	LC	Schedule-IV
98	*Cirrhinus mrigala*	Mrigal	VU	Schedule-IV
99	*Oreochromis mossambicus*	Tilapia	NT	Schedule-IV
100	*Anguilla bengalensis*	Eel	NT	Schedule-IV
101	*Mystus vittatus*	Cat fish	LC	Schedule-IV
102	*Hetyeropneustes fossilis*	Cat fish	LC	Schedule-IV
**data collected through interactions with local elderly personnel and forest officials of respective forest ranges*				

ANNEXURE – 4 A

METEOROLOGICAL DATA – OCTOBER, 2016

Year	Month	Day	Hour	Temperature oC	Relative Humidity, %	Wind Direction	Wind Speed, m/sec
16	10	1	1	26.3	77	273	2.4
16	10	1	2	26.1	78	317	2
16	10	1	3	26	77	347	2.3
16	10	1	4	25.8	73	347	2.6
16	10	1	5	25.3	73	0	2.9
16	10	1	6	24.6	75	15	2.4
16	10	1	7	25	77	30	1.7
16	10	1	8	27.3	69	48	1.6
16	10	1	9	29.6	57	50	0.8
16	10	1	10	31.1	49	38	0.3
16	10	1	11	32	46	313	0.1
16	10	1	12	32.6	45	287	0.1
16	10	1	13	33.1	44	284	0
16	10	1	14	33.4	42	131	0.1
16	10	1	15	33.6	42	147	0
16	10	1	16	33.5	42	139	0.4
16	10	1	17	33.1	47	181	1.4
16	10	1	18	32.1	52	210	2.7
16	10	1	19	31	57	224	3.5
16	10	1	20	30.1	59	226	3.4
16	10	1	21	29.6	60	224	3
16	10	1	22	29.1	61	225	2.7
16	10	1	23	28.5	64	231	2.5
16	10	1	24	27.8	67	249	2.3
16	10	2	1	27.1	71	275	2.6
16	10	2	2	26.8	73	293	3
16	10	2	3	26.5	75	306	3.2
16	10	2	4	26.1	75	306	3.1
16	10	2	5	25.8	75	308	3
16	10	2	6	25.4	74	317	2.8
16	10	2	7	25.6	72	336	2
16	10	2	8	28	58	21	2.6
16	10	2	9	29.8	52	33	2
16	10	2	10	31.1	48	35	1.5
16	10	2	11	32.1	43	29	0.8
16	10	2	12	32.9	41	34	0.4
16	10	2	13	33.3	40	41	0.3
16	10	2	14	33.6	39	65	0.2
16	10	2	15	33.8	38	97	0.2
16	10	2	16	33.6	38	130	0.4
16	10	2	17	33.3	43	189	1
16	10	2	18	32.4	48	207	2
16	10	2	19	31.3	52	212	2.7
16	10	2	20	30.3	56	221	2.7
16	10	2	21	29.6	59	240	2.4
16	10	2	22	28.9	62	265	2
16	10	2	23	28.1	65	276	1.6
16	10	2	24	27.6	69	315	1.6
16	10	3	1	27.3	69	344	3
16	10	3	2	26.6	69	1	3.7
16	10	3	3	25.4	73	23	3.7
16	10	3	4	24.6	77	34	3.6
16	10	3	5	24.1	79	26	2.7
16	10	3	6	24	80	25	2.6
16	10	3	7	24.6	78	28	2.2
16	10	3	8	27.3	67	47	1.6
16	10	3	9	29.5	55	65	1.5

Year	Month	Day	Hour	Temperature oC	Relative Humidity, %	Wind Direction	Wind Speed, m/sec
16	10	3	10	30.8	50	65	1
16	10	3	11	31.9	45	57	0.6
16	10	3	12	32.8	42	47	0.5
16	10	3	13	33.3	40	41	0.7
16	10	3	14	33.6	38	39	1.1
16	10	3	15	33.6	37	52	1.1
16	10	3	16	33.6	37	88	0.8
16	10	3	17	33.1	41	157	0.6
16	10	3	18	32.1	47	225	0.6
16	10	3	19	31	52	254	1.3
16	10	3	20	30.1	56	257	2.4
16	10	3	21	29.5	58	262	3.1
16	10	3	22	29	59	268	3.8
16	10	3	23	28.1	62	272	4
16	10	3	24	27.4	66	283	4
16	10	4	1	26.5	71	306	4.1
16	10	4	2	25.9	74	330	3.9
16	10	4	3	25.5	73	344	3.2
16	10	4	4	24.6	73	359	3.6
16	10	4	5	24	74	9	3.7
16	10	4	6	23.6	74	13	3.5
16	10	4	7	24.5	70	21	2.9
16	10	4	8	27.5	54	35	2.9
16	10	4	9	29.1	47	49	2
16	10	4	10	30.3	45	60	1.2
16	10	4	11	31.3	43	79	0.5
16	10	4	12	32.3	41	49	0
16	10	4	13	32.9	38	99	0
16	10	4	14	33.1	36	77	0
16	10	4	15	33.3	35	67	0.4
16	10	4	16	33.3	35	73	0.6
16	10	4	17	32.8	38	150	0.2
16	10	4	18	31.6	45	276	0.1
16	10	4	19	30.3	52	351	0
16	10	4	20	29.1	57	312	0
16	10	4	21	28.4	61	307	0.2
16	10	4	22	27.3	68	280	2.2
16	10	4	23	26.6	74	210	1.2
16	10	4	24	26.1	77	121	2
16	10	5	1	25.5	82	132	3.5
16	10	5	2	24.9	86	118	3.9
16	10	5	3	24.6	89	102	3.5
16	10	5	4	24.4	90	90	3.6
16	10	5	5	24.3	90	88	3.5
16	10	5	6	24.3	88	81	3.3
16	10	5	7	24.8	85	74	2.7
16	10	5	8	27.5	63	79	2.7
16	10	5	9	28.9	51	70	2
16	10	5	10	29.9	47	62	1.4
16	10	5	11	30.8	45	56	0.7
16	10	5	12	31.5	43	58	0.2
16	10	5	13	32	42	191	0
16	10	5	14	32.3	41	49	0.1
16	10	5	15	32.3	40	83	0.1
16	10	5	16	32.1	41	131	0.3
16	10	5	17	31.8	45	162	0.8
16	10	5	18	30.9	50	184	1.1
16	10	5	19	29.8	55	203	1.2
16	10	5	20	28.9	59	220	1.6
16	10	5	21	28.3	62	222	1.9
16	10	5	22	27.6	64	217	1.7
16	10	5	23	27	67	218	1.1
16	10	5	24	26.3	71	249	0.8

Year	Month	Day	Hour	Temperature oC	Relative Humidity, %	Wind Direction	Wind Speed, m/sec
16	10	6	1	25.6	75	279	1.6
16	10	6	2	25.3	76	286	2.5
16	10	6	3	25	77	281	2.4
16	10	6	4	24.6	79	262	1.7
16	10	6	5	24	81	239	0.9
16	10	6	6	23.5	84	245	0.5
16	10	6	7	23.8	84	250	0.6
16	10	6	8	26.6	64	272	0.9
16	10	6	9	28.6	56	269	1
16	10	6	10	30.1	50	264	1
16	10	6	11	31.1	47	260	0.8
16	10	6	12	31.8	44	252	0.6
16	10	6	13	32.1	42	254	0.5
16	10	6	14	32.5	40	246	0.5
16	10	6	15	32.6	40	220	0.6
16	10	6	16	32.4	41	206	1.3
16	10	6	17	31.9	47	198	2
16	10	6	18	31	49	199	2.4
16	10	6	19	30.1	52	197	2.4
16	10	6	20	29.3	54	191	2
16	10	6	21	28.3	58	195	1.4
16	10	6	22	27.4	64	220	0.9
16	10	6	23	26.6	68	234	0.7
16	10	6	24	26	72	257	0.8
16	10	7	1	25.5	74	302	1.6
16	10	7	2	25.4	74	315	2.9
16	10	7	3	25.4	73	313	2.8
16	10	7	4	25	74	347	1.5
16	10	7	5	24.1	78	44	1
16	10	7	6	23.6	82	33	0.6
16	10	7	7	23.6	84	9	0.4
16	10	7	8	26.5	69	331	0
16	10	7	9	28.6	59	313	0.1
16	10	7	10	30.4	51	236	0.1
16	10	7	11	31.4	47	192	0.1
16	10	7	12	32	46	122	0.1
16	10	7	13	32.4	45	147	0.1
16	10	7	14	32.6	44	172	0.1
16	10	7	15	32.6	44	202	0.4
16	10	7	16	32.5	45	198	1.3
16	10	7	17	32	51	195	2
16	10	7	18	31.1	53	202	2.3
16	10	7	19	30.4	56	203	2
16	10	7	20	29.6	59	199	1.7
16	10	7	21	28.9	62	196	1.4
16	10	7	22	28.1	66	190	0.9
16	10	7	23	27.4	70	182	0.8
16	10	7	24	26.9	73	181	0.8
16	10	8	1	26.4	76	205	1.2
16	10	8	2	25.9	79	246	1.6
16	10	8	3	25.6	80	315	1.5
16	10	8	4	25.3	82	35	1.9
16	10	8	5	24.1	86	167	0.3
16	10	8	6	23.6	89	17	0.2
16	10	8	7	23.9	89	1	0.6
16	10	8	8	26.9	73	250	0.1
16	10	8	9	28.8	63	83	0
16	10	8	10	30.1	56	217	0.1
16	10	8	11	31.1	51	204	0.1
16	10	8	12	31.8	48	221	0
16	10	8	13	32.1	46	235	0.1
16	10	8	14	32.4	46	229	0.2
16	10	8	15	32.4	45	218	0.6

Year	Month	Day	Hour	Temperature oC	Relative Humidity, %	Wind Direction	Wind Speed, m/sec
16	10	8	16	32.3	46	213	1.4
16	10	8	17	31.6	52	206	2.3
16	10	8	18	30.8	55	212	3.1
16	10	8	19	30	57	213	3
16	10	8	20	29.3	58	202	2.4
16	10	8	21	28.5	61	194	1.8
16	10	8	22	27.6	66	174	1.9
16	10	8	23	26.9	73	163	2.6
16	10	8	24	26.3	78	157	2.3
16	10	9	1	25.6	83	138	2.2
16	10	9	2	25.1	87	127	2.3
16	10	9	3	24.6	90	116	1.1
16	10	9	4	24.3	91	73	0.4
16	10	9	5	24	93	65	0.2
16	10	9	6	23.6	95	323	0
16	10	9	7	23.9	95	321	0
16	10	9	8	26.4	83	234	0
16	10	9	9	28.3	71	260	0.1
16	10	9	10	29.8	61	297	0.1
16	10	9	11	30.9	55	227	0.1
16	10	9	12	31.6	51	255	0.1
16	10	9	13	32.1	49	260	0.1
16	10	9	14	32.5	47	228	0.1
16	10	9	15	32.6	47	224	0.1
16	10	9	16	32.5	47	159	0.4
16	10	9	17	32.1	51	181	1.6
16	10	9	18	31.3	55	201	2
16	10	9	19	30.4	59	219	2.2
16	10	9	20	29.6	62	233	2.1
16	10	9	21	28.8	65	238	1.5
16	10	9	22	28.1	68	241	0.9
16	10	9	23	27.5	72	297	0.4
16	10	9	24	26.5	79	97	1.2
16	10	10	1	25.6	86	104	3
16	10	10	2	25.3	92	126	2.8
16	10	10	3	24.8	96	145	3.3
16	10	10	4	24.6	98	148	3.3
16	10	10	5	24.6	99	146	2.9
16	10	10	6	24.6	99	142	2.4
16	10	10	7	25.1	97	142	1.3
16	10	10	8	27.3	83	141	1.8
16	10	10	9	28.6	73	125	0.9
16	10	10	10	29.6	67	103	0.6
16	10	10	11	30.3	64	97	0.6
16	10	10	12	30.8	61	94	0.6
16	10	10	13	31.6	57	174	0
16	10	10	14	31.6	56	78	0.9
16	10	10	15	31.9	54	87	1.3
16	10	10	16	31.6	59	101	1.6
16	10	10	17	31.3	60	124	1.4
16	10	10	18	30.5	62	147	1.7
16	10	10	19	29.9	64	156	1.6
16	10	10	20	29.1	67	160	1.8
16	10	10	21	28.1	73	168	2.4
16	10	10	22	27.1	78	168	2.7
16	10	10	23	26.5	82	160	2.3
16	10	10	24	25.9	85	146	2.4
16	10	11	1	25.4	87	144	2.1
16	10	11	2	25.1	89	142	1.1
16	10	11	3	24.8	90	120	0.1
16	10	11	4	24.6	91	338	0
16	10	11	5	24.3	93	344	0
16	10	11	6	24	95	352	0

Year	Month	Day	Hour	Temperature oC	Relative Humidity, %	Wind Direction	Wind Speed, m/sec
16	10	11	7	24.4	94	345	0
16	10	11	8	27	80	295	0
16	10	11	9	28.5	70	146	0
16	10	11	10	29.6	63	107	0
16	10	11	11	30.6	58	242	0
16	10	11	12	31.5	55	57	0.1
16	10	11	13	32	52	58	0.3
16	10	11	14	32.1	51	72	0.6
16	10	11	15	32.3	51	49	0.4
16	10	11	16	32.3	51	108	0.2
16	10	11	17	32.1	54	167	1
16	10	11	18	31.3	58	189	1.8
16	10	11	19	30.3	64	183	3
16	10	11	20	28.1	79	173	3.9
16	10	11	21	27.1	88	167	3.6
16	10	11	22	26.8	91	154	3.5
16	10	11	23	26.5	92	144	3.5
16	10	11	24	26.3	93	141	3.4
16	10	12	1	26.1	94	139	3.3
16	10	12	2	25.9	94	141	3
16	10	12	3	25.8	95	149	2.7
16	10	12	4	25.6	95	160	2.3
16	10	12	5	25.5	95	165	1.9
16	10	12	6	25.3	95	170	1.5
16	10	12	7	25.3	95	180	1.1
16	10	12	8	27	87	172	1.7
16	10	12	9	28.5	77	136	1
16	10	12	10	29.8	68	111	0.6
16	10	12	11	30.1	64	112	0.5
16	10	12	12	31	61	121	0.3
16	10	12	13	31.3	59	109	0.7
16	10	12	14	31.6	58	117	0.4
16	10	12	15	31.9	57	264	0
16	10	12	16	31.8	57	140	0.4
16	10	12	17	31.3	62	132	1.9
16	10	12	18	29.5	73	136	3.7
16	10	12	19	28	84	149	4.1
16	10	12	20	27.1	90	151	4.1
16	10	12	21	26.6	91	151	3.8
16	10	12	22	26.1	92	144	3.6
16	10	12	23	25.9	94	133	3.5
16	10	12	24	25.5	95	131	3.4
16	10	13	1	25.1	96	131	3
16	10	13	2	25	96	128	2.5
16	10	13	3	24.9	96	122	1.8
16	10	13	4	24.6	97	106	0.8
16	10	13	5	24.1	98	306	0
16	10	13	6	23.8	100	334	0
16	10	13	7	24.3	98	298	0
16	10	13	8	26.5	83	152	0.3
16	10	13	9	27.9	75	163	0.3
16	10	13	10	29.1	67	158	0.5
16	10	13	11	30.1	62	159	0.7
16	10	13	12	30.5	60	152	1.3
16	10	13	13	31.1	58	138	1.6
16	10	13	14	31.5	56	137	1.9
16	10	13	15	31.6	55	137	2.2
16	10	13	16	31.4	57	138	2.7
16	10	13	17	31.1	66	139	2.4
16	10	13	18	30.1	71	147	3.4
16	10	13	19	28.4	79	151	4
16	10	13	20	27	83	151	3.9
16	10	13	21	26.1	84	150	3.8

Year	Month	Dav	Hour	Temperature oC	Relative Humidity, %	Wind Direction	Wind Speed, m/sec
16	10	13	22	25.6	85	149	3.7
16	10	13	23	25.1	87	148	3.6
16	10	13	24	24.8	90	148	3.5
16	10	14	1	24.6	92	146	3.2
16	10	14	2	24.4	94	142	3
16	10	14	3	24.3	95	139	2.6
16	10	14	4	24.1	96	143	1.6
16	10	14	5	23.9	97	175	0.2
16	10	14	6	23.6	98	282	0.1
16	10	14	7	24	97	255	0.3
16	10	14	8	26.5	83	193	1.1
16	10	14	9	28	74	187	0.9
16	10	14	10	29.4	65	175	0.6
16	10	14	11	30.5	59	158	0.7
16	10	14	12	31.4	55	151	0.9
16	10	14	13	31.9	53	148	1.3
16	10	14	14	32.1	52	149	1.7
16	10	14	15	32.1	52	148	2.1
16	10	14	16	31.9	54	144	2.5
16	10	14	17	31.6	65	139	2.4
16	10	14	18	30.3	71	148	3.7
16	10	14	19	28.3	79	156	3.9
16	10	14	20	27.1	83	158	3.8
16	10	14	21	26.3	84	162	3.7
16	10	14	22	25.8	84	167	3.4
16	10	14	23	25.4	85	173	3
16	10	14	24	25	86	178	2.9
16	10	15	1	24.6	88	178	2.7
16	10	15	2	24.4	89	176	2.4
16	10	15	3	24.1	90	180	2.2
16	10	15	4	23.9	91	187	2.1
16	10	15	5	23.8	92	194	1.9
16	10	15	6	23.6	92	207	1.3
16	10	15	7	24.1	90	211	1.2
16	10	15	8	26.8	74	198	1.9
16	10	15	9	28.8	63	191	1.3
16	10	15	10	30.4	55	175	0.8
16	10	15	11	31.6	47	162	1.2
16	10	15	12	32.4	44	156	1.4
16	10	15	13	32.8	42	152	1.9
16	10	15	14	32.9	42	148	2.5
16	10	15	15	32.8	43	146	3
16	10	15	16	32.3	50	148	3.3
16	10	15	17	31.3	62	148	3.2
16	10	15	18	29.1	70	156	4.3
16	10	15	19	27.4	75	162	4.1
16	10	15	20	26.3	78	164	3.9
16	10	15	21	25.5	80	162	3.7
16	10	15	22	24.9	81	161	3.5
16	10	15	23	24.4	83	163	3.4
16	10	15	24	24	86	161	3
16	10	16	1	23.6	89	153	2.5
16	10	16	2	23.5	92	149	2.1
16	10	16	3	23.3	94	153	1.8
16	10	16	4	23.1	96	156	1.4
16	10	16	5	23	98	158	1.2
16	10	16	6	22.9	100	162	1.1
16	10	16	7	23	100	137	1.2
16	10	16	8	25	92	131	2.2
16	10	16	9	26.3	84	115	2.5
16	10	16	10	27.8	70	110	2.6
16	10	16	11	29.4	56	115	2.3

Year	Month	Day	Hour	Temperature oC	Relative Humidity, %	Wind Direction	Wind Speed, m/sec
16	10	16	12	30.6	47	119	2.1
16	10	16	13	31.1	43	117	1.7
16	10	16	14	31.5	41	114	1.4
16	10	16	15	31.6	41	116	1.3
16	10	16	16	31.5	42	121	1.2
16	10	16	17	31.1	45	160	0.4
16	10	16	18	30.1	51	244	0.3
16	10	16	19	29	57	252	0.3
16	10	16	20	28.1	62	193	1.2
16	10	16	21	26.9	71	193	3
16	10	16	22	25.8	79	198	3.2
16	10	16	23	25.3	82	205	3.1
16	10	16	24	25	82	207	3.1
16	10	17	1	24.8	81	207	2.9
16	10	17	2	24.8	80	209	2.5
16	10	17	3	24.6	79	225	1.4
16	10	17	4	24.4	80	237	0.8
16	10	17	5	24.3	80	240	0.3
16	10	17	6	24.1	80	17	0.1
16	10	17	7	24.1	81	20	0.1
16	10	17	8	26.6	65	251	0.4
16	10	17	9	28.6	58	272	0.1
16	10	17	10	30.1	52	233	0.1
16	10	17	11	31.5	47	135	0.3
16	10	17	12	32.3	45	125	0.6
16	10	17	13	32.6	44	125	0.8
16	10	17	14	32.6	45	138	0.8
16	10	17	15	32.6	45	150	1.2
16	10	17	16	32.4	46	160	1.7
16	10	17	17	31.9	54	171	2.3
16	10	17	18	30.8	59	175	3.6
16	10	17	19	28.6	70	174	4.1
16	10	17	20	27.3	76	181	3.8
16	10	17	21	26.6	77	185	3.4
16	10	17	22	26.3	77	190	3.2
16	10	17	23	26.1	76	192	3
16	10	17	24	25.8	76	191	2.6
16	10	18	1	25.4	77	202	1.7
16	10	18	2	25.1	78	251	0.7
16	10	18	3	24.8	80	313	0.6
16	10	18	4	24.6	80	331	0.4
16	10	18	5	24.6	85	8	1.1
16	10	18	6	24.3	87	41	0.3
16	10	18	7	24.3	88	101	0
16	10	18	8	26.6	74	174	0
16	10	18	9	28.6	61	170	0
16	10	18	10	30	52	122	0.1
16	10	18	11	30.6	51	89	0
16	10	18	12	31.3	50	42	0.2
16	10	18	13	31.6	49	38	0.6
16	10	18	14	31.8	48	33	1
16	10	18	15	31.8	49	24	1.2
16	10	18	16	31.6	49	8	1.2
16	10	18	17	31.5	52	322	0.9
16	10	18	18	30.8	56	278	1.3
16	10	18	19	30	60	266	1.9
16	10	18	20	29.3	64	262	2.4
16	10	18	21	28.6	67	270	3
16	10	18	22	28	70	277	3.4
16	10	18	23	27.3	71	283	3.1
16	10	18	24	26.6	73	295	2.7
16	10	19	1	26	73	308	2.2
16	10	19	2	25.5	74	313	1.9

Year	Month	Day	Hour	Temperature oC	Relative Humidity, %	Wind Direction	Wind Speed, m/sec
16	10	19	3	25	74	314	1.7
16	10	19	4	24.5	76	321	1.2
16	10	19	5	24.1	78	330	0.5
16	10	19	6	23.8	78	315	0.2
16	10	19	7	23.9	77	288	0.1
16	10	19	8	26.1	62	44	1.8
16	10	19	9	27.8	54	59	2.1
16	10	19	10	28.9	50	63	1.8
16	10	19	11	30	47	61	1.5
16	10	19	12	30.6	45	61	1.3
16	10	19	13	31.1	43	57	0.7
16	10	19	14	31.4	43	65	0
16	10	19	15	31.5	42	334	0
16	10	19	16	31.4	42	285	0.8
16	10	19	17	31	46	267	1.7
16	10	19	18	30	51	260	2.5
16	10	19	19	29.1	54	255	2.7
16	10	19	20	28.3	57	250	2.5
16	10	19	21	27.5	60	248	1.9
16	10	19	22	26.6	64	235	0.7
16	10	19	23	25.9	68	188	0.1
16	10	19	24	25	73	245	0.1
16	10	20	1	24.1	77	268	0
16	10	20	2	23.6	80	153	0
16	10	20	3	23.1	82	318	0.1
16	10	20	4	22.6	84	337	0.3
16	10	20	5	22.1	86	346	0.2
16	10	20	6	21.8	87	193	0
16	10	20	7	21.9	87	180	0
16	10	20	8	24.9	73	65	0
16	10	20	9	27.6	57	130	0.1
16	10	20	10	29.5	48	142	0
16	10	20	11	30.6	45	198	0
16	10	20	12	31.4	42	159	0.1
16	10	20	13	31.8	41	154	0.1
16	10	20	14	32.1	39	187	0
16	10	20	15	32.1	39	23	0
16	10	20	16	32.1	39	195	0.2
16	10	20	17	31.6	43	229	0.3
16	10	20	18	30.6	49	226	0.3
16	10	20	19	29.5	54	193	0.2
16	10	20	20	28.5	59	162	0.4
16	10	20	21	27.6	63	172	0.7
16	10	20	22	27	67	174	0.9
16	10	20	23	26.3	71	157	1.1
16	10	20	24	25.6	76	152	1.4
16	10	21	1	24.9	83	155	2.5
16	10	21	2	24.1	92	154	3
16	10	21	3	23.5	100	154	2.5
16	10	21	4	23.1	100	154	1.6
16	10	21	5	23.3	100	149	0.3
16	10	21	6	23.4	100	341	0.4
16	10	21	7	23.6	100	316	0.8
16	10	21	8	24.1	100	319	1.1
16	10	21	9	25.1	97	316	0.1
16	10	21	10	27.6	82	244	0
16	10	21	11	29.1	71	261	0
16	10	21	12	30.1	62	229	0.1
16	10	21	13	30.9	57	152	0
16	10	21	14	31.1	55	57	0
16	10	21	15	30.8	55	125	0.9
16	10	21	16	30.1	61	145	2.8
16	10	21	17	29	73	161	3.1

Year	Month	Day	Hour	Temperature oC	Relative Humidity, %	Wind Direction	Wind Speed, m/sec
16	10	21	18	28	79	168	3.6
16	10	21	19	27.1	81	167	4
16	10	21	20	26.4	82	161	3.9
16	10	21	21	25.9	82	150	3.4
16	10	21	22	25.6	83	149	2.9
16	10	21	23	25.6	84	153	2.2
16	10	21	24	25.4	85	151	1.5
16	10	22	1	25.1	86	141	1
16	10	22	2	24.8	88	131	0.8
16	10	22	3	24.5	90	139	0.4
16	10	22	4	24.1	92	300	0.1
16	10	22	5	24	93	343	0.1
16	10	22	6	23.8	94	81	0
16	10	22	7	23.6	96	352	0
16	10	22	8	25.3	87	287	0.2
16	10	22	9	27.1	71	285	0.1
16	10	22	10	28.4	63	295	0.2
16	10	22	11	29.5	58	316	0.2
16	10	22	12	30.3	54	337	0.3
16	10	22	13	30.9	51	343	0.4
16	10	22	14	31.3	48	338	0.5
16	10	22	15	31.5	46	330	0.7
16	10	22	16	31.5	44	320	0.9
16	10	22	17	31.1	47	271	0.7
16	10	22	18	30.3	52	239	1
16	10	22	19	29.3	57	238	1.6
16	10	22	20	28.4	60	250	2.3
16	10	22	21	27.6	62	264	3
16	10	22	22	27	63	275	3.6
16	10	22	23	26	66	289	3.7
16	10	22	24	25.1	68	303	3.3
16	10	23	1	24.4	71	314	3.3
16	10	23	2	23.6	75	319	3.1
16	10	23	3	23	81	330	2.8
16	10	23	4	22.6	89	343	2.7
16	10	23	5	23.6	81	278	2.8
16	10	23	6	23.1	82	284	2.8
16	10	23	7	23.3	83	302	2.3
16	10	23	8	25.1	80	359	1.6
16	10	23	9	26.6	76	25	1.3
16	10	23	10	27.9	69	39	1.6
16	10	23	11	29.1	63	34	1.6
16	10	23	12	30.5	55	41	1.4
16	10	23	13	31.3	51	50	1.5
16	10	23	14	31.5	50	60	2.1
16	10	23	15	31.1	52	68	3
16	10	23	16	30.6	63	75	2.8
16	10	23	17	29.8	68	78	3.4
16	10	23	18	28.8	72	82	3.6
16	10	23	19	27.8	80	100	3.8
16	10	23	20	26.6	89	123	3.5
16	10	23	21	26.1	92	134	3.1
16	10	23	22	25.8	92	137	2.6
16	10	23	23	25.6	92	134	2.4
16	10	23	24	25.3	92	118	2.1
16	10	24	1	24.9	92	105	2
16	10	24	2	24.6	92	97	1.6
16	10	24	3	24.4	93	94	1.2
16	10	24	4	24.1	93	88	0.8
16	10	24	5	23.9	94	52	0.2
16	10	24	6	23.6	95	49	0
16	10	24	7	23.5	95	68	0
16	10	24	8	25	84	68	0.7

Year	Month	Day	Hour	Temperature oC	Relative Humidity, %	Wind Direction	Wind Speed, m/sec
16	10	24	9	26.9	72	60	1.6
16	10	24	10	28.1	64	58	2.5
16	10	24	11	29.1	59	52	3
16	10	24	12	29.9	56	50	2.9
16	10	24	13	30.3	54	49	2.8
16	10	24	14	30.6	53	52	2.3
16	10	24	15	30.6	54	54	2
16	10	24	16	30.5	59	56	1.4
16	10	24	17	30.1	64	62	1.6
16	10	24	18	28.9	73	129	3
16	10	24	19	27.1	86	168	4.1
16	10	24	20	26.1	92	192	3.2
16	10	24	21	25.9	92	192	2.6
16	10	24	22	25.9	91	176	2.2
16	10	24	23	25.6	91	166	2.4
16	10	24	24	25.4	91	152	2.1
16	10	25	1	25.1	93	112	0.9
16	10	25	2	24.9	94	61	1
16	10	25	3	24.6	95	59	1.9
16	10	25	4	24.5	96	66	2.6
16	10	25	5	24.4	98	66	2.5
16	10	25	6	24.1	98	58	1.7
16	10	25	7	24.1	98	39	0.9
16	10	25	8	25.1	93	60	1.8
16	10	25	9	26.8	79	86	2.9
16	10	25	10	28	70	86	3.4
16	10	25	11	29.1	63	81	3.4
16	10	25	12	29.8	59	73	3.4
16	10	25	13	30.3	56	68	3.2
16	10	25	14	30.4	58	67	2.7
16	10	25	15	30.4	60	56	2.1
16	10	25	16	30.5	55	57	2.4
16	10	25	17	29.9	63	97	2
16	10	25	18	28.5	70	128	3.4
16	10	25	19	27.5	76	139	3
16	10	25	20	27.3	78	150	1.3
16	10	25	21	26.9	81	125	0.4
16	10	25	22	26.5	84	111	0.8
16	10	25	23	26.1	87	117	1.6
16	10	25	24	25.8	89	110	1.3
16	10	26	1	25.4	91	74	0.9
16	10	26	2	25.1	92	56	0.9
16	10	26	3	24.9	93	58	1.1
16	10	26	4	24.6	94	57	1.3
16	10	26	5	24.5	94	61	1.5
16	10	26	6	24.4	94	57	1.7
16	10	26	7	24.4	94	50	1.6
16	10	26	8	24.6	93	34	1.3
16	10	26	9	25.6	84	55	1.8
16	10	26	10	27	75	70	1.6
16	10	26	11	28.1	64	71	1.7
16	10	26	12	29.1	55	70	1.7
16	10	26	13	29.6	49	62	2
16	10	26	14	30	46	55	2.2
16	10	26	15	30	45	47	2.2
16	10	26	16	29.9	48	41	1.5
16	10	26	17	29.6	51	20	0.3
16	10	26	18	28.6	56	213	0.2
16	10	26	19	27.9	61	258	0.6
16	10	26	20	27.1	65	275	1
16	10	26	21	26.5	68	263	0.6
16	10	26	22	26.1	71	171	0
16	10	26	23	25.8	74	75	0

Year	Month	Day	Hour	Temperature oC	Relative Humidity, %	Wind Direction	Wind Speed, m/sec
16	10	26	24	25.3	78	111	0.9
16	10	27	1	25	79	108	2.1
16	10	27	2	24.8	80	116	2.2
16	10	27	3	24.3	85	137	2.2
16	10	27	4	23.8	91	135	1.8
16	10	27	5	23.5	96	128	1.1
16	10	27	6	23.1	99	110	0.1
16	10	27	7	23.1	100	329	0.1
16	10	27	8	25.1	91	74	1.3
16	10	27	9	26.6	82	59	1.9
16	10	27	10	27.8	73	49	2.7
16	10	27	11	29	65	48	3.4
16	10	27	12	29.8	60	48	4.1
16	10	27	13	30.4	56	44	4.3
16	10	27	14	31	50	42	4.4
16	10	27	15	31.5	45	39	4.1
16	10	27	16	31.5	48	27	3
16	10	27	17	31.1	53	4	2.2
16	10	27	18	30.1	55	0	1
16	10	27	19	28.6	64	150	3.6
16	10	27	20	26.8	80	157	4.3
16	10	27	21	26.4	84	160	3.5
16	10	27	22	26	86	152	3.3
16	10	27	23	25.5	89	136	3.2
16	10	27	24	25.1	91	123	2.9
16	10	28	1	24.8	93	109	2.1
16	10	28	2	24.4	94	91	1.5
16	10	28	3	24.1	96	70	0.9
16	10	28	4	23.6	97	49	0.7
16	10	28	5	23.1	94	58	0.7
16	10	28	6	22.9	94	39	0.7
16	10	28	7	22.9	94	20	0.9
16	10	28	8	25.1	78	59	2.1
16	10	28	9	26.5	70	61	2
16	10	28	10	27.9	64	62	1.9
16	10	28	11	29	58	66	2.2
16	10	28	12	29.8	54	66	2.7
16	10	28	13	30.3	52	64	2.8
16	10	28	14	30.6	51	64	2.7
16	10	28	15	30.9	50	67	2.5
16	10	28	16	30.6	55	69	1.6
16	10	28	17	30.4	58	74	0.5
16	10	28	18	29.6	61	225	0.1
16	10	28	19	29	64	143	0.9
16	10	28	20	27.8	72	138	3.5
16	10	28	21	26.1	85	142	4
16	10	28	22	25.4	88	147	3.8
16	10	28	23	24.9	90	149	3.7
16	10	28	24	24.5	92	147	3.3
16	10	29	1	24.1	93	136	2.7
16	10	29	2	24	94	123	2.6
16	10	29	3	23.6	95	111	2.4
16	10	29	4	23.5	96	102	1.9
16	10	29	5	23.3	97	94	1.6
16	10	29	6	23.1	98	76	1.3
16	10	29	7	23.1	97	54	1.3
16	10	29	8	24.6	91	81	2.8
16	10	29	9	25.3	87	79	3.5
16	10	29	10	25.8	85	76	3.7
16	10	29	11	26	83	84	3.4
16	10	29	12	26.6	79	93	2.8
16	10	29	13	27.6	74	99	1.8
16	10	29	14	28.3	70	108	1.6

Year	Month	Day	Hour	Temperature oC	Relative Humidity, %	Wind Direction	Wind Speed, m/sec
16	10	29	15	28.8	67	109	0.4
16	10	29	16	28.9	66	11	0.2
16	10	29	17	28.6	69	311	0.8
16	10	29	18	28.1	72	278	0.6
16	10	29	19	27.5	76	186	0.4
16	10	29	20	27	79	149	1.1
16	10	29	21	26.5	80	149	2.1
16	10	29	22	25.9	83	162	2.3
16	10	29	23	25.4	87	188	2.1
16	10	29	24	24.9	90	209	1.8
16	10	30	1	24.5	91	219	1.1
16	10	30	2	24.1	93	62	0
16	10	30	3	23.6	95	261	0
16	10	30	4	23.4	97	322	0
16	10	30	5	23.1	98	317	0.2
16	10	30	6	22.9	99	314	0.5
16	10	30	7	23	98	317	1
16	10	30	8	25.1	85	330	2.6
16	10	30	9	26.9	73	348	2.6
16	10	30	10	28.4	61	8	2.8
16	10	30	11	29.6	53	24	3.3
16	10	30	12	30.4	49	34	3.8
16	10	30	13	30.9	46	40	3.7
16	10	30	14	31.1	44	37	3.3
16	10	30	15	31.3	41	33	3
16	10	30	16	31.1	40	23	2.6
16	10	30	17	30.6	47	348	1.5
16	10	30	18	29.5	50	307	1.2
16	10	30	19	28.3	54	283	1.3
16	10	30	20	27.1	60	273	1.2
16	10	30	21	25.8	69	157	1.1
16	10	30	22	25	78	151	1.6
16	10	30	23	24.4	85	162	1.8
16	10	30	24	24	92	165	2.1
16	10	31	1	23.6	97	163	2.1
16	10	31	2	23.1	100	155	2
16	10	31	3	22.9	100	141	1.7
16	10	31	4	22.4	100	117	0.8
16	10	31	5	22.1	100	66	0.2
16	10	31	6	22	100	302	0
16	10	31	7	22.1	100	340	0.1
16	10	31	8	22.6	100	50	0.1
16	10	31	9	23.1	100	46	0.5
16	10	31	10	24.9	88	318	0
16	10	31	11	27.3	72	63	0.1
16	10	31	12	28.6	65	67	0.8
16	10	31	13	29.5	61	66	0.9
16	10	31	14	30	58	70	1.2
16	10	31	15	30.1	59	74	2.1
16	10	31	16	29.8	60	74	2.3
16	10	31	17	29.6	64	67	1.2
16	10	31	18	28.9	67	66	0.4
16	10	31	19	28.1	71	117	1.3
16	10	31	20	26.5	80	126	4.4
16	10	31	21	25.4	88	141	3.3
16	10	31	22	25.1	90	141	2.9
16	10	31	23	24.9	92	139	2.6
16	10	31	24	24.6	93	137	1.8

ANNXURE – 4 B

PREDICTED 50 HIGH 24-HOURLY GROUND LEVEL CONCENTRATIONS OF PARTICULATE MATTER

SOURCES: PROPOSED 4000 MW POWER PLANT – TSGENCO

RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (M,M)		TYPE	RANK	CONC	YYMMDDHH	AT	RECEPTOR (M,M)		TYPE
	µg/m3			X	Y			µg/m3			X	Y	
1	13.44916	16100624	AT	500	-866.03	GP	26	6.94919b	16100824	AT	642.79	-766.04	GP
2	12.81782	16100624	AT	642.79	-766.04	GP	27	6.91516b	16100224	AT	321.39	-383.02	GP
3	10.79801b	16101024	AT	642.79	-766.04	GP	28	6.80449b	16101924	AT	383.02	-321.39	GP
4	10.59636b	16101224	AT	642.79	-766.04	GP	29	6.79805b	16101024	AT	964.18	-1149.07	GP
5	10.49053c	16102624	AT	866.03	-500	GP	30	6.73685c	16102624	AT	1500	0	GP
6	10.24339b	16101224	AT	766.04	-642.79	GP	31	6.56606c	16102624	AT	2462.02	434.12	GP
7	10.18121b	16101024	AT	766.04	-642.79	GP	32	6.48348c	16102824	AT	1409.54	-513.03	GP
8	9.85876b	16100524	AT	642.79	-766.04	GP	33	6.42970b	16101924	AT	321.39	-383.02	GP
9	9.66727c	16102624	AT	939.69	-342.02	GP	34	6.42663b	16100124	AT	642.79	-766.04	GP
10	9.32487b	16100524	AT	500	-866.03	GP	35	6.41916b	16101924	AT	433.01	-250	GP
11	9.13712c	16102624	AT	1477.21	-260.47	GP	36	6.39940b	16101224	AT	866.03	-500	GP
12	9.05956c	16101424	AT	642.79	-766.04	GP	37	6.37667c	16103024	AT	321.39	-383.02	GP
13	8.84735b	16100724	AT	642.79	-766.04	GP	38	6.35413b	16101224	AT	1149.07	-964.18	GP
14	8.22653c	16101424	AT	766.04	-642.79	GP	39	6.29304c	16103024	AT	642.79	-766.04	GP
15	8.19429	16101624	AT	642.79	-766.04	GP	40	6.22789b	16100224	AT	766.04	-642.79	GP
16	7.98395	16101524	AT	642.79	-766.04	GP	41	6.18976	16101624	AT	500	-866.03	GP
17	7.71446b	16100224	AT	642.79	-766.04	GP	42	6.00963b	16100224	AT	383.02	-321.39	GP
18	7.38051c	16100324	AT	766.04	-642.79	GP	43	6.00552	16101624	AT	766.04	-642.79	GP
19	7.36802c	16102624	AT	2000	0	GP	44	6.00291b	16101724	AT	642.79	-766.04	GP
20	7.32945c	16100324	AT	500	-866.03	GP	45	5.99927	16100624	AT	173.65	-984.81	GP
21	7.27214	16100624	AT	766.04	-642.79	GP	46	5.98376	16102524	AT	866.03	-500	GP
22	7.22557c	16100324	AT	642.79	-766.04	GP	47	5.97104b	16101824	AT	321.39	-383.02	GP
23	7.15666c	16100324	AT	866.03	-500	GP	48	5.92905b	16101024	AT	1285.58	-1532.09	GP
24	7.09668b	16101224	AT	964.18	-1149.07	GP	49	5.90793	16100624	AT	0	-1000	GP
25	7.04554b	16101724	AT	500	-866.03	GP	50	5.90611c	16102624	AT	766.04	-642.79	GP

PREDICTED 50 HIGH 24-HOURLY GROUND LEVEL CONCENTRATIONS OF PARTICULATE MATTER
SOURCES: OPERATING UNITS

1. **India Cements Limited - Cement Plant, Captive Power Plant and Mine**
2. **Parasakti Cements - Cement Plant and Mine**
3. **Penna Cements - Cement Plant, Captive Power Plant and Mine**
4. **Deccan Cements - Cement Plant, Captive Power Plant and Mine**
5. **Andhra Cements - Cement Plant and Mine**

RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (M,M)		TYPE	RANK	CONC	YYMMDDHH	AT	RECEPTOR (M,M)		TYPE
	µg/m3			X	Y			µg/m3			X	Y	
1	11.21995c	16102624	AT	-6893.65	1215.54	GP	26	5.46119	16101624	AT	-13000	0	GP
2	10.63694c	16102824	AT	-13000	0	GP	27	5.42837c	16102624	AT	-7386.06	1302.36	GP
3	9.99457	16102524	AT	-13000	0	GP	28	5.33457c	16102624	AT	-13500	0	GP
4	9.30294c	16102624	AT	-13000	0	GP	29	5.31745b	16100224	AT	-7386.06	1302.36	GP
5	8.72636c	16102824	AT	-6893.65	1215.54	GP	30	5.25432c	16102624	AT	-5638.16	2052.12	GP
6	8.49105c	16102924	AT	-13000	0	GP	31	5.24143	16102524	AT	-5638.16	2052.12	GP
7	7.51046b	16101824	AT	-7386.06	1302.36	GP	32	5.14848c	16102824	AT	-8227.24	4750	GP
8	7.2632	16102524	AT	-6893.65	1215.54	GP	33	5.12962c	16103024	AT	-7386.06	1302.36	GP
9	7.2063	16100624	AT	-13500	0	GP	34	5.09990c	16102824	AT	-5638.16	2052.12	GP
10	7.06989c	16102824	AT	-6108	2223.13	GP	35	5.08594b	16101224	AT	-13500	0	GP
11	6.76481	16100624	AT	-7386.06	1302.36	GP	36	5.04549c	16100324	AT	-7386.06	1302.36	GP
12	6.54050c	16101424	AT	-6893.65	1215.54	GP	37	5.02003c	16102824	AT	-12124.4	7000	GP
13	6.50262b	16102124	AT	-13000	0	GP	38	4.96614	16102524	AT	-6108	2223.13	GP
14	6.39094b	16103124	AT	-13000	0	GP	39	4.92616	16101624	AT	-6401.25	1128.71	GP
15	6.34434c	16102624	AT	-12124.4	7000	GP	40	4.87698c	16102624	AT	-6108	2223.13	GP
16	6.22042b	16100224	AT	-13500	0	GP	41	4.86829b	16101024	AT	-7000	0	GP
17	6.04217b	16101224	AT	-6893.65	1215.54	GP	42	4.86015b	16101024	AT	-6893.65	1215.54	GP
18	6.00220c	16100324	AT	-13500	0	GP	43	4.77066	16100624	AT	-14000	0	GP
19	5.99704c	16102624	AT	-8227.24	4750	GP	44	4.72009c	16102624	AT	-6577.85	2394.14	GP
20	5.90683c	16103024	AT	-6577.85	2394.14	GP	45	4.64076b	16102024	AT	-7500	0	GP
21	5.83766b	16101024	AT	-13000	0	GP	46	4.60365b	16100524	AT	-8000	0	GP
22	5.66660c	16102924	AT	-6893.65	1215.54	GP	47	4.56180b	16101924	AT	-7386.06	1302.36	GP
23	5.59791	16101524	AT	-6893.65	1215.54	GP	48	4.41985b	16100924	AT	-13000	0	GP
24	5.56323	16100624	AT	-6893.65	1215.54	GP	49	4.38853b	16102024	AT	-7000	0	GP
25	5.52161c	16100324	AT	-6893.65	1215.54	GP	50	4.34727b	16101224	AT	-7386.06	1302.36	GP

PREDICTED 50 HIGH 24-HOURLY GROUND LEVEL CONCENTRATIONS OF PARTICULATE MATTER
SOURCES: PROPOSED UNITS

1. **Proposed 4000 MW Power Plant - TSGENCO**
2. **Proposed Power Plant of KGPUL**
3. **Proposed Cement Plant and Limestone Mine of Myhome Cement Industries Ltd**

RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (M.M)		TYPE	RANK	CONC	YYMMDDHH	AT	RECEPTOR (M.M)		TYPE
	µg/m3			X	Y			µg/m3			X	Y	
1	13.56576	16100624	AT	500	-866.03	GP	26	7.04652b	16101724	AT	500	-866.03	GP
2	12.93416	16100624	AT	642.79	-766.04	GP	27	6.98264b	16100224	AT	321.39	-383.02	GP
3	11.07645b	16101024	AT	642.79	-766.04	GP	28	6.94969b	16100824	AT	642.79	-766.04	GP
4	10.78436b	16101224	AT	642.79	-766.04	GP	29	6.80474b	16101924	AT	383.02	-321.39	GP
5	10.52507c	16102624	AT	866.03	-500	GP	30	6.77126c	16102624	AT	1500	0	GP
6	10.43609b	16101024	AT	766.04	-642.79	GP	31	6.60036c	16102624	AT	2462.02	434.12	GP
7	10.41951b	16101224	AT	766.04	-642.79	GP	32	6.56687b	16101224	AT	866.03	-500	GP
8	9.98506b	16100524	AT	642.79	-766.04	GP	33	6.54002	16101624	AT	500	-866.03	GP
9	9.70203c	16102624	AT	939.69	-342.02	GP	34	6.51901b	16101224	AT	1149.07	-964.18	GP
10	9.45130b	16100524	AT	500	-866.03	GP	35	6.49813c	16102824	AT	1409.54	-513.03	GP
11	9.19540c	16101424	AT	642.79	-766.04	GP	36	6.48894b	16100124	AT	642.79	-766.04	GP
12	9.17092c	16102624	AT	1477.21	-260.47	GP	37	6.42993b	16101924	AT	321.39	-383.02	GP
13	8.85536b	16100724	AT	642.79	-766.04	GP	38	6.41940b	16101924	AT	433.01	-250	GP
14	8.54704	16101624	AT	642.79	-766.04	GP	39	6.38605c	16103024	AT	321.39	-383.02	GP
15	8.35890c	16101424	AT	766.04	-642.79	GP	40	6.35925	16101624	AT	766.04	-642.79	GP
16	8.05045	16101524	AT	642.79	-766.04	GP	41	6.30214c	16103024	AT	642.79	-766.04	GP
17	7.77891b	16100224	AT	642.79	-766.04	GP	42	6.29221b	16100224	AT	766.04	-642.79	GP
18	7.49047c	16100324	AT	766.04	-642.79	GP	43	6.20780b	16101024	AT	1285.58	-1532.09	GP
19	7.43997c	16100324	AT	500	-866.03	GP	44	6.11763	16100624	AT	173.65	-984.81	GP
20	7.40144c	16102624	AT	2000	0	GP	45	6.07715b	16100224	AT	383.02	-321.39	GP
21	7.38823	16100624	AT	766.04	-642.79	GP	46	6.03830b	16101224	AT	750	-1299.04	GP
22	7.33576c	16100324	AT	642.79	-766.04	GP	47	6.02772	16100624	AT	0	-1000	GP
23	7.27854b	16101224	AT	964.18	-1149.07	GP	48	6.00396b	16101724	AT	642.79	-766.04	GP
24	7.26665c	16100324	AT	866.03	-500	GP	49	5.99865	16102524	AT	866.03	-500	GP
25	7.07263b	16101024	AT	964.18	-1149.07	GP	50	5.97160b	16101824	AT	321.39	-383.02	GP

PREDICTED 50 HIGH 24-HOURLY GROUND LEVEL CONCENTRATIONS OF PARTICULATE MATTER
SOURCES: EXISTING AND PROPOSED UNITS

PROPOSED SOURCES:

1. **Proposed 4000 MW Power Plant - TSGENCO**
2. **Proposed Power Plant of KGPUL**
3. **Proposed Cement Plant and Limestone Mine of Myhome Cement Industries Ltd**

OPERATING SOURCES:

1. **India Cements Limited - Cement Plant, Captive Power Plant and Mine**
2. **Parasakti Cements - Cement Plant and Mine**
3. **Penna Cements - Cement Plant, Captive Power Plant and Mine**
4. **Deccan Cements - Cement Plant, Captive Power Plant and Mine**
5. **Andhra Cements - Cement Plant and Mine**

RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (M,M)		TYPE	RANK	CONC	YYMMDDHH	AT	RECEPTOR (M,M)		TYPE
	µg/m3			X	Y			µg/m3			X	Y	
1	13.99035	16100624	AT	500	-866.03	GP	26	7.97438b	16101224	AT	-6893.65	1215.54	GP
2	13.35959	16100624	AT	642.79	-766.04	GP	27	7.92787c	16101424	AT	-6893.65	1215.54	GP
3	11.58790c	16102624	AT	-6893.65	1215.54	GP	28	7.89048c	16100324	AT	766.04	-642.79	GP
4	11.57419b	16101024	AT	642.79	-766.04	GP	29	7.83957c	16100324	AT	500	-866.03	GP
5	11.24798b	16101224	AT	642.79	-766.04	GP	30	7.81189	16100624	AT	766.04	-642.79	GP
6	10.97534b	16100524	AT	642.79	-766.04	GP	31	7.73526c	16100324	AT	642.79	-766.04	GP
7	10.95456b	16101024	AT	766.04	-642.79	GP	32	7.72571b	16101224	AT	964.18	-1149.07	GP
8	10.87615b	16101224	AT	766.04	-642.79	GP	33	7.69663c	16102624	AT	2000	0	GP
9	10.76996c	16102624	AT	866.03	-500	GP	34	7.67326b	16101824	AT	-7386.06	1302.36	GP
10	10.71501c	16102824	AT	-13000	0	GP	35	7.66870c	16100324	AT	866.03	-500	GP
11	10.38147b	16100524	AT	500	-866.03	GP	36	7.51647b	16101024	AT	964.18	-1149.07	GP
12	10.03469	16102524	AT	-13000	0	GP	37	7.37094c	16102824	AT	-6108	2223.13	GP
13	9.95624c	16102624	AT	939.69	-342.02	GP	38	7.36222	16102524	AT	-6893.65	1215.54	GP
14	9.58472c	16101424	AT	642.79	-766.04	GP	39	7.23540b	16100224	AT	321.39	-383.02	GP
15	9.49151c	16102624	AT	-13000	0	GP	40	7.06828b	16101724	AT	500	-866.03	GP
16	9.41786c	16102624	AT	1477.21	-260.47	GP	41	7.04575c	16102624	AT	1500	0	GP
17	9.08601c	16102824	AT	-6893.65	1215.54	GP	42	7.01793b	16101224	AT	866.03	-500	GP
18	8.99965	16101624	AT	642.79	-766.04	GP	43	7.01632	16101624	AT	500	-866.03	GP
19	8.92679b	16100724	AT	642.79	-766.04	GP	44	6.9957	16100624	AT	-6893.65	1215.54	GP
20	8.74177c	16101424	AT	766.04	-642.79	GP	45	6.98531c	16102624	AT	2462.02	434.12	GP
21	8.66147c	16102924	AT	-13000	0	GP	46	6.97115b	16100824	AT	642.79	-766.04	GP
22	8.25301	16101524	AT	642.79	-766.04	GP	47	6.95581b	16101224	AT	1149.07	-964.18	GP
23	8.11879	16100624	AT	-7386.06	1302.36	GP	48	6.84528c	16102624	AT	-12124.4	7000	GP
24	8.01797b	16100224	AT	642.79	-766.04	GP	49	6.83587b	16101924	AT	383.02	-321.39	GP
25	7.99793	16100624	AT	-13500	0	GP	50	6.83061c	16102924	AT	-6893.65	1215.54	GP

PREDICTED 50 HIGH 24-HOURLY GROUND LEVEL CONCENTRATIONS OF SULPHURDIOXIDE
SOURCES: PROPOSED 4000 MW POWER PLANT – TSGENCO

RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (M,M)		TYPE	RANK	CONC	YYMMDDHH	AT	RECEPTOR (M,M)		TYPE
	µg/m3			X	Y			µg/m3			X	Y	
1	18.18269b	16101224	AT	642.79	-766.04	GP	26	16.30034b	16101224	AT	-321.39	-383.02	GP
2	18.16802b	16101224	AT	766.04	-642.79	GP	27	16.25506b	16101224	AT	-383.02	-321.39	GP
3	17.92686b	16101224	AT	500	-866.03	GP	28	16.24864b	16101224	AT	984.81	-173.65	GP
4	17.75655b	16101224	AT	866.03	-500	GP	29	16.20077b	16101224	AT	-86.82	492.4	GP
5	17.49911b	16101224	AT	342.02	-939.69	GP	30	16.19220b	16101224	AT	-171.01	469.85	GP
6	17.24064b	16101224	AT	1149.07	-964.18	GP	31	16.17183b	16101224	AT	86.82	-492.4	GP
7	17.20110b	16101224	AT	1299.04	-750	GP	32	16.15911b	16101224	AT	-173.65	984.81	GP
8	17.00155b	16101224	AT	939.69	-342.02	GP	33	16.15893b	16101224	AT	-433.01	-250	GP
9	16.99222b	16101224	AT	173.65	-984.81	GP	34	16.15685b	16101224	AT	0	500	GP
10	16.84373b	16101224	AT	642.79	766.04	GP	35	16.13852b	16101224	AT	-250	433.01	GP
11	16.82850b	16101224	AT	964.18	-1149.07	GP	36	16.12958b	16101224	AT	-342.02	-939.69	GP
12	16.82598b	16101224	AT	766.04	642.79	GP	37	16.11424b	16101224	AT	750	-1299.04	GP
13	16.76233b	16101224	AT	500	866.03	GP	38	16.06805b	16101224	AT	-321.39	383.02	GP
14	16.70090b	16101224	AT	1409.54	-513.03	GP	39	16.05846b	16101224	AT	-469.85	-171.01	GP
15	16.64874b	16101224	AT	342.02	939.69	GP	40	16.00654b	16101224	AT	86.82	492.4	GP
16	16.64864b	16101224	AT	866.03	500	GP	41	15.99895b	16101224	AT	984.81	173.65	GP
17	16.58721b	16101224	AT	0	-1000	GP	42	15.98937b	16101224	AT	-342.02	939.69	GP
18	16.45497b	16101224	AT	173.65	984.81	GP	43	15.97498b	16101224	AT	-500	-866.03	GP
19	16.36463b	16101224	AT	-86.82	-492.4	GP	44	15.95620b	16101224	AT	-383.02	321.39	GP
20	16.36191b	16101224	AT	-171.01	-469.85	GP	45	15.94104b	16101224	AT	1477.21	-260.47	GP
21	16.34450b	16101224	AT	939.69	342.02	GP	46	15.92416b	16101224	AT	-492.4	-86.82	GP
22	16.32553b	16101224	AT	-250	-433.01	GP	47	15.90284b	16101224	AT	1000	0	GP
23	16.32540b	16101224	AT	0	1000	GP	48	15.89217b	16101224	AT	-433.01	250	GP
24	16.32397b	16101224	AT	-173.65	-984.81	GP	49	15.85565b	16101224	AT	171.01	-469.85	GP
25	16.31559b	16101224	AT	0	-500	GP	50	15.84500b	16101224	AT	-500	866.03	GP

PREDICTED 50 HIGH 24-HOURLY GROUND LEVEL CONCENTRATIONS OF SULPHURDIOXIDE

SOURCES: OPERATING UNITS

1. **India Cements Limited - Cement Plant, Captive Power Plant and Mine**
2. **Parasakti Cements - Cement Plant and Mine**
3. **Penna Cements - Cement Plant, Captive Power Plant and Mine**
4. **Deccan Cements - Cement Plant, Captive Power Plant and Mine**
5. **Andhra Cements - Cement Plant and Mine**

RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (M,M)		TYPE	RANK	CONC	YYMMDDHH	AT	RECEPTOR (M,M)		TYPE
	µg/m3			X	Y			µg/m3			X	Y	
1	26.96850b	16101224	AT	-7386.06	1302.36	GP	26	8.90846b	16101224	AT	-7000	0	GP
2	24.96578	16100624	AT	-7386.06	1302.36	GP	27	8.90308b	16101224	AT	-7878.46	1389.19	GP
3	23.87849c	16100324	AT	-7386.06	1302.36	GP	28	8.83985c	16101424	AT	-7000	0	GP
4	17.92719c	16100324	AT	-6893.65	1215.54	GP	29	8.79614b	16100524	AT	-6893.65	1215.54	GP
5	16.93802b	16101024	AT	-7386.06	1302.36	GP	30	8.73341	16101624	AT	-6401.25	1128.71	GP
6	15.89952b	16100224	AT	-7386.06	1302.36	GP	31	8.66630c	16101424	AT	-7500	0	GP
7	15.18288b	16101224	AT	-6893.65	1215.54	GP	32	8.65170c	16102624	AT	-6577.85	2394.14	GP
8	14.35581	16100624	AT	-6893.65	1215.54	GP	33	8.61001	16102524	AT	-5638.16	2052.12	GP
9	14.32844c	16102924	AT	-6893.65	1215.54	GP	34	8.26025	16101524	AT	-6500	0	GP
10	14.31125c	16102624	AT	-6893.65	1215.54	GP	35	8.21456c	16101424	AT	-6500	0	GP
11	12.55626c	16101424	AT	-7386.06	1302.36	GP	36	8.16451c	16100324	AT	-6401.25	1128.71	GP
12	12.07678	16101624	AT	-6893.65	1215.54	GP	37	8.10695b	16101024	AT	-6500	0	GP
13	11.53821c	16101424	AT	-6893.65	1215.54	GP	38	7.94807b	16100424	AT	-7386.06	1302.36	GP
14	11.49223c	16103024	AT	-6577.85	2394.14	GP	39	7.82283	16102324	AT	-6893.65	1215.54	GP
15	11.25445b	16101024	AT	-6893.65	1215.54	GP	40	7.67731c	16100324	AT	-6108	2223.13	GP
16	10.97993	16102524	AT	-6401.25	1128.71	GP	41	7.67142b	16101024	AT	-6000	0	GP
17	10.83109c	16102824	AT	-6893.65	1215.54	GP	42	7.62512c	16102624	AT	-6401.25	1128.71	GP
18	10.56239c	16102924	AT	-6401.25	1128.71	GP	43	7.60135	16100624	AT	-8370.87	1476.01	GP
19	10.54909	16102524	AT	-6893.65	1215.54	GP	44	7.59049c	16103024	AT	-7047.69	2565.15	GP
20	10.39958c	16102824	AT	-5638.16	2052.12	GP	45	7.55709	16102524	AT	-5168.31	1881.11	GP
21	10.38556	16100624	AT	-7878.46	1389.19	GP	46	7.54372c	16101424	AT	-7878.46	1389.19	GP
22	9.52549c	16102824	AT	-6108	2223.13	GP	47	7.48602b	16101224	AT	-6401.25	1128.71	GP
23	9.42087c	16102624	AT	-6108	2223.13	GP	48	7.34625b	16101224	AT	-7500	0	GP
24	9.38206b	16100224	AT	-6893.65	1215.54	GP	49	7.18000b	16101024	AT	-7878.46	1389.19	GP
25	9.11486c	16100324	AT	-7878.46	1389.19	GP	50	7.15874b	16100524	AT	-7386.06	1302.36	GP

PREDICTED 50 HIGH 24-HOURLY GROUND LEVEL CONCENTRATIONS OF SULPHURDIOXIDE
SOURCES: PROPOSED UNITS

1. **Proposed 4000 MW Power Plant - TSGENCO**
2. **Proposed Power Plant of KGPUL**
3. **Proposed Cement Plant and Limestone Mine of Myhome Cement Industries Ltd**

RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (M,M)		TYPE	RANK	CONC	YYMMDDHH	AT	RECEPTOR (M,M)		TYPE
	µg/m3			X	Y			µg/m3			X	Y	
1	18.87843b	16101224	AT	642.79	-766.04	GP	26	17.06013b	16101224	AT	-383.02	-321.39	GP
2	18.85828b	16101224	AT	766.04	-642.79	GP	27	17.04487b	16101224	AT	939.69	342.02	GP
3	18.63114b	16101224	AT	500	-866.03	GP	28	17.00166b	16101224	AT	-86.82	492.4	GP
4	18.44349b	16101224	AT	866.03	-500	GP	29	17.00108b	16101224	AT	-171.01	469.85	GP
5	18.21552b	16101224	AT	342.02	-939.69	GP	30	16.98526b	16101224	AT	-173.65	984.81	GP
6	17.89721b	16101224	AT	1149.07	-964.18	GP	31	16.97130b	16101224	AT	-433.01	-250	GP
7	17.85215b	16101224	AT	1299.04	-750	GP	32	16.95429b	16101224	AT	-250	433.01	GP
8	17.72237b	16101224	AT	173.65	-984.81	GP	33	16.94914b	16101224	AT	0	500	GP
9	17.68712b	16101224	AT	939.69	-342.02	GP	34	16.93492b	16101224	AT	984.81	-173.65	GP
10	17.57879b	16101224	AT	642.79	766.04	GP	35	16.92132b	16101224	AT	86.82	-492.4	GP
11	17.54739b	16101224	AT	766.04	642.79	GP	36	16.91186b	16101224	AT	-342.02	-939.69	GP
12	17.51304b	16101224	AT	500	866.03	GP	37	16.88942b	16101224	AT	-321.39	383.02	GP
13	17.49384b	16101224	AT	964.18	-1149.07	GP	38	16.87582b	16101224	AT	-469.85	-171.01	GP
14	17.41707b	16101224	AT	342.02	939.69	GP	39	16.83378b	16101224	AT	-342.02	939.69	GP
15	17.35836b	16101224	AT	866.03	500	GP	40	16.79284b	16101224	AT	750	-1299.04	GP
16	17.34938b	16101224	AT	1409.54	-513.03	GP	41	16.78956b	16101224	AT	86.82	492.4	GP
17	17.33366b	16101224	AT	0	-1000	GP	42	16.78103b	16101224	AT	-383.02	321.39	GP
18	17.24177b	16101224	AT	173.65	984.81	GP	43	16.77652b	16101224	AT	-500	-866.03	GP
19	17.13532b	16101224	AT	-171.01	-469.85	GP	44	16.74419b	16101224	AT	-492.4	-86.82	GP
20	17.13208b	16101224	AT	0	1000	GP	45	16.71928b	16101224	AT	-433.01	250	GP
21	17.12933b	16101224	AT	-86.82	-492.4	GP	46	16.70564b	16101224	AT	-500	866.03	GP
22	17.10834b	16101224	AT	-250	-433.01	GP	47	16.69237b	16101224	AT	984.81	173.65	GP
23	17.09408b	16101224	AT	-321.39	-383.02	GP	48	16.67082b	16101224	AT	-469.85	171.01	GP
24	17.08862b	16101224	AT	-173.65	-984.81	GP	49	16.66065b	16101224	AT	-500	0	GP
25	17.07239b	16101224	AT	0	-500	GP	50	16.65866b	16101224	AT	-642.79	-766.04	GP

PREDICTED 50 HIGH 24-HOURLY GROUND LEVEL CONCENTRATIONS OF SULPHURDIOXIDE
SOURCES: EXISTING AND PROPOSED UNITS

PROPOSED SOURCES:

1. **Proposed 4000 MW Power Plant - TSGENCO**
2. **Proposed Power Plant of KGPUL**
3. **Proposed Cement Plant and Limestone Mine of Myhome Cement Industries Ltd**

OPERATING SOURCES:

1. **India Cements Limited - Cement Plant, Captive Power Plant and Mine**
2. **Parasakti Cements - Cement Plant and Mine**
3. **Penna Cements - Cement Plant, Captive Power Plant and Mine**
4. **Deccan Cements - Cement Plant, Captive Power Plant and Mine**
5. **Andhra Cements - Cement Plant and Mine**

RANK	CONC	(YYMMDDH H)	AT	RECEPTOR (M,M)		TYPE	RANK	CONC	YYMMDDH H	AT	RECEPTOR (M,M)		TYPE
	µg/m3			X	Y			µg/m3			X	Y	
1	31.76755b	16101224	AT	-7386.06	1302.36	GP	26	18.46289b	16101224	AT	1409.54	-513.03	GP
2	29.86217	16100624	AT	-7386.06	1302.36	GP	27	18.45138b	16101224	AT	-250	-433.01	GP
3	28.04897c	16100324	AT	-7386.06	1302.36	GP	28	18.44682b	16101224	AT	-321.39	-383.02	GP
4	22.31573c	16100324	AT	-6893.65	1215.54	GP	29	18.44663b	16101224	AT	-86.82	-492.4	GP
5	20.68466b	16101024	AT	-7386.06	1302.36	GP	30	18.43159b	16101224	AT	0	1000	GP
6	20.43836b	16101224	AT	-6893.65	1215.54	GP	31	18.42131b	16101224	AT	-383.02	-321.39	GP
7	20.08886b	16101224	AT	642.79	-766.04	GP	32	18.41869b	16101224	AT	-173.65	-984.81	GP
8	20.05264b	16101224	AT	766.04	-642.79	GP	33	18.38655b	16100224	AT	-7386.06	1302.36	GP
9	19.85982b	16101224	AT	500	-866.03	GP	34	18.37547b	16101224	AT	0	-500	GP
10	19.62545b	16101224	AT	866.03	-500	GP	35	18.34093b	16101224	AT	-433.01	-250	GP
11	19.54959	16100624	AT	-6893.65	1215.54	GP	36	18.33509b	16101224	AT	-171.01	469.85	GP
12	19.46523b	16101224	AT	342.02	-939.69	GP	37	18.32218b	16101224	AT	-86.82	492.4	GP
13	19.03742b	16101224	AT	1149.07	-964.18	GP	38	18.31399b	16101224	AT	-173.65	984.81	GP
14	18.99744b	16101224	AT	173.65	-984.81	GP	39	18.30083b	16101224	AT	-250	433.01	GP
15	18.97640b	16101224	AT	1299.04	-750	GP	40	18.27078b	16101224	AT	-342.02	-939.69	GP
16	18.86101b	16101224	AT	939.69	-342.02	GP	41	18.25559b	16101224	AT	0	500	GP
17	18.78303b	16101224	AT	642.79	766.04	GP	42	18.25242b	16101224	AT	-469.85	-171.01	GP
18	18.73651b	16101224	AT	766.04	642.79	GP	43	18.24721b	16101224	AT	-321.39	383.02	GP
19	18.73581b	16101224	AT	500	866.03	GP	44	18.21275b	16101224	AT	939.69	342.02	GP
20	18.66328b	16101224	AT	342.02	939.69	GP	45	18.21073b	16101224	AT	86.82	-492.4	GP
21	18.65688b	16101224	AT	964.18	-1149.07	GP	46	18.19162b	16101224	AT	-342.02	939.69	GP
22	18.63571b	16101224	AT	0	-1000	GP	47	18.16324b	16101224	AT	-500	-866.03	GP
23	18.53462b	16101224	AT	866.03	500	GP	48	18.15171b	16101224	AT	-383.02	321.39	GP
24	18.51113b	16101224	AT	173.65	984.81	GP	49	18.12781b	16101224	AT	-492.4	-86.82	GP
25	18.46609b	16101224	AT	-171.01	-469.85	GP	50	18.10312b	16101224	AT	984.81	-173.65	GP

PREDICTED 50 HIGH 24-HOURLY GROUND LEVEL CONCENTRATIONS OF OXIDES OF NITROGEN
SOURCES: PROPOSED 4000 MW POWER PLANT – TSGENCO

RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (M,M)		TYPE	RANK	CONC	YYMMDDHH	AT	RECEPTOR (M,M)		TYPE
	µg/m3			X	Y			µg/m3			X	Y	
1	18.18269b	16101224	AT	642.79	-766.04	GP	26	16.30034b	16101224	AT	-321.39	-383.02	GP
2	18.16802b	16101224	AT	766.04	-642.79	GP	27	16.25506b	16101224	AT	-383.02	-321.39	GP
3	17.92686b	16101224	AT	500	-866.03	GP	28	16.24864b	16101224	AT	984.81	-173.65	GP
4	17.75655b	16101224	AT	866.03	-500	GP	29	16.20077b	16101224	AT	-86.82	492.4	GP
5	17.49911b	16101224	AT	342.02	-939.69	GP	30	16.19220b	16101224	AT	-171.01	469.85	GP
6	17.24064b	16101224	AT	1149.07	-964.18	GP	31	16.17183b	16101224	AT	86.82	-492.4	GP
7	17.20110b	16101224	AT	1299.04	-750	GP	32	16.15911b	16101224	AT	-173.65	984.81	GP
8	17.00155b	16101224	AT	939.69	-342.02	GP	33	16.15893b	16101224	AT	-433.01	-250	GP
9	16.99222b	16101224	AT	173.65	-984.81	GP	34	16.15685b	16101224	AT	0	500	GP
10	16.84373b	16101224	AT	642.79	766.04	GP	35	16.13852b	16101224	AT	-250	433.01	GP
11	16.82850b	16101224	AT	964.18	-1149.07	GP	36	16.12958b	16101224	AT	-342.02	-939.69	GP
12	16.82598b	16101224	AT	766.04	642.79	GP	37	16.11424b	16101224	AT	750	-1299.04	GP
13	16.76233b	16101224	AT	500	866.03	GP	38	16.06805b	16101224	AT	-321.39	383.02	GP
14	16.70090b	16101224	AT	1409.54	-513.03	GP	39	16.05846b	16101224	AT	-469.85	-171.01	GP
15	16.64874b	16101224	AT	342.02	939.69	GP	40	16.00654b	16101224	AT	86.82	492.4	GP
16	16.64864b	16101224	AT	866.03	500	GP	41	15.99895b	16101224	AT	984.81	173.65	GP
17	16.58721b	16101224	AT	0	-1000	GP	42	15.98937b	16101224	AT	-342.02	939.69	GP
18	16.45497b	16101224	AT	173.65	984.81	GP	43	15.97498b	16101224	AT	-500	-866.03	GP
19	16.36463b	16101224	AT	-86.82	-492.4	GP	44	15.95620b	16101224	AT	-383.02	321.39	GP
20	16.36191b	16101224	AT	-171.01	-469.85	GP	45	15.94104b	16101224	AT	1477.21	-260.47	GP
21	16.34450b	16101224	AT	939.69	342.02	GP	46	15.92416b	16101224	AT	-492.4	-86.82	GP
22	16.32553b	16101224	AT	-250	-433.01	GP	47	15.90284b	16101224	AT	1000	0	GP
23	16.32540b	16101224	AT	0	1000	GP	48	15.89217b	16101224	AT	-433.01	250	GP
24	16.32397b	16101224	AT	-173.65	-984.81	GP	49	15.85565b	16101224	AT	171.01	-469.85	GP
25	16.31559b	16101224	AT	0	-500	GP	50	15.84500b	16101224	AT	-500	866.03	GP

PREDICTED 50 HIGH 24-HOURLY GROUND LEVEL CONCENTRATIONS OF OXIDES OF NITROGEN
SOURCES: OPERATING UNITS

1. **India Cements Limited - Cement Plant, Captive Power Plant and Mine**
2. **Parasakti Cements - Cement Plant and Mine**
3. **Penna Cements - Cement Plant, Captive Power Plant and Mine**
4. **Deccan Cements - Cement Plant, Captive Power Plant and Mine**
5. **Andhra Cements - Cement Plant and Mine**

RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (M,M)		TYPE	RANK	CONC	YYMMDDHH	AT	RECEPTOR (M,M)		TYPE
	µg/m3			X	Y			µg/m3			X	Y	
1	27.65560b	16101224	AT	-14000	0	GP	26	14.78936	16101624	AT	-6401.25	1128.71	GP
2	27.50176	16100624	AT	-14000	0	GP	27	14.77406	16102524	AT	-5638.16	2052.12	GP
3	24.14129c	16100324	AT	-14000	0	GP	28	14.28573c	16101424	AT	-7386.06	1302.36	GP
4	23.82712b	16101224	AT	-13500	0	GP	29	14.28049b	16101024	AT	-6893.65	1215.54	GP
5	23.52132	16100624	AT	-13500	0	GP	30	14.04058b	16100224	AT	-13500	0	GP
6	22.45875c	16100324	AT	-13500	0	GP	31	14.02224	16100624	AT	-14500	0	GP
7	22.39748c	16100324	AT	-7386.06	1302.36	GP	32	13.86084	16102524	AT	-6108	2223.13	GP
8	22.39294b	16101224	AT	-7386.06	1302.36	GP	33	13.72079	16101524	AT	-6893.65	1215.54	GP
9	21.9376	16100624	AT	-7386.06	1302.36	GP	34	13.28489c	16101424	AT	-13500	0	GP
10	20.29459c	16100324	AT	-6893.65	1215.54	GP	35	13.21156c	16100324	AT	-13000	0	GP
11	18.79056b	16101024	AT	-14000	0	GP	36	13.12822c	16102924	AT	-6893.65	1215.54	GP
12	18.55506b	16101224	AT	-6893.65	1215.54	GP	37	13.11868b	16100224	AT	-7386.06	1302.36	GP
13	18.41853c	16101424	AT	-6893.65	1215.54	GP	38	13.03668	16100624	AT	-7878.46	1389.19	GP
14	18.23267c	16102824	AT	-6108	2223.13	GP	39	12.88652	16100624	AT	-13000	0	GP
15	18.07569c	16103024	AT	-6577.85	2394.14	GP	40	12.62120b	16101224	AT	-13000	0	GP
16	16.68129	16100624	AT	-6893.65	1215.54	GP	41	12.51032c	16102624	AT	-11000	0	GP
17	16.40215c	16101424	AT	-14000	0	GP	42	12.48185c	16102924	AT	-13500	0	GP
18	15.80086b	16101024	AT	-7386.06	1302.36	GP	43	12.47116c	16100324	AT	-6108	2223.13	GP
19	15.71214b	16101024	AT	-13500	0	GP	44	12.31758c	16101424	AT	-6401.25	1128.71	GP
20	15.66556c	16102624	AT	-6108	2223.13	GP	45	12.23600c	16100324	AT	-7878.46	1389.19	GP
21	15.56867	16102524	AT	-13000	0	GP	46	12.13822c	16102624	AT	-6893.65	1215.54	GP
22	15.33193b	16100224	AT	-14000	0	GP	47	11.89654c	16102824	AT	-13000	0	GP
23	15.27315c	16102824	AT	-5638.16	2052.12	GP	48	11.86699c	16102624	AT	-13000	0	GP
24	14.84533c	16102924	AT	-13000	0	GP	49	11.85877b	16101224	AT	-11500	0	GP
25	14.83401c	16102624	AT	-6577.85	2394.14	GP	50	11.83839c	16103024	AT	-11500	0	GP

PREDICTED 50 HIGH 24-HOURLY GROUND LEVEL CONCENTRATIONS OF OXIDES OF NITROGEN
SOURCES: PROPOSED UNITS

1. **Proposed 4000 MW Power Plant - TSGENCO**
2. **Proposed Power Plant of KGPUL**
3. **Proposed Cement Plant and Limestone Mine of Myhome Cement Industries Ltd**

RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (M,M)		TYPE	RANK	CONC	YYMMDDHH	AT	RECEPTOR (M,M)		TYPE
	µg/m3			X	Y			µg/m3			X	Y	
1	18.91648b	16101224	AT	642.79	-766.04	GP	26	17.08034b	16101224	AT	-383.02	-321.39	GP
2	18.89640b	16101224	AT	766.04	-642.79	GP	27	17.07679b	16101224	AT	939.69	342.02	GP
3	18.66880b	16101224	AT	500	-866.03	GP	28	17.01786b	16101224	AT	-86.82	492.4	GP
4	18.48137b	16101224	AT	866.03	-500	GP	29	17.01607b	16101224	AT	-171.01	469.85	GP
5	18.25198b	16101224	AT	342.02	-939.69	GP	30	16.99459b	16101224	AT	-173.65	984.81	GP
6	17.94119b	16101224	AT	1149.07	-964.18	GP	31	16.99001b	16101224	AT	-433.01	-250	GP
7	17.89582b	16101224	AT	1299.04	-750	GP	32	16.97160b	16101224	AT	984.81	-173.65	GP
8	17.75707b	16101224	AT	173.65	-984.81	GP	33	16.96823b	16101224	AT	-250	433.01	GP
9	17.72451b	16101224	AT	939.69	-342.02	GP	34	16.96691b	16101224	AT	0	500	GP
10	17.60416b	16101224	AT	642.79	766.04	GP	35	16.95124b	16101224	AT	86.82	-492.4	GP
11	17.57545b	16101224	AT	766.04	642.79	GP	36	16.93926b	16101224	AT	-342.02	-939.69	GP
12	17.53747b	16101224	AT	964.18	-1149.07	GP	37	16.90273b	16101224	AT	-321.39	383.02	GP
13	17.53539b	16101224	AT	500	866.03	GP	38	16.89355b	16101224	AT	-469.85	-171.01	GP
14	17.43658b	16101224	AT	342.02	939.69	GP	39	16.83960b	16101224	AT	-342.02	939.69	GP
15	17.39246b	16101224	AT	1409.54	-513.03	GP	40	16.83521b	16101224	AT	750	-1299.04	GP
16	17.38840b	16101224	AT	866.03	500	GP	41	16.80860b	16101224	AT	86.82	492.4	GP
17	17.36612b	16101224	AT	0	-1000	GP	42	16.80072b	16101224	AT	-500	-866.03	GP
18	17.25734b	16101224	AT	173.65	984.81	GP	43	16.79379b	16101224	AT	-383.02	321.39	GP
19	17.16165b	16101224	AT	-171.01	-469.85	GP	44	16.76116b	16101224	AT	-492.4	-86.82	GP
20	17.15704b	16101224	AT	-86.82	-492.4	GP	45	16.73229b	16101224	AT	-433.01	250	GP
21	17.14487b	16101224	AT	0	1000	GP	46	16.72607b	16101224	AT	984.81	173.65	GP
22	17.13310b	16101224	AT	-250	-433.01	GP	47	16.70862b	16101224	AT	-500	866.03	GP
23	17.11847b	16101224	AT	-173.65	-984.81	GP	48	16.68441b	16101224	AT	-469.85	171.01	GP
24	17.11677b	16101224	AT	-321.39	-383.02	GP	49	16.67945b	16101224	AT	-642.79	-766.04	GP
25	17.10131b	16101224	AT	0	-500	GP	50	16.67633b	16101224	AT	-500	0	GP

PREDICTED 50 HIGH 24-HOURLY GROUND LEVEL CONCENTRATIONS OF OXIDES OF NITROGEN
SOURCES: EXISTING AND PROPOSED UNITS

PROPOSED SOURCES:

1. **Proposed 4000 MW Power Plant - TSGENCO**
2. **Proposed Power Plant of KGPUL**
3. **Proposed Cement Plant and Limestone Mine of Myhome Cement Industries Ltd**

OPERATING SOURCES:

1. **India Cements Limited - Cement Plant, Captive Power Plant and Mine**
2. **Parasakti Cements - Cement Plant and Mine**
3. **Penna Cements - Cement Plant, Captive Power Plant and Mine**
4. **Deccan Cements - Cement Plant, Captive Power Plant and Mine**
5. **Andhra Cements - Cement Plant and Mine**

RANK	CONC	(YYMMDDHH)	AT	RECEPTOR (M,M)		TYPE	RANK	CONC	YYMMDDHH	AT	RECEPTOR (M,M)		TYPE
	µg/m3			X	Y			µg/m3			X	Y	
1	30.38640b	16101224	AT	-14000	0	GP	26	20.20028b	16101224	AT	766.04	642.79	GP
2	30.36111	16100624	AT	-14000	0	GP	27	20.15336b	16101224	AT	342.02	939.69	GP
3	27.43251b	16101224	AT	-7386.06	1302.36	GP	28	20.14700b	16101024	AT	-7386.06	1302.36	GP
4	26.72872b	16101224	AT	-13500	0	GP	29	20.13629b	16101224	AT	0	-1000	GP
5	26.64603	16100624	AT	-7386.06	1302.36	GP	30	20.09127b	16101224	AT	964.18	-1149.07	GP
6	26.58548c	16100324	AT	-14000	0	GP	31	20.00897b	16101224	AT	173.65	984.81	GP
7	26.54734c	16100324	AT	-7386.06	1302.36	GP	32	19.99048b	16101224	AT	866.03	500	GP
8	26.45789	16100624	AT	-13500	0	GP	33	19.98885b	16101224	AT	-171.01	-469.85	GP
9	24.98914c	16100324	AT	-13500	0	GP	34	19.98025b	16101224	AT	-250	-433.01	GP
10	24.62962c	16100324	AT	-6893.65	1215.54	GP	35	19.97579b	16101224	AT	-321.39	-383.02	GP
11	23.91654b	16101224	AT	-6893.65	1215.54	GP	36	19.96221b	16101224	AT	-86.82	-492.4	GP
12	22.66334c	16101424	AT	-6893.65	1215.54	GP	37	19.95073b	16101224	AT	-383.02	-321.39	GP
13	21.63587	16100624	AT	-6893.65	1215.54	GP	38	19.94325b	16101224	AT	0	1000	GP
14	21.54774b	16101224	AT	642.79	-766.04	GP	39	19.93177b	16101224	AT	-173.65	-984.81	GP
15	21.50523b	16101224	AT	766.04	-642.79	GP	40	19.88496b	16101224	AT	0	-500	GP
16	21.32785b	16101224	AT	500	-866.03	GP	41	19.88358b	16101224	AT	1409.54	-513.03	GP
17	21.07346b	16101224	AT	866.03	-500	GP	42	19.87477b	16101224	AT	-433.01	-250	GP
18	20.94435b	16101224	AT	342.02	-939.69	GP	43	19.85726b	16101224	AT	-171.01	469.85	GP
19	20.81309b	16101024	AT	-14000	0	GP	44	19.83797b	16101224	AT	-86.82	492.4	GP
20	20.48655b	16101224	AT	173.65	-984.81	GP	45	19.83636b	16101224	AT	-173.65	984.81	GP
21	20.46542b	16101224	AT	1149.07	-964.18	GP	46	19.82949b	16101224	AT	-250	433.01	GP
22	20.40081b	16101224	AT	1299.04	-750	GP	47	19.79736b	16101224	AT	-342.02	-939.69	GP
23	20.30525b	16101224	AT	939.69	-342.02	GP	48	19.79162b	16101224	AT	-469.85	-171.01	GP
24	20.25401b	16101224	AT	642.79	766.04	GP	49	19.78252b	16101224	AT	-321.39	383.02	GP
25	20.21487b	16101224	AT	500	866.03	GP	50	19.76608b	16101224	AT	0	500	GP

ANNEXURE –4C

Government of Telangana
Irrigation & CAD Department

From
Sri C. Muralidhar, B.Tech,
Engineer-in-Chief (I),
2nd Floor, Jalasoudha,
Errum Mazil, Hyderabad.
EMAIL : enc_major@yahoo.co.in

To
The Chairman & MD, TSGENCO,
Vidyut Soudha
(Govt. Of TS Undertaking)
Khairatabad,
Hyderabad-500082.

Letter No. ENC (I)/DCE-I/OT1/AEE5/**YTPS (5x800 MW)**/2016, Dt: 24-12-2016

Sir,

Sub:- TSGENCO – Establishment of Thermal Power Plants of 4000 MW at Veerlapalem Village of Dameracherla Mandal of Nalgonda District – Preparation of Environmental Impact Assessment report for getting Environmental Clearance (EC) – Certain Information – Furnished – Reg.

Ref:-
1. G.O.Ms. No. 13, dated 30.01.2005.
2. Lr.No.CE/C/T/SE/TCD-1/EE/C/TCD-1/D.NO.302/16,dt:16.2.2016.
3. T.O.Lr.NO.ENC (1)/DCE-I/OT2/AEE5/YTPS (5x800 MW)/2015, dt: 22.02.2016
4. Lr. No. CE/ISWR/DD (K)/DEE4/4833/Industries/Vol.1, dt: 03.03.2016
5. Lr. No. CMD/CE/C/T/SE/TCD-I/EE/C/TCD, dated 28.09.2016.
6. T.O. Lr. No. ENC (1)/DCE-I/OT2/AEE5/, dated 01.10.2016
7. Lr. No. CE/NSP/CO/Hyd/Ot.2/AEE2/YTPS/1019 dt:06.10.2016
8. Lr. No. CE/NSP/CO/Hyd/OT.2/AEE2/YTPS/1075 dt:21.10.2016
9. T.O.Lr.NO.ENC (1)/DCE-I/OT1/AEE5/YTPS (5x800 MW)/2015, dt: 24.10.2016

SE/Tech.I

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Anent to the above subject matter and in continuation to our letter ref 9th cited, the information for the condition No.24 of ToR, MoEF & CC, GoI, New Delhi as requested in the ref 5th cited is as follows:

1. Sustainability of water even in lean season duly considering interstate shares (if any)

The KWDT-I has allocated 811 TMC to the erstwhile Andhra Pradesh, out of which the Andhra Pradesh has earmarked 299 TMC to the projects located in Telangana Region. The average utilization of Krishna Waters in Telangana region is about 256 TMC considering the utilizations data from 1972-73 to 2007-08 (i.e) 36 years. As such, the requirement of 3.154 TMC of water, to the proposed 5x800 MW super critical coal based Yadadri Thermal Power Station, at Veerlapalem (V), Dameracherla (M) of Nalgonda District will be met from the water allocated by KWDT-I for the State of Telangana. Hence, there are no Inter-State aspects involved/other competing downstream sources for drawl of 3.154TMC of water sanctioned for this power project.

Contd...2

2. Release minimum ecological flows in Tungapadu vagu

The "Tungapadu Bandam" stream passes through the power project area and joins river Krishna. This stream lies in K-7 sub basin of Krishna basin and receives substantial flows as regenerated water of NSLC command. In lean periods, the Department shall release minimum flows from the upstream reservoir (Pedda Cheruvu) which will ensure sustenance of the downstream ecology of the vagu.

Yours faithfully,
Sd/-C.Muralidhar, Dt;24.12.2016
Engineer-In-Chief (Irrigation)

1. Copy submitted to the Spl. Chief Secretary, I&CAD Dept., B-Block, Secretariat, T.S, Hyderabad for favour of information.
2. Copy to the Chief Engineer (Civil/Thermal), TSGENCO, Vidyut Soudha, Khairatabad, Hyderabad – 500082.
3. Copy to the Chief Engineer (ISWR), 2nd Floor, Jalasoudha, Hyderabad for information.
4. Copy to the Chief Engineer, AMR & SLBC, Stilt Floor, Jalasoudha, Hyderabad for information.

24/5/16
For Engineer-In-Chief (Irrigation)

GOVERNMENT OF TELANGANA **ANNEXURE –4D**
FOREST DEPARTMENT

From:
Sri K.Sudarshan Reddy,SFS.,
Forest Divsional Officer,
Nalgonda.

To:
The Chief Engineer/Civil/Thermal,
TSGENCO, Vidyut Soudha,
Hyderabad - 500082

Rc.No. 3561/2016/S6, Dt: 23.12.2016

Sir,

Sub:- TSGENCO – 4000 MW (5x800 MW) Super Critical Coal based Yadadri Thermal Power Station at Veerlapalem Village of Damercherla Tahsil, Nalgonda district, Telangana State – Preparation of Environmental Impact Assessment report for getting Environmental Clerance (EC) certain information – Report submitted – Reg.

Ref:- 1.CE/Civil/Thermal, TSGENCO, Vidyut Soudha, Hyderabad Lr.No.CE/C/Thermal/SE/C/TCD-I/F.Forest land/D.No.269/16, dt: 06.12.2016.
2. FRO, Miryalaguda Rc.No. 297/2016/M, dt: 21.12.2016.

* * *

With reference to the above subject cited, it is to inform that 1892.35 Ha RF land at was aquired at Veerlapalem R.F block for establishing the Yadadri Thermal Power Station. The Veerlapalem RF block falling in Compt. No. 41,42,43,44 & 45. The TSGENCO is going to rainee green belt in about 1300 Acres in degraded land near Comp.No. 44 & 45.

Further it is inform that, the Veerlapalem RF block is Tropical thorny dry deciduos Forest area. The prominent species are Billudu (Chloroxylonswetenia), Sandra (Accasia catechu), Narlinga (Albazzia Amara), Neelamarri (Mandulea suberoses), Jana (Grewia salvifollia), Nemilinara (Holoptelia integrifolia), Narayepi (Hardwikia bi pinneta) and Kanugu (Pongamia pinneta).

The Naravepa, Nemilinara species are highly suitable/recommended for this area. All these species can be raised in nurseries. At least one year old seedlings (bag plants) have to be planted in 0.60 m X 0.60 m X 0.60 m cube pits. Soil Moisture Conservation works like Continuous Contour Trenches, Percolation tanks, Rock fill dams and Check dams have to be taken up to improve the sub-surface moisture content which will help in the success of plantations.

Further it is informed that, the Forest Department will raise the required number of seedlings to the TSGENCO if they provide the necessary budget.

Yours faithfully,

Forest Divisional Officer,
Nalgonda.

ANNEXURE –4E

Penna Cement Industries Limited.

PCIL : YPS : 2016-17/22 April 26, 2016

The Project Director,
M/s. Yadadri Power Station,
TSGENCO,
Hyderabad.

Kind Attn : **Sri Radhakrishnan, Project Director**

Dear Sir,

Sub : **Allotment of fly ash from Yadadri Thermal Power Station to our cement plant situated at Ganeshpahad Village, Damarcherla Mandal, Nalgonda District** – Reg.

This has reference to the setting up of 4000 MW Thermal Power Plant under the name of Yadadri Power Station near Damarcherla Mandal, Nalgonda District by TSGENCO.

We have 1.0 MTPA cement plant in Ganeshpahad Village, Damarcherla Mandal, Nalgonda District operating since 2000. For the production of PPC cement at this plant, we need about 300 tons per day of fly ash regularly.

We will be interested to procure the same from your plant once the power plant comes into operation.

This is for your information and necessary action.

Thanking you,

Yours faithfully,
For PENNA CEMENT INDUSTRIES LIMITED,

(S. KRISHNA KUMAR)
DGM (PURCHASE)

1000 000 lakh/annum
OPC + PPC
2740 TPD

Lakshmi Nivas 705, Road # 3, Banjara Hills, Hyderabad, Telangana, India. Pin code : 500034
Phone : 040 - 44565100 / 400, Fax : 040 - 44565145 / 44565222 / 44565310. www.pennacement.com
CIN : U26942AP1991PLC013359

PARASAKTI CEMENT INDUSTRIES LIMITED

Parasakti CEMENT

Date: 26th April, 2016

To,
The Chief Engineer /Civil/Thermal,
TS Genco, Vidyut Soudha,
Hyderabad – 500 082.

Sir,

Subject: Lifting of Flyash from proposed Yadadri Thermal Power Station (5x800MW), Near Veerlapalem Village, Dameracherla Mandal, Nalgonda district, Telangana.

We are one of the leading cement manufacturing companies in South India with a production capacity of 1.2 Million tones out of which 25% of PPC to cater various clients in the states of South India.

We are willing to lift the dry fly ash about 6000 MTs per month from your upcoming Yadadri Thermal Power Station (5x800MW), Near Veerlapalem Village, Dameracherla Mandal, Nalgonda District, to be commissioned in the year 2017 at free of cost by entering the long term agreement for period of not less than 10 years.

We assure you of our best services at all times and would like to foresee mutually beneficial long standing association with you.

Thanking you,

Yours faithfully,

For Parasakti Cement Industries Ltd,

Authorised Signatory.

16.8 lakhs / annum
OPC + PPC
4602 TPD

Regd.Off:
8-3-214/21, Srinivasa Nagar Colony (West),
Hyderabad-38. Phone: +91 40 44119100 / 200,
Fax: +91 40 23747562

Factory:
Jettipalem Village, Post - 522 421,
Rentachintala Mdl, Guntur Dist., A.P.
Phone: 0863 2344600, 98667 00014

Internet:
www.parasakticement.com
info@parasakticement.com
CIN: U26942TG1993PLC015764

NAGARJUNA CEMENT

To,

Date: 25/04/2016
Hyderabad.

The Chief Engineer/Civil/Thermal,
TSGENCO, Vidyut Soudha,
Hyderabad – 500082

Sir,

Sub. Lifting of dry fly ash from proposed Yadadri Thermal Power Station (5x800 MW), Veetalapalem(V). Dameracherla (M), Nalgonda Dist.

****

We are one of the leading cement manufacturing Companies in South India with a production capacity of 2 Million Ton out of which almost 45 % is PPC grade and is catered to various clients in South India.

We are willing to lift the dry fly ash of about 3000 MT per month as per our factory requirement specification from your upcoming Yadadri Thermal Power Station (5x800 MW), Veerlapalem(V),Dameracherla(M), Nalgonda District to be commissioned in the year 2019 at free of cost by entering the long term agreement for a period of not less than 10 years.

We assure you best of our support at all times and would like to foresee long standing association with you.

Yours Faithfully,
For M/s. NCL Industries Limited,

Utkal Goradia – DGM Purchase
(M) 09390801010 (P) 040-30120000

EE-1
25/4/2016.

THE INDIA CEMENTS LIMITED

Regional Office: "White House", Block III B, 3rd Floor, 6-3-1192/1/1, Kundanbagh, Begumpet, Hyderabad - 500 016
Phones : 040-23417317, 23417319 to 321 Fax: 040-23417324

26th April 2016

Chief Engineer
Civil / Thermal
TSGENCO
Vidyut Soudha
Hyderabad

Dear Sir,

Sub: Dry Flyash from Yadadri TPP in Damarcherla, Nalgonda Dist.

We understand that TSGENCO is coming up with a 5 X 800 MW coal based thermal power project (Yadadri TPP) at Damarcherla Mandal in Nalgonda District of Telangana and that Phase-1 of the project is expected to be commissioned in FY 2019-20.

We are operating a large cement plant at Vishnupuram, which is located close by and would be interested in taking about 500 MT/Day of Dry Flyash from Yadadri TPP, subject to mutually acceptable terms & conditions, for manufacture of Portland Pozzolana Cement at our plant.

Yours faithfully,
For The India Cements Ltd

I.Gopinath
Sr. Vice President
Corporate Affairs

Registered Office: "Dhun Building", 827 Anna Salai, Chennai - 600 002.
Corporate Office : "Coromandel Towers", 93 Santhome High Road, Karpagam Avenue, RA Puram, Chennai - 600 028.
Corporate Identity No: L26942TN1946PLC000931 Website : www.indiacements.co.in

DECCAN CEMENTS LIMITED

CIN : L26942TG1979PLC002500
REGD OFFICE : 6-3-666/B,
"DECCAN CHAMBERS", SOMAJIGUDA,
HYDERABAD - 500 082.
PHONE : +91 (40) 23310168, 23310552,
+91 (40) 23310561, 23310599
FAX : +91 (40) 23318366
E-MAIL : info@deccancements.com
WEBSITE : www.deccancements.com

Date: 30.04.2016

TO
CHIEF ENGINEER / CIVIL / THERMAL
TELANGANA STATE POWER GENERATION CORPORATION LTD.
A-BLOCK,
VIDYUTH SOUDHA,
KHAIRATABAD,
HYDERABAD,
TELANGANA STATE.

Dear Sir,

Sub: To lift dry Fly Ash from Yadadri Thermal Power Station (5 x 800 MW), Veerlapalem (V), Damarcherla (M), Nalgonda Dist, Telangana – Reg.

We are one of the leading Cement Manufacturers In South India. We are willing to lift Dry Fly Ash 150 MT/ Day as per our factory requirement / specification from your proposed Yadadri Thermal Power Station at Veerlapalem (V), Damarcherla (M), Nalgonda Dist, Telangana State at free of cost by entering the long term agreement for a period of Ten Years.

Thanking you,

Yours Faithfully,

For Deccan Cements Ltd

30/04/16

DECCAN CEMENTS LIMITED Hyd.

(D.SIVAJISIMHARAI)

Manager (Purchase)

Mobile No: 9490729384

Mail I.D: sivaji.d@deccancements.com

ACL/JAL/2016/FA/2366
26th April, 2016

ANDHRA CEMENTS LIMITED
DURGA CEMENT WORKS

The Chief Engineer (Thermal)
Telangana State GENCO
Vidyut Soudha, Khairatabad
HYDERABAD.

Sub: Lifting of Flyash from proposed Yadadri Thermal Power Station – Reg.

Dear Sir,

With reference to the subject cited above and discussions with your Good selves, we submit as follows:

1. Andhra cements Limited (ACL) is manufacturing cement from the production facilities located at Dachepalli Village of Guntur District.

2. Jaypee group has taken over the management control of ACL in February 2012.

3. Proposal to enhance the production capacity of Cement to 5.31 MTPA from existing 2.31 MTPA is at an advance stage, tentatively schedules of operation to commence end of 2019.

4. ACL proposes to lift 10000 to 15000 MT per annum of Dry Flyash from upcoming YTPS (Yadadri Thermal Power Station).

5. Above mentioned quantity shall be supplied to us on Free of Cost Basis.

6. Once YTPS is operational, we shall enter into a long term agreement for a period of 10 years above.

7. Proposal mentioned herein is subject to our production facility being operational as scheduled. ACL shall not be penalised for non-lifting / delay in lifting of flyash as detailed in this proposal owing to delay in project Implementation of ACL.

Thanking You,

Yours faithfully,
For Andhra Cements Limited

(R K DOODA)
Sr. Vice President

JAYPEE GROUP

ANDHRA CEMENTS LIMITED
Regd. Office & Factory: Durga Cement Works, Durgapuram, Srinagar (P.O), Dachepalli - 522 414, Guntur Dt. Andhra Pradesh
Ph : +91-8649-257428-29, Fax : +91-8649-257449

SRI CHAKRA
CEMENT LIMITED
Admn. Office: CONCRETE HOUSE
A 3 & A 10,66 Durga Nagar Colony,
Hyderabad - 500 082
Tel: (O) 040-66123344 66134635
Fax: 040-23404657
E-mail: srichakra.cement@gmail.com

Date:26.04.2016

To,
The Chief Engineer-Civil/Thermal.
TSGENCO. Vidyut Soudha.
Hyderabad – 500082

Sir,

Sub: Lifting of fly Ash from proposed Yadadri Thermal Power Station (5 x 800 MW), Damercherla (M), Nalgonda Dist.

****

We are one of the leading cement manufacturing Companies in South India with a production capacity of 2000 TPD Out of which 50.% of PPC to cater various clients in the states South India.

We are willing to lift the dry fly ash about 100 MT per day from your upcoming Yadadri Thermal Power Station (5x800 MW), Damercherla (M), Nalgonda District to be commissioned in the year 2019 at free of cost by entering the long term agreement for period of not less than 10 years.

We assure you of our best services at all times and would like to foresee mutually beneficial long standing association with you.

Yours Faithfully,
For M/s. Sri Chakra Cement Ltd.

T.Ramasuri
GM (Commercial)

ISO 9001 : 2008, ISO 14001 : 2004 and
BS OHSAS 18001 : 2007 Company
Award of Excellence in CSR by FAPCCI
CIN : L26942MH1983PLC265166

Anjani Portland Cement Ltd
(A Subsidiary of Chettinad Cement Corporation Limited)

ANJANI CEMENT

Ref : APCL/TSGENCO/Fly-Ash/2016-17. 28.04.2016.

To,

The Chief Engineer (Civil / Thermal **)**
T S GENCO,
Vidyut Soudha
HYDERABAD – 500 082.

Dear Sir,

Sub : To lift Fly-Ash from proposed Yadadri Thermal Power Plant, Damarcherla, Nalgonda-Dist., Telangana-Reg.

This is bring to your kind information that we are one of the leading Cement manufacturing company in South India with a production capacity of 01 million Tons, out of which 20 to 30% PPC to cater various clients in the states of South India.

Hence, we are willing to lift the Dry Fly-Ash about 200-250 MTs per day (provided the quality of Fly-Ash as per our requirement) from your upcoming Yadadri Thermal Power Plant, Damarcherla, Nalgonda-Dist., at free-of-cost by entering the long term agreement.

As per Ministry of Environment and Forest (NoEF), New Delhi, State Pollution Control Board directions and also to encourage waste minimization by producing more PPC and encourage CO_2 (Carbon-Di-Oxide) reduction for Environmental Protection,

We assure you of our best services at all times and would like to foresee mutually beneficial long standing association with your Organization.

Thanking you,

Yours faithfully,

for **ANJANI PORTLAND CEMENT LIMITED**

3000 TPD
OPC + PPC
10,35,000 MTPA

Authorized Signatory

TIN & CST :36684105579 CELL:9704400810,9701804899

RAVI TRADESRS (BRICKS)

7/79,Chowdary Colony,Saraswathi Sishumandir opp Road,

MIRYALAGUDA – 508207 , Nalgonda Dist. (T.S)

Ref: Date: 12-01-2017

To,

The Chief Engineer(Civil)

TS Genco,

Vidyuth Soudha,

Khairatabad,

Hyderabad.

Sub:- Permission request to lift Pond Ash Lifting and transporting to various bricks manufacturing Units From Yadadri thermal power Plant,Damaracharla Nalgonda Dist to Various Brick manufacturing units in Telangana State.

Dear sir,

My name is Ravulapalli.Ravi Kumar, resident of Miryalaguda, nalgonda Dist, we have brick manufacturing units in various locations in telangana state. We required ash pond Fly ash from Yadadri Thermal Power Plant Damaracharla to use in bricks manufacturing units, so we kindly request you that to give the required five years (5 years) permission to lift and transport the pond ash. As per our requirement we can lift pond ash per day 700 to 1000 tons daily.

Thanking you sir,..

Yours sincerely,

Ravulapalli.Ravi kumar.

PROCEEEDINGS OF THE ENVIRONMENTAL PUBLIC HEARING FOR THE PROPOSED 5 X800 MW COAL BASED YADADRI THERMAL POWER STATION BY TSGENCO AT VEERLAPALEM VILLAGE, DAMARCHERLA MANDAL, NALGONDA DISTRICT ON 31.05.2016 AT 10.00 AM AT PYLON AREA IN THE PREMISES OF PROPOSED SITE OF 5X800 MW COAL BASED YADADRI THERMAL POWER STATION, VEERLAPALEM (V), DAMARCHERLA (M), NALGONDA DISTRICT.

The following members have attended the meeting:

Sl. No.	Name of the Panel Member	Designation
1.	Sri P. Sathyanarayana Reddy, IAS, Collector & District Magistrate, Nalgonda	Chairman
2.	Sri G. Hanumantha Reddy, Environmental Engineer (FAC) T.S. Pollution Control Board, Regional Office, Nalgonda.	Member

The following Government officials were present at the venue

Sl. No.	Name & Designation
1.	Dr. N. Satyanarayana, IAS, Joint Collector & Additional District Magistrate, Nalgonda.
2.	Sri B. Kishan Rao, Revenue Divisional Officer, Miryalaguda, Nalgonda District.
3.	Sri G. Ganesh, Tahsildar, Damarcherla (M), Nalgonda District.
4.	Sri P. Suresh Babu, AEE, TSPCB, RO, Nalgonda.
5.	Sri T.Ravindar, Analyst Gr-1, TSPCB, RO, Nalgonda.

The following representatives of TSGENCO were present at the venue

Sl. No.	Name & Designation
1.	Sri C. Radhakrishna Director/Projects & Chairman & Managing Director (I/C) M/s. Telangana State Power Generation Corporation Limited.
2.	Sri S. Ashok Kumar, Director/HR, Telangana State GENCO.
3.	Sri A. Ajay, Chief Engineer /Civil/Thermal, Telangana State GENCO.

About **3000** public from the surrounding villages attended the public hearing meeting and Hon'ble Member of Parliament- Nalgonda and Hon'ble MLA of Miryalaguda constituency and other local body representatives took part in the meeting.

At the outset the Environmental Engineer, T.S. Pollution Control Board, Regional Office, Nalgonda welcomed the gathering and invited the Collector & District Magistrate, Nalgonda to preside over the meeting. Further, he welcomed the TSGENCO officials, public representatives, the public gathered at the venue and press. He explained the salient features of the notification S.O. 1533(E), dated 14-09-2006 issued by the Ministry of Environment and Forest, Govt. of India under the Environment (Protection) Act, 1986. He stated that the public consultation process has been made mandatory for the projects listed in Schedule –A &B1 of EIA Notification, 2006 for obtaining Environmental Clearance from the Ministry of Environment of Forest & Climate Change, Govt. of India. He further explained that as per the provisions of EIA Notification, public opinion regarding the proposed project was invited in writing from the public by giving an advance notification in Namaste Telangana (Telugu daily) and The Hindu (English daily) newspapers on 30.04.2016. The public were given 30 days time to submit their opinions, objections, suggestions

etc. in writing. The Executive summaries both in Telugu & English and the EIA reports were displayed for access to the public as mentioned in the press notification.

He further stated that as a part of the programme the project authorities would explain the environmental aspects of the proposed project and then the people would be given an opportunity to elicit their opinion. The project authorities would give replies to the issues raised during the hearing before concluding the hearing process. He further explained that all the proceedings of the public hearing would be recorded and forwarded to the Ministry of Environment, Forests & Climate Change (MoEF&CC), Govt. of India for further course of action. He then requested the Collector & District Magistrate, Nalgonda to preside over the public hearing.

The Collector & District Magistrate, Nalgonda while welcoming Hon'ble MP & MLA, and other officials, media and the public gathered at the venue, requested the representatives of TSGENCO to explain the salient features of the proposed project.

Sri C. Radha Krishna, Chairman and Managing Director (I/C) - TSGENCO welcomed the dignitaries on the dais and the public and expressed the following.

He stated that he has been deputed on behalf of the CMD of TSGENCO and gave a brief account on the development status of the power sector in the State. The brief details are as follows:

- Power sector is the core sector of growth in the economy and more so in the newly formed State of Telangana. There is a power deficit of 2700 MW after formation of Telangana State w.e.from 02.06.2014. To tide over this power crisis to some extent, the government has been purchasing power from other states at higher cost.
- Hon'ble Chief Minister has envisioned a power –surplus Telangana State by the end of 2018. In pursuance to his orders, the State generation utility TSGENCO is working to realise the ambitious goal of building a 'Golden Telangana' and to meet power requirement for water grid schemes, lift irrigation,24 hours power supply to the entire state,9 hours power supply to agricultural sector, uninterrupted supply to industries and other sectors .
- In this regard, TSGENCO has proposed to establish power plants viz, 800 MW Kothagudem Thermal Power station (Stage-VII) at Paloncha,1080MW (4 x270 MW) Bhadadri Thermal Power Station at Manuguru in Khammam district and 4000 MW Yadadri Thermal Power station at Damaracherla in Nalgonda district with total investment of Rs. 39000 crores approximately. For this ,they obtained financial closure from REC and PFC which are Central Government agencies.
- The proposed Yadadri Thermal Power Station (5x800 MW) is being developed by TSGENCO with the financial assistance from Rural Electrification Corporation and Power Finance Corporation at an investment of Rs.25,099.42 crores.
- The Expert Appraisal Committee of MoEF&CC, GoI, New Delhi has issued the terms of reference to the project on **16-02-2016** for conducting EIA studies. Accordingly, the draft Environmental Impact Assessment study has been conducted by the accredited consultant as per the Standard terms of reference issued on 02.11.2015.

- The project is designed by adopting latest and most efficient technology in thermal power projects. An amount of Rs. 2410 crore is envisaged towards the implementation of pollution control measures.

- The proposed (5 x 800 MW) 4000 MW Supercritical Plant will be the First in terms of capacity at one place in the country, undertaken by Government Sector Utility.

- The Project is based on the Super Critical Technology which has been made mandatory by the Ministry of Power, Government of India for all the Projects establishing after 01.04.2017.

- The Units will not have a Boiler Drum, but only Tubes which circulates water and the water heated by the fire in the furnace, duly converting into RH steam, SH steam and is finally let into Turbine for running the Machines duly producing electricity from the Generator.

- The temperature of main stream will be 565 Degrees Celsius and re-heater steam will be 593 Degrees Celsius. The steam capacity of the Unit will be 2420 Tonnes per hour and the pressure will be 247 Kgs per Centimeter Square.

- The requirement of water will be 9755 Cubic Meters per hour. The Boiler is designed for pulverized coal either 100% imported Coal or 50% imported + 50% Indigenous coal. The chimney will be 275 meters high, 2 nos with twin flue arrangements for four Units and one for fifth unit.

- The coal requirement will be 138 Lakh Tonnes Per Annum with 50% imported coal + 50% indigenous and 110 Lakh Tonnes if it is 100% imported.

- The station heat rate will be 2109.4 Kcal per Kwhr.

- The natural draft cooling tower (NDCT) of height 170 meters with a COC of 5.

- As per the latest Paris Summit held in December, 2015 the latest environmental norms will be implemented in this project. The SPM levels will be 30 mg/Nm^3 and NOx will be 100 mg/Nm^3. To achieve these parameters additional ESPs will be provided. Modification of Boiler Mills and Flue Gas Ducts will be added to achieve the NOX levels. For achieving SOx levels of 100mg/Nm^3 FGD Plants will be installed. All these will be incorporated in this Project.

- Also 39 Lakh Tonnes of fly ash will be generated per annum and this will be utilized 100% within a period of 3 years and this has been committed to MOEF. There are 22 cement factories around plant and they have assured for lifting of fly Ash from above plant.

- Setting up of latest electro static precipitators with 99% efficiency to control dust emissions and an additional ESP field is also proposed to bring the dust emission as per the latest norms adopted at Paris convention, 2015 i.e. to bring down the dust emission below 30 mg/m3.

- To control NOx, Ammonia will be used,through SCR(Selective Catalytive Reduction) mechanism which will bring down the NOx concentration below the standard levels as stipulated in the norms.

- Flue gas desulphurisation(FGD) plant is proposed to bring down the sulphur concentration levels as stipulated in the ToR.

- The estimated quantum of coal requirement is 13.81 mtpa, which includes 50 per cent of indigenous coal and 50 per cent imported coal with the average GCV of coal as 455 k.Cal/kg.

- The make-up and consumptive water requirement is assessed as 9755 cum/hr which will be sourced from the river Krishna.

- Five natural draft cooling towers are envisaged to recycle the water with COC 5.

- It is also contemplated to establish Effluent Treatment Plant, Ash water recovery system and Sewage Treatment Plant with recycling system to utilise the treated water for development of green belt and floor washings, dust suppression in coal plant areas and ashing requirements.

- The TSGENCO has allocated Rs. 100 crores towards the implementation of development works such as water supply, repairs to the school buildings, construction of roads, toilets in the surrounding villages under corporate social responsibility of TSGENCO.

- An amount of Rs. 285.81 crores towards land compensation, R&R package and other charges was deposited with the District Collector, Nalgonda in the month of January 2016 for acquiring Ac. 854.32 Gts of patta lands and Ac. 920.25 Gts of ROFR land.

- In addition to the above, about Rs. 198 crores was deposited with the Forest Department towards NPV of forest land which includes raising and maintenance under compensatory afforestation over an extent of 4676 acres.

- Establishment of this project has certain beneficial impacts in terms of bridging the power demand-supply gap and providing employment opportunities that will be created during the course of construction and operation phase as well.

He then sought support to the proposed thermal power station as it will give required boost to the power generation capacity and also to make the State to attain self-sufficiency in respect of power.

The District Collector has requested the public gathered at the venue of public hearing to offer their views, comments, suggestions and objections, if any, on the proposed thermal power project. He also requested Hon'ble Member of Parliament, Nalgonda constituency to offer his views on the proposed thermal power plant.

1. Sri Gutta Sukhendar Reddy, Hon'ble Member of Parliament, Nalgonda after customary address he has stated that this is the biggest project after the formation of the State and any development will have some adverse impact. Electricity is a quintessential requirement like water. This project will help to enhance the supply of power from 6-hrs to 9 hrs for agriculture. After commissioning of the project, there will be no power cuts in the State. At present the State is purchasing power from Chattisgarh State at an average cost of Rs. 6/- per unit which will come down drastically to Rs. 4-5/- per unit. Government of India banned the setting up of new units based on sub-critical technology and this project utilises the latest super-critical technology. Moreover, the compensation is paid as per the Land Acquisition Act, 2013.

Necessary infrastructure will be promoted in surrounding villages with the advent of the proposed thermal power project. There is an extent of 650-acres of land without pattas but under cultivation in Thallaveerappagudem panchayat, for which compensation has to be paid on par with patta lands. He has requested the District Administration and CMD, TSGENCO to take necessary action in that direction. He further requested CMD to engage the local labourers for construction purposes and provide employment to the local people in the project by giving priority for the land oustees. He added that Hon'ble CM was kind enough to release compensation liberally to all classes of lands lost under the project. He expressed profound gratitude to all scheduled tribe people and other land losers for parting their lands to facilitate the setting up of this project. Finally, he thanked the district administration for their excellent effort and cooperation in ensuring the timely acquisition of land for the project.

2. Sri N. Bhaskar Rao, Hon'ble Member of Legislative Assembly, Miryalaguda, after customary address, he specifically thanked the Hon'ble CM for choosing this location for setting up this mega power project. There were several apprehensions over the implementation of this project initially. In fact, few villagers have lost their lands. On behalf of the people of his constituency, he assured full cooperation to the implementation of this project. There are no pattas for 740-acres of land, however, he assured them that the compensation will be worked out to render justice to them. He expressed his gratitude to the Hon'ble Minister for Power in expediting the process of compensation payment. He requested the management of TSGENCO to reciprocate on the same lines by timely completion of the works on the project. He has further stated that there are no political differences in respect of this project and assured the officials of cooperation from the leaders cutting across the party lines and from the people as well. He expects that Damarchela area will be transformed economically and socially as the land rates are increasing with the setting up of this project from 50-lakhs to 1.0 crores. He has assured that work will be provided to all eligible local people without their political affiliations. He expressed his gratitude to the people for extending the unequivocal support for setting of this important mega project which enabled him to keep up his word given to the Hon'ble CM.

3. Sri Shankar Naik, ZPTC Member- Damarcherla, after customary address he welcomed the project. He has stated that Kapoor thanda and Veerlapalem people are affected by this project and employment is not provided to the B. Tech graduates as was done in the case of ITI trained people. Compensation has not been paid so far to the crops damaged by the recent hail storm and urged the authorities to expedite the process of compensation.

4. Smt. Mangamma, President - Mandal Praja Parishad, Damarcherla welcomed the setting up of the project. She has requested for payment of compensation to the land holders as there are no pattas vested with them, who are mainly from backward classes. She demanded the payment of compensation within a month time on par with the patta lands and provision of employment to the people of the mandal.

5. Sri Kotya Naik, Sarpanch- Veerlapalem, after the customary address to the chair, he has stated that the land acquisition process has been completed in his village, which includes forest land also. He has brought out the problem of losing the grazing area of the cattle and the dung-storing grounds and sought alternate land to compensate the loss. People would be happier if

employment is provided on priority to the project displaced persons. He has requested for expediting the process of compensation to the remaining land. He appealed to TSGENCO not to engage the labourers from outside area and only local labourers should be engaged during the construction and operation phase.

6. Smt. Aruna Balu, MPTC member, Veerlapalem welcomed the project.

7. Sri Balu Naik, Husband of MPTC member-Veerlapalem has stated that farmers of the village have lost their agricultural lands due to the proposed thermal project and have been paid Rs. 7.0 lakhs per acre. Endowment lands are not paid so far. He demanded the authorities for payment of Rs. 6 lakhs to the non-right holders. He sought employment to the local people and demanded that no outsider should be engaged. The village lost its grazing ground to cattle and suitable place should be identified in the adjacent forest areas. He sought the establishment of corporate hospital with health card worth of Rs. 5.0 lakhs to be provided to each villager.

8. Sri G. Kotaiah, MPTC member, Thallaveerpaqudem supported the setting up of the power project as it would boost the rural economy.

9. Smt. J. Rajyalakshmi, Sarpanch, Thallaveerpaqudem urged the authorities to make adequate payment of compensation to the lands lost under the proposed project and employment to the people of her village as per eligibility.

10. Sri D. Narayana Reddy, PACS Chairman- Veerlapalem, after customary address, he has stated that about 174 families have lost their lands and has requested the government to allot double-bed room houses to all of them. He sought facilities to the land losers on par with BCs and SCs. He demanded for the setting up of an ITI to train adequate number of local youth in skills required by the project, as the existing private ITI is having a limited intake capacity of 30-40 members only. He demanded employment to all eligible people of the area.

11. Sri B. Hanuma Naik, R/o Moduqulkuntathanda welcomed the setting up of the project.

12. Sri Eeshwar, R/o Kapoorthanda raised the issue of losing his complete land under this project and sought justice by way of providing employment to all such people.

13. Sri G. Surya Naik, R/o Moduqulakuntathanda sought enhancement of compensation to the lands lost by them as the existing compensation is not adequate enough.

14. Sri Vasha Naik, R/o Moduqulakulathanda has stated that the compensation is not commensurate with the market rate and sought payment as per the value determined locally. He wanted that resettlement colony could be located near Shanthi Nagar. He also requested for payment of compensation to the lands under enjoyment of local people (assignee land).

15. Sri Chandrasekhar Yadav, CPI(M) Leader has stated that water is available, land is available and people have sacrificed their lands for setting up of this project. Keeping this in view, compensation should be paid to the farmers of surrounding thandas. He demanded employment to all eligible people irrespective of their party affiliations. Earlier, the managements

of cement factories located in the mandal discriminated the local people by not providing employment to the local people. Instead, they brought the people from outside, leaving dust pollution to the locals. He cited the examples of M/s Deccan Chromates, M/s India Cements Limited to prove his case. He warned of agitation in case the local land losers and other affected people are not provided employment in the proposed project.

16. Sri A. Balu Naik, R/o Veerlapalem demanded employment to one member from each family and free supply of electricity and water. He requested for the establishment of a hospital to cater to the needs of the people.

17. Sri Mohd. Yousuf, TDP Leader, R/o Wadapally (V), Damarcherla (M) stated clearly that all political parties irrespective of their party affiliations welcomed the setting up of the proposed project. He wanted to know about the actual number of people to be provided direct employment in this project. About 180 families were displaced on account of acquisition of their properties and they should be provided employment on priority basis. He hoped that adequate steps would be taken to prevent the contamination of Krishna river water from dust pollution, which used to serve as drinking water source for thousand people living in these areas. There is no information on this aspect in the draft EIA report. There were instances of non-payment of compensation even after acquisition of lands and the people had bitter experiences on this count earlier. He sought compensation to the loss of agriculture crops in case of any such instances of pollution. He demanded for the allotment of double-bed room houses as part of compensation.

18. Sri A. Parsha Naik, ex-Sarpanch - Veerlapalem demanded adequate compensation to the project affected people belonging to Veerlapalem and Thallaveerappagudem. He thanked profoundly for payment of compensation to about 80% of land losers and requested for the expeditious payment of compensation for the remaining people of TV Gudem.

19. Sri D. Balaji Naik, Mandal President, TRS party-Damarcherla assured cooperation of local people to the proposed project and sought employment on priority basis to the people of Damarcherla mandal only. He hoped that Damarcherla would become a mega city in near future and the electricity generated from this project would provide uninterrupted supply of power to the entire state of Telangana.

20. Sri M. Kishan Naik, TRS Leader, R/o Narsapuram thanda spoke bilingually. He stated that Scheduled Tribe dependent on agriculture for their livelihood and there should be adequate place to store the natural organic fertiliser like cow dung etc. Pollution has troubled them frequently. He pointed out that STs being un-educated were not provided with pattas to the lands cultivated by them and demanded payment of compensation to all such lands. He also dwelt about the people who left these areas in search for suitable employment and all such people should be provided compensation.

21. Sri K. Saidulu, TRS activist, R/o Wadapally thanked the Hon'ble CM for selecting the location to set up this mega project. He requested for the payment of compensation to the lands lost under the project. He also requested for coverage of entire mandal under CSR. He further

requested for setting up of institutions to cater to the needs of people under KG-PG free education scheme.

22. Sri Veera Koti Reddy, Ex-PACS Chairman, Damarcherla while welcoming the project requested the payment of compensation to the residents of TV Gudem and sought an assurance in respect of provision of employment. An ITI should be established in this mandal for attaining the technical skills required for the project by the local people and preference on provision of employment. Most of the people in the thandas (Veerlapalem, Veerappagudem & Modugulathanda) surrounding this project have lost their lands and needed rehabilitation and requested for provision of 500-Sq. yards of homestead land to accommodate their cattle. Since the area up to 10-km radius will be impacted by pollution, there will be corresponding increase in temperature and requested to take suitable measures. In all such cases, employment should be provided as measure of compensation.

23. Sri Kokala Venkateshwarlu, Congress Party SC cell Coordinator & Chairman - Lift Irrigation Scheme stated that the project site covers the route of existing pipeline and requested the realignment of pipeline and the construction of pump house. He expressed happiness that the new state was formed and new power station would come up. He cited the case of M/s India Cements Limited that fertile lands of black cotton soil were acquired and resulted in the loss of agriculture income. He sought the name of TV Gudem to be incorporated in the title of the project along with name of Veerlapalem village. Several forest cases were filed against the people of TV Gudem for taking up illegal cultivation earlier, for all such lands he demanded payment of compensation at the rate of Rs. 6 lakhs per acre. The actual occupants of such lands should be identified and compensation should be paid to them only. In survey number 26, an extent of 78 acres of land is being cultivated by 30 families, only assignment pattas were issued in their favour and some of them disposed their lands. However, the land remained in the name of original assignee. He sought in all such cases the present occupant should be ascertained before effecting payment of compensation.

24. Sri Suddha Saidaiah, R/o TV Gudem stated that only 100-acres of land are covered under pattas and the remaining 700-acres of land are classified as forest land under cultivation. He sought provision of employment to all the land oustees. He demanded the development of infrastructure like roads, which needs to be converted as CC roads and construction of Ramalayam temple. He sought adequate compensation to 700-acres of land located in TV Gudem. He also sought the name of TV Gudem to be incorporated in the title of the project along with name of Veerlapalem village.

25. Sri R. Saidulu, R/o TV Gudem thanked the people of TV Gudem for supporting the setting up of the project. He demanded payment of compensation at the rate of Rs. 6 lakhs per acre and provision of employment for one member. In case of lands under enjoyment, Rs. 5 lakhs per acre and provision of employment for one member.

26. Sri A. Karunakar Reddy, Mandal President - YSRCP, Damarcherla welcomed the setting up of the project. He stated that about 80% of the land oustees received compensation

and about 20% yet to be compensated. He sought construction of a corporate type hospital for providing free health care and institutions for imparting free education.

27. Sri Venkateshwarlu, R/o Ganeshpahad alleged that not even a single person was provided employment in the cement industries including the post graduates of that local area. He sought job opportunities for the local people.

28. Sri K. Sathyanarayana, R/o TV Gudem stated that the village lost entire forest land of 650 acres to the project. He demanded employment for all local people and also to the engineering and post-graduates from the village without following the process of eligibility. He expressed apprehensions on the viability of agriculture in view of the impending increase in temperatures on account of this mega project. Action shall be taken to control dust pollution.

29. Sri Konakanti Narsaiah, R/o TV Gudem has stated that there is a dispute of ownership in respect of 150-acres of patta land and compensation has been withheld which may be expedited. He sought employment protection card as a guarantee. Compensation should be paid to the oustess of the enclosed lands.

30. Sri R. Suresh, R/o TV Gudem stated that the lands were sold and claim for compensation is made by previous land holders, which should be curbed.

31. Sri Pokala Kiran Madiga, TMRPS, R/o TV Gudem cited the past experiences of inadequate compensation paid to the lands acquired for setting up M/s India Cements Limited. Compensation for cultivating the forest land was paid at the rate of Rs. 2 lakhs per acre. He demanded the enhancement of compensation for all such lands where bore wells were dug up and power was also supplied. He requested for issuance of ID cars for all land oustees and dependent labourers should be provided with employment in the project. He sought construction of the temple in his village.

32. Sri S. Saidi Reddy, TDP activist, Damarcherla welcomed the setting up of the proposed thermal power project.

33. Sri Skylab Naik, R/o Kondrapolu village welcomed the setting up of the project as it would enhance the employment opportunities. He complained that the industries in Damarcherla mandal were using the resources of their area without providing any gainful employment to the local people and engaging people from outside.

34. Sri R. Saidulu, R/o TV Gudem supported the project proposal in their area. He demanded the compensation for all lands.

35. Sri R. Kotaiah, R/o TV Gudem sought the name of TV Gudem to be incorporated in the title of the project along with name of Veerlapalem village. He requested to take up the construction of temple in his village and up-gradation of local school to full-fledged level so that pupil could continue their studies beyond 8th standard up to 10th standard without any sort of difficulty of going outside the village.

36. Sri Parshya Balu Naik, Banjara Seva Samithi leader, R/o Kalepally requested for restoration of lift irrigation scheme. He welcomed the setting up of the project.

37. Sri L. Hanimi Reddy, R/o Veerlapalem supported the project proposal in their area.

38. Sri Ravinder, TRS district Secretary, R/o Dilawarpurthanda supported the project proposal.

39. Smt. T. Nagalakshmi Bhargav, Chairperson- Miryalaguda Municipality unequivocally supported the establishment of proposed mega power project as this step would enhance the economic activity in this region.

40. Sri N. Balu Naik, Akhila Bharata Banjara Seva Samithi, R/o Veerlapalem stated that the village lost its grazing ground to the project and sought alternate land in the adjacent forest area.

41. Sri G. Hathiram, R/o Thimmapuram welcomed the proposed project. He requested the project proponent to clarify the status of land acquisition at Survey No. 190.

42. Sri G. Hanimi Reddy, R/o Veerlapalem sought clarification as to whether the lands in survey number 190 were included in the project area. He demanded acquisition of lands in survey number 190 and payment of compensation.

43. Sri K. Sreenu, Sarpanch - Mogilicherla supported the setting up of the proposed project.

44. Sri Gunda Lakshmi Kanth Gupta, R/o Wadapally wanted a pollution-free power plant in their area. He hoped that the proposed project would benefit the area. Since this area is tail-end of Nagarjuna Sagar canal, water supply is irregular. Hence, he requested to implement lift irrigation scheme to increase the greenery as a measure of abatement of pollution. He requested that the latest and most efficient technology for control of pollution should be adopted in the proposed thermal power plant. He sought employment to the local people and adequate compensation to all land oustees.

45. Sri D. Venkateshwarlu, R/o Damarcherla while welcoming the setting up of the project requested for construction of a Hospital & College.

46. Sri A. Anjaneyulu, Ex-MPTC, Wadapally thanked the Hon'ble CM for selecting this area for construction of mega power project. He appealed to the project authorities to establish high power ESPs using advanced technologies to control dust pollution.

47. Sri N. Harinder, National Alliance for People's Movement, R/o Miryalaguda objected the setting up of thermal power project by TSGENCO and presence of TSGENCO officials on the dais. He quoted the recent international convention, wherein the Hon'ble Prime Minister of India also agreed to the suggestions to desist from construction of new thermal power projects in view of impending increase of 2 degree Celsius in global temperatures, which will make the earth inhospitable for living beings. He cited the popular saying "earth can support the needs of human beings but not to the greed." He alleged that EIA report was not studied by anybody here except

one person though the report was exhibited for the access of the public. As per the report, the power project would generate 30 lakh tonnes of ash annually. That means the project generates ash at the rate of 2 tonnes/minute. As per the report, 7% of the total ash produced would be supplied to the cement industries in this area and 93% of ash would be left in the ash pond. The TSGENCO had no concrete plans of disposing the ash without causing any harm to environment. He questioned the rationale behind setting up of this type of mega power plant, which is detrimental to environment and people. At present the TSPCB is staffed with three members to cater the needs of 2000 industries located in the district. He stated that the cost of the power from this project would be around Rs. 5/- per unit, whereas the solar power project developed with site specific locations would cater to the needs of the people without causing pollution. He added that solar power could be harnessed and supplied to the consumers by way of putting up at decentralised locations at cheaper prices without any adverse impacts. The mega projects like the present one require rehabilitation & resettlement of people. The experience of the people, who are displaced due to the construction of Pulichintala Project, is fresh in the minds of people even after lapse of seven years. There is water course adjacent to the M/s India Cements Limited, which cater to the needs of thousands of acres in the vicinity, which may be affected by the dust pollution. The EIA report failed to evaluate the adverse impact on the water course.

48. Sri K. Thirupathaiah Goud, R/o Wadapally supported the setting up of the project and sought implementation of the lift irrigation scheme.

49. Sri P. Rampal Reddy, Telangana Trade Union welcomed the project and requested that no person from Andhra should be allowed to take up any sort of employment in the project and only local people should be given opportunity to do the same work.

50. Sri G. Mahesh Goud, Vidhyardhi Sangham, BC Welfare Association sought employment and wanted to know the details of job opportunities available in the proposed project.

51. Sri S. Nagasena Reddy, Environmentalist, R/o Veerlapalem while welcoming the project he dwelt the elaborate process followed by Expert Appraisal Committee of MoEF&CC. The EAC headed by one Dr. C.R. Babu (from Kakinada) and assisted by one Deputy Director from MoEF inspected the site and deferred the location of the thermal power plant. With great effort, the government convinced the authorities and obtained terms of reference for the present location. He cited the latest guidelines regarding brick kilns wherein the use of fertile top soil useful for agriculture is prohibited. Construction is going at a brisk pace in Hyderabad city and fly ash in large quantities can be used for manufacturing of bricks apart from meeting the requirement of cement units. He sought free power supply to the lift irrigation schemes under CSR to provide irrigation needs of the area. He assured that he would volunteer to support TSGENCO legally in case of any impending cases filed against the proposed project.

52. Sri G. Ramaiah, R/o Veerlapalem questioned the decision of setting up of the thermal power plant at Veerlapalem instead of coal mining areas like Manuguru and Kothagudem. He raised the issue of compensation for occupied lands. He sought raising plantation on large-scale in advance.

53. Sri Surkanti Venkat Reddy, NGO, Choutuppal welcomed the setting up of the proposed power plant. He cited that the progressive people of Telangana State supported the project like this in contrast to the opposition of setting up of similar type of projects at Kakarapally and Sompet by the people from Andhra region. He sought to take up advance operations for developing plantations.

54. Sri Jeethiram, R/o Thimmapuram requested for the survey of lands in survey number 188 in Veerlapalem area.

The District Collector, Nalgonda requested the project proponent i.e. CMD, TSGENCO to offer his clarifications on various issues raised during the course of public hearing.

Sri C. Radha Krishna, Chairman and Managing Director (i/C) - TSGENCO gave a detailed explanation to the technical issues raised as follows:

- The plant is proposed to install additional ESP's to meet the emission standards of 30 mg/Nm^3 and also proposed to install FGD plant to control SO_2 emissions.
- The Plant is designed for Zero discharge concept. No effluent will be discharged into the natural stream. Effluent treatment plant will be constructed with re-cycling system and treated water will be utilized for cooling water make up, dust suppression system in coal plant, wetting of coal in coal stock yard and for plantations. Also Ash Water Recovery System will be provided to collect decanted water from the Ash Pond and the same collected water will be reused in ashing purpose.
- The Tungapadu Vagu which is flowing through the Plant site will not be disturbed. The Sub-Committee of Expert Review Committee (special Team) from MOEF has visited the Project site on 05.12.2015and after a thorough visit recommended for deepening the stream and also recommended provide embankments on either side of the stream so that it cannot be disturbed. To this effect TSGENCO has already committed to the MOEF.
- Arrangements for 100% Fly Ash Utilisation are made available so that there will not be any Air Pollution.
- With respect to the query about temperature of 140 Degrees at the Plant it is clarified that the Chimney's height is designed for 275 meters so that the exhaust temperatures of Flue Gas is let out at that height and there will not be any thermal pollution.
- Regarding employment, as per the norms available there would be a provision for 2000 employees in the Project which comprises all cadres in the plant. For the land losers jobs will be provided as per the existing norms of the Government and also as per eligibility criteria.

The EE, TSPCB while summing up of the proceedings stated that there are 15 written representations received by him and about 54 persons spoke during the course of public hearing. He has stated that entire proceedings are videographed and will be sent along with the written representations to the MoEF&CC for further course of action.

The District Collector stated that the public hearing was conducted in accordance with the provisions of the notification. There are 15 written representations received on this project and about 54 speakers have offered their comments at this venue. Many people supported the setting up of this project. People from surrounding villages overwhelmingly supported this project proposal. Regarding payment of compensation, 80% of work has been completed and the remaining 20% relating to the category of encroachments will be completed at the earliest after verification of the details of the occupants. The district administration has submitted proposal for enhancement of compensation in case of certain categories, whose lands are covered under acquisition process. The entire proceedings are videographed and the minutes will be sent to the MoEF&CC for further course of action. He then concluded the hearing on positive note as the public in general, who have gathered at the venue of public hearing supported the project proposal.

List of the public participated in the public hearing is appended.

Representations received before and on the day of hearing in connection with the subject are herewith for consideration.

Environmental Engineer (FAC)
T.S. Pollution Control Board
Regional Office, Nalgonda.

Collector & District Magistrate,
Nalgonda.

Statement of representations received w.r.to Environmental Public Hearing (EPH) held on 31.05.2016 for proposed to set up 5x800 MW Super Critical Coal Based Yadadri Thermal Power Station (YTPS) of M/s. Telangana State Power Generation Corporation Ltd., (TSGENCO) at Veerlapalem (V), Damarcherla (M), Nalgonda District.

Sl. No	Representation given by	Date of receipt	Content of the representation
1	Sri N. Bhaskara Rao, Hon'ble MLA, Miryalguda Constituency, Nalgonda District.	31.05.2016	He supported the proposed power project.
2	Sri D. Narayana Reddy, S/o. Chintha Reddy, Veerlapalem (V), Damarcherla (M), Nalgonda District.	31.05.2016	He supported the proposed power project as per CPCB norms. And requested the management to provide & take all pollution control measures & he requested the management to develop the green belt in surrounding villages. He requested the management to give employment to land loosers and local villagers & spent CSR funds to roads, schools & health camps.
3	Sri P. Venkateshwarlu, Chairman, Sri Kantamaheshwara Ettipothala Pathakam, Thallaveerappa Gudem (V), Damarcherla (M), Nalgonda District.	31.05.2016	He supported the proposed power project. And requested the management to give employment to land loosers and local villagers & sanction the new lift irrigation scheme for Thallaveerappagudem (V) instead of Sri Kantamaheshwara Ettipothala Pathakam which is lost in acquisition for YTPS project.
4	Sri N. Kotya Naik, Sarpanch, Veerlapalem (V), Damarcherla (M), Nalgonda District.	31.05.2016	He supported the proposed power project. He requested that the management to do all basic needs in his village.
5	Sri P. Kiran Madiga, Founder President, TMRPS, 2-2-87/24/1/d/1, Amberpet, Mallikarjuna Nagar, Hyderabad.	31.05.2016	He supported the proposed power project. And requested the management to give employment to land loosers and local villagers & sanction the new lift irrigation scheme for Thallaveerappagudem (V) instead of Sri Kantamaheshwara Ettipothala Pathakam which is lost in acquisition for YTPS project.
6	Smt. J. Rajya Lakshmi, Sarpanch, Thallaveerappa Gudem (V), Damarcherla (M), Nalgonda District.	31.05.2016	He supported the proposed power project and take-up developmental activities in our village as top priority. And requested the management to give employment first priority in our village as our village is very closed to proposed project.
7	Sri R. Saidulu, CPI Mandal Secretary, Damarcherla (V&M), Nalgonda District.	31.05.2016	He supported the proposed power project and he requested to provide jobs for the local villagers. The management to give free Power, Education, Medical treatment, Drinking water & Double bed room houses and he also requested to control pollution & temperature by advanced technology. He requested the Government to sanction Government Technical College and he requested the management to give 100% local employment.
8	Samachara Hakku Sadhana Samithi, Nalgonda District Committee, Nalgonda.	31.05.2016	They supported the proposed power project. They requested the management to develop the forest in other area. The management to take-up developmental activities in villages.

9	Sri V. Abraham, General Secretary, Manava Vanarulu & Paryavarana Parirakshana Prachara Samstha. Amanagallu (V), Vemulapally (M), Nalgonda District.	31.05.2016	He supported the proposed power project as the proponent proposed all necessary pollution control measured in the EIA report.
10	Sri Surkanti Venkata Reddy, Social Worker, Nalgonda District.	31.05.2016	He supported the proposed power project and requested for good compensation and jobs to local.
11	Sri G. Mohan, State Secretary, Human Rights Forum.	31.05.2016	Submitted detailed questionnaire on TOR's, Coal, Water, Forest, Socio Economic Impact Assessment, Ash pond, Health, Cumulative Impact Assessment, and Alternatives. He expressed that the EIA report is not complete.
12	Sri N. Harinder, Human Rights Forum.	31.05.2016	Submitted detailed queries on draft EIA.
13	Sri Ch. Sailu, NGO, Choutuppal (V&M), Nalgonda District.	28.01.2016	He supported the proposed power project and requested for employment and development in the area.
14	Sri J. Ravinder, President, Haritha Kala Morcha, Nalgonda.	31.05.2016	He supported the proposed power project.
15	Modugula Thanda & Kapoor Thanda Hamlets of Veerla Palem Villagers, Damarcherla (M), Nalgonda District.	31.05.2016	They requested the authorities for compensation to the lands and employment to each family.
16	Sri P. Nagaiah, President, Parja Chaitanya Vedika, Hyderabad.	31.05.2016	He supported the power project and requested the authorities for necessary action for environmental protection and massive plantation in the area.

ANNEXURE –7B

ACTION PLAN FOR FULFILLMENT OF ASSURANCES GIVEN IN THE PUBLIC HEARING HELD ON 31-05-2016 ON THE PROPOSED (5 X800 MW) COAL BASED YADADRI THERMAL POWER STATION AT VEERLAPALEM (V), DAMARACHERLA (M), NALGONDA DIST.

The points raised by the public/public representatives, response given by the project authorities and action plan for fulfillment of the assurances given to the public are furnished below:

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
1.	**Sri Sri Gutta Sukhendar Reddy, Hon'ble Member of Parliament, Nalgonda constituency** while welcoming the proposed thermal power project has explained following events behind realising the dream of power plant in his constituency area: ➢ This is the biggest project after the formation of the State and any development will have some adverse impact. ➢ Electricity is a quintessential requirement like water. This project will help to enhance the supply of power from 6-hrs to 9 hrs for agriculture. ➢ After commissioning of the project, there will be no power cuts in the State. At present the State is purchasing power from neighbouring States at an average cost of Rs. 6/- per unit which will come down drastically to Rs. 4-5/- per unit. ➢ Government of India banned	------ ---- After bifurcation of the state. Telangana state had a short fall of 2700 MW which is being met by way of power purchases from other states and IPPs at an average rate of Rs. 5.11 Paisa per unit.	

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	the setting up of new units based on sub-critical technology and this project utilises the latest super-critical technology. ➢ Moreover, the compensation is paid as per the Land Acquisition Act, 2013. Necessary infrastructure will be promoted in surrounding villages with the advent of the proposed thermal power project. There is an extent of 650-acres of land without pattas but under cultivation in Thallaveerappagudem panchayat, for which compensation has to be paid on par with patta lands. ➢ He has requested the District Administration and CMD, TSGENCO to take necessary action in that direction.	---- a) TSGENCO has acquired the patta/UDAFA Patta/Assigned/ UDAFA Kharaj Khata/ D-Form patta lands to an extent of Ac. 854.32 Gts including ROFR lands to an extent of Ac. 920.25 Gts which are sandwiched within the forest land diverted in favour of TSGENCO and also for construction of residential quarters. b) With reference to Ac. 650.00 of land without pattas referred by the Hon'ble Member of Parliament, the District Collector, Nalgonda District has submitted the proposals to the Govt. for payment of compensation to the encroachers for an extent of Ac. 702.29 which is a part of the forest land (Ac. 4676.00) diverted in favour of TSGENCO vide Lr. No.	a) An amount of Rs. 285.81 crores towards land compensation, R&R package and other charges was deposited with the District Collector, Nalgonda in the month of January 2016 for acquiring Ac. 854.32 Gts of patta lands and Ac. 920.25 Gts of ROFR land. Already disbursement of land compensation was made to the 80% of the land losers by the Revenue authorities. Balance payment is under process. b) After receipt of approval from the Govt. for payment of compensation to the encroachers, the necessary amount will be deposited with the District Collector, Nalgonda for disbursement of the same.

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
		G1/4089/2016, dt. 28.07.2016. The proposals are under finalization at State Govt. level.	
	➢ He further requested the CMD to engage the local labourers for construction purposes and provide employment to the local people in the project by giving priority for the land oustees. ➢ He added that Hon'ble CM was kind enough to release compensation liberally to all classes of lands lost under the project. He expressed profound gratitude to all scheduled tribe people and other land losers for parting their lands to facilitate the setting up of this project. ➢ Finally, he thanked the District administration for their excellent effort and cooperation in ensuring the timely acquisition of land for the project.	a) TSGENCO has agreed to engage the local agricultural labourers, unemployed youth with necessary qualification in ITI grade and unskilled workers in civil and mechanical construction works of the project. b) TSGENCO has agreed to provide employment to 584 members from project affected and displaced families. ----	a) They will be taken into the works once the project construction commences. b) Employment will be provided to all 584 members once the project comes into operation. ----
2.	**Sri N. Bhaskar Rao, Hon'ble Member of Legislative Assembly, Miryalaguda,** ➢ He specifically thanked the Hon'ble CM for choosing this location for setting up this mega power project.	----	-----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	➢ There were several apprehensions over the implementation of this project initially. In fact, few villagers have lost their lands.	----	-----
	➢ On behalf of the people of his constituency, he assured full cooperation to the implementation of this project.	-----	-----
	➢ There are no pattas for 740-acres of land, however, he assured them that the compensation will be worked out to render justice to them. ➢ He expressed his gratitude to the Hon'ble Minister for Power in expediting the process of compensation payment. He requested the management of TSGENCO to reciprocate on the same lines by timely completion of the works on the project.	a) There are 563 encroachers in an extent of Ac. 702.29 Gts of land which is a part of diverted forest land. The District Collector, Nalgonda District has submitted the proposals to the Govt. for payment of compensation to the encroachers for an extent of Ac. 702.29 which is a part of the forest land (Ac. 4676.00) diverted in favour of TSGENCO vide Lr. No. G1/4089/2016, dt. 28.07.2016. The proposals are under finalization at State Govt. level. b) TSGENCO will complete the project as per the schedule.	a) After receipt of approval from the Govt. for payment of compensation to the encroachers, the necessary amount will be deposited with the District Collector, Nalgonda for disbursement of the same.
	➢ He has further stated that there are no political differences in respect of this project and assured the officials of cooperation from the leaders	-----	----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	cutting across the party lines and from the people as well. He expects that Dameracherla area will be transformed economically and socially as the land rates are increasing with the setting up of this project from 50-lakhs to 1.0 crores. ➢ He has assured that work will be provided to all eligible local people without their political affiliations. ➢ He expressed his gratitude to the people for extending the unequivocal support for setting of this important mega project which enabled him to keep up his word given to the Hon'ble CM.	TSGENCO has agreed to engage the local agricultural labourers, unemployed youth with necessary qualification in ITI grade and unskilled workers in civil and mechanical construction works of the project. -----	They will be taken into the work once the project construction commences. -----
3.	**Sri Shankar Naik, ZPTC Member - Damarcherla.** ➢ He welcomed the project. ➢ He has stated that Kapoora thanda and Veerlapalem people are affected by this project and employment is not provided to the B. Tech graduates as was	---- As per the guidelines issued in the G.O. Ms No. 98, dt. 15.04.1986, not more than 50 % of the vacancies of the categories equivalent to Junior Assistants/Typists and the cadre below are to be filled	---- ----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	done in the case of ITI trained people.	with displaced families or their dependents of the respective families duly following the reservations for various categories viz SC, ST, BC, Ex-servicemen, Physically handicapped and meritorious, sportsman and other conditions stipulated. There is no provision for providing employment directly to Engineering graduates belonging to project displaced families.	
	➢ Compensation has not been paid so far to the crops damaged by the recent hail storm and urged the authorities to expedite the process of compensation.	This issue is not applicable to TSGENCO.	---
4.	**Smt. Mangamma, President-Mandal Praja Parishad, Damarcherla** ➢ She welcomed the setting up of the project.	---	---
	➢ She has requested for payment of compensation to the land holders as there are no pattas vested with them, who are mainly from backward classes. She demanded the payment of compensation within a month time on par with the patta lands and provision of employment to the people of the mandal	The District Collector, Nalgonda District has submitted the proposals to the Govt. for payment of compensation to the encroachers for an extent of Ac. 702.29 which is a part of the forest land (Ac. 4676.00) diverted in favour of TSGENCO vide Lr. No. G1/4089/2016, dt. 28.07.2016. The proposals	After receipt of approval from the Govt. for payment of compensation to the encroachers who are not having pattas, the necessary amount will be deposited with the District Collector, Nalgonda for disbursement of the same.

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
		are under finalization at State Govt. level.	
5.	**Sri Kotya Naik, Sarpanch-Veerlapalem,** ➢ He has stated that the land acquisition process has been completed in his village, which includes forest land also.	-----	-----
	➢ He has brought out the problem of losing the grazing area of the cattle and the dung-storing grounds and sought alternate land to compensate the loss.	a) There is no notified grazing land in the lands acquired for setting up of thermal power project. However an amount of Rs. 285.81 crores towards land compensation, R&R package and other charges was deposited with the District Collector, Nalgonda in the month of January 2016 for acquiring Ac. 854.32 Gts of patta lands and Ac. 920.25 Gts of ROFR land. The District Revenue authorities will take care of this issue as the sufficient amount is already deposited with the District Collector, Nalgonda towards R&R package.	-----
	➢ People would be happier if employment is provided on priority to the project displaced persons.	TSGENCO has agreed to provide employment to 584 members from project affected and displaced families.	Employment will be provided to all 584 members once the project comes into operation.

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	➢ He has requested for expediting the process of compensation to the remaining land.	As per the demand note raised by the District Collector, Nalgonda Dist, an amount of Rs. 285.81 Crores was already deposited with District Collector, Nalgonda on 04.01.2016. Balance payments to the remaining land losers is under process by the Revenue Authorities.	----
	➢ He appealed to TSGENCO not to engage the labourers from outside area and only local labourers should be engaged during the construction and operation phase.	Priority will be given to engage local villagers/ agriculture labour as unskilled/Semi skilled /skilled/ workers in Civil/E&M construction works as per their eligibility and they will be continued as outsource workers after commissioning of the unit as per plant requirement in labour oriented annual maintenance works such as cleaning of roads, drains, up keeping of all buildings, maintenance of lawns and plantations, annual maintenance works in coal handling plant etc.	----
6.	**Smt.Aruna Balu, MPTC member Veerlapalem** welcomed the project.	----	----
7.	**Sri Balu Naik, Husband of MPTC member-Veerlapalem** ➢ He has stated that farmers of the village have lost their agricultural lands due to the	-----	-----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	proposed thermal project and have been paid Rs. 7.0 lakhs per acre.		
	➢ Endowment lands are not paid so far. He demanded the authorities for payment of Rs. 6 lakhs to the non-right holders.	There are no endowment lands in the lands acquired for the project.	-----
	➢ He sought employment to the local people and demanded that no outsider should be engaged. The village lost its grazing ground to cattle and suitable place should be identified in the adjacent forest areas.	a)Priority will be given to engage Local villagers/ agriculture labour as unskilled/Semi skilled /skilled/ workers in Civil/E&M construction works as per their eligibility and they will be continued as outsource workers after commissioning of the unit as per plant requirement in labour oriented annual maintenance works such cleaning of roads, drains, up keeping of all buildings, maintenance of lawns and plantations, annual maintenance works in coal handling plant etc. b) There is no notified grazing land in the lands acquired for setting up of thermal power project.	----- -----
	➢ He sought the establishment of corporate hospital with health card worth of Rs. 5.0 lakhs to be provided to each villager.	There is a 100 bedded Govt. area hospital at Miryalaguda which is at a distance of 27 km from project site. However, Periodical health camps will be conducted in	----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
		surrounding villages of the plant and necessary medicines will be distributed at free of cost to the people who visit the health camps.	-----
8.	**Sri G. Kotaiah, MPTC member, Thalla veerppagudem** ➢ He supported the setting up of the power project as it would boost the rural economy.	-----	-----
9.	**Smt.J. Rajyalakshmi, Sarpanch, Thallaveerppagudem** She urged the authorities to make adequate payment of compensation to the lands lost under the proposed project and employment to the people of her village as per eligibility.	a) The land compensation was finalized by the District Collector, Nalgonda District as per the LA R&R Act, 2013 and an amount of Rs. 285.81 Crores was already deposited with District Collector, Nalgonda on 04.01.2016 for disbursement to the land losers. b) TSGENCO has agreed to provide employment to 584 members from project affected and displaced families under this project.	---- ----
10.	**Sri D. Narayana Reddy, PACS Chairman- Veerlapalem,** ➢ He has stated that about 174 families have lost their lands and has requested the government to allot double-bed	a) Allotment of double bed room houses is a State Govt. policy	-----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	room houses to all of them. He sought facilities to the land losers on par with BCs and SCs. He demanded for the setting up of an ITI college to train adequate number of local youth in skills required by the project, as the existing private ITI college is having a limited intake capacity of 30-40 members only. He demanded employment to all eligible people of the area.	b) There are two ITI colleges in Miryalaguda town which is located at 27 km from the project site. TSGENCO will approach the ITIs at Miryalaguda for imparting training and technical knowhow to the un employed local youth. c) TSGENCO has agreed to provide employment to 584 members from project affected and displaced families.	---- ----
11.	**Sri B. Hanuma Naik, R/o Modugulakunta thanda** welcomed the setting up of the project.	----	----
12.	**Sri. Eeshwar, R/o Kapoorthanda** He raised the issue of losing his complete land under this project and sought justice by way of providing employment to all such people.	TSGENCO has agreed to provide employment to 584 members from project affected and displaced families as per their eligibility and qualification.	----
13.	**Sri G. Surya Naik, R/o Modugulakunta thanda** He sought enhancement of compensation to the lands lost by them as the existing compensation is not adequate enough.	The land compensation was finalized by the District Collector, Nalgonda District as per the LA R&R Act, 2013 which is a latest one and approved by the State Govt.	----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
14.	**Sri Vasha Naik, R/o Modugulakulathanda** ➢ He has stated that, the compensation is not commensurate with the market rate and sought payment as per the value determined locally.	The land compensation was finalized by the District Collector, Nalgonda District as per the LA R&R Act, 2013 which is a latest one and approved by the State Govt.	-----
	➢ He wanted that resettlement colony could be located near Shanthi Nagar.	The District Revenue authorities have identified the suitable land for relocating the land losers to an extent of Ac. 13.21 Gts in Sy. No. 98 at Kallepalli village, Dameracherla Mandal and approved by the Commissioner, R&R, Hyderabad.	-----
	➢ He also requested for payment of compensation to the lands under enjoyment of local people (assignee land).	Finalization of list of assignees/enjoyers and disbursement of compensation is the responsibility of District Revenue Authorities.	-----
15.	**Sri Chandrasekhar Yadav, CPI(M) Leader** ➢ He has stated that water is available, land is available and people have sacrificed their lands for setting up of this project.	-----	-----
	➢ Keeping this in view, compensation should be paid to the farmers of surrounding thandas.	-----	-----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	➢ He demanded employment to all eligible people irrespective of their party affiliations. Earlier, the managements of cement factories located in the mandal discriminated the local people by not providing employment to the local people. Instead, they brought the people from outside, leaving dust pollution to the locals.	Priority will be given to engage Local villagers/ agriculture labour as unskilled/Semi skilled /skilled/ workers in Civil/E&M construction works as per their eligibility and they will be continued as outsource workers after commissioning of the unit as per plant requirement in labour oriented annual maintenance works such cleaning of roads, drains, up keeping of all buildings, maintenance of lawns and plantations, annual maintenance works in coal handling plant etc.	-----
	➢ He cited the examples of M/s Deccan Chromites, M/s India Cements Limited to prove his case.	-----	-----
	➢ He warned of agitation in case the local land losers and other affected people are not provided employment in the proposed project.	-----	-----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
16.	**Sri A. Balu Naik, R/o Veerlapalem** He demanded employment to one member from each family and free supply of electricity and water. He requested for the establishment of a hospital to cater to the needs of the people.	a) TSGENCO has agreed to provide employment to 584 members from project affected and displaced families as per their eligibility and qualification. b) Supply of electricity at free of cost is a policy of State Govt. c) TSGENCO will provide drinking water supply to the surrounding villages under CSR provision. d) There is a 100 bedded Govt area hospital at Miryalaguda which is at a distance of 27 km from project site. However, Periodical health camps will be conducted in surrounding villages of the plant and necessary medicines will be distributed at free of cost to the people who visit the health camps.	----- ----- Necessary provision has been made towards drinking water, sanitation, education, health care, infra structure development, with a provision of **Rs 100.40crores** @ 0.40% of the project cost towards CSR plan.
17.	**Sri Mohd. Yousuf, TDP Leader, R/o Wadapally (V), Damarcherla (M)** ➢ **He** stated clearly that all political parties irrespective of their party affiliations welcomed the setting up of the proposed project.	-----	-----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	➢ He wanted to know about the actual number of people to be provided direct employment in this project. About 180 families were displaced on account of acquisition of their properties and they should be provided employment on priority basis.	TSGENCO has agreed to provide employment to 584 members from project affected and displaced families as per their eligibility and qualification.	-----
	➢ He hoped that, adequate steps would be taken to prevent the contamination of Krishna river water from dust pollution, which used to serve as drinking water source for thousand people living in these areas. There is no information on this aspect in the draft EIA report. There were instances of non-payment of compensation even after acquisition of lands and the people had bitter experiences on this count earlier. He sought compensation to the loss of agriculture crops in case of any such instances of pollution.	a) The effluent treatment plant proposed to set up in the project will be designed with recycling system so as to reuse the treated water for cooling tower make up, dust suppression system in coal conveyors and coal stack yard, green belt development and floor wash in the plant ➢ Ash water recovery system is also designed with recycling system so as to recover the decanted water from ash pond and treat the same in the treatment plant and reuse the treated water for ashing purpose. ➢ Sewage treatment plant will also be designed with recycling system so as to use the treated water in the green belt development.	An amount of Rs. 2410.00 Crores is provided towards cost of Environmental Mitigation measures.

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
		➢ As such no plant effluent and decanted water from ash pond will be discharged into the near by water bodies including Krishna river. ➢ The above issues are discussed in the EIA report.	------
	➢ He demanded for the allotment of double-bed room houses as part of compensation.	b) An amount of Rs. 285.81 Crores was already deposited with District Collector, Nalgonda on 04.01.2016 for disbursement to the land losers. Already payment was made to the 80 % of the land losers. c) Allotment of double bed room houses is a State Govt. policy	------
18.	**Sri A. Parsha Naik,** **ex-Sarpanch- Veerlapalem** ➢ He demanded adequate compensation to the project affected people belonging to Veerlapalem and Thalla veerappagudem.	The land compensation was finalized by the District Collector, Nalgonda District as per the LA R&R Act, 2013 which is a latest one and approved by the State Govt.	------

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	➢ He thanked profoundly for payment of compensation to about 80% of land losers and requested for the expeditious payment of compensation for the remaining people of TV Gudem.	The District Collector, Nalgonda District has submitted the proposals to the Govt. for payment of compensation to the encroachers for an extent of Ac. 702.29 which is a part of the forest land (Ac. 4676.00) diverted in favour of TSGENCO vide Lr. No. G1/4089/2016, dt. 28.07.2016. The proposals are under finalization at State Govt. level.	------
19.	**Sri D. Balaji Naik, Mandal President, TRS party-Damarcherla** ➢ He assured cooperation of local people to the proposed project and sought employment on priority basis to the people of Damaracherla mandal only. He hoped that Damaracherla would become a mega city in near future and the electricity generated from this project would provide uninterrupted supply of power to the entire state of Telangana.	Priority will be given to engage Local villagers/ agriculture labour as unskilled/Semi skilled /skilled/ workers in Civil/E&M construction works as per their eligibility and they will be continued as outsource workers after commissioning of the unit as per plant requirement in labour oriented annual maintenance works such cleaning of roads, drains, up keeping of all buildings, maintenance of lawns and plantations, annual maintenance works in coal handling plant etc.	------

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
20.	**Sri M. Kishan Naik, TRS Leader, R/o Narsapuram thanda** spoke bilingually. He stated that Scheduled Tribe dependent on agriculture for their livelihood and there should be adequate place to store the natural organic fertiliser like cow dung etc. Pollution has troubled them frequently. He pointed out that STs being un-educated were not provided with pattas to the lands cultivated by them and demanded payment of compensation to all such lands. He also dwelt about the people who left these areas in search for suitable employment and all such people should be provided compensation.	---- The District Collector, Nalgonda District has submitted the proposals to the Govt. for payment of compensation to the encroachers for an extent of Ac. 702.29 which is a part of the forest land (Ac. 4676.00) diverted in favour of TSGENCO vide Lr. No. G1/4089/2016, dt. 28.07.2016. The proposals are under finalization at State Govt. level. ----	---- ----
21.	**Sri K. Saidulu, TRS activist, R/o Wadapally** ➢ He thanked the Hon'ble CM for selecting the location to set up this mega project. ➢ He requested for the payment of compensation to the lands lost under the project.	----- An amount of Rs. 285.81 crores towards land compensation, R&R package and other charges was deposited with the District Collector, Nalgonda and disbursement of compensation upto 80% is completed and the balance is under process.	----- ----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	➢ He also requested for coverage of entire mandal under CSR.	As per the proposals received from the District Collector, Nalgonda, CSR funds will be allotted for taking up the developmental works in the surrounding villages of the project.	A provision of Rs 100.40 crore is made in the project cost to take up the CSR activities in the surrounding villages of Project.
	➢ He further requested for setting up of institutions to cater to the needs of people under KG-PG free education scheme.	It is a policy of State Government.	-----
22.	**Sri Veera Kotireddy, ex-PACS chairman, Damaracherla** while welcoming the project requested the payment of compensation to the residents of TV Gudem and sought an assurance in respect of provision of employment.	a) The land losers under TV gudem are only encroachers in the diverted forest land and the District Collector, Nalgonda District has submitted the proposals to the Govt. for payment of compensation to the encroachers for an extent of Ac. 702.29 which is a part of the forest land (Ac. 4676.00) diverted in favour of TSGENCO vide Lr. No. G1/4089/2016, dt. 28.07.2016. The proposals are under finalization at State Govt. level. b) TSGENCO has agreed to provide employment to 584 members from project affected and displaced families under this project.	-----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	➢ An ITI should be established in this mandal for attaining the technical skills required for the project by the local people and preference on provision of employment. Most of the people in the thandas (Veerlapalem, Veerappagudem& Modugula thanda) surrounding this project have lost their lands and needed rehabilitation and requested for provision of 500-Sq. yards of homestead land to accommodate their cattle. Since the area up to 10-km radius will be impacted by pollution, there will be corresponding increase in temperature and requested to take suitable measures. In all such cases, employment should be provided as measure of compensation.	There are two ITI colleges in Miryalaguda which is located at 27 km from the project site. --- All pollution control measures will be taken up to control the pollution levels due to the power plant.	--- --- TSGENCO will install the following systems in the power plant to maintain the pollution levels as prescribed by the MoEF & CC, GoI vide its Gazette notification dt. 07.12.2015. i) Construction of 275 m high chimneys for dispersion of flue gases ii) Providing Electro Static Precipitators (ESPs) with 99.98% efficiency to maintain SPM levels less than 30 mg/Nm3. iii) Effluent Treatment plant with zero discharged concept to treat the plant effluents and reuse the same in the plant use. iv) Flue gas desulphurization unit to maintain SO2 levels less

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
			than 100 mg/Nm3 v) Selective Catalytic Reduction unit to maintain NOx levels less than 100 mg/Nm3 vi) Sewage treatment plant with recycling system. vii) Development of green belt in an extent of Ac. 1352.00. viii) Water sprinkling system in ash ponds to suppress dust emissions and coal conveyors and coal storage yard to control fugitive emissions. ix) Construction of fly ash storage silos for issue of fly ash to various end users.
23.	**Sri Kokala Venkateshwarlu, Congress Party SC cell Coordinator & Chairman- Lift Irrigation Scheme** ➢ He stated that the project site covers the route of existing pipeline and requested the realignment of pipeline and the construction of pump house. He expressed happiness that the new state was formed and new power station would come up. He cited the case of M/s India Cements Limited that fertile lands of black cotton soil were acquired and resulted in the loss of agriculture income.	a) In case of any fouling of the proposed project structures with the existing pipe line and pump house, they will be rerouted suitably at the cost of TSGENCO. -----	---- ----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	He sought the name of TV Gudem to be incorporated in the title of the project along with name of Veerlapalem village. Several forest cases were filed against the people of TVGudem for taking up illegal cultivation earlier, for all such lands he demanded payment of compensation at the rate of Rs. 6 lakhs per acre. The actual occupants of such lands should be identified and compensation should be paid to them only. In survey number 26, an extent of 78 acres of land is being cultivated by 30 families, only assignment pattas were issued in their favour and some of them disposed their lands. However, the land remained in the name of original assignee. He sought in all such cases the present occupant should be ascertained before effecting payment of compensation.	b) The land losers under TV gudem are only encroachers in the diverted forest land and the District Collector, Nalgonda District has submitted the proposals to the Govt. for payment of compensation to the encroachers for an extent of Ac. 702.29 which is a part of the forest land (Ac. 4676.00) diverted in favour of TSGENCO vide Lr. No. G1/4089/2016, dt. 28.07.2016. The proposals are under finalization at State Govt. level.	After receipt of the approval of the Govt. for payment of compensation to the encroachers under Thalla Veerappagudem, the necessary amount will be deposited with the District Collector, Nalgonda for disbursement.
24.	**Sri Suddha Saidaiah, R/o TV Gudem** stated that, ➢ only 100-acres of land are covered under pattas and the remaining 700-acres of land are classified as forest land under cultivation. ➢ He sought provision of employment to all the land oustees. He demanded the development of infrastructure like roads, which needs to be converted as CC roads and construction of Ramalayam temple.	---- a)TSGENCO has agreed to provide employment to 584 members from project affected and displaced families under this project.	---- ------

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
		b) As per the proposals received from the District Collector, Nalgonda, CSR funds will be allotted for taking up the developmental works in the surrounding villages of the project.	A provision of Rs 100.40 crore is made in the project cost to take up the CSR activities in the surrounding villages of Project.
	➢ He sought adequate compensation to 700-acres of land located in TV Gudem. He also sought the name of TV Gudem to be incorporated in the title of the project along with name of Veerlapalem village.	The land losers under TV gudem are only encroachers in the diverted forest land and the District Collector, Nalgonda District has submitted the proposals to the Govt. for payment of compensation to the encroachers for an extent of Ac. 702.29 which is a part of the forest land (Ac. 4676.00) diverted in favour of TSGENCO vide Lr. No. G1/4089/2016, dt. 28.07.2016. The proposals are under finalization at State Govt. level.	After receipt of the approval of the Govt. for payment of compensation to the encroachers under Thalla Veerappagudem, the necessary amount will be deposited with the District Collector, Nalgonda for disbursement.
25.	**Sri R. Saidulu, R/o TV Gudem** thanked the people of TV Gudem for supporting the setting up of the project. He demanded payment of compensation at the rate of Rs. 6 lakhs per acre and provision of employment for one member. In case of lands under enjoyment, Rs. 5 lakhs per acre and provision of employment for one member.	a) The land losers under TV gudem are only encroachers in the diverted forest land and the District Collector, Nalgonda District has submitted the proposals to the Govt. for payment of compensation to the encroachers for an extent of Ac. 702.29 which is a	After receipt of the approval of the Govt. for payment of compensation to the encroachers under Thalla Veerappagudem, the necessary amount will be deposited with the District Collector, Nalgonda for disbursement.

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
		part of the forest land (Ac. 4676.00) diverted in favour of TSGENCO vide Lr. No. G1/4089/2016, dt. 28.07.2016. The proposals are under finalization at State Govt. level. b) TSGENCO has agreed to provide employment to 584 members from project affected and displaced families under this project.	-----
26.	**Sri A. Karunakar Reddy, Mandal President- YSRCP, Damarcherla** welcomed the setting up of the project. He stated that about 80% of the land oustees received compensation and about 20% yet to be compensated. He sought construction of a corporate type hospital for providing free health care and institutions for imparting free education.	---- The revenue authorities will disburse the compensation to balance 20% land losers as the sufficient amount was deposited with the District Collector, Nalgonda There is a 100 bedded Govt area hospital at Miryalaguda which is at a distance of 27 km from project site. However, Periodical health camps will be conducted in surrounding villages of the plant and necessary medicines will be distributed at free of cost to the people who visit the	----- -----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
		health camps. There are very good Govt. institutions for education in Miryalaguda.	-----
27.	**Sri Venkateshwarlu, R/o Ganeshpahad** alleged that, not even a single person was provided employment in the cement industries including the post graduates of that local area. He sought job opportunities for the local people	---- Priority will be given to engage Local villagers/ agriculture labour as unskilled/Semi skilled /skilled/ workers in Civil/E&M construction works as per their eligibility and they will be continued as outsource workers after commissioning of the unit as per plant requirement in labour oriented annual maintenance works such cleaning of roads, drains, up keeping of all buildings, maintenance of lawns and plantations, annual maintenance works in coal handling plant etc.	------ ------
28.	**Sri K. Sathyanarayana, R/o TV Gudem** stated that the village lost entire forest land of 650 acres to the project. He demanded employment for all local people and also to the engineering and post-graduates from the village without following the process of eligibility.	---- a) Priority will be given to engage Local villagers/ agriculture labour as unskilled/Semi skilled /skilled/ workers in Civil/E&M construction works as per	---- ----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
		their eligibility and they will be continued as outsource workers after commissioning of the unit as per plant requirement in labour oriented annual maintenance works such cleaning of roads, drains, up keeping of all buildings, maintenance of lawns and plantations, annual maintenance works in coal handling plant etc. b) There is no provision for providing employment to engineering graduates and post graduates under land loser quota directly.	
	He expressed apprehensions on the viability of agriculture in view of the impending increase in temperatures on account of this mega project. Action shall be taken to control dust pollution	All pollution control measures will be taken up to control the pollution levels due to the power plant.	TSGENCO will install the following systems in the power plant to maintain the pollution levels as prescribed by the MoEF & CC, GoI vide its Gazette notification dt. 07.12.2015. i) Construction of 275 m high chimneys for dispersion of flue gases ii) Providing Electro Static Precipitators (ESPs) with 99.98% efficiency to maintain SPM levels less than 30 mg/Nm3. iii) Effluent Treatment plant with zero discharged concept to treat the plant effluents and reuse the same in

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
			the plant use. iv) Flue gas desulphurization unit to maintain SO2 levels less than 100 mg/Nm3 v) Selective Catalytic Reduction unit to maintain NOx levels less than 100 mg/Nm3 vi) Sewage treatment plant with recycling system. vii) Development of green belt in an extent of Ac. 1352.00. viii) Water sprinkling system in ash ponds to suppress dust emissions and coal conveyors and coal storage yard to control fugitive emissions. ix) Construction of fly ash storage silos for issue of fly ash to various end users.
29.	**Sri Konakanti Narsaiah, R/o TV Gudem** has stated that, there is a dispute of ownership in respect of 150-acres of patta land and compensation has been withheld which may be expedited. He sought employment protection card as a guarantee. Compensation should be paid to the oustess of the enclosed lands.	There is no such dispute came to the notice of TSGENCO. Any disputes in land issues will be resolved by Revenue authorities. TSGENCO has agreed to provide employment to 584 members from project affected and displaced families under this project.	---- ----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
30.	**Sri R. Suresh, R/o TV Gudem** stated that the lands were sold and claim for compensation is made by previous land holders, which should be curbed.	The District Administration will settle the land compensation issues as they are competent authorities.	----
31.	**Sri Pokala Kiran Madiga, TMRPS, R/o TV Gudem** cited the past experiences of inadequate compensation paid to the lands acquired for setting up M/s India Cements Limited. Compensation for cultivating the forest land was paid at the rate of Rs. 2 lakhs per acre. He demanded the enhancement of compensation for all such lands where bore wells were dug up and power was also supplied. He requested for issuance of ID cards for all land oustees and dependent labourers should be provided with employment in the project. He sought construction of the temple in his village.	a) The land compensation was finalized by the District Collector, Nalgonda District as per the LA R&R Act, 2013 which is a latest one and approved by the State Govt. The District Revenue authorities will issue the land loser certificate which is the basis for providing employment under land loser quota.	---- ----
32.	**Sri S. Saidi Reddy, TDP activist, Damarcherla** welcomed the setting up of the proposed thermal power project.	-----	----
33.	**Sri Skailash Naik, R/o Kondrapolu village** welcomed the setting up of the project as it would enhance the employment opportunities. He complained that the industries in Damaracherla mandal were using the resources of their area without providing any gainful employment to the	---- TSGENCO will give priority to the local people and also land losers.	---- ----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	local people and engaging people from outside.		
34.	**Sri R. Saidulu, R/o TV Gudem** supported the project proposal in their area.	----	----
35.	**Sri R. Kotaiah, R/o TV Gudem** sought the name of TV Gudem to be incorporated in the title of the project along with name of Veerlapalem village. He requested to take up the construction of temple in his village and up-gradation of local school to full-fledged level so that pupil could continue their studies beyond 8th standard up to 10th standard without any sort of difficulty of going outside the village.	The proposed project is named by the Hon'ble Chief Minister of Telangana State. Provision is made in the CSR budget for upgradation of schools existing in the surrounding villages. Sanction will be given for the same as per the proposals received from the District Collector, Nalgonda.	---- Necessary provision has been made towards drinking water, sanitation, education, health care, infra structure development, with a provision of **Rs. 100.40crores** @ 0.40% of the project cost towards CSR plan.
36.	**Sri Parshya Balu Naik, Banjara Seva Samithi leader, R/o Kalepally** requested for restoration of lift irrigation scheme. He welcomed the setting up of the project.	The existing lift irrigation scheme on the Tungapadu vagu will not be disturbed in any way. ----	---- ----
37.	**Sri L. Hanimi Reddy, R/o Veerlapalem** supported the project proposal in their area.	----	----
38.	**Sri Ravinder, TRS district Secretary,R/o Dlawarpurthanda** supported the project proposal.	----	----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
39.	**Smt. T. Nagalakshmi Bhargav, Chairperson- Miryalaguda Municipality** unequivocally supported the establishment of proposed mega power project as this step would enhance the economic activity in this region.	----	----
40.	**Sri N. Balu Naik, Akhila Bharata Banjara Seva Samithi, R/o Veerlapalem** stated that the village lost its grazing ground to the project and sought alternate land in the adjacent forest area.	There is no notified grazing land in the lands acquired for the project.	-----
41.	**Sri G. Hathiram, R/o Thimmapuram** welcomed the proposed project.	-----	-----
42.	**Sri G. Hanimi Reddy, R/o Veerlapalem** sought clarification as to whether the lands in survey number 190 were included in the project area. He demanded acquisition of lands in survey number 190 and payment of compensation.	Part of the lands are covered under Sy. No. 190. Already compensation amount as finalized by the Dist. Collector for all the lands was deposited with the District Collector, Nalgonda. No further lands are required for the project.	-----
43.	**Sri K. Sreenu, Sarpanch-Mogilicherla** supported the setting up of the proposed project.	-----	-----
44.	**Sri Gunda Lakshmi Kanth Gupta, R/o Wadapally** wanted a pollution-free power plant in their area. He hoped that the proposed project would benefit the area. Since this area is tail-end of Nagarjuna Sagar canal, water supply is irregular. Hence, he requested to implement lift	All pollution control measures will be taken up to control the pollution levels due to the power plant.	TSGENCO will install the following systems in the power plant to maintain the pollution levels as prescribed by the MoEF & CC, GoI vide its Gazette notification dt. 07.12.2015. i) Construction of 275 m high chimneys for

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	irrigation scheme to increase the greenery as a measure of abatement of pollution. He requested that the latest and most efficient technology for control of pollution should be adopted in the proposed thermal power plant.	Green belt development will be taken up as per the norms prescribed by the MoEF&CC,GoI,New Delhi and an extent of 1352 acres of land allocated for this purpose.	dispersion of flue gases ii) Providing Electro Static Precipitators (ESPs) with 99.98% efficiency to maintain SPM levels less than 30 mg/Nm3. iii) Effluent Treatment plant with zero discharged concept to treat the plant effluents and reuse the same in the plant use. iv) Flue gas desulpurisation unit to maintain SO2 levels less than 100 mg/Nm3 v) Selective Catalytic Reduction unit to maintain NOx levels less than 100 mg/Nm3 vi) Sewage treatment plant with recycling system. vii) Development of green belt in an extent of Ac. 1352.00. viii) Water sprinking system in ash ponds to suppress dust emissions and coal conveyors and coal storage yard to control fugitive emissions. ix) Construction of fly ash storage silos for issue of fly ash to various end users.
	He sought employment to the local people and adequate compensation to all land oustees.	TSGENCO will give priority to the local people and also land losers. An amount of Rs. 285.81 Crores was deposited with the District Collector, Nalgonda for payment of compensation to all land oustees.	

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
45.	**Sri D. Venkateshwarlu, R/o Damarcherla** while welcoming the setting up of the project requested for construction of a hospital.	There is a 100 bed Govt area hospital with well equipped & doctors in Miryaguda town which is 27 km away from the project.	----
46.	**Sri A. Anjaneyulu, ex-MPTC, Wadapally** thanked the Hon'ble CM for selecting this area for construction of mega power project. He appealed to the project authorities to establish high power ESPs using advanced technologies to control dust pollution.	------ Accepted.	------ -----
47.	**Sri N. Harinder, National Alliance for People's Movement, R/o Miryalaguda** objected the setting up of thermal power project by TSGENCO. He quoted the recent international convention, wherein the Hon'ble Prime Minister of India also agreed to the suggestions to desist from construction of new thermal power projects in view of impending increase of 2 degree Celsius in global temperatures, which will make the earth inhospitable for living beings. He cited the popular saying "earth can support the needs of human beings but not to the greed." He alleged that EIA report was not studied by anybody here except one person though the report was exhibited for the access of the public. As per the report, the	Telangana State is a newly formed backward and drought affected state which came into force from 02.06.2014. There is a power deficit of 2700 MW on the day of its formation. About 21 lakhs pump sets are using by the farmers for drawl of water for cultivation of their fields. In view of the proposed lift irrigation projects, drinking water scheme declared by Govt. and due to various proposed projects in the state, the gap between demand and supply escalates. Further to the above, Telangana state requires substantial capacity addition to meet the progressive demand	------

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	power project would generate 30 lakh tonnes of ash annually. That means the project generates ash at the rate of 2 tonnes/minute. As per the report, 7% of the total ash produced would be supplied to the cement industries in this area and 93% of ash would be left in the ash pond. The TSGENCO had no concrete plans of disposing the ash without causing any harm to environment. He questioned the rationale behind setting up of this type of mega power plant, which is detrimental to environment and people. At present the TSPCB is staffed with three members to cater the needs of 2000 industries located in the district. He stated that the cost of the power from this project would be around Rs. 5/- per unit, whereas the solar power project developed with site specific locations would cater to the needs of the people without causing pollution. He added that solar power could be harnessed and supplied to the consumers by way of putting up at decentralised locations at cheaper prices without any adverse impacts. The mega projects like the present one require rehabilitation & resettlement of people. The experience of the people, who are displaced due to the construction of Pulichintala Project, is fresh in the minds of people even after lapse of seven years. There is water course adjacent to the M/s India Cements Limited, which cater to	for other sectors viz, 9 hours power supply for agricultural sector, estimated demand of 7000 MW for lift irrigation schemes, 24x7 power supply, etc. Hence to meet the above demand, establishment of new power plants in the state is very much essential. a) All pollution control measures will be taken up to control the pollution levels due to the above power plant. b) As per the revised EIA report, the ash generated from the power plant is 27.63 Lakh Tonne per Annum. There are 22 cement industries around the proposed plant. The fly ash generated from the plant will be supplied to the above cement industries, brick industries and other users and 100% utilization will met within four years as per the norms fixed by MoEF & CC, GoI.	TSGENCO will install the following systems in the power plant to maintain the pollution levels as prescribed by the MoEF & CC, GoI vide its Gazette notification dt. 07.12.2015. i) Construction of 275 m high chimneys for dispersion of flue gases ii) Providing Electro Static Precipitators (ESPs) with 99.98% efficiency to maintain SPM levels less than 30 mg/Nm3. iii) Effluent Treatment plant with zero discharged concept to treat the plant effluents and reuse the same in the plant use. iv) Flue gas desulpurisation unit to maintain SO2 levels less than 100 mg/Nm3

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	the needs of thousands of acres in the vicinity, which may be affected by the dust pollution. The EIA report failed to evaluate the adverse impact on the water course.	c) The state Govt. has already taken steps to establish solar power plants with a total capacity of 5000 MW out of which 1000 MW is already connected to the grid. The solar power plants are not a base load stations. They will run only @ 18 - 19% PLF and only supplementary to the existing thermal and hydel power stations. d) For R&R of the project displaced people Ac. 13.21 Gts of land was acquired at Kallepalli village, Dameracherla Mandal, Nalgonda Dist. e) No plant effluent will be discharged in to the nearby water bodies as effluent treatment plant is designed with recycling system to reuse the treated water for cooling tower make up, dust suppression system in coal conveyor and coal stock yard, green belt development and floor wash in the plant. f) Action plan was already submitted to protect the Tungapadu vagu which is passing through the proposed project site as suggested by Sub Committee of MoEF & CC, GoI during their site visit to the project site on 05.12.2015.	v) Selective Catalytic Reduction unit to maintain NOx levels less than 100 mg/Nm3 vi) Sewage treatment plant with recycling system. vii) Development of green belt in an extent of Ac. 1352.00. viii) Water sprinking system in ash ponds to suppress dust emissions and coal conveyors and coal storage yard to control fugitive emissions. ix) Construction of fly ash storage silos for issue of fly ash to various end users. -----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
48.	**Sri K. Thirupathaiah Goud, R/o Wadapally** supported the setting up of the project and sought implementation of the lift irrigation scheme.	The Telangana State Governement is already initiated various lift irrigation schemes under "Mission Bhagiratha" programme.	-----
49.	**Sri P. Rampal Reddy, Telangana Trade Union** welcomed the project and requested that no person from Andhra should be allowed to take up any sort of employment in the project and only local people should be given opportunity to do the same work.	Only local people will be considered for providing livelihood in the project.	-----
50.	**Sri G. Mahesh Goud, Vidhyardhi sangham, BC Welfare Association** sought employment and wanted to know the details of job opportunities available in the proposed project.	a) TSGENCO has agreed to provide employment to 584 members from project affected and displaced families under this project. b) Priority will be given to engage Local villagers/ agriculture labour as unskilled/Semi skilled /skilled/ workers in Civil/E&M construction works as per their eligibility and they will be continued as outsource workers after commissioning of the unit as per plant requirement in labour oriented annual maintenance works such cleaning of roads, drains, up keeping of all buildings, maintenance of lawns and plantations, annual	----- -----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
		maintenance works in coal handling plant etc. c) The land losers will be considered for employment in the project as Junior Plant Attendants (JPAs), drivers, office subordinates, junior assistants, typists and other categories equal to class IV.	------
51.	**Dr. S. Nagasena Reddy, Environmentalist, R/o Veerlapalem** while welcoming the project he dwelt the elaborate process followed by Expert Appraisal Committee of MoEF&CC. The EAC headed by one Dr. C.R. Babu (from Kakinada) and assisted by one Deputy Director from MoEF inspected the site and deferred the location of the thermal power plant. With great effort, the government convinced the authorities and obtained terms of reference for the present location. He cited the latest guidelines regarding brick kilns wherein the use of fertile top soil useful for agriculture is prohibited. Construction is going at a brisk pace in Hyderabad city and fly ash in large quantities can be used for manufacturing of bricks apart from meeting the requirement of cement units. He sought free power supply to the lift irrigation schemes under CSR	---- ----- All the buildings in the plant and residential quarters will be constructed using fly ash bricks. Hence, there is a scope for establishing more than 25 fly ash brick manufacturing units around the plant site by	---- ---- ----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
	to provide irrigation needs of the area. He assured that he would volunteer to support TSGENCO legally in case of any impending cases filed against the proposed project.	the private entrepreneurs. TSGENCO will establish two fly ash brick plants in the proposed project site.	------
52.	**Sri G. Ramaiah, R/o Veerlapalem** questioned the decision of setting up of the thermal power plant at Veerlapalem instead of coal mining areas like Manuguru and Kothagudem. He raised the issue of compensation for occupied lands. He sought raising plantation on large-scale in advance.	Already power plants are existing at coal mining areas like Kothagudem, Ramagundam and also 1080 MW capacity power plant is proposed by TSGENCO at Manuguru. The proposed power project at Veerlapalem village is a site specific as it is having good road connectivity, nearby water source in the form of Krishna river, near by railway station at a distance of 8.00 km and MoEF & CC, GoI has diverted the degraded forest land for establishing the power plant. An amount of Rs. 285.81 Crores was deposited with the District Collector, Nalgonda for payment of compensation to all the land losers. Green belt development will be taken up in the vacant areas of the power plant including proposed colony & around ash pond area to meet the environmental norms as fixed by MoEF&CC, GoI to protect the environment. The same will be taken up once EC is received for the	Further, the local forest department has advised for taking up plantation with suitable species. ----- ----

S. No	Points raised by Public representative/public	Response/Commitment by project proponent	Action Plan to comply with the commitments with budgetary provision
		project. Power plant will be established near load centres also to avoid transmission loses and low voltage problems.	-----
53.	**Sri Surkanti Venkat Reddy, NGO, Choutuppal** welcomed the setting up of the proposed power plant. He cited that the progressive people of Telangana State supported the project like this in contrast to the opposition of setting up of similar type of projects at Kakarapally and Sompet by the people from Andhra region. He sought to take up advance operations for developing plantations.	---- --- Green belt development will be taken up in the vacant areas of the power plant including proposed colony & around ash pond area to meet the environmental norms as fixed by MoEF&CC, GoI to protect the environment. The same will be taken up once EC is received for the project.	----- ----- -----
54.	**Sri Jeethiram, R/o Thimmapuram** requested for the survey of lands in survey number 190 in Veerlapalem area	----	----

Annexure – 7B (Contd...)

Replies to the issues raised by various Private Parties on the proposed 5x 800 MW Supercritical Coal Based Yadadri Thermal Power Station At Veerlapalem Village, Damercherla Mandal, Nalgonda, Telangana.

S. No	QUERIES RAISED BY	PAGE NO
1	Dr. Babu Rao Kalapala, Retd Scientist, Snehapuri colony, Hyderbad	01 - 22
2	Shri. Prasad Khale, Conservation Officer, Conservation Action Trust	23 - 36
3	Shri. G Mohan, State Secretary and Shri. N Harinder, General Secretary, Human Rights forum, Nalgonda, Telangana	37-52
4	Shri. N Harinder, General Secretary, Human Rights forum, Nalgonda, Telangana	53
5	Shri. Pushp Jain and Shri. Deepala Suresh, M/s EIA Resource and Response Centre,(eRc) New Delhi	54-61

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Dr. Babu Rao Kalapala, Retired Scientist, Snehapuri Colony, Hyderabad)

<table>
<tr><th>S.No</th><th>Issue</th><th>Proponent Response
(updated as per Revised EIA Report)</th></tr>
<tr><td>II</td><td colspan="2">'Falsification of data and plagiarism in EIA report of YTPS", by Dr. BabuRao Kalapala vide email dt 27-05-2016</td></tr>
<tr><td>1</td><td>Land requirement for the project is given as "The total extent of land for establishment of proposed power project is 2800 Acres (Forest land is Ac. 2095.28 Gts, Patta Land, Government Land, Udfapatta Land and D-Patta Land etc is Ac. 704.12 Gts)." (Page 2-27)
"A thick greenbelt will be developed around the project boundary in an extent of 1225 acres of land." (Page 1-16)
"The total area of extent for establishment of power station is 2800 acres, including 100 acres for colony and 1300 acres for greenbelt development." (Page 2-25).

<table>
<tr><th>Sno</th><th>Details</th><th>Area (acres)</th></tr>
<tr><td>1</td><td>Main plant area</td><td>250.00</td></tr>
<tr><td>2</td><td>BOP area</td><td>350.00</td></tr>
<tr><td>3</td><td>Raw water Reservoir</td><td>100.00</td></tr>
<tr><td>4</td><td>Coal handling plant</td><td>250.00</td></tr>
<tr><td>5</td><td>Ash dyke area</td><td>400.00</td></tr>
<tr><td>6</td><td>Green belt area</td><td>1225.00</td></tr>
<tr><td>7</td><td>Housing colony</td><td>100.00</td></tr>
<tr><td>8</td><td>Raw water pipeline and Railway corridor</td><td>50.00</td></tr>
<tr><td>9</td><td>Roads</td><td>75.00</td></tr>
<tr><td></td><td>Total</td><td>2800.00</td></tr>
</table>
</td><td>The total land requirement of the project is about 2800 acres complying with CEA norm of 0.7 acres/MW. Item wise break up of land requirement is provided in Chapter -2 of the Revised EIA Report

Revised plant layout showing proposed the greenbelt development is provided in Chapter -4 of the Revised EIA</td></tr>
</table>

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Dr. Babu Rao Kalapala, Retired Scientist, Snehapuri Colony, Hyderabad)

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	What is the logic in converting Ac2095.28 Gts of reserve forest land for industrial use and developing a green belt in 1225 acres of the same forest land? Greenbelt requirement is 30% of the total project land. According to the above table 1575 acres is the actual project area that constitutes 70% of the total area. So the land requirement including greenbelt comes to 1575/0.7 = 2250 acres. So land requirement for greenbelt is 675 acres only. Excess land is 550 acres. Why is 704 acres of poor people's land taken away beyoun requirement?	
2	Fresh water is presently a very limited resource. Several thermal power plants in various states were forced to close due to shortage of water this summer. Telangana state is undergoing severe drought. According to the new directive of MoEFCC dated 7 Dec 2015 all new plants coming up after Jan 2017 have to use not more than 2.5 m3/MWhr of water. "New plants to be installed after 1st January, 2017 shall have to meet specific water consumption upto maximum of 2.5 m^3/MWh and achieve zero waste water discharge." As per this norm the water requirement for the 4000 MW plant comes to 2.5 X 4000 = 10000 m^3/hr at full capacity and at a PLF of 85% the water requirement is 8500 m^3/hr on average with peak value at 10000 m^3/hr. But the total water requirement is given as 9755 m3/hr = 2.87 m3/MWhr at 0.85 PLF violating the standard. What is the basis for obtaining 9755 m3/hr? This requirement does not include water needed for FGD units as Table 2.11 reproduced below indicates.	The project is based on Zero Discharge Concept considering recycling of treated wastewater. Water requirement of the project is estimated to be 10,000 m^3/hr (97.8 cusecs/3.10 TMC per year) considering a COC of 5.0 and complying with the new MOEF & CC norm of 2.5 m^3/MWHr. Details of water balance considering reuse and recycle are provided in Chapter – 4 of the Revised EIA Report

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Dr. Babu Rao Kalapala, Retired Scientist, Snehapuri Colony, Hyderabad)

<table>
<tr><th>S.No</th><th>Issue</th><th>Proponent Response
(updated as per Revised EIA Report)</th></tr>
<tr><td></td><td>
<table>
<tr><th>Sno</th><th>Water Usage Description</th><th>Water requirement Qty (m³/hr)</th><th>Remarks</th></tr>
<tr><td>1</td><td>Make-up water for cooling tower</td><td>8250</td><td>(1540) to ash pond/CHP,(100) to</td></tr>
<tr><td>2</td><td>DMF feed pump</td><td>290</td><td>(15) Silting chamb PTP(20)CMB(205) up to boiler CST</td></tr>
<tr><td>3</td><td>Service water</td><td>215</td><td>To CMB</td></tr>
<tr><td>4</td><td>HVAC Makeup</td><td>275</td><td></td></tr>
<tr><td>5</td><td>Portable water</td><td>25</td><td>Treated in STP</td></tr>
<tr><td>6</td><td>AHS compressor cooling, makeup for wastage from clarifier, AHP water sump coal handling plant, Miscellaneous</td><td>700</td><td>Sludge handing sys CMB</td></tr>
<tr><td></td><td></td><td>9755</td><td></td></tr>
</table>
Water required for the growing paddy per acre is about 1300 m³ for the crop season. An hour's use of water in the plant (9755/1300 = 7.5) is sufficient for 7.5 acres of paddy crop. Per day 7.5 X 24 = 180 acres irrigation for a season is deprived. About 56000 acres will be deprived of irrigation every year.
</td><td></td></tr>
<tr><td>3</td><td>Draft EIA does not unambiguously commit to setting up FGD unit to reduce SO_2.Emissions to meet the new emission</td><td>The proposed project is redesigned to comply with the new emission norms of</td></tr>
</table>

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Dr. Babu Rao Kalapala, Retired Scientist, Snehapuri Colony, Hyderabad)

<table>
<tr><th>S.No</th><th>Issue</th><th>Proponent Response
(updated as per Revised EIA Report)</th></tr>
<tr><td></td><td>standard of 100 mg/Nm³ of stack gas. True extract of the minutes of 16thboard meeting of the company held on 14.03.2016 discussed the new standards but did not take any firm decision to implement them. Board decide to follow in principle the steps to be taken by NTPC, New Delhi in this regard"(Annexure 8) but while computing the incremental GLCs new standard value is taken to calculate the rate of SO_2 stack. How is SO_2 reduced to that level without FGD needs limestone and produces solid waste that should disposed and liquid waste water that requires treatment? There is no mention about these in the draft EIA. Amount of SO_2 generated based on coal rate and composition = 13.81 x 106 X 0.65 / 100 X 64/32 = 179,530 TPA. (Sulphur content from table 2.14). In the table 4.56 reproduced SO_2 emission rate from the stack is calculated based on fictitious stack gas flow rate based on stoichiometric combustion calculations. Numbers given do not match. How does the proponent / consultant justify it?
<table>
<tr><th>S.no</th><th>Parameters</th><th>Units</th><th>2x800MW (Unit 1&2)</th><th>2x800 MW (Unit 3&4)</th><th>2x800M (Unit 5)</th></tr>
<tr><td>1</td><td>Stack height</td><td>m</td><td>275</td><td>275</td><td>275</td></tr>
<tr><td>2</td><td>No.of flue</td><td>No</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td>3</td><td>Top diameter of flue</td><td>m</td><td>7.6</td><td>7.6</td><td>7.6</td></tr>
</table>
</td><td>MOEF where in a flue gas treatment system comprising High Efficiency ESPs for control of Particulate emissions and Flue Gas Desulphurization (FGD) for control of Sulphur dioxide emissions(Flue Gas Desulphurization (FGD) technology with wet limestone process is considered for implementation) and Selective Catalytic Reduction Unit (SCR) and For control of NOx emissions, SCR is proposed which will be located between the economizer outlet and APH inlet.

Details of FGD are given in Chapter -2 and Chapter – 4 of the Revised EIA Report

Emission details of the project considering FGD are provided in Chapter – 4 of the Revised EIA Report</td></tr>
</table>

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Dr. Babu Rao Kalapala, Retired Scientist, Snehapuri Colony, Hyderabad)

S.No	Issue						Proponent Response (updated as per Revised EIA Report)
	4	Flue gas velocity in each flue	m/s	22	22	22	
	5	Flue gas temperature	°K	413	413	413	
	6	Flow rate of gas in each flue	Nm^3/S	998.02	998.02	998.02	
	8	Emission rates					
	A	Sulphur dioxide(SO2) (emission rate based on 100 mg/Nm^3 emission standard)	g/s/flue	61.06	61.06	61.06	
	B	Particulate matter (PM)(emission rate based on 30 mg/Nm^3 emission standard)	g/s/flue	18.32	18.32	18.32	
	C	Oxides of Nitrogen(NOx)(emission rate based on 100 mg/Nm^3	g/s/flue	61.96	61.96	61.96	

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
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<table>
<tr><th>S.No</th><th>Issue</th><th>Proponent Response
(updated as per Revised EIA Report)</th></tr>
<tr><td></td><td>
<table>
<tr><td></td><td>emission standard)</td><td></td><td></td><td></td><td></td></tr>
<tr><td>D</td><td>Mercury(emission rate based on 0.03 mg/Nm³ emission standard)</td><td>g/s/flue</td><td>0.02</td><td>0.02</td><td>0.02</td></tr>
</table>
</td><td></td></tr>
<tr><td>4</td><td>Emission rates of pollutants presented in Table 4.66 are erroneous. For example, both SO2 and NOx emission rates are based on the standard 100mg/Nm3. So the emission rate per flue should be same. But the values given are 61.06 and 61.96 respectively. But based on the flow rate of gas per flue of 998.02 Nm3/s the emission rate should be 998.02x100/1000 = 99.8 g/s/flue for both SO2 and NOx. Emission rate taken is nearly 39% off. This error is in addition to calculation of a fictitious stack gas velocity that has no real basis. Similarly the emission rate of PM10 given the table cannot be reproduced.
Proponent consultant to explain how the NO_x concentration is reduced to 100 mg/Nm³.
<table>
<tr><th>Project</th><th>Nox Emission Standard used</th><th>Year</th><th>Source Respective EIA</th></tr>
<tr><td>KTPS Expansion 800MW</td><td>200g/GJ =500mg/Nm³</td><td>2014</td><td>EIA,page63</td></tr>
<tr><td>SDTPSII</td><td>350mg/Nm³</td><td>2014</td><td>Table 4.5</td></tr>
</table>
</td><td>Emission details of the project considering FGD are provided in Chapter – 4 of the Revised EIA Report</td></tr>
</table>

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Dr. Babu Rao Kalapala, Retired Scientist, Snehapuri Colony, Hyderabad)

S.No	Issue	Proponent Response (updated as per Revised EIA Report)

,Krishnapatnam			
NTPC,Ramagundam	260g/GJ =742.85mg/Nm^3	2015	Table 4.4
NTPC,Pudimadka	510mg/Nm^3	2015	Table 4.4
YTPS,Veerlapalem	Assumed Nox in stack gas at 100mg/Nm^3	2016	No data

There is no proposal for any treatment of gas to reduce Nox. Use of low NOx burners can at best lower the NOx generated to 400 mg/Nm^3. Selective catalytic reduction is required to bring it down to 110 mg/Nm3. International Energy Agency compilation of "Fossil Fuel fired Power Generation: Case studies of recently constructed Coal – and gas – Fired power plants" published in 2007 on several best performing plants in OECD countries show that NOx cannot be brought down to below 100 mg/Nm^3 without use of selective catalytic Reduction process. What is the actual NOx generated? How the company will achieve the standard of 100 mg/Nm^3 of NOx in effluent gas? Same is the case for mercury. What is the total mercury released in coal combustion and how it is made to meet the emission standard needs explanation. The flue gas flow rate given at serial no 6 is not Nm^3/s but m^3/s. Conversion to STP conditions gives about 659 Nm^3/s. With FGD installed the stake gas temperatures will be lower at about 383 K and not 43 K as given here. Emission

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<table>
<tr><th>S.No</th><th>Issue</th><th>Proponent Response
(updated as per Revised EIA Report)</th></tr>
<tr><td></td><td>rates for pollutants given in the table do not match with calculated values based on this flue gas flow rate also. Consultant falsified the information. How this consultant got accreditation from NABET is rather surprising. It indicates the quality of our accreditation agencies. With false emission rates what is the sanctity of computed GLCs?</td><td></td></tr>
<tr><td>5</td><td>Stack diameter per flue is given as 7.6 m for this project. Given below is a comparative table for several 800 MW supercritical plants.
<table>
<tr><th>S. no</th><th>Plant</th><th>Stack Diameter, m</th><th>Velocity m/s</th><th>GCV Kcal/kg</th><th>SHR(De Kcal/k</th></tr>
<tr><td>1</td><td>KTPS Expansion</td><td>7.0</td><td>22</td><td>3700</td><td>2317</td></tr>
<tr><td>2</td><td>APGENCO, Krishnapatnam</td><td>7.5</td><td>22</td><td>6340</td><td>2317</td></tr>
<tr><td>3</td><td>APGENCO, Ibrahimpatnam</td><td>7.0</td><td>22</td><td>3700</td><td>2317</td></tr>
<tr><td>4</td><td>NTPC, Ramagundam</td><td>8.15</td><td>22</td><td>NA</td><td>NA</td></tr>
<tr><td>5</td><td>UMPP, Krishnapatnam</td><td>7.7</td><td>25</td><td>6500-7000</td><td>NA</td></tr>
<tr><td>6</td><td>NTPC,Kudgi</td><td>7.7</td><td>26</td><td>3400</td><td>2447</td></tr>
</table>
From the above data it is clear that calculating emission rates of</td><td>Emission details of the project considering FGD are provided in Chapter – 4 of the Revised EIA Report</td></tr>
</table>

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	pollutants based on an assumed stack gas velocity could be off substantially.	
6	Regarding the linkage for domestic coal compliance for ToR 36 is: " The quantity of coal required for the proposed project is 13.81 mtpa (50% domestic + 50% imported) Source: 50% quantity of Domestic coal will be sourced from M/s SCCL and the balance 50% of coal will be from foreign origin. Accordingly an MOU is entered with M/s SCCL for supply of 50% domestic coal of G9 grade which is GCV of 4600 Kcal/Kg. The Coal analysis results are given in Table- 2.6 of Chapter-2." Table 2.14 given the GCV of domestic coal as 3400 KCal/Kg and the blended coal GCV as 4550KCal/Kg. There is discrepancy in the quality of domestic coal considered in the preparation of draft EIA and the domestic coal for which a MoU with M/s SCCL is claimed. Copy of the MoU is not provided with the draft EIA. Is entering a MoU for supply of coal synonymous to firm linkage? Linkage letter can only be issued by Ministry of coal. Will the coal allotted have the same GCV and quality parameters used in the preparation of EIA? Is this project eligible to apply for EC without firm linkage of fuel?	The quantity of coal required for the proposed project is 12.28 MTPA (50% domestic +50% indigenous) The MOU with M/s SCCL for supply of Indigenous coal Details of fuel analysis are given in Chapter – 2 of Revised EIA Report along with lab reports The quantity of coal required for the proposed project is 12.28 MTPA (50% domestic +50% indigenous) The MOU with M/s SCCL for supply of Indigenous coal and SCCL commitment letter for supply of coal as per the MOU are provided in Chapter -2 M/s MSTC for supply of imported coal is revised as directed by the EAC and details are provided in Chapter -2 Details are given in the Revised EIA Report

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
7	Entire report has no reference to the material taken from other works. Most of Chapter six is lifted from Annexure document of EIA/EMP of Rao sahib dada Pawar Ghodganga Sahakari Sakhar Karkhana Ltd for captive power plant expansion to 20.5 MW prepared by SGM Corporate Consultants pvt. Ltd., and MKW Biosystems, Pune available on MoEFCC website. Table 6.70 and 6.71 are reproduced from this document verbatim. http://environmentclearance.nic.in/writereaddata/FromB/EC/EIA EMP/15032016SL0QCU4LAnnexvre-documentofEIA-EMP.pdf There is extensive copy paste in section 7.8 from "Risk Assessment and Disaster Management Plan & Hazard Control w.r.t Ferro Alloys Division of M/s Misrilall Mines Pvt.Ltd., Pankapal, Jajpur, Odisha." This report is available at http://environmentclearance.nic.in/writereaddata/online/RiskAssessment/18022015COKJ5207RiskAssessmentandDisasterManagementPlan.pdf Section 7.8.2 is fully lifted from the above reference. This EIA and EMP report prepared by Environmental Research and Services (India) Pvt.Ltd., Bhubaneswar was submitted to MoEF&CC in July 2012. Fourth and fifth paragraphs of section 7.8 are a verbatim copy from a website in Australia. The Second sentence of the copied paragraph "These regulations and codes, adopted under state and territory OH & S Acts, explain the duties of particular groups of people in controlling the risks associated with specific	The report has been revised addressing the site specific and project specific issues

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	hazards." In India we do not have any state territory OH & S Acts. This is an indication of the quality of the EIA report and the competency of the consultant.- indicates that it is thoughtlessly lifted from an Internet source. "As a small business owner one has certain rights and responsibilities regarding health and safety in the workplace. Even without any employees, one must ensure that the business doesn't create health and safety problems for the customers and the general public." The principal source for all these plagiarized parts is "Safety amng Health in the Iron and Steel Industry, ILO Code of Practice, Second Edition 2005" available at https://books.google.co.in/books?isbn=9221175359 Section 7.6.2.3 Safety Policy and Regulations is a verbatim reproduction from NTPC Safety Manual 2004 available at www.rgppl.com/tender/Safety.pdf Section 7.6.2.1, 7.6.2.2, and 7.6.2.3 are extensively copy pasted from the publication of RuchiSrivastava and Pravin Patel, International Journal of Engineering Research & Technology (IJERT), Vol. 3 Issue 4, April – 2014. Table 7.79 Risk Classification Screening and Table 7.80 Risk Classification pertain to a Hazard Identification and Risk Assessment Study (HIRA) done by the authors for the CSEB thermal power plant at Kobra in Chhattisgarh. The same is presented as HIRA for the proposed 4000 Mw YTPS. This is most unethical practice and attracts disqualification as per OM dated 5 October 2011 on the	

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	ownership of EIA Report. MoEF Notification 2006 in section 8 (vi) clearly states "Deliberate cocealment and/or submission of false or misleading information or data which is material to screening or scoping or appraisal or decision on the application shall make the application liable for rejection, and cancellation of prior environmental clearance granted on that basis." Second para of section 6.2 and some bullet points under 6.2.1 are copied from "Environmental Management in Oil and Gas Exploration and Production" available at http://books.google.co.in/books?isbn=9280716395 Few examples of the section and page on which it begins in the source copied is given below to confirm the fact of plagiarism for anyone to verify. Entire section 7.7 dealing with Disaster Management Plan and Sections 7.8.2.4 are all copied from a document on Risk Assessment available at http://environmentclearance.nic.in/.../01042015G0QGT1PXRiskassessmentfortheProject.pdf. Author of the report is Unknown. [Source:https://books.google.co.in/books?id=2mNlt-TUASAC&pg=PA127&lpg=PA127&dq=Respirators+should+be+cleaned+and+sanitized+periodically&source=bl%ots=DCVir6s8vi&sig=_w5f0eXoe3XsoJ8ZoupU8PGwTgg&hl=en&sa=X&ved=0CBwQ6AewAGoVChMI7NzNn-2vyAIVjRmOCh1Ibw1z#v=onepage&q=Respirators%20should%20be%20cleaned%20and%20sanitized%20periodically&f=false] "Handling of Heavy Bags	

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	Handling of heavy bags of the final products may lead to occupational Injuries like strains, sprains and cramps. This can be avoided by going for mechanical handling of the product or minimising the weight for manual handling." (Page 7-216) This has no relevance to this project but is a relic of copy paste from other reports. One such is available on MoEF website http://environmentclearance.nic.in/.../online/.../08082014QUGPYT2311Ch6-ICPL-final.pdf Also the Entry Medical Examination Form and the Periodic Medical Examination Form are taken from literature but not acknowledged. Respective sources for these forms are given below. [www.unv.org/fileadmin/docs/...of.../Entry Medical Exam Form.doc http.//sas.undp.org/.../Periodic Medical Examination FormMS6.doc] There is enough evidence in this chapter to conclude that this chapter is copy pasted from the EIA report for a fertilizers and chemicals plant for VBC Fertilizers and Chemicals Ltd, Jayantipuram, AP done by this consultant in 2015. For Example More incidence of plagiarism can be identified with patient search at conservable expense of time. But it is not worth the effort. It is a clear case of plagiarism that is very common in the EIA report preparation as the scrutiny is weak. A Rs25,000crore company beginning its venture on false premises is disturbing.	

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	It is violative of professional ethics. Explain the reasons for passing others work as the contribution of the Consultant. Thungapaduvaguang its feeding channels pass through the site chosen for the power plant. A subcommittee visited the site on 5 December 2015 and made a visit report based on which ToR was issued on 16 February 2016. "The Vgu has a catchm,ent area of 267 sq. Miles (696 sq.KMs) including the NSLC command area and yields 1,234 mcft. (1.234 TMC) including 328.98 Mc ft. As regenerated flow the ayacut." Hydrogeological character map taken from the hydrogeological studies report annexed to draft EIA is presented below showing the contours of drain channels on the proposed site connecting to Thungapaduvagu. Once the site is developed for construction all these natural channels will be leveled and eliminated. That is an ecological damage not cosidered in the EIA or the subcommittee visit report. Ash pond also is located over drain channels and disrupts natural drainage. What are the health impacts of pollution generated from the plant? What is rthe fate of all the toxic elements released inti the environment? Where will they disappear? Provide material balance for mercury and other heavy matals in the coal. ToRare not adequately complied with. For example, ToR 24 on "source of water and sustainability even in lean season" comliance report staes "As the Krishna river is perennial river sufficient water will be available even during the lean season also." But the reality is different. RTPS located close to Krishna	

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	River in Karnataka was forced to close down 3 units this summer due to shotage of water. "The drought situation has affected the opearations at the Raichur Thermal Power Station (RTPS), which accounts for over 30 per cent of the State's power generation. There of its generating units (2, 6, and 7) with an installed capacity of 210 MW each have stopped opearations due to shortage of water for their cooling towers." http://www.thehindu.com/news/national/karnataka/drought-hits-power-generation-in-rtps/article8358513.ece Again ToR 42 on "Radioactivity and Heavy metal content" compliance stated in Annexure 7 is misleading. The analysis reports are for some coal and not for the actual coal to be used in the plant as there is no firm fule linkage as yet. Among the additional terms of reference issued to YTPS the following were not answered. "(d) What is the carbon intensity from your electricity generation projected? (i.e. CO2 Tons/MWh or Kg/kWh) (e) Amount of CO2 in Tons/Yr expected to be reduced from the baseline data availabe on CEA's website (www.cea.nic.in)" On "Cumulative impact assessment" prescribed, the compliance stated is: "Accepted. TSGENCO will undertake the cumulative impact assessment of air, water and socio economics covering the industries located within 15 km radius of the present propject site and present the same in the Draft EIA report." But no such assessment within 15 km area is presented in the draft	

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	EIA. How could the consultant make such a false statement and get away with it? [Source:htpp://www.canberrabusinesspoint.com.au/resourcestools/business-topics/?id=253] Another sentence in the fifth paragraph of section 7.8 indicates that it is thoughtlessly lifted from an Internet source. "As a small business owner one has certain rights and responsibilities regarding health and safety in the workplace. Even without any employees, one must ensure that the business doesn't create health and safety problems for the customers and the general public." The principal source for all these plagiarized parts is "Safety amng Health in the Iron and Steel Industry, ILO Code of Practice, Second Edition 2005" available at https://books.google.co.in/books?isbn=9221175359 Section 7.6.2.3 Safety Policy and Regulations is a verbatim reproduction from NTPC Safety Manual 2004 available at www.rgppl.com/tender/Safety.pdf Section 7.6.2.1, 7.6.2.2, and 7.6.2.3 are extensively copy pasted from the publication of RuchiSrivastava and Pravin Patel, International Journal of Engineering Research & Technology (IJERT), Vol. 3 Issue 4, April – 2014. Table 7.79 Risk Classification Screening and Table 7.80 Risk Classification pertain to a Hazard Identification and Risk Assessment Study (HIRA) done by the authors for the CSEB thermal power plant at Kobra in Chhattisgarh. The same is presented as HIRA for the	

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	proposed 4000 Mw YTPS. This is most unethical practice and attracts disqualification as per OM dated 5 October 2011 on the ownership of EIA Report. MoEF Notification 2006 in section 8 (vi) clearly states "Deliberate concealment and/or submission of false or misleading information or data which is material to screening or scoping or appraisal or decision on the application shall make the application liable for rejection, and cancellation of prior environmental clearance granted on that basis." Second para of section 6.2 and some bullet points under 6.2.1 are copied from "Environmental Management in Oil and Gas Exploration and Production" available at http://books.google.co.in/books?isbn=9280716395 Few examples of the section and page on which it begins in the source copied is given below to confirm the fact of plagiarism for anyone to verify. Entire section 7.7 dealing with Disaster Management Plan and Sections 7.8.2.4 are all copied from a document on Risk Assessment available at http://environmentclearance.nic.in/.../01042015G0QGT1PXRiskassessmentfortheProject.pdf. Author of the report is Unknown. [Source:https://books.google.co.in/books? Id=2mNlt-TUASAC&pg=PA127&lpg=PA127&dq=Respirators+should+be+cleaned+and+sanitized+periodically&source=bl%ots=DCVir6s8vi&sig=_w5f0eXoe3XsoJ8ZoupU8PGwTgg&hl=en&sa=X&ved=0CBwQ6AewAGoVChMI7NzNn-2vyAIVjRmOCh1Ibw1z#v=onepage&q=Respirators%20should%2	

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	0be%20cleaned%20and%20sanitized%20periodically&f=false] "Handling of Heavy Bags Handling of heavy bags of the final products may lead to occupational Injuries like strains, sprains and cramps. This can be avoided by going for mechanical handling of the product or minimising the weight for manual handling." (Page 7-216) This has no relevance to this project but is a relic of copy paste from other reports. One such is available on MoEF website http://environmentclearance.nic.in/.../online/.../08082014QUGPYT2311Ch6-ICPL-final.pdf Also the Entry Medical Examination Form and the Periodic Medical Examination Form are taken from literature but not acknowledged. Respective sources for these forms are given below. [www.unv.org/fileadmin/docs/...of.../Entry Medical Exam Form.doc http.//sas.undp.org/.../Periodic Medical Examination FormMS6.doc] There is enough evidence in this chapter to conclude that this chapter is copy pasted from the EIA report for a fertilizers and chemicals plant for VBC Fertilizers and Chemicals Ltd, Jayantipuram, AP done by this consultant in 2015. For Example More incidence of plagiarism can be identified with patient search at considerable expense of time. But it is not worth the effort.	

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	It is a clear case of plagiarism that is very common in the EIA report preparation as the scrutiny is weak. An Rs25,000crore company beginning its venture on false premises is disturbing. It is violative of professional ethics. Explain the reasons for passing others work as the contribution of the Consultant.	
8	Thungapaduvagu and its feeding channels pass through the site chosen for the power plant. A subcommittee visited the site on 5 December 2015 and made a visit report based on which ToR was issued on 16 February 2016. "The Vagu has a catchment area of 267 sq. Miles (696 sq.KMs) including the NSLC command area and yields 1,234 mcft. (1.234 TMC) including 328.98 Mc ft. As regenerated flow the ayacut." Hydrogeological character map taken from the hydrogeological studies report annexed to draft EIA is presented below showing the contours of drain channels on the proposed site connecting to Thungapaduvagu. Once the site is developed for construction all these natural channels will be levelled and eliminated. That is an ecological damage not considered in the EIA or the subcommittee visit report. Ash pond also is located over drain channels and disrupts natural drainage.	The project activities will not interfere with flow of Tungapahad Vagu since there is no extraction of water or discharge. No diversion of Tungapahad vagu is proposed. Plant layout is designed to keep a minimum distance of 500 m buffer between ash pond and Tungapahad Vagu to prevent contamination. A 100 m barrier on either side of banks of the vagu will be left as barrier which will be developed under greenbelt. Details of the same are given in Chapter – 4 of Revised EIA Report
9	What are the health impacts of pollution generated from the plant? What is the fate of all the toxic elements released into the environment? Where will they disappear? Provide material balance for mercury and other heavy metals in the coal.	Flue gas treatment system proposed which is in compliance with the new norms of MOEF & CC stipulated for thermal power plants will be implemented by TSGENCO.

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
		The proposed project is redesigned to comply with the new emission norms of MOEF where in a flue gas treatment system comprising High Efficiency ESPs for control of Particulate emissions and Flue Gas Desulphurization (FGD) for control of Sulphur dioxide emissions(Flue Gas Desulphurization (FGD) technology with wet limestone process is considered for implementation) and Selective Catalytic Reduction Unit (SCR) and For control of NOx emissions, SCR is proposed which will be located between the economizer outlet and APH inlet. The above system will ensure that there is no significant impact on health of surrounding villagers. No pollutant will be discharge outside the plant premises. The plant is based on Zero Discharge concept. The ground level concentration of air pollutants are within the permissible limits. Hence, no adverse impact on health. The details on health and safety impacts

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
		of project operations are provided in Chapter – 4 and Chapter – 7 of the Revised EIA Report
10	ToR are not adequately complied with. For example, ToR 24 on "source of water and sustainability even in lean season" compliance report states "As the Krishna river is perennial river sufficient water will be available even during the lean season also." But the reality is different. RTPS located close to Krishna River in Karnataka was forced to close down 3 units this summer due to shortage of water."The drought situation has affected the operations at the Raichur Thermal Power Station (RTPS), which accounts for over 30 per cent of the State's power generation.There of its generating units (2, 6, and 7) with an installed capacity of 210 MW each have stopped operations due to shortage of water for their cooling towers."http://www.thehindu.com/news/national/karnataka/drought-hits-power-generation-in-rtps/article8358513.ece. Again ToR 42 on "Radioactivity and Heavy metal content" compliance stated in Annexure 7 is misleading. The analysis reports are for some coal and not for the actual coal to be used in the plant as there is no firm fuel linkage as yet. Among the additional terms of reference issued to YTPS the following were not answered."(d) What is the carbon intensity from your electricity generation projected? (i.e. CO_2 Tons/MWh or Kg/kWh). (e) Amount of CO_2 in Tons/Yr expected to be reduced from the baseline data available on CEA's website	The TOR points have been adequately addressed in the Revised EIA Report along with compliance statement

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	(www.cea.nic.in)" On "Cumulative impact assessment" prescribed, the compliance stated is: "Accepted. TSGENCO will undertake the cumulative impact assessment of air, water and socio economics covering the industries located within 15 km radius of the present project site and present the same in the Draft EIA report." But no such assessment within 15 km area is presented in the draft EIA. How could the consultant make such a false statement and get away with it?	

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Shri. Prasad Khale, Conservation Officer, Conservation Action Trust)

S. No	Issue	Proponent Response (updated as per Revised EIA Report)
II	**Comments, Questions and Suggestions for the Public Hearing to be held on 31 May 2016 for "5x800 MW Supercritical Coal Based Thermal Power Plant at Veerlapalem Village, Damarcherla Mandal, District Nalgonda, Telangana", Prasad Khale, Conservation Officer, Conservation Action Trust vide email from prasad@cat.org.in on 28/05/16 06:11 PM**	
1.	Given the huge size of the proposed project, site monitoring should have been carried out for all four seasons viz. Pre-monsoon, Monsoon, Post-monsoon and Winter Season. It is also important to know the worst case scenario during the dry season.	MoEF & CC guidelines and the TOR issued stipulate collection of one season data for preparation of Draft EIA Report. TSGENCO will undertake regular monitoring of the baseline data as part of compliance during construction and operation phase. The same will be submitted to the MoEF& CC.
2.	As the proposed thermal power plant unit is based on coal, please provide full details about the expected deterioration of ambient air quality due to emissions from the plant and its related activities, as well as storage and transport of coal and disposal of fly ash.	Cumulative impacts of all sources of emissions including handling and transportation of existing and proposed projects has been assessed in Chapter -4 of the Revised EIA Report.
3.	Also provide the details of expected plume behaviour as per the wind speed and wind direction data collected from IMD as well as onsite monitoring using 3D models validated with ground monitoring.	Cumulative impacts of all sources of emissions including handling and transportation of existing and proposed projects has been assessed in Chapter -4 of the Revised EIA Report The terrain of 15 km radial extent (3D model) of the project boundary being undulated with altitude ranging from 230 - 40 m amsl, elevated terrain has been considered for estimation of cumulative impact using AERMOD air quality model. Details of 3D Modeling carried out are detailed in Chapter -4 of Revised EIA Report.

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Shri. Prasad Khale, Conservation Officer, Conservation Action Trust)

S. No	Issue	Proponent Response (updated as per Revised EIA Report)
4.	EIA mentions about the data obtained from Indian Meteorological Department, but there is no comparison of the data obtained by onsite monitoring and data obtained from IMD. Please provide proper Tables and Charts comparing the differences using both sets of data.	The EIA has been revised with site specific meteorological data. Details are provided in Chapter -3 of Revised EIA Report.
5.	Surface water quality monitoring mentions only about the existing quality of water. Please provide the details on the expected deterioration of existing surface water quality due to proposed Thermal Power project.	The proposed project is based on "Zero Discharge Concept". No wastewater will be discharged into River Krishna or Tungapahad Stream. Details of the wastewater, treatment and reuse in the plant are detailed in Chapter -4 of Revised EIA Report.
6.	Similarly provide details about the expected deterioration of existing ground water quality parameters due to the proposed project.	The project will not extract groundwater and hence there will be no impact on ground water. Also HDPE liner will be provided in the ash pond which will ensure that there is no leaching effect on ground water quality. Periodic monitoring of ground water quality near the ash pond is proposed in the revised EIA report. Details of Ash pond are given in Chapter -2 and Chapter -4 of Revised EIA Report. Proposed post project monitoring to check the ground water quality is given in Chapter -6 of Revised EIA Report.
7.	What will be the expected deterioration of existing water quality of Krishna River due to the proposed project?	The project is based on Zero Discharge Concept. The details on wastewater treatment, recycling and utilization are provided in Chapter -4 of Revised EIA Report. No wastewater will be discharged into River Krishna or Tungapahad Stream hence, no impact is envisaged on surface river water quality.

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Shri. Prasad Khale, Conservation Officer, Conservation Action Trust)

S. No	Issue	Proponent Response (updated as per Revised EIA Report)
8.	Please provide the data for analysis of meteorological parameters like wind speed, wind direction, thermal inversion, atmospheric pressure, rainfall and cloud cover etc. Please provide the data for the period of last 10 years.	The latest available secondary meteorological data from Climatological Tables, 1975-2000, India Meteorological Department (IMD), Nalgonda which is the nearest Indian IMD station is provided in Section-3.3 of Chapter-3 of the previous EIA report.
9.	What will be the impact on the existing soil quality due to deposition of pollutants from proposed coal thermal power plant?	The latest Government Gazette Norms, dated 07.12.2015, stipulates the following stack emission levels for the boilers which will be installed after 01.01.2017 ESP outlet dust concentration: 30 mg/Nm^3 SOx: 100 mg/Nm^3 NOx: 100 mg/Nm^3 Mercury: 0.03 ppm TSGENCO proposes to implement Flue gas treatment system which is in compliance with the new norms of MOEF & CC stipulated for thermal power plants at an estimated additional cost of Rs. 0.9 crores/MW which will ensure the following: a. Reduction of Particulate emissions b. Reduction of SO_2 emissions c. Reduction of NO_x emissions No deposition of pollutant is anticipated with implementation of above system. Details of Flue gas Treatment System are provided in Chapter -2 and Chapter -4 of Revised EIA Report.

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Shri. Prasad Khale, Conservation Officer, Conservation Action Trust)

S. No	Issue	Proponent Response (updated as per Revised EIA Report)
10.	What will be the impact on the farmlands and crops due to deposition of pollutants from proposed plant? How will the farmers be compensated for decrease in productivity?	Detailed reply is provided in the above point. Soil quality Monitoring will be carried out both within the project area and outside the project area to check contamination due to project activities. Details of soil quality monitoring are given in Chapter – 6 of Revised EIA Report.
11.	Please provide mitigation measures for the same.	The pollution control equipment is redesigned to comply with new norms of MOEF & CC. Reply for the point is provided against Point 9 and 10.
12.	Please provide the complete list of flora and fauna with IUCN status of the species whether it is endemic, endangered or vulnerable etc.	IUCN status of the species is provided in Chapter -3 of the Revised EIA Report.
13.	What is the distance of the project site from the boundary of Nagarjuna Sagar Wildlife Sanctuary?	There are no wild life sanctuaries, national parks, elephant/tiger reserves within 10km radius of the study area. Amrabad Tiger Reserve is located at a distance of 14.03 km from project site. A Letter and Authenticated Map has been obtained from Principal Chief Conservator of Forests (WL) and Chief Wild Life Warden, Forest Department, Government of Telangana. Details are provided in Chapter – 2 of the Revised EIA Report
14.	Are there any wildlife corridors passing through the proposed project area? Have any studies being carried out for the same? If yes, kindly provide mitigation measures for the same.	Same as above.
15.	What will be the impact of this project on existing Flora and Fauna?	There will be no significant impact on the existing Flora and Fauna due to implementation of Flue gas

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
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S. No	Issue	Proponent Response (updated as per Revised EIA Report)
		treatment system. The project also will improve the degraded forest area which substantially improves the flora and fauna. Plan for restoration of degraded forest land is detailed in Chapter -4 of the Revised EIA Report
16.	What steps have been taken to minimize the entrapment of small aquatic flora and fauna? Have state of the art low aperture intake screens proposed to be installed, along with fishnets around the intake? Please provide the details of the system proposed to be installed in order to minimize entrapment.	R.C.C Intake well structure type is selected which will not disturb flow conditions and also provide free movement to fishes. Intake structures will be designed to minimize entrainment or impingement by providing strainers. Details of intake structure are provided in Chapter -4 of the Revised EIA Report
17.	Please provide IUCN status of all the aquatic flora and fauna species found in the study area.	IUCN statuses of the species are provided in Chapter - 3 of the Revised EIA Report.
18.	There are Schedule-I species present in the study area. What are the mitigation measures to protect the same?	Details of the Schedule – I Species and conservation measures are detailed in Chapter -4 of Revised EIA Report. TSGENCO in coordination with Forest Department will prepare a Conservation Plan. TSGENCO has budgeted an amount of Rs. 100 Lakhs. Based on the requirement, TSGENCO will allot additional budget.
19.	Please specify details of the mines, the means of transport, the composition, the radioactivity, the mercury content, other heavy metals, the Sulphur content of the coal for the proposed thermal power plant.	Details of fuel analysis are given in Chapter – 2 of Revised EIA Report.
20.	What will be losses of coal during transportation?	No loses are anticipated.
21.	What measures will be taken to prevent coal dust	Suitable mitigation measures to control fugitive dust

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
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S. No	Issue	Proponent Response (updated as per Revised EIA Report)
	getting into the atmosphere?	emissions have been furnished in Chapter -4 of the Revised EIA report.
22.	What will be the environmental impact due to coal transportation for this project? Kindly furnish full details of same.	Coal is transported only through rail wagons covered with tarpaulins.
23.	How will the coal be transported to power plant? Where would it be stored? Kindly provide co-ordinates and details of the coal storage yard, and the green belt along its periphery.	The coal will be transported to power Station from coal mines through Indian Railways Network. Storage location and greenbelt details and plant layout map are provided in Revised EIA report.
24.	Please mention the source of imported and / or the indigenous coal and its detailed composition.	Indigenous coal will be transported from SCCL. Imported coal will be received from Indonesia. Details of fuel analysis are given in Chapter – 2 of Revised EIA Report
25.	Please furnish full details of radioactivity and heavy metal content analysis of the coal proposed to be used. Report for the same should be submitted.	The certified copy of the values obtained for radioactive elements in coal from M/s Bhabha Atomic Research Centre and Heavy metal analysis from M/s Vimta Labs are given in Chapter – 2 of Revised EIA Report
26.	What will be the dispersion of fly ash due to wind, and in what direction, and at what speed? What is the amount of fly ash expected to be dispersed due to wind? Please provide full details of the same for each season.	No dust emissions are anticipated due to wet handling system.
27.	What are the co-ordinates of the proposed Effluent Treatment Plant? What is the area required for the same?	The location ETP in the Revised plant layout is shown in Chapter -2 of Revised EIA report
28.	What are the co-ordinates of the proposed Sewage Treatment Plant? What is the area required for the same?	The location STPs in the Revised plant layout is shown in Chapter -2 of Revised EIA report

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
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S. No	Issue	Proponent Response (updated as per Revised EIA Report)
29.	What is the expected increase in traffic in the area? What will be the approximate increase in SOx and NOx emissions as well as SPM and noise pollution due to increased traffic because of the plant? Please furnish with the mitigation measures of same, if any.	The impact on air quality due to increased traffic is furnished in Chapter -4 of Revised EIA report.
30.	Which are the industries where the fly ash will be supplied? Please provide full details. Please also mention the distance of such industries from the proposed project area and mode of transportation for fly ash.	Details provided in Chapter -4 of Revised EIA report.
31.	Please furnish full details of the field visits conducted to undertake the ecological study including copies of field notes. Please mention full details of the team members, their qualifications, and the number of man-days spent on the ecological data collection.	Experts approved by NABET, QCI involved in EIA studies were provided in the earlier EIA Report.
32.	What are the proposed facilities for the parking, washing, repairs and maintenance of trucks and other heavy equipment?	Designated facilities for the parking and automobile workshop will be provided and at the detailed engineering stage for maintenance of vehicles and heavy equipment per the plant requirement.
33.	Is the EIA report in line with the EIA guidelines and TOR as specified by the MoEF & CC?	Yes
34.	The EIA report does not deal with the impact of coal dust, Fly ash and other emissions on crops and other agricultural produces. Please provide expected impacts of such emissions on agriculture of the area.	Details provided in Chapter -4 of Revised EIA report.
35.	What will be the impact of the air pollution and the fly ash on the people living in the vicinity of the project area? What are the health impacts? Kindly furnish with	Details of Cumulative air quality modelling are furnished in Chapter – 4 of the Revised EIA Report.

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
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S. No	Issue	Proponent Response (updated as per Revised EIA Report)
	details of same.	Flue gas treatment system proposed which is in compliance with the new norms of MoEF & CC stipulated for thermal power plants will be implemented by TSGENCO. This will ensure that there is no significant impact on health of surrounding villages. No pollutant will be discharge outside the plant premises. The plant is based on Zero Discharge concept. The ground level concentration of air pollutants are within the permissible limits. Hence, no adverse impact on health. The details on health and safety impacts of project operations are provided in Chapter -4 and Chapter – 7 of the Revised EIA Report
36.	Please provide the number of people expected to lose livelihoods or be displaced due to this project. Please provide detailed rehabilitation and resettlement plan for these people.	Details provided in Chapter – 7 of Revised EIA report.
37.	Please furnish copies of compliance reports and monitoring reports.	Project is a greenfield project and hence compliance reports / monitoring reports will be submitted after commissioning of the plant.
38.	How will this proposed project impact the bird life?	Flue gas treatment system which is in compliance with the new norms of MoEF & CC stipulated for thermal power plants will be implemented by TSGENCO. This will ensure that there is no significant impact on surrounding villages and bird life. The development of

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
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S. No	Issue	Proponent Response (updated as per Revised EIA Report)
		the degraded forest will attract avi fauna in the region. Details of greenbelt proposed along with restoration of degraded forest land are given in Chapter -4 of Revised EIA Report.
39.	How will this proposed project impact the livelihoods of local community?	Need based studies have been carried out in surrounding villages to study socio economic profiles, infrastructure availability and infrastructure requirement. Accordingly EIA report is prepared for implementation of CSR activities, necessary provision has been made towards drinking water, sanitation, education, health care, infrastructure development, with a provision of Rs 100.40crores @ 0.40% of the project cost towards CSR plan. Impacts discussed in EIA report. The project will improve the living standards of the people living around the project site, as it will provide direct and indirect employment. Details are provided in Chapter -3, Chapter -4 and Chapter -7 of Revised EIA Report.
40.	Please provide details on how much area is going to be reclaimed for various activities for the proposed project.	No reclamation is involved. Details of land requirement of the project are furnished in Chapter -2 of the Revised EIA Report.
41.	Please furnish details of the length of the intake and outfall channel.	Details of intake structure are provided in Chapter -4 of the Revised EIA Report. No outfall, as zero discharge envisaged.
42.	Please furnish the details on the aquatic ecology of Krishna River from which the water for the project is going to be withdraw and discharged.	Details provided in Chapter -2 of the Revised EIA report.
43.	Kindly furnish the list of industries in the study area as	Details provided in Chapter -2 and Chapter -4 of the

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Shri. Prasad Khale, Conservation Officer, Conservation Action Trust)

S. No	Issue	Proponent Response (updated as per Revised EIA Report)
	well as other activities such as quarries, mining, etc.	Revised EIA report.
44.	Have cumulative assessment studies for the project being carried out? Please furnish details of same as well as copies of these Reports.	Yes. Details provided in Chapter -4 of the Revised EIA report.
45.	Please explain the mitigation measures for the noise generated from the plant machineries.	Details provided in Chapter -4 of the Revised EIA report.
46.	Seismic map of the area is not provided in Disaster Management Plan. Please provide the same.	The Project area falls under Seismic Zone - II. Details provided in Chapter -7 of the Revised EIA report.
47.	The project site is located in an area lying in seismic zone 3. What possible measures will be undertaken in event of earthquake? Is the power plant and all the structures designed for Category 3?	The Project area falls under Seismic Zone - II. Details provided in Chapter -7 of the Revised EIA report.
48.	Please furnish study on the impact on the ecology of the area during the site clearance, construction activities and operation activities of the proposed project.	Details provided in Chapter-4 of EIA report
49.	Kindly furnish details of all the clearances granted to the proposed project – forest clearance, environment clearance.	Details of Forest Clearance are provided in Chapter -7 of the Revised EIA report.
50.	Does the any area of intake & outfall channel for the plant coming under fishing zone?	No
51.	Please furnish full details of the type of material being used for the landfill/reclamation and its source(s).	No material will be used for filling from outside of the plant area. Cut and fill quantities have been estimated and details are given in Chapter -4 of the Revised EIA Report
52.	What is the life of this proposed project? And what is the lease period of the land given for this project?	Life of plant-25 years; The land is not taken on lease. It is completely acquired by –TSGENCO and it is now the property of

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
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S. No	Issue	Proponent Response (updated as per Revised EIA Report)
		TSGENCO.
53.	Has the work of the proposed project commenced? Please furnish full details of work carried out so far.	No.
54.	What will be the configuration of the thermal power plants? What will be the height of each stack of each unit?	5 x 800 MW One single flue and two bi-flue stacks of 275 m height will be provided as per CPCB guidelines. Details are given in Chapter -4 of the Revised EIA Report.
55.	What will be configuration of stacks?	One single flue and two bi-flue stacks of 275 m height will be provided as per CPCB guidelines. Details are given in Chapter -4 of the Revised EIA Report
56.	Please furnish details on impact of the increase in water temperature on the aquatic life.	No wastewater will be discharged into any water bodies which will have impact on aquatic life. The project is based on Zero discharge. Details are given in Chapter -4 of the Revised EIA Report.
57.	Is there provision of FGD installation? What type of FGD units will be installed?	Yes. Wet type Flue Gas Desulphurisation System will be installed for reduction of SO_2. Details of FGD are given in Chapter -4 of the Revised EIA Report.
58.	Please furnish the Cumulative impact assessment of all sources of emissions (including transportation) on the AAQ of the area. Please also furnish full details of the model used and the input data used for modelling shall also be provided.	The cumulative impact assessment study has been done considering all the industries located in study area. Details along with terrain, sources and model considered are provided in Chapter -4 the Revised EIA Report.
59.	Please furnish full details of green belt, along with map, gps coordintes and area details.	Greenbelt development will be taken up from the construction stage itself. Greenbelt will be developed in 1352 acres of the project area which will include restoration of the forest area of 1049 acres and development of greenbelt in non-forest area of 303 acres. It is proposed to develop an in-house nursery for

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
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S. No	Issue	Proponent Response (updated as per Revised EIA Report)
		developing greenbelt. Details of greenbelt development along with schedule, species of plantation and pattern of development are given in Chapter – 4 of Revised EIA Report.
60.	What will be the quantity of fly ash generated from the proposed project?	Quantity of fly ash is provided in Chapter-4 of Revised EIA report.
61.	Please furnish details of proposed fly ash utilization as per the notification.	Ash utilization plan is provided in Chapter-4 of Revised EIA report.
62.	Please list the details on the area of green belt around the fly ash dumping pond, width of this green belt, density of plants in this green belt and composition of plants of the green belt.	Details of greenbelt development along with schedule, species of plantation and pattern of development are given in Chapter – 4 of Revised EIA Report along with layout of greenbelt development.
63.	Has any carrying capacity study been conducted for the area? Please furnish copies the Reports.	Cumulative impact assessment has been carried out and incorporated in Chapter -4 of the Revised EIA Report
64.	Considering the ecological importance of the area please justify the feasibility of the project. Please mention the impacts of project on the crops and river. Please also give the mitigation measures. Please furnish with details of compensation for the same to the project affect people.	The latest Government Gazette Norms, dated 07.12.2015, stipulates the following stack emission levels for the boilers which will be installed after 01.01.2017 ESP outlet dust concentration: 30 mg/Nm^3 Sox : 100 mg/Nm^3 NOx : 100 mg/Nm^3 Mercury : 0.03 ppm TSGENCO proposes to implement Flue gas treatment system which is in compliance with the new norms of MoEF & CC stipulated for thermal power plants at an estimated additional cost of Rs. 0.9 crores/MW which

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
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S. No	Issue	Proponent Response (updated as per Revised EIA Report)
		will ensure the following: a. Reduction of Particulate emissions b. Reduction of SO_2 emissions c. Reduction of NO_x emissions No impact on crops and river is anticipated with implementation of above system. Details of FGD and measures proposed for implementation are detailed in Chapter -2 and Chapter -4 of Revised EIA Report
65.	What will be the capacity of the STP & ETP? How much water will be generated from STP & how much of it will be reused. Kindly furnish with full details.	Capacity of ETP and STPs proposed are given in Chapter – 4 of the Revised EIA report.
66.	Were any alternate studied for intake or outfall channel? Please mention in details about same.	TSGENCO has carried out reconnaissance Survey for locating the intake structure on River Krishna. The intake point is selected near Madachelu. Details are furnished in Chapter -4 of Revised EIA Report.
67.	How much water shall be drawn from the Krishna River & how much will be discharged back?	Details on quantity of water drawal from River Krishna are provided in Chapter -2 and Chapter -4 of the Revised EIA report. There will be no discharge from the plant into River Krishna of Tungapahad Vagu.
68.	Has the Project proponent carried out detailed Social impact assessment (SIA) study? If yes, please furnish with same. If no, kindly explain.	Yes. Details provided in Chapter -7 of the Revised EIA report.
69.	How many villagers from villages has given permission for the project? How many are objecting the proposal? Kindly give information for each village.	All the villagers have welcomed the project. Details are provided in Chapter – 7 under Public consultation.
70.	What will be the impact of the additional transport of raw materials and the finished products on the road,	Impact due to the projected traffic was assessed considering the material required for transport inward

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S. No	Issue	Proponent Response (updated as per Revised EIA Report)
	rail?	and outward of the project. Details are provided in Chapter -4 of Revised EIA report.
71.	Please furnish details of the transportation studies conducted.	Traffic studies carriedout are provided in Chapter -3. Impact due to the projected traffic was assessed considering the material required for transport inward and outward of the project. Details are provided in Chapter -4 of Revised EIA report.
72.	What will be the impact of the utility corridor, roads, etc. required for this project?	Details provided in Chapter -4 of the Revised EIA report.
73.	Please furnish No Objection Certificates, Consents, from the State Pollution Control Board for the projects involving discharge of effluents, solid wastes, and sewage waste under Environmental Protection Act 1986.	As per the procedure, Consent for Establishment of the project under Air and Water Act will be obtained from TSPCB only after obtaining EC from MoEF&CC, GOI, New Delhi.
74.	How much percentage of the project cost shall be utilized for environment management? Please explain the execution plan for the same.	Environmental Management Plan budget of Rs. 5597 Crores and Rs. 430 crores/annum is earmarked towards capital cost and recurring cost respectively for implementing the various pollution control measures. Item - wise cost details are furnished in Chapter – 6 of Revised EIA Report.
75.	Is this project designed to comply with the latest norms issued by the MoEF&CC?	Yes, as per the Gazette Notification dated 07th December 2015 issued by MoEF & CC. The estimated capital cost of the project is about Rs. 25099.42 crores. An additional budget of Rs. 0.9 crore/MW will be incurred to comply with new emission norms of MoEF & CC stipulated for Thermal Power Plants as per the Gazette Notification S.O. 3305 (E) dated 07.12.2015.

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Mr. G Mohan, State Secretary and Sri N Harinder, General Secretary, Human Rights Forum, Nalgonda, Telangana)

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
I	**Written questionnaire for Yadadri Public Hearing, G Mohan, Human Rights Forum, State Secretary and N. Harinder, General Secretary Human Rights Forum.**	
1.	How can it be that TOR can be automatically get generated by the MoEF&CC when the same has been rejected by the EAC?	As per the para (4) of Gazette Notification dated 10th April 2015 of MoEF& CC the standard TOR shall enable the project proponent to commence preparation of an EIA report after successful on line submission and registration of application. The online application for issue of ToR was filed on 19th September 2015. The standard TOR was received on 2nd November 2015 from MoEF &CC. The TOR was not rejected by MoEF&CC during its 45th EAC (Thermal) meeting held on 29th – 30th October, 2015. But the proposal was deferred with an intention to consider TOR after site visit by sub-committee of EAC. The sub-committee visited the site on 5th December 2015 and recommended for grant of ToR.
2.	How can it further be that when the TOR itself has been given in the month February, 2015, the baseline data has been collected from December, 2015 to February, 2016?	The above answer gives the reply.
3.	The EIA should be strictly in accordance to ToR which has been granted. However, the EIA study is far away	Revised EIA Report has been prepared in compliance to the approved ToR issued by

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(Representation of Mr. G Mohan, State Secretary and Sri N Harinder, General Secretary, Human Rights Forum, Nalgonda, Telangana)

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	from compliance of many of the TOR. Therefore, the EIA Study is not in compliance of the TOR. (Detailed queries on non-compliance of TOR are made in question no. 37)	MoEF&CC.
4.	There are many cement industries and their captive mining operations and also other industries within 15 Kms of the project area. In order to effectively study the Environmental Impact of the proposed project, he Comprehensive Environmental Impact Assessment study (CEIA) should be conducted covering 3 seasons baseline data. However, in contrast, only the Rapid EIA (REIA) with only one season data has been conducted. Please give us a "Detailed Explanation" of what is the hurry for such REIA studies? Please also explain us if such REM Studies will actually give effective, comprehensive and complete view of the impact of the proposed project?	As per the condition no 38 of Standard TOR, one complete season site specific meteorological and AAQ data (Except Monsoon Season) as per latest MoEF notification shall be collected. Accordingly the baseline data was collected and EIA report was prepared. Cumulative impact assessment studies duly considering the Industries with in 15 km radius of the project area was carried out and incorporated in the Revised EIA report.
5.	There is no Confirmed Fuel linkage for the proposed project either for the Indigenous Coal or for the Imported Coal. In the absence of the same, how can be it that Coal analysis can be done without any labo atonal reports and the EIA Study can be conducted accordingly?	Details of fuel analysis are given in Chapter – 2 of Revised EIA Report along with lab reports The quantity of coal required for the proposed project is 12.28 MTPA (50% domestic +50% indigenous) The MOU with M/s SCCL for supply of Indigenous coal and SCCL commitment letter for supply of coal as per the MOU are

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Mr. G Mohan, State Secretary and Sri N Harinder, General Secretary, Human Rights Forum, Nalgonda, Telangana)

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
		provided in Chapter -2 of Revised EIA Report M/s MSTC for supply of imported coal is revised as directed by the EAC and details are provided in Chapter -2 of Revised EIA Report Details of fuel analysis are given in Chapter – 2 of Revised EIA Report
6.	The Source from which the Coal will be sourced, the transportation route, is impact on the Ambient Air Quality have not been examined. In the absence of the same, how can it be said that the EIA study is complete.	Indigenous coal received will be transported from SCCL Mines using the Rail network. Imported coal will be received by ships at Krishnapatnam/Kakinada/Visakhapatnam ports. From the Ports, coal will be transported by Indian Railways to the plant site. Coal Quality and Transportation Route are provided in Chapter -2 of Revised EIA Report.
7.	The Proposed Project site is ecologically a very sensitive area by virtue of the fact there are hills, forests and water bodies within the project area. There will be irreversible and inevitable damage on all these ecologically sensitive areas by the proposed project. What is the justification for setting up the proposed project on such ecologically sensitive areas?	"The proposed project site has been selected after careful examination of ecologically sensitivities and the proposed plant site was found to have least impact on the environment." The forest land is a degraded forest where no forest is observed. The project site doesn't fall under the ecologically sensitive areas declared by MoEF&CC and allotted by MoEF&CC with due diligence.

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Mr. G Mohan, State Secretary and Sri N Harinder, General Secretary, Human Rights Forum, Nalgonda, Telangana)

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
		There are no wild life sanctuaries, national parks, elephant/tiger reserves within 10km radius of the study area. Amrabad Tiger Reserve is located at a distance of 14.03 km from project site. The Letter and Authenticated Map was obtained from Principal Chief Conservator of Forests (WL) and Chief Wild Life Warden, Forest Department, Government of Telangana. Details of the same are provided in Chapter -2 TSGENCO proposes to implement Flue gas treatment system which is in compliance with the new norms of MOEF & CC stipulated for thermal power plants at an estimated additional cost of Rs. 0.9 crores/MW No damage is anticipated with implementation of above system. Details of FGD and measures proposed for implementation are detailed in Chapter -2 and Chapter -4 of Revised EIA Report
8.	It is quite certain that proposed will cause irriversable damage, fill up and pollute all the tributaries of Thungapadu Stream / Bandham(aka AnnameruVaagu) within the Project site. Give us " Detailed explanation" as to how the each and every	The project activities will not interfere with flow of Tungapahad Vagu since there is no extraction of water or discharge. No diversion of Tungapahad vagu is proposed. Plant layout is designed to keep a minimum distance of 500 m

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Mr. G Mohan, State Secretary and Sri N Harinder, General Secretary, Human Rights Forum, Nalgonda, Telangana)

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	tributary of Thungapadu stream will not be affected in a way by the propose Project	buffer between ash pond and Tungapahad Vagu to prevent contamination. A 100 m barrier on either side of banks of the vagu will be left as barrier which will be developed under greenbelt. Details of the same are given in Chapter -4 of the Revised EIA Report
9.	As per the Terms of Reference, the project site should be away from High Flood Line plus 500 meters of any stream/ creek/tanks/Rivers, etc. Please give us the "Detailed Explanation" as to why the proposed project site is located on the significant number of tributaries of Thungapadu Stream" and also the Thungapadu Stream, all of which are flowing to the Krishna River from with the project site.	The main plant boundary is kept at a distance of 2.40 km and the ash pond boundary is kept a distance of 0.79 km from HFL of Krishna River. As such, the project site is beyond 500m distance from Krishna river. Also the ash pond is kept a distance 500 m away from the Tungapahad vagu.
10.	The Sub-committee of EAC which visited the project site did not have any understanding of common TOR for all Thermal Power Plants which makes it mandatory that Project site should be High Flood Line Plus 500 mtrs away from any stream/ creek/ tanks / Rivers, etc. While recommending that the proposed project can be allwoed for TOR consideration, provided 100 meter buffer zone is maintained from Thungapadu Stream. How can it be that Sub-Committee can voilate TOR given by MoEF@CC itself and recommend the project on the basis of 100 meter buffer area?	A 100 m barrier on either side of banks of the Tungapahad vagu will be left as barrier which will be developed under greenbelt The above details are provided in Chapter -4 of Revised EIA Report
11.	Isn't it true that the present site selection has been monotonously decided during the Aerial Survey	Three sites have been evaluated based on environmental sensitivity, R&R issues, road and

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Representation of Mr. G Mohan, State Secretary and Sri N Harinder, General Secretary, Human Rights Forum, Nalgonda, Telangana)

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	conducted along with the Chief Minister of Telengana, without any due precautions on ecological and environmental sensitivity of the project area?	rail connectivity, proximity to source of water. Finally the proposed location at Veerlapalem village is selected after due deliberations on alternate sites. Details of alternative sites are provided in Chapter -5 of Revised EIA Report.
12.	Why have you obtained permission for withrdrawal of 6.6 TMC Water from Krishna River when the plant requirement for water is only 3.3 TMC?	Originally it is proposed to establish 6800 MW coal based TPP at Veerlapalem, Dameracherla, Nalgonda Dist. Accordingly 6.6 TMC of water is allocated for the project from Krishna river by Telangana State Government. But it is decided to establish 4000 MW TPP in the above area in first phase and take up the balance 2800 MW in second phase. The water requirement for the 4000 MW at 3.1 TMC per annum will only be drawn from Krishna River out of the allocated 6.6 TMC per annum.
13.	Is such huge quantum of water available at the point where Krishna River is going to be drawn from?	Yes. TSGENCO has carried out reconnaissance Survey for locating the intake structure on River Krishna.
14.	Give us the Statistical details of Water availability in the last 5 years at the point from the Water is going to be drawn for the proposed project? No details of water availability have been presented in the EIA report	Location of the Intake structure for tapping Krishna water is proposed at a distance of 1.0 km on the upstream of confluence of River Krishna and Tungapahad Vagu. Details of intake are given in Chapter – 4 of Revised EIA Report
15.	The Project's EIA report does not give any details whatsoever of the downstream impacts of water	Impact of withdrawal of water from River Krishna is addressed in Chapter -4 of Revised

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	withdrawal for the proposed project. Please give us a "Detailed Explanation" of downstream impacts of 6.6 TMC water usage for the proposed project	EIA Report.
16.	What is the total amount of Krishna River which is drawn per year by the 22 cement industries within 15 kms radius of the proposed project site?	As per the information, Krishna Water Disputes Tribunal - I (KWDT-I) has allocated 811 TMC to the erstwhile Andhra Pradesh (AP). Out of this allocation, AP has earmarked 299 TMC to the projects located in Telangana. Based on the utilization data for the period 1972-73 to 2007-08 (36 years), the average utilization of Krishna Water in Telangana is about 256 TMC. Govt of Telangana, Irrigation and CAD Department has allocated 208 cusecs of water (6.60 TMC) from Krishna River water vide G.O.Ms No.13 dt: 30.01.2015 to TSGENCO. The present requirement for the 4000 MW power plant is about 3.10 TMC. Above details are given in Chapter -2 and Chapter -4 of Revised EIA Report
17.	The EIA report does not also say anything about ecological and environmental impacts of alread existing industries within 15 kms radius of the Krishna River. Please give us "Detailed Explanation" of the ecological and environmental impact of the industries within 15 kms radius of the proposed	Cumulative impacts of all sources of emissions including handling and transportation of existing and proposed projects has been assessed in Chapter -4 of the Revised EIA Report

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	project.	
18.	The TOR requires the assessement of the plant's impact on ground and surface water. Yet the report does not properly establish a baseline of ground water and surface water quality. The baseline data collection described in the EIA is grossly inadequate both for ground water and surface water. Proponents sampled ten existing bore wells outside the project area and only three groundwater wells within the proposed footprint of the ash pond. In addition, only one surface water was taken from the Krishna River, and no sample were taken from Thungapaduvagu, the stream that actually flows through the project area. All Sampling locations were only sampled once. Both the number of locations and the frequency of sampling are wholly insufficient for determining the baseline ground water and surface water quality in the study area. Standard baseline monitoring occurs over an entire year, in order to determine the water quality in all seasons. There is absolutely no justification for the proponents to provide so few sampling points and to sample only once. Sampling of wells and surface waters provides essential data. Post-Operation impacts cannot be determined if baseline data is not collected and assesed. Neglecting to sample the stream that flow through the project area is certainly a critical oversight.	Additional water samples have been collected and analyzed Details of the water samples collected along with quality is given in Chapter - 3 of Revised EIA Report

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
19.	Similarly the EIA claims there will be no impact on the aquatic ecology because there will be no discharges. There is a false assumption. At the very least, the EIA should have examined the plant's proximity to the Krishna River and Thungapadu stream and explained how the underlying fractured geology may quickly route contaminates to the nearby surface waters. ("The ground water movement in the Limestone and Granite is mainly through the joint and fractures." Hydro-Geological Studies report at 14.) In addition, the deposition of pollutants, like mercury from the stacks, or fugitive dust from the ash ponds, may severely impact aquatic environments. Failure to evaluate these factors is a violation of the requirements of the ToR.	Ash pond will be provided with impervious HDPE lining above clay lining to completely avoid the seepage of water in to the ground surface. Minimum amount of moisture in the ash pond will be maintained to control the fugitive emissions. Hence, there will not be any scope for seepage from ash pond. The proposed project is redesigned to comply with the new emission norms of MOEF where in a flue gas treatment system comprising High Efficiency ESPs for control of Particulate emissions and Flue Gas Desulphurization (FGD) for control of Sulphur dioxide emissions(Flue Gas Desulphurization (FGD) technology with wet limestone process is considered for implementation) and Selective Catalytic Reduction Unit (SCR) and For control of NOx emissions, SCR is proposed which will be located between the economizer outlet and APH inlet. No deposition of pollutant is anticipated with implementation of above system.

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
		Details are given in Chapter – 4 of the Revised EIA Report.
20.	What is the total quantam of Waste Water generated which will be generated by the proposed project per day? It has not been mentioned in the EIA Report. Therefore, I specifically request you to please give me the figure.	The project is based on Zero Discharge Concept. The details on wastewater treatment, recycling and utilization are provided in Chapter -4 of Revised EIA Report
21.	What are all the components for which Waste Water will be reutilized within the project under the concept of Zero Liquid Dischage? Please give us detailed engineering as well as scientific explanation to substantiate how the proposed project will meet the Zero Liquid Discharge, as the same has been not been in detailed in the EIA report.	
22.	Why have you obtained Forest Clearance to the extent of about 4,800 acres when the land requirement for the project is only about 2,800 Acres? What is the purpose of acquiring such huge amount of land?	Forest clearance obtained with a view to establish 6800 MW plant. Now it is proposed to establish 4000 MW in first phase and 2800 MW in second phase as an expansion project.
23.	Has the Forest Rights Act been implemented in the Forest Area which is proposed for Diversion?	All the conditions stipulated in the Stage II FC of MoEF & CC accorded for diversion of 4676 acres are complied with.
24.	What are the Tribal Communities which are residing within the project area and what are their present sources of Livelihood?	Details are furnished in the R & R report in Chapter -7 of Revised EIA Report.
25.	Will the Project not have any adverse impact on the list of Flore and Fauna within the project area as well as	There is no significant impact on the existing Flora and Fauna due to implementation of Flue

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	in the Study area ? There details have not been provided in the EIA Report	gas treatment system. The project also will improve the degraded forest areas which substantially improve the flora and fauna. The development of the degraded forest will attract avi-fauna in the region. Details of greenbelt development programme for restoration of the degraded forest area is furnished in Chapter -4 of Revised EIA Report
26.	What has been done as a part of Socio - Economic Impact Assessement study is only a CSR report, identifying what activities will need to be taken up under CSR? You are kindly reminded that "Socio-Economic Impact Assessement" does not mean mere presentation of "Charitable Activities" which will be undertaken. It means to study and assess the impacts of the proposed project on various socio-economic rights of the people, which include the following. Impact of the Project on the People's Land rights Impact of the Project on Agriculture Impact of the Project on Social Relations of the people Impact of the project on Livelihoods and Economic dependency and Interdependency of the people. Impact of the Project on People's common property resources such as common lands, grazing lands, water resources, forest resources etc.	Social Impact Assessment is incorporated in the Chapter -7 of Revised EIA Report

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	Impact of the Project on People's right to health etc. The entireEIA Report does not in any way reflect on the project's impact on the above components,"Socio-Economic Impact". In fact it is quite striking to see that you have not conducted any such thing called "Socio Economic Impact Assessment" for the proposed project.	
27.	The EIA states that the Yadadri Plant will generate 3.1 Million tons of Fly ash and 0.8 Million tons of Bottom ash (EIA page 160). In contrast the "Hydro-Geological Studies" report states that the plant will generate 5,685,255 tons per year of fly ash and bottom ash(Annexure 10 page 28 "a 4000 MW thermal power plant burning 44,505 TPD of coal will generate 11,682(75%) TPD of fly ash and 3894 TPD(25%) of bottom ash") These figures represent a 46% increase in quality of ash produced. The annual generation rate of ash is important because it determines the size of the ash pond needed to contain the waste. Therefore gives us the figures of exact quantum of Fly ash and bottom ash which will be generated by the proposed project.	Details of ash generation are furnished in Chapter -4 of Revised EIA Report. Ash pond design details are provided in Chapter - 2
28.	The EIA also states that "during emergency only" the ash will be sent to the ash pond "with a provision for storage of ash upto 15 m level as per CEA norms."(EIA at 54). The proponents claim that the ash dyke and 400 acre ash pond will have a storage capacity of "3 to	Ash pond design details are provided in Chapter - 2

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	9 years ash generation c as per CEA recommendations, to cater for any exigencies". However even at the lower estimate of ash generation, a 400 acre pond would exceed a height of 15 meters in 9 years, Using a conversion rate of 1 ton per cubic yard, a 400 -acre pond would receive 6 acre - feet per year assuming 100 % disposal. At the end of 9 years the levels would exceed 15 meters. Furthermore the life span of plant, according to the EIA, is at least 25 years, which would result in an ash dyke that is roughly 46 meters high. At the higher estimate, the height of the dyle at 9 years and 25 years far exceeds "CEA norms", If the higher Hydro-geological studies figures are correct, dykes of the 400 - acre pond would have to be raised about 3 meters a year, thus exceeding the 15 meter limit in 5 years . At 25 years the ash pnd dykes would need to be 67 meters tall to contain the ash. In view of the above facts, give us "Detailed explanation" of the sufficiency of the size of the Ash Pond area and explain as to how the height and breadth of Ash Pond will not be increased in the years of operation of the proposed project. Please also explain us the consequences if the height and breadth of Ash Pond is increased in future.	
29.	The EIA Report is completely silent on Health impacts of the proposed project. Please give us a "detailed explanation" of the impacts that the proposed project	Flue gas treatment system proposed which is in compliance with the new norms of MOEF & CC stipulated for thermal power plants will be

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	will have on People's health.	implemented by TSGENCO. This will ensure that there is no significant impact on health of surrounding villages. No pollutant will be discharge outside the plant premises. The plant is based on Zero Discharge concept. The ground level concentration of air pollutants are within the permissible limits. Hence, no adverse impact on health. The details on health and safety impacts of project operations are provided in the Revised EIA Report
30.	Far from Cumulative Impact Assessment study, not even the list of industries within the project has been given in the EIA Report. Further, the Cumulative Impact Assessment Study has also not been carried out by the Project Proponent. Why the cumulative Impact Assessement study has not been done.	The cumulative impact assessment study has been done considering all the industries located in study area. Details of the same are provided in Chapter -4 of the Revised EIA Report
31.	What is the per unit cost of generating power through COAL vis - a vis generating power through Solar Energy and Wind Energy. ?	The cost of power generation from Coal is Rs. 4.57 per unit, Wind is Rs. 4.70 per unit and Solar is Rs. 5.17 per unit (Provisional).
32.	Isn't true that Coal is diriest form of producing Electricity ?	No
33.	When the simple deficiency of about 2700 MW power deficiency of state can be easily met Solar and other	The solar power plants are not a base load stations which run only at 18% to 19% PLF. It

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	renewable energy power production, what is the need of such a huge expenditure project which is certainly does not in any way contribute to Sustainable Development?	is only a supplementary to existing thermal & Hydel power stations to fill the deficit to some extent. However the Telangana state Government has initiated steps for setting up of 5000 MW solar power plants in the state. Already 800 MW is connected to the grid and 2000 MW will be commissioned by end of March 2017.Further, balance 2200 MW solar power plants will come within two years. Also the solar power plants cannot fulfill the needs of the newly formed state and the cost of generation is also high when compared to the Coal based thermal power plants since the land required for each MW of solar power plant is 5 acres whereas for thermal power plants , the land requirement is varying from 0.50 acre/MW to 0.70 acre/MW. Availability of land is also a major problem in Telangana state. The people of the state will not afford the power at higher tariff where power is supplied to the agricultural sector at free of cost and domestic sector at subsidized prices. Further, Telangana state will require installed capacity of 17,041 MW by the end of 2018-19 as per the 18th Electrical Power Survey conducted by CEA.
34.	Fundamentally there is no need of the proposed project only. The Telangana State Government aims to generate over 6000MW of electricity through Solar power by the year 2018-19, Further in the next 3 years the government also aims to 4000 MW power through Wind Power. Reference is invited "Power for all document "on deficiency will be met by the Telangana State, it will be far in excess of required power. In addition, the state has recently started producing 600 MW power from Kakatiya Project in Warangal and 800MW power project in Kothagudem. This further adds to the net power production. In view of the above facts, please give us "detailed explanation of the fundamental necessity of the project"?	
35.	Further when a number if nations together across the globe are switching to power production through the renewable energy, how can it be that TSGENCO and Telengana state government cannot learn anything from it and generate power through renewable sources of energy?	
36.	As you would certainly agree, the Coal energy and its	

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S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	environmental impacts especially in the India scenario as far, far many and irreversible. The present project is a classical example of how there will be many irreversible impacts as a result of the project. This can be easily done way with by producing power through renewable energy. Why cannot TSGENCO produce this amount of power through the Renewable Energy?	Further to the above, Telangana state requires substantial capacity addition to meet the progressive power demand for other sectors viz., 9 hours power supply for agriculture sector, estimated demand of 7000 MW for lift irrigation schemes, 24/7 power supply etc., As such the above project is very much essential to meet the future demand.

REPLIES TO THE ISSUES RAISED BY VARIOUS PRIVATE PARTIES
(Queries on the draft EIA for YTPS", N Harinder, General Secretary, Human Secretary Forum, Nalgonda, Telangana)

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
1	Many of the Terms of Reference have not been complied and EIA Study has not been conducted accordingly	All the conditions of TOR are complied with and incorporated in the Revised EIA report
2	There is no confirmed Fuel linkage and therefore the Coal characteristics are unknown for the EIA Study to be conducted.	Details provided in the Revised EIA report.
3	The source from which Fuel will be obtained and the route from which is not brought to the project is not certain. The impact of transportation on AAQ has not been studied	
4	The list of industries within 15 kilometer radius of the project has not been given	
5	The Cumulative Impact Assessment study has not been done.	
6	The Hydro-geological study is inadequate and incomplete on many aspects	
7	The Impact of the project on Aquatic Ecology has not been studied.	
8	The Health impacts of the proposed project have not been studied, etc.	

Replies to the issues raised by M/s eRc's review for EAC Thermal Meet on 14th-15th July 2016, Yadadri Thermal Power Station, Telangana.

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
1	**ToR granted by Web Portal while EAC was considering the proposal** The present project was first considered for grant of TOR by the EAC The Project was further considered by the EAC in its 48 meeting dated 18th December, 2015 and has been further deferred. However, the Project Proponent submitted before the EAC during in its 50th meeting dated 28th and 29th January, 2016 that the online MoEF&CC web portal has automatically granted TOR on 2nd November, 2015. Therefore, the project has been erroneously granted automatic TOR by the Web Portal, during the same period in which EAC has deferred the proposal. The MoEF&CC has not passed any order granting the TOR to the Project Proponent EAC had agreed to recommend the project for TOR in its 50th meeting, but it seems MoEF&CC has not issued any letter communicating the grant of TOR to the Project Proponent.	The Standard ToR was issued vide letter No: J-13012/18/2015-IA.I(T)s dated 2nd November, 2015 by MoEF&CC, GOI, New Delhi as per the timelines prescribed in the Notification for various stages of clearance which are as given below: 30 days specified for prescribing the Terms-of Reference (TORs); (After 30 days the standard ToRs generated by the system are issued automatically) Since Online application was submitted to MoEF&CC,GoI,New Delhi in the MoEF&CC web portal on 19th Sept 2015 for grant of ToR and 30 days from the day of application submitted was over by 18th October, 2015 and the standard ToR was generated by MoEF&CC web portal on 2nd Nov'2015 vide letter No: J-13012/18/2015- IA.I(T)s for carrying out of EIA studies & preparation of EIA and EMP report based on one season data. Further, Additional TOR was granted vide letter No: J-13012/18/2015-IA.I(T) dated 16th Febraury, 2016 by MoEF&CC,GOI after detailed discussions held in its 50th meeting dated 28th and 29th January, 2016. From the above it is clear that the applicant M/s eRC, New Delhi has no idea about the EIA notification process and communication system and making vague allegations to

Replies to the issues raised by M/s eRc's review for EAC Thermal Meet on 14th-15th July 2016, Yadadri Thermal Power Station, Telangana.

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
		obstruct the development of the project in the state of Telangana with ulterior motivation.
2	**EIA study has been conducted prior to the issue of ToR granted** Further, as the Project Proponent submitted, the EIA study has commenced from 1st December, 2015, during the period in which technically the TOR has not been granted by the MoEF&CC. As per the EIA Notification, 2006, the Project Proponent has to commence the EIA Study only after the TOR is granted by the MoEF	The EIA studies were conducted from- 6th December 2015 to 5th March, 2016 only after receipt of Standard TOR issued vide letter No: J-13012/18/2015-IA.I(T) s dated 2nd November, 2015 by MoEF&CC,GOI,New Delhi
3	**No lab reports on coal characteristics** The Project Proponent submits that the coal requirement for the proposed project is based on 50% indigenous and 50% imported coal. However, the coal characteristics of both types of coal have been randomly presented by the Project Proponent in the Memorandums of Understandings entered into with coal supplying firms. Coal characteristics have to be determined based on authentic laboratorial reports. No such reports have been presented by the project proponent to provide confirmed evident of coal characteristics.	Details of fuel analysis are given in Chapter – 2 of Revised EIA Report along with lab reports The quantity of coal required for the proposed project is 12.28 MTPA (50% domestic +50% indigenous) The MOU with M/s SCCL for supply of Indigenous coal and SCCL commitment letter for supply of coal as per the MOU are provided in Chapter -2 M/s MSTC for supply of imported coal is revised as directed by the EAC and details are provided in Chapter -2 Details are given in the Revised EIA Report
4	**No radioactivity and heavy metal analysis**	The certified copy of the values obtained for radioactive

Replies to the issues raised by M/s eRc's review for EAC Thermal Meet on 14th-15th July 2016, Yadadri Thermal Power Station, Telangana.

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	report Further, the Project Proponent has also not submitted radioactive reports of both indigenous and imported coal for the proposed project.	elements in coal from M/s Bhabha Atomic Research Centre and Heavy metal analysis from M/s Vimta Labs given in Revised EIA Report
5	**Impact of heavy metals including mercury?** Since the radio-activity and heavy metal analysis have not been provided, it is also clear that the Project Proponent has not studied the impact of heavy metals, including Mercury.	The heavy metals analysis report of domestic coal indicates no presence of mercury in the coal to be sourced. Hence, no impact studies are required. The proposed project is redesigned to comply with the new emission norms of MOEF where in a flue gas treatment system comprising High Efficiency ESPs for control of Particulate emissions and Flue Gas Desulphurization (FGD) for control of Sulphur dioxide emissions(Flue Gas Desulphurization (FGD) technology with wet limestone process is considered for implementation) and Selective Catalytic Reduction Unit (SCR) and For control of NOx emissions, SCR is proposed which will be located between the economizer outlet and APH inlet. The above system will ensure that there will be no significant impact of heavy metals including mercury. Details are given in Revised EIA Report.
6	**Sources/ mines of coal have not been provided** The source i.e. locations from which the Coal shall be brought to the proposed project has not	The domestic coal will be sourced from M/s SCCL group of mines and the imported coal from Indonesian origin through the nearest sea port. The respective MoUs for supply of domestic and imported coal are provided in

Replies to the issues raised by M/s eRc's review for EAC Thermal Meet on 14th-15th July 2016, Yadadri Thermal Power Station, Telangana.

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	been provided both for the indigenous and imported coal by the Project Proponent.	the revised EIA Report.
7	**Coal transportation route has not been provided** The Project Proponent has also not provided any details of route in which both indigenous as well as the imported coal shall be brought to the project site. In both the cases, the transportation routes by sea, train and road have not been determined. Thus, the impact of transportation is not known.	Indigenous coal received will be transported from SCCL Mines using the Rail network. Imported coal will be received by ships at Krishnapatnam/Kakinada/Visakhapatnam ports. From the Ports, coal will be transported by Indian Railways to the plant site. Details of the same are given in Revised EIA Report
8	**Site is ultra vires of Siting Guidelines** From many of the figures and explanation provided in the hydro- geological report, it is evident that Tungapadu Stream and many of its tributaries are flowing through the project site. Siting guidelines (2.2.4) directs that the TPP should be 500 m away from the high flood level of a river. While here the site is located in the river itself!	500 m minimum distance is maintained between the plant boundary and HFL of River Krishna. Tungapahad Vagu (stream) passes through the project area. About 3.90 km of this Vagu passes through the project site taking south-easterly course and flows for a distance of 2.40 km before joining River Krishna.
	It is inevitable that both Tungapadu and its tributaries will be contaminated with various forms of pollution from the proposed project, both during construction as well as operation. The Project Proponent has not considered these aspects while choosing the present project site.	The project activities will not interfere with flow of Tungapahad Vagu since there is no extraction of water or discharge. No diversion of Tungapadu vagu is proposed. Plant layout is designed to keep a minimum distance of 500 m buffer between ash pond and Tungapadu Vagu to prevent contamination. A 100 m barrier on either side of banks of the vagu will be left as barrier which will be developed under greenbelt. Details

Replies to the issues raised by M/s eRc's review for EAC Thermal Meet on 14th-15th July 2016, Yadadri Thermal Power Station, Telangana.

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
		are provided in the Revised EIA Report
	The siting guidelines further prohibit setting up of Thermal Power Plant in the forest area. The Project Proponent submits that since the present project site has degraded forest land, it is justified to set up the proposed project at such site. However, such justification is irrelevant and unscientific. The presence of degraded forests does not justify the setting up of a project on forest land.	The MoEF&CC,GoI, New Delhi after studying all the aspects and making the proposed site visit diverted the forest land in favour of TSGENCO Vide letter no. F.No. 8- 07/2015/ FC dated 7th July 2015 of MoEF&CC, GOI, New Delhi for setting up of 6800 MW Coal based Thermal Power Plant.
9	**Availability of water and impacts of withdrawal?** The Project Proponent has submitted that 6.6 TMC is required for the proposed project. However, the details of such water availability in River Krishna have not been submitted by the Project Proponent. The Project Proponent has also not studied the downstream impacts due to the withdrawal of 6.6 TMC water from Krishna River. Questions were asked during the Public Hearing about the availability of water as well as the downstream impacts of withdrawal of 6.6 TMC water from Krishna River. The Project Proponent has not provided any explanation on both these aspects	Source of water is River Krishna. Krishna river is perennial in nature and even during the summer, just before the first monsoon rain, the minimum flow (June, 2005) has been measured as 25.72 Mm^3/month at Pondugala G/D station and the minimum flow (June, 2005) has been measured as 27.84 Mm^3/month at Wadenapalli station against the power plant requirement of 7.21 Mm^3/month. Thus the withdrawal percentage is less than 30% in lean season. the details of the same are given in the revised EIA Report Govt. of Telangana, Irrigation and CAD Department has allocated 208 cusecs of water (6.60 TMC/year) from Krishna River vide G.O. Ms No. 13 dated 30.01.2015 . TSGENCO will utilize about 97.8 cusec (3.10 TMC per year) for the proposed 4000 MW from this allocation. Details of the same are furnished in Revised EIA Report

Replies to the issues raised by M/s eRc's review for EAC Thermal Meet on 14th-15th July 2016, Yadadri Thermal Power Station, Telangana.

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
10	**No detail of zero liquid discharge** The Project Proponent has randomly submitted that the proposed project will operate on the concept of Zero Liquid Discharge. However, no detailed and scientific feasibility of Zero Liquid discharge has not been provided	The project is based on Zero Discharge Concept. The details on wastewater treatment, recycling and utilisation are provided in Revised EIA Report
11	**No socio-economic impact assessment** Socio-Economic Impact Assessment study has not been conducted by the Project Proponent. The CSR initiatives which have been taken up by the Project Proponent has been termed as Socio-Economic Impact Assessment study. We do not want to dwell on Socio-Economic Study being far different from CSR initiative.	Social Impact Assessment study has been done and incorporated in the revised EIA Report
12	**No Health impacts study** Burning of Coal produces harmful pollutants which have numerous health impacts. Global scientific studies have provided overwhelming evidence of adverse health impacts of coal-fired power plants. The National Environmental Engineering Research Institute (NEERI) in its report of 2006 has highlighted that people living within 2 km radius of NTPC's 2600 MW Thermal Power Plant in Ramagundam are suffering from respiratory diseases. The present project is a much bigger project which ultimately aims to produce 6800 MW	Flue gas treatment system proposed which is in compliance with the new norms of MOEF & CC stipulated for thermal power plants will be implemented by TSGENCO. This will ensure that there is no significant impact on health of surrounding villages. No pollutant will be discharge outside the plant premises. The plant is based on Zero Discharge concept. The ground level concentration of air pollutants are with in the permissible limits. Hence, no adverse impact on health. The details on health and safety impacts of project

Replies to the issues raised by M/s eRc's review for EAC Thermal Meet on 14th-15th July 2016, Yadadri Thermal Power Station, Telangana.

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	Power. However, the Project Proponent has not conducted any health impact assessment studies for the proposed project.	operations are provided in the Revised EIA Report
13	**No Cumulative Impact Assessment** The Project Proponent has also not conducted the Cumulative Environmental Impact Assessment study. As per the Project Proponent, there are 22 cement industries within the 15 kilometre radius of the project site.	The cumulative impact assessment study has been done considering all the industries located in study area. Details of the same are provided in the Revised EIA Report
14	**Complete information not provided at public hearing**	
	The following significant questions were raised during the Public Hearing. They have not been replied to by the Project Proponent. "In view of the following facts, the EIA Study is not complete: a) Many of the Terms of Reference have not been complied and EIA Study has not been conducted accordingly b) There is no confirmed Fuel linkage and therefore the Coal characteristics are unknown for the EIA Study to be conducted. c) The source from which Fuel will be obtained and the route from which is not brought to the project is not certain. The impact of transportation on AAQ has not been studied d) The list of industries within 15 kilometer	All the issues raised are addressed in the Revised EIA Report.

Replies to the issues raised by M/s eRc's review for EAC Thermal Meet on 14th-15th July 2016, Yadadri Thermal Power Station, Telangana.

S.No	Issue	Proponent Response (updated as per Revised EIA Report)
	radius of the project has not been given e) The Cumulative Impact Assessment study has not been done. f) The Socio-Economic Impact Assessment study has not been done. g) The Hydro-geological study is' inadequate and incomplete on many aspects h) The Impact of the project on Aquatic Ecology has not been studied. i) The Health impacts of the proposed project have not been studied, etc. In view of the all the above facts, the EIA Study of the project is not complete. Therefore is not justification for conducting of Public Hearing on 31.05.2016."	
15	**Non-Compliance of TOR** During the Public Hearing, the following TORs have been submitted to be non-complied by the Project Proponent. Even this has not been replied by the Project Proponent.	All TORs have been complied and details are provided in the Revised EIA Report along with compliance statement.

B.S. ENVI - TECH PVT. LTD.
CONSULTANTS - ENVIRONMENT & ENERGY

ANNEXURE – 12A

To
The Director (IA Thermal Power)
Ministry of Environment, Forest & Climate Change
Indira Pariyavaran Bhavan
Jor Bagh, New Delhi

UNDERTAKING

The Re-Constituted Expert Appraisal Committee (Thermal Power), Ministry of Environment, Forest & Climate Change, GoI, New Delhi during its 1st meeting held on 28.12.2016 has directed that, We M/s. B.S. Envi-Tech Pvt., Ltd, Secunderabad, new consultants to TSGENCO for preparation of revised EIA/EMP report for 5X800 MW Super Critical Coal based Yadadri Thermal Power Station at Veerlapalem (Village), Dameracherla (Mandal), Nalgonda (Dist.), Telangana State, should own the base line data collected by M/s. Bhagavathi Ana Labs Pvt. Ltd, Hyderabad during the period from December, 2015 to February, 2016 in preparation of EIA/EMP report for the above project as per the standard ToR issued vide Lr. No. J-13012/18/2015 - IA.I(T)s, dt. 02.11.2015 and additional TOR granted by MoEF & CC, GoI, New Delhi vide Lr. No. J-13012/18/2015 - IA.I(T), dt. 16.02.2016

In view of the above, M/s. B.S. Envi-Tech Pvt., Ltd, Secunderabad here by undertakes to own the baseline data collected by earlier consultant, M/s. Bhagavathi Ana Labs Pvt. Ltd, Hyderabad. Additionally BSET has also collected the baseline data for Post Monsoon Season (October, 2016) as part of Validation.

BSET owns the responsibility of preparing the Revised EIA report as per the Terms of Reference (ToR) issued for the above project and also the comments/observations of EAC.

B.S. Envi-Tech Pvt. Ltd. ★ HYD ★

For B.S. Envi-Tech Pvt., Ltd,

Y B S Moorthy
Managing Director

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St. Ann's Road, Tarnaka,
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Telangana, India

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Website : www.bsenvitech.com
CIN No. : U74210TG1999PTC032358

NABET
QUALITY COUNCIL OF INDIA

ANNEXURE – 12B

National Accreditation Board
for Education and Training
(Member of International Accreditation Forum
and Pacific Accreditation Cooperation)

QCI/NABET/EIA/ACO/16/11/0209 November 16, 2016

M/s B S Envi-Tech Pvt Limited
12-13-1270/71/73,
Amity Ville, 4th Floor
St Anne Road, Tarnaka,
Secundrabad- 5000017
(Kind Attention: Mr Y B S Moorthy)

Sub: Validity of Accreditation as EIA Consultant organisation- B S Envitech, Hyderabad

Dear Sir,

This has reference to the accreditation given to your organisation and its validity under QCI-NABET EIA Scheme. The accreditation of **M/s B S Envitech** is continued till the next surveillance assessment SA3 which is due on September 2017.

The extension of validity is subject to the submission of required information documents related to above assessment to NABET on time.

You are requested not to use this letter after expiry of the stated date.

With best regards,

16/11/2016

A.K Jha
Senior Director

Annexure-VII

Declaration by Experts Contributing to the Environmental Impact Assessment (EIA) of the proposed 4000 MW (5X800 MW) Supercritical Coal Based Yadadri Thermal Power Station of M/s. Telangana State Power Generation Corporation at Veerlapalem Village, Damercherla Mandal, Nalgonda (Dist.), Telangana State.

I, hereby, certify that I was a part of the EIA team in the following capacity that developed the above EIA.

EIA Coordinator :

Name	:	Mr. Y.B.S. Moorthy
Signature & Date	:	
Period of involvement	:	August 2016 to till date
Contact information	:	M/s. B. S. Envi-Tech Pvt. Ltd. #12-13-1270/71/73, Amity Ville, 4th Floor, Beside Spencer Super Market, St. Ann's Road, Tarnaka, Secunderabad-500017
Email id	:	info@bsenvitech.com
Ph. No	:	+91-40-49783062.
Team member For EC	:	G. Chandra Mouli (TM)

Functional Area Experts:

S. No	Functional Areas	Name of the expert/s	Involvement (Period & Task)	Signature &Date
1	**LU** (Land Use)	G. Chandra Sekhar	Sep'16 -Jan'17	
2	**AQ** (Meteorology, Air Quality Modeling & Prediction)	Ch. V. Tulasi	Sep'16 -Jan'17	
		B.S. Chandra Murthy	Sep'16 -Jan'17	
3	**AP** (Air Pollution Prevention, Monitoring & Control)	Y.B.S Moorthy	Sep'16 -Jan'17	
		V. Vijay Kumar (TM)	Sep'16 -Jan'17	
4	**WP** (Water Pollution Prevention,	Ch. V. Tulasi	Sep'16 -Jan'17	

S. No	Functional Areas	Name of the expert/s	Involvement (Period & Task)	Signature &Date
	Control & Prediction of Impacts)	V. Vijay Kumar (TM)	Sep'16 -Jan'17	
5	**EB** (Ecology and Biodiversity)	G. Raja Reddy	Sep'16 -Jan'17	
		Dr. Manoj Kumar Pardeshi (Baghavathi Ana Labs Pvt. ltd.,)	Feb'16-Jun'16	-
6	**SE** (Socio-Economics)	D.V.L.N.V. Prasad Rao	Sep'16-Jan'17	
7	**NV** (Noise/ Vibration)	B.S. Chandra Murthy	Sep'16-Jan'17	
8	**GEO** (Geology)	G. Chandra Sekhar	Sep'16-Jan'17	
9	**SC** (Soil Conservation)	B. Hari Babu	Sep'16-Jan'17	
10	**HG** (Hydrology, Ground Water & Water Conservation)	M. Veeranna	Sep'16-Jan'17	
		Dr. Meeta Khilnani (Hydro-Geosurvey Consultants Pvt. Ltd, Jodhpur)	Sep'16-Jan'17	-
11	**RH** (Risk Assessment & Hazard Management)	D.H. Patel	Sep'16-Jan'17	
12	**SHW** (Solid Waste and Hazardous Waste Management)	Ch. V. Tulasi	Sep'16-Jan'17	
		B.S. Chandra Murthy	Sep'16-Jan'17	

The Following Engineers/Scientist involved in Preparation of EIA Report:

S. No.	Name of Engineers/ Scientist	Involvement (Period & Task **)	Signature &Date
1	P. Hima Kranthi	Sep'16 to Jan'17	Hima Kranthi
2	K. Surender		K. Surender
3	D. V. Padmasan		D.V. Padmasan
4	M.G. Jayaramudu		Jayaramudu. M.G
5	JBSN Raju		Bhraj

Declaration by the Head of the Accredited Consultant Organization

I, Y.B.S. Moorthy, hereby, confirm that the above mentioned experts prepared the EIA of M/s. Telangana State Power Generation Corporation – 4000 MW (5X800 MW) Supercritical Coal Based Yadadri Thermal Power Station at Veerlapalem Village, Damercherla Mandal, Nalgonda (Dist.), Telangana State. I also confirm that I shall be fully accountable for any mis-leading information mentioned in this statement.

Signature :

Name : Y B S Moorthy

Designation : Managing Director

Name of the EIA Consultant Organization : B.S. Envi Tech (P) Ltd

NABET Certificate No. : NABET/EIA/1316/RA0002

Valid Date : September 2017