

## **MINUTES OF THE 32<sup>nd</sup> MEETING OF THE RE-CONSTITUTED EXPERT APPRAISAL COMMITTEE ON ENVIRONMENTAL IMPACT ASSESSMENT OF THERMAL POWER & COAL MINING PROJECTS**

The 32<sup>nd</sup> Meeting of the reconstituted Expert Appraisal Committee (Thermal Power) was held on **23<sup>rd</sup> & 24<sup>th</sup> February, 2015** at Teesta Meeting Hall, First Floor, Vayu Wing, Indira Paryavaran Bhawan (new building), Jorbagh, New Delhi-110003. The members present were:

- |  |   |                                 |
|--|---|---------------------------------|
| 1. Prof. C.R. Babu                     | - | Vice Chairman (Acting Chair)    |
| 2. Shri T.K.Dhar                       | - | Member                          |
| 3. Shri A.K. Bansal                    | - | Member                          |
| 4. Shri G.S. Dang                      | - | Member                          |
| 5. Shri N.K. Verma                     | - | Member                          |
| 6. Dr. S.D. Attri                      | - | Member (Representative of IMD)  |
| 7. Shri P.D Siwal and Shri N.S. Mondal | - | Member (Representative of CEA)  |
| 8. Dr. S.S. Bala                       | - | Member (Representative of CPCB) |
| 9. Dr. Asha Rajvanshi                  | - | Member (Representative of WII)  |
| 10. Dr. Saroj                          | - | Member Secretary                |

In attendance: Dr. M. Ramesh, Scientist 'D' and Dr. Deepak Gautam, Research Officer, MoEF&CC.

Shri J.L Mehta, Dr. Ratnavel, and Dr. C.B.S Dutt could not be present.

### **Item No.1: CONFIRMATION OF THE MINUTES OF THE LAST MEETING.**

The Minutes of the 30<sup>th</sup> EAC meeting held during 29<sup>th</sup> & 30<sup>th</sup> January, 2015 were confirmed with minor corrections.

### **Item No. 2: CONSIDERATION OF PROJECTS**

#### **2.1 2,000 MW Gas Based Combined Cycle Power Plant (CCPP) at Village Godhra, Kutch Distt, Gujarat by M/s. Nana Layja Power Co. Ltd. - reg. EC**

1. The PP along with their environmental consultant, L&T Infrastructure Engineering Ltd. (formerly known as L&T Ramboll) has made a presentation and inter-alia provided the following information. The ToR for preparation of EIA/EMP report was accorded on 24.09.2012 and an extension of validity of ToR till 23.09.2015 was accorded on 13.02.2015. The EIA/EMP report after conducting Public Hearing was submitted to the Ministry for consideration of environmental clearance.

2. The proposed TPP will be located in Multiproduct SEZ being developed by IL&FS group companies. Total SEZ area is 3473 acres and the area designated for TPP is 88 acres, of which plant area is 66 acres and green belt area is 22 acres. MoU has been signed between the PP and SEZ developers for transfer of required land on long term lease basis. 100% of required land for the TPP has been acquired by SEZ developers. The Utility corridor of 8.33 km long, 60 m wide involves 124 acres of land. Since the land identified for project is un-inhabited, no R&R issue arise due to Land Acquisition. Ecologically sensitive areas like Biosphere Reserves, National Parks, Wildlife Sanctuaries, protected sites as per Ramsar convention and other protected areas (PA) are not present within 15 km radius of the project site. Letter and map duly authenticated by CWLW was obtained. There are no litigations pending or otherwise with respect to project in any Court, Tribunal etc.

3. Commissionerate of industries, Gujarat has bonafide the land for industrial purpose (Letters dated May-June, 2010). SEZ Board of Approval, GoI has accorded in-principle approval to SEZ in June, 2010 and issued the official letter in May, 2014. IL&FS Group is also developing Shipyard cum Captive Jetties including LNG terminal at Nana Layja coast, Kutch District, Gujarat and the Shipyard cum Captive jetties site is at 8 km South of SEZ site. These Jetties will cater the requirements of SEZ including Power Plants. An integrated/common EIA Report was prepared after obtaining ToRs from respective EACs of MoEF.

4. The proposed TPP is planned to be equipped with 5 blocks of 400 MW each, out of which first Block is expected to be commissioned within 33 months from the date of NTP to the EPC contractor and each subsequent Block of 400 MW will achieve commercial operation in 3 months after the COD of each preceding Block. Quantity of fuel (natural gas) required will be 7.7 MMSCMD (~2.0MTPA) and shall be sourced/imported in form of Liquefied Natural Gas (LNG) from USA in special vessels. LNG shall be unloaded at LNG Jetty and storage and re-gasification of LNG shall be carried out at dedicated LNG Terminal. LNG Terminal of 5.0 MTPA capacity is proposed to be set up near Shipyard cum Captive Jetty being developed by IL&FS Group, located at a distance of around 11.6 km South to the project site at Nana Layja's seafront. The re-gasified LNG will be transported through underground pipeline which will be routed through dedicated utility corridor proposed between TPP and LNG Terminal. The PP has signed the "Term Sheet" for LNG Sale and Purchase Agreement (LSPA) with BARCA LNG LLC, USA for supply of LNG for 25 years at commercially viable price.

5. One season site-specific meteorological data was generated during the study period (September to December, 2012) and in addition, one year (2012) met data was purchased. AAQ monitoring for one season (post monsoon) to collect site specific AAQ data for the mentioned parameters was carried out. To evaluate baseline air quality of study area, Twenty Four (24) monitoring locations were identified in all directions from project site. Industries Proposed over a radius of 15 km are SEZ/FTWZ, DTA including Power and Desalination Plants and Shipyard Cum Captive Jetties including LNG Terminal. No other industries are proposed in 15 km radius. Cumulative Impact assessment over 15 km radius for the proposed industries has been carried out considering all industries emissions and Discharges including Seawater withdrawal for all the projects. The AAQ model studies were conducted covering Point sources (proposed 2000 MW Gas Based CCPP and 4000 MW Coal TPP, other SEZ and DTA Industrial Units, Shipyard cum Captive Jetties including LNG Terminal), Line source from increased vehicular activity on NH-8A extension & Utility Corridors and Area Sources i.e., Coal Stockyard of TPP & at Shipyard cum captive Jetties for Particulate Matter (PM). Hourly meteorological data for the entire year of 2012, Wind Speed and Wind Direction was taken for study. The predominant wind directions were from South West followed by West, while calm conditions prevailed for 3.13% of the total time and average wind speed was observed to be 3.69 m/s. Annual avg. resultant conc. and 1<sup>st</sup> highest 24 Hr avg. of NO<sub>x</sub>, PM<sub>10</sub>, PM<sub>2.5</sub> & SO<sub>2</sub> at all receptor locations are found to be well within NAAQ Standards.

6. Water requirement is based on 1.3 CoC. Condenser cooling will be closed cycle cooling using cooling towers (NDCT). Sea water intake for cooling water make-up will be required as 217.68 MLD with a fresh water requirement of 2.52 MLD from desalination plant. The water requirement has been optimized as per prevailing practices. Re-use and re-circulation of effluents, DM plant rejects, Boiler Area floor wash, Wastewater from oil water separator will be treated in ETP and will be used for greenbelt. STP treated water will be used for greenbelt. Other areas like return seawater which cannot be reused will be sent to marine outfall.

7. Department of Earthquake Engineering, IIT- Roorkee carried out the seismic hazard assessment studies for Site Specific Design Earth Quake parameters. Studies related to the

regional geology, tectonic and earthquake occurrences in the region around the site and seismotectonic modeling of the region for the estimation of strong ground motion were taken up. Based on the Probabilistic Seismic Hazard Assessment (PSHA) carried out for the project site, recommendations were made for the strong ground motion at the site in terms of design response spectra for various return periods along with appropriate strong motion time histories.

8. Hydrological Investigation & Drainage Pattern Study was carried out by National Institute of Hydrology, Roorkee. Storm water drainage pattern has been designed for drains crossing project area and drain around proposed plant area is designed to safely carry runoff generated due to 100 year return period rainfall. Cross-section of the drains are designed according to the Indian Standard, IS 10430:2000 (BIS, 2006) and in-principle approval from Narmada Water Resources Department, Gujarat has been obtained.

9. Marine impact assessment study was carried out including model studies for identification of intake and outfall. Common marine outfall system is proposed for return cooling water discharges from power plants, reject brine from desalination plant, SEZ's CETP treated effluent discharge and treated wastewater from Shipyard cum captive jetties. NoC for sea water Intake and Outfall locations was obtained from GMB. Velocity cap Type Intake with screens & low velocity to reduce Impingement/Entrapment and Entrainment will be used. The mode of conveyance of sea water will be pipeline, intake is proposed within breakwaters and permission for sea water withdrawal was obtained from GMB.

10. Physical, Chemical and Biological parameters shall be monitored and also Alpha, Beta emitters (surface water), Monitoring shall be carried out once a month (construction & operation phases). Monitoring shall be carried out for Groundwater in six locations: SEZ Site, Layja Mota, Bayat, Undatnand, Godhra, Janakpur and for surface water in two locations: Rajada Reservoir and Vengdi Check Dam near Bayat. Marine Water Quality near Intake/outfall/Kharod River confluence point and 500 East and West of outfall location is proposed. In addition, all the ETP/STP influent and effluent will be monitored.

11. Mitigation Measures will be adopted including stack height of 70 m, Low Nox Burners etc. Ambient air quality monitoring will be carried out regularly at selected locations in the predicted maximum impact zone along with green belt development all along the project boundary. All the vehicles will be periodically checked to ensure compliance to the emission standards and SEZ's EMC shall ensure that all the individual units shall implement essential pollution control measures.

12. Detailed studies on fisheries have been carried out by MART and International Fisheries Expert Dr. Munir Ahmed. The study area of 15 km radius has 5 fishing villages with total 344 households, 2716 population and 650 active fishermen. Proposed project integrates adequate improved safeguards and mitigation measures in the project design to eliminate or reduce or mitigate the impacts due to intake and outfall on the fishermen. Based on the socioeconomics, livelihood and value chain assessment, the livelihood enhancement plan for fishermen has been prepared. Fishermen Welfare Fund has been prepared as a part of the CSR plan and Capital Cost of Rs. 1.5 Crores has been allotted for Fishermen Welfare Fund.

13. Detailed Social Impact Assessment study has been carried out by CEPT University, Ahmedabad. Study area of 15 km radius consists of 49 inhabited census villages with a population of 69,602 with 34,697 males and 34,905 females. Village Level Surveys of 49 villages within 15 km radius and Household Surveys in 30 villages in 10 km radius (10% of total households) were carried out. Social needs and gap assessment were undertaken. It was

observed that Literacy rate in the study area is 72%. Main workforce comprises of 80% whereas marginal workforce comprises of 20% of the total workforce. Women workforce participation rate is low. Focused Group Discussions were held with Farmers, Fishermen, Cattle Rearers, Women Groups, Artisans, Community Based Organisations, NGOs and Government Agencies. It was noted that access to Primary Education and Primary Healthcare is adequate. However, needs improvement in quality of service delivery. The directly and indirectly affected people for SEZ have been identified. The project area is un-inhabited and hence no R&R is involved. Private land acquired has been purchased by SEZ Developer through direct consent and negotiation. MoU signed between the PP and SEZ developers for transfer of required land on long term lease basis. Most of the land owners are non-residents. Government waste land has been identified and it is under process of transfer.

14. An Environment Management Plan has been prepared covering administrative and technical setup for environmental management, greenbelt development, wildlife conservation plan, rainwater harvesting, regeneration action of degenerated water bodies, solar power harnessing, occupational health and safety, institutional mechanism for implementation of mitigation measures, environmental management cell (EMC), approach towards voluntary compliance, audits and inspections, summary of impacts and mitigation measures. Budgetary estimates for environmental management have been formulated with a total capital cost of Rs. 150.56 crores.

15. About 8.9 Ha area is proposed for greenbelt development in power plant (33% of the total plant area). 3 tiers 50 m wide greenbelt is proposed around the boundary of the plant and approximately 22,250 no. of trees are proposed to be planted in the power plant area to ensure 2500 trees/Ha. Greenbelt development shall be implemented with tall, medium & short height permanent trees at 2 m x 2 m spacing and survival rate of the plantation during operational phase will be monitored and aimed at 80%. For the purpose, a capital cost of INR 56 Lakhs shall be earmarked for greenbelt development in CAPP premises. Additional plantation as approved by CWLW will be implemented in consultation with District Forest Department. Financial budget of Rs. 62.50 Lakhs is allocated for the same, out of the above budget, Rs. 12.50 Lakhs is allocated for Plantation of native/displaced important plants (like Commiphora wightii, etc.) only. Provision for Green Endowment Fund is made as part of the EMP budget and an amount of Rs. 3 Crores. has been allotted.

16. Solar Power Harnessing has been proposed at available roof tops and Off grid solar PV system is proposed to be used for solar power harnessing. Suitable buildings and structures are identified and roof top areas are considered for calculation of total possible capacity of installed solar PV. Status of implementation and execution will be submitted to MoEF&CC at regular intervals.

17. Public hearing/public consultation was conducted by the Gujarat Pollution Control Board on 12.12.2014. It was noted that the issues raised in the public hearing include loss of grazing land within the project area, affect of fishery and livelihood of fisherman, impact on fishing in creek area, harmful effect on agriculture, check dam, River and lake, health issues due to coal dust and fly ash, forest land patch falling in shipyard/captive jetty, survey nos. of the total area for the project including TPP, presence of Olive Reedley Turtles in the area, contamination of drinking water due to the project, impact of air pollution on public health and crop, impact of traffic on marine ecology and impact of project on the wandering birds. The Committee discussed the issues raised in Public Hearing, the responses made by Project Proponent including the action plan and the budgetary allocation under CSR.

18. CSR plan was prepared based on comprehensive understanding of the project area through baseline study, community needs assessment & gap assessment and extensive community consultations. CSR plan designed by CEPT University, Ahmedabad, further detailed and supported by village micro-planning, Watershed study, Fishermen Livelihood Study and Model Clean Village study. Focus was laid on livelihood and economic value creation and Intervention designs based on devolved ownership by community for sustainable process. CSR planning is based on creating shared value approach and prioritization of developmental activities is based on critical stakeholders and real needs of the communities. The components of the CSR Plan are Social Enterprise and Livelihood Development, Natural Resource Management, Infrastructure and Human Capital Development.

19. Capital CSR Cost for CCPP will be 0.4% of power project cost i.e., Rs. 28.75 Crores and recurring cost will be 2% of average annual profit of last 3 preceding years (as per Company's Act 2013). Monitoring Mechanism for CSR will comprises monthly monitoring of Projects by CSR Cell, quarterly monitoring by relevant committee, CSR Progress reported to the Board bi-annually and annual social audits. Local people shall be given preference in the project based on their skills and educational qualifications. Livelihood Interventions and Skill development facilities including Technical Trainings have been proposed as a part of CSR.

20. The Committee noted that the Ministry has received certain queries on the subject multiproduct SEZ, TPPs etc. from an organization called 'Conservation Action Trust', Mumbai. The reply of PP in this regard was also sought. The Committee noted that the queries/issues were detailed by the PP in the EIA/EMP report and also deliberated upon by the Committee. The Committee also suggested that the PP may forward the reply to Conservation Action Trust.

21. Based on the information and clarifications provided by the Project Proponent and detailed discussions held on all the issues, the Committee *recommended the project for environmental clearance* subject to stipulation of the following additional specific conditions:

- i) *Since the project site falls under seismic zone V, all precautions shall be taken as per the recommendations of subject experts.*
- ii) *Latest authenticated satellite imagery shall be submitted on an annual basis to monitor the alterations of the area.*
- iii) *Ensure by periodic preventive maintenance that there are no leakages of pipes transporting LNG and seawater.*
- iv) *The regenerated water bodies shall be maintained and sufficient funds shall be earmarked in this regard*
- v) *Stacks of 70 m each shall be provided with continuous online monitoring equipments. Exit velocity of flue gases shall not be less than 22 m/sec.*
- vi) *Dry Low NO<sub>x</sub> burners shall be installed to control NO<sub>x</sub> emission. NO<sub>x</sub> emission from each Gas Turbine shall not exceed 50 ppm.*
- vii) *COC of atleast 1.3 shall be adopted.*
- viii) *Explore the commercial utilization of brine instead of discharging into sea.*
- ix) *Natural topography and surface drainage shall be maintained to the extent possible. The second order and third order drains passing through the Plant shall be diverted so as to maintain them free from dust and pollutants. Further, ponds and check dams shall be created in the nearby villages using the diverted streams in consultation with State Govt.*
- x) *The wild life conservation plan and the allocation of funds shall be for a period of minimum 30 years*
- xi) *Sea water quality shall be continuously monitored for salinity, turbidity and temperature at selective sites across the impacted zone including estuarine waters.*

- Mitigative measures shall be undertaken through institutes such as Annamalai University for continuous preservation of mangroves and their ecology. The monitoring data shall be uploaded on the company's website and also submit to Regional Office of the Ministry every six months.*
- xii) *To minimize entrapment of even small marine flora and fauna, state of the art low aperture intake screens with high effectiveness for impingement and entrainment and fishnet around intake shall be installed.*
  - xiii) *Fish catch along the impacted zone of sea should be monitored periodically by the Department of Fisheries, Government of Gujarat. The project proponent shall accordingly take up the matter with the Fishery Dept., Govt. of Gujarat from time to time.*
  - xiv) *The project proponent shall upload environmental quality monitored data on a regular basis on its website.*
  - xv) *Marginalized section of society particularly traditional fishermen communities shall be identified based on 2011 population census data and socio-economic study of the various strata of families such as those carrying out subsistence fishing, commercial fishing etc. shall be carried out and impact on their livelihoods shall be assessed separately. Accordingly, sustainable welfare scheme/measures shall be undertaken and status of implementation shall be submitted to the Regional Office of the Ministry within six months.*
  - xvi) *A state-of-the-art environmental laboratory at the project site shall be established such that the laboratory has facilities for long term monitoring of sea water quality and sediment in the impacted zone over and above and ambient air, soil quality analysis of the area. The proponent shall undertake mitigative measures if there are any negative impacts.*
  - xvii) *The width of the green belt shall be the maximum possible towards the nearby Bhandaras.*
  - xviii) *As committed, a minimum amount of Rs 28.75 Crores shall be earmarked as capital cost for CSR activities.*

## **2.2 Expansion by addition of 1x660 MW coal based Super Critical Unit at Harduaganj TPP at Kasimpur, Aligarh District, Uttar Pradesh by M/s Uttar Pradesh Rajya Vidyut Nigam Ltd. - reg. EC**

1. The PP along with their environmental consultant, EQMS India Pvt. Ltd., Delhi has made a presentation and inter-alia provided the following information. The ToR for preparation of EIA/EMP report was accorded on 12.03.2010 and the EIA/EMP report after conducting Public Hearing was submitted to the Ministry in August, 2011 for consideration of environmental clearance. The baseline data was again collected from 15<sup>th</sup> March – 15<sup>th</sup> June, 2013 for revalidation. The revised final EIA/EMP Report with revalidated data was submitted to the Ministry in March, 2014. However, the project was on hold due to the linkage of coal.

2. The total capacity of the existing Units under operation is 605 (105 +2X250) MW. Although another 60 MW Unit is currently operational, will be phased out shortly. The total area of Harduaganj TPS is 201.31 Ha. The land required and usable land available for proposed TPP is 60 Ha. The coordinates of the proposed plant site are Latitude 28° 0' 29.87" N and Longitude 78° 8' 9.77" E. The main power house would be constructed at old colony area. Existing ash dyke of the power station will be used for the proposed Unit (after raising its bund height). No land is to be acquired for any coal transportation system as well as for laying of pipelines (ash) etc. As the land is within existing UPRVUNL premises, there are no land acquisition and R&R issues and agricultural land is involved. There are no litigations pending

or otherwise with respect to project in any Court, Tribunal etc. The estimated project cost is Rs. 4674.49 Crores.

3. Regarding the certified compliance report of the Ministry's R.O. dated 27.01.2015 for compliance of EC conditions by the existing Units, the PP submitted that most of the conditions have been complied. On the observation that the ESP No#5 was not working properly, it was submitted that ESP has been installed now in unit No.5 of Harduaganj TPS. However, this unit shall be phased out. On green belt, it was submitted that Orders have been placed for plantation in 21 ha area by Forest Deptt. in 2014-15 and afforestation/plantation is being done around the ash pond area. 78,200 trees have been planted in 71 ha. land upto year 2013-14 and about 85% of these plants have survived.

4. The estimated raw coal requirement for the proposed Unit is 2.96 MTPA (with GCV of 4,200 kCal/kg and Design Station Heat Rate of 2,380 kCal/kWh at 90% PLF). UPRVUNL had been allocated Chhendipada Coal Block in Talcher coalfield, Orissa. However, the same has been cancelled by Hon'ble Supreme Court of India. Ministry of Coal, GOI, has allocated 250 million tonnes of coal from Deocha-Pachami Coal Block (WB) and 51 million tonnes from Kalyanpur-Badalpara Coal Block (Jharkhand) to UPRVUNL for its projects including the proposed Unit. Based on the MoM dated on 24.07.2014 (Agenda Point No. 3) of SLC of Ministry of Coal, LOA/Linkage granted to the old plant (to be phased out) shall be automatically transferred to new super critical units. UPRVUNL Board and Energy Task Force of U.P have approved to utilize coal from old units of UPRVUNL till the coal block is made available for the proposed 1x660 MW Unit. The ash content, sulfur content and GCV of the allocated Chhendipada Coal Block are 32%, 0.47% and 4200 kCal/kg respectively. The ash content, sulfur content and GCV of the coal blocks for the existing units are 33-34%, 0.4-0.5% and 4200-4800 kCal/kg respectively.

5. Yard capacity of the Coal storage shall be 1,35,000 MT (storage equivalent to 15 days of coal consumption at 100% PLF). One rail mounted, traveling stacker-reclaimer, bucket wheel type is proposed for coal stockyard management. The capacity of CHP for proposed unit shall be 1200 MTPH with parallel double stream belt conveyors along with facilities for receiving, unloading, crushing and conveying the crushed coal to boiler bunkers and stacking/reclaiming the coal to/from crushed coal stack yards. Dust suppression and water systems shall be provided for CHP. Coal dust extraction and suppression systems will be provided and conveying system will be enclosed and bag filters will be provided at transfer points. Coal dust will be collected on the transfer points through bag filters of requisite efficiency (minimum 95%) and a single flue stack of 275 m height will be installed to ensure adequate dispersion of all the pollutants. ESP (99.9% efficiency) with fly ash hoppers for the trapped fly ash will be provided for the collection of fly ash and space provision shall be made for installation of FGD for removal of SO<sub>2</sub> (if required). The reduction of NO<sub>x</sub> emission of 60% to 65% is targeted with the help of low NO<sub>x</sub> burners.

6. The maximum baseline concentration of AAQ reported during summer season for SO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> are 19.0 µg/m<sup>3</sup>, 39.0 µg/m<sup>3</sup>, 245.0 µg/m<sup>3</sup> and 132.0 µg/m<sup>3</sup>. Air dispersion modeling study was conducted using AERMOD View 6.2 Model of Lakes Environment. The maximum rise in GLC of SO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> are predicted as 21.59 µg/m<sup>3</sup>, 5.74 µg/m<sup>3</sup>, 0.74 µg/m<sup>3</sup> and 0.17 µg/m<sup>3</sup>. The resultant concentration (Post Project Scenario) of SO<sub>x</sub>, NO<sub>x</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> in the AAQ would be 40.59 µg/m<sup>3</sup>, 44.74 µg/m<sup>3</sup>, 245.74 µg/m<sup>3</sup> and 132.17 µg/m<sup>3</sup> respectively.

7. The monitoring and analysis of environmental parameters (for December 2014) was carried out through EMTRC Consultants Pvt. Ltd., Delhi. There has been significant overall

improvement in various environmental parameters due to improved efficiency of the power units/machines such as ESP etc., which were not installed at the time of earlier tested report. *The Committee noted that the PM values at some locations are exceeding the NAAQS and recommended that the PP shall take immediate measures to control the PM in consultation with SPCB.*

8. Water requirement for the proposed expansion will be 2,440 m<sup>3</sup>/hr (24 cusec) with ash water re-circulation system and shall be met from Upper Ganga Canal. Total 106 cusec of water is already allotted to Harduaganj TPS which is sufficient to meet the requirements of water for the various units like Units 5 (60 MW) and 7 (105 MW) (Unit 5 to be phased out), newly constructed Units 8 and 9 (2x250 MW) and Proposed 1 x 660 MW Plant. About 30 m<sup>3</sup>/hr will be the excess water with ash water recirculation which will be utilized for Greenbelt in plant premises and township areas as parks, road side plantations etc., other industrial purposes within the plant premises such as floor washing, toilet cleaning, CHP, dust suppression system, AC filter washing, air pre-heaters, etc. Any excess water (emergency situation and rainy season) will be discharged into the Upper Ganga Canal after treatment in ETP to specified standard quality.

9. Water consumption will be minimized by a combination of water saving devices and other domestic water conservation measures. UPRVUNL further plans to enhance the reuse of treated effluent through methods like increased CoC of 5 in cooling system etc. Rain water from the building roofs and runoff from the yard area grade level surfaces will be carried to rainwater harvesting pits. Total run-off volume during peak rainfall is estimated as 3,002.70 m<sup>3</sup>. Proposed numbers of rainwater harvesting pits are 40 Nos. with pit diameter 4 m and depth 4.5 m. The capacity of the recharge tank will be designed to retain run-off from at least 15 minutes of rainfall of peak intensity.

10. 100% fly ash from the existing Units is being utilized since last 10 months and the same shall be targeted for the proposed expansion. An expression of interest has been received from two cement manufacturers for utilizing the fly ash i.e. M/s Mangalam Cement Ltd. and Shree Cement Limited. Fly ash will also be utilized through brick manufacturing units. Maximum quantity of fly ash will be transported by road through closed trucks to ensure control of dust emission. UPRVUNL will ensure proper control measures shall be undertaken during transportation of fly ash. In case of emergency, fly ash will be disposed in wet form to the ash pond through conventional ash slurry disposal system. Four piezometric wells (old ash pond) and six piezometric wells around new ash pond will be made and regular monitoring of ground water from these wells will be done to check the leachate from the ash ponds. In addition, regular monitoring of ground water and soil quality including heavy metals will be continued around ash dyke and the project area. Decanters in the ash pond will be cleaned and maintained regularly to remove excess water from the ash pond.

11. There are two different ash ponds for various Units of Harduaganj TPP, the old one in an area of 62 Ha. and the present one in an area of 192 Ha. The old ash pond has been utilized to its full capacity and is completely filled with ash and now abandoned. Plantation/afforestation with species of plants approved by the Forest Dept. is being done on the total surface area through State Forest Dept., U.P. So far, upto year 2013-14, about total 68,000 saplings have been planted on old ash Pond and 80 % of the plants have survived. Beside these trees, the surface area is covered with natural vegetation/shrubs which prevents erosion of fugitive ash particles from the ash pond.

12. The present ash pond has been built in two compartments. So far no raising has been done for either of the compartment. The storage capacity of the pond with the existing mother

dyke (for both the compartments) is approximately 1,38,79,908 MT. At present, bottom ash from various existing units is being disposed at various points in both the compartments. At the same time, UPRVUNL has engaged various agencies who are lifting the pond ash from different approaches / corners of both the compartments. It is now planned to dispose the bottom ash from various units in one compartment (A) only. The filled ash in the other compartment will be continued to be lifted from various agencies. It shall be made ready at the earliest for laying of LDPE liner and other courses as required so as to comply with the directives of MOEF/CPCB regarding provision of the lining arrangement. The compartment (B) will have storage capacity of 52,00,000 MT and will be sufficient for disposal of ash due to some emergencies from the proposed expansion Unit for a period of about 10 - 12 years. The development of the aforesaid compartment with requisite liner etc. shall be done in a period of 1-1 ½ year.

13. Hydrogeological study was conducted by IIT, Roorkee. 14 water samples were collected from existing tube wells, hand pumps, upstream and downstream of Upper Ganga Canal. Samples were analysed with respect to IS drinking water norms and the results of analysis reveal that water is colorless and alkaline in nature, EC of ground and surface water are within permissible limits, all major constituents like Zn, Ni, Fe, Mn, Cr and F1 are within permissible limits and samples from shallow or deep aquifers or from canal have high concentration of lead. It was recommended that methods should be employed to arrest the further leaching of fly ash which is being deposited in ash ponds.

14. Total 78,200 trees have been planted in 71 Ha. land in the year 2013-14 and in the year 2014-15, for plantation of 21 Ha. area, orders have been issued to Forest Department and they have started the plantation/afforestation around the ash dyke area. In 2015-16, 12 Ha. of land is proposed for development of green belt. An additional area of 50 Ha (Government land) have been allocated by Forest Department in nearby villages for plantation/afforestation and will be sponsored by UPRVUNL to the Forest Department. As part of CSR activity, further tree plantations will be taken up in village Panchayat lands/Government land etc.

15. The socio-economic study of the area within 10 km radius from the periphery of the project site was carried out by TRIPS, Mumbai which show that a total of 45 villages fall within the study area. Most of the people in the villages are involved in agricultural activities. The occupational structure within 10 km radius of the project site constitute 21.8% as main workers, marginal workers contribute 7.37% and 70% are non-workers of the total population. Total working population in the study area is about 29% of the total population.

16. Need based assessment study was conducted in 5 villages Nagola, Jawa, Rampur, Kasimpur and Satha of the study area and it was found that health care, sanitation, proper drainage and street lightings facilities were non-existent. A separate budget for community development activities and income generating programs has been assigned. Financial allocation of 0.4% of the capital cost of the project has been done for the CSR activities, out of which 1/5<sup>th</sup> of this one time investment will be done as recurring cost per annum till the operation of the plant. UPRVUNL plans to take up improvement/development works for implementation of some of the basic facilities like public toilets, health care centers/ mobile dispensaries, drainage systems and street lighting facilities etc. A committee for carrying out CSR activities has been formed by Board of Directors.

17. Public hearing/public consultation was conducted by the State Pollution Control Board on 27.05.2011. It was noted that the issues raised in the public hearing include land acquisition for new ash pond, ash management, pollution control measures, water requirement, employment to locals, CSR etc. The Committee discussed the issues raised in

Public Hearing, the responses made by Project Proponent including the action plan and the budgetary allocation under CSR.

18. Based on the information and clarifications provided by the Project Proponent and detailed discussions held on all the issues, the Committee *recommended the project for environmental clearance* subject to stipulation of the following additional specific conditions:

- i) *Immediate measures shall be taken to control the PM in consultation with SPCB.*
- ii) *Coal transportation shall be by Rail only*
- iii) *Water consumption shall be optimized as per CEA norms.*
- iv) *Isotopic studies shall be conducted considering the direction of ground water and remediation plan prepared by a reputed institute and implemented accordingly.*
- v) *The existing ash pond shall be utilized and no additional land will be required for ash pond.*
- vi) *The sulphur and ash content of coal shall not exceed 0.5 % and 34 % respectively. In case of variation of quality at any point of time, fresh reference shall be made to the Ministry for suitable amendments to the environmental clearance.*
- vii) *As committed, a minimum amount of 0.4% of the capital cost of the project shall be earmarked as capital cost for CSR activities and 1/5<sup>th</sup> of the capital cost shall be earmarked as recurring cost per annum till the operation of the plant.*
- viii) *Latest authenticated satellite imagery shall be submitted on an annual basis to monitor the alterations of the area.*

### **2.3 Manuguru Thermal Power Project (4x270 MW) at Villages Ramanujavaram, Eddulabayyaram & Seetharamapuram, Mandals Manuguru & Pinapaka, District Khammam, Telangana by M/s Telangana State Power Generation Corporation Ltd. (TSGENCO) - reg. ToR**

1. The project proponent along with their environmental consultant, Vimta Labs, Hyderabad made a presentation and inter-alia provided the following information. Three sites were examined for setting up the proposed power plant. Site- 2 & 3 were not considered as they are falling within the Reserve Forest Block area. The land for the proposed project is 1183.24 acres (for Thermal power plant is 1110.38 acres and for future expansion of Solar power plant is 72.86 acres). Kinnerasani wildlife sanctuary is at a distance of 10.8 km in the SW direction. The total estimated project cost is approx. Rs. 7,360.21 Crores.

2. Coal requirement will be 4.07 MTPA (50% domestic coal + 50 % imported coal) at 85% PLF with GCV of 4550 Kcal/kg and 3.24 MTPA (100% imported coal) at 85% PLF with GCV of 5700 Kcal/kg. Domestic coal is proposed to be sourced from the SCCL mines and imported coal will be sourced from Indonesia or other available good quality imported coal. Ash content of Indigenous coal and Imported coal will be 40% and 15% respectively. The total water requirement of 4155 m<sup>3</sup>/h (1.4 TMC/annum) shall be sourced from River Godavari.

3. *After detailed deliberations, the Committee sought the following information and **deferred** the proposal.*

- i) *Minimum two alternate potential sites on a topo sheet.*
- ii) *Optimize the land requirement as per CEA norms.*
- iii) *Revise the Plant layout by shifting the locations of ash pond and township.*

iv) *Examine the feasibility of switching to super-critical technology and accordingly, revise the configuration of proposed Units.*

**2.4 Change in capacity from 3x660 MW (1980 MW) to 4x800 MW (3200 MW) Coal Based Katni Thermal Power Plant at Villages Bujbuja & Dokariya, Tehsils Barhi & Vijayaraghavgarh, District Katni, Madhya Pradesh by M/s Welspun Energy Madhya Pradesh Ltd.- reg. ToR**

1. The project proponent along with their environmental consultant, Vimta Labs, Hyderabad made a presentation and provided the following information. EC was accorded for 3x660 MW TPP at Bujbuja & Dokariya Villages, Barhi Tehsil, Katni District, Madhya Pradesh on 01.06.2012. Since PPA could not be finalized, plant construction could not be started at site.

2. The proposed change in capacity is because, Station comprising 800 MW Units is preferable in order to take advantage of economy of scale in specific cost, construction and operation of the units, manpower involved, the heat rate achievable and lower specific auxiliary power consumption, specific water and land requirement. Approximately 1220 acres of land is required which includes Plant, Township, Ash pond area & Green Belt. Out of the 1220 acres, 1200 acres is already in possession and land use status is converted. In-principle approval for diversion of 19.37 acres of Forest Land has been obtained. The land is mix of fallow agriculture and barren land. The coordinates of the site are Latitude: 23°53' 59.53" N to 23°55'13.12"N and Longitude: 80°45'45.26" E to 80°46'45.12"E. The homesteads are ~ 25 to 30 and R & R is completed. The nearest habitats are Bujbuja (Population 2373) and Dukhariya (2815) and the nearest town is Katni at about 38 km. Rivers Mahanandi, Umer, Bhadar and Son flow at a distance of about 6.0 km North, 10.0 km SW, 12.4 km East and 25 Km respectively from the project site. Bansagar Dam is at a distance of 10 km. The site is located approximately at a distance of 1 km from SH-10 and 1 km from SH-11. No Biosphere Reserves/Habitat for Migratory Birds/Protected Archaeological Monuments are present within 10 km radius of the study area.

3. The coal requirement is 18 MTPA and will be sourced from domestic source. Coal linkage is expected through long term letter of assurance/captive coal block and shortfall if any, will be made up by coal from e-auction/imported coal. The ash content, sulphur content and GCV of coal shall be 35-42 %, <0.5% and 3000-3500 kcal/kg respectively. Water requirement will be 6,850 m<sup>3</sup>/h (60 MCM per year) which will be met from Bansagar Dam and WRD, M.P has allocated 60 MCM. A reservoir at site with capacity of 14 days storage will be made at site.

4. *The PP requested for collection of baseline data for pre-monsoon season 2015 (1<sup>st</sup> March - 31<sup>st</sup> May, 2015) for which the Committee agreed to.*

5. *Based on the information provided and the presentation made, the Committee recommended the following ToR in addition to the standard TORs (as applicable) at **Annexure-A1** for undertaking detailed EIA study and preparation of EMP.*

- *Revise the layout so as to have wide/thick green belt all around the ash pond.*

**2.5 Expansion by addition of 1x660 MW (Unit IV) Super Critical Coal Based TPP near Village Pathadi, District Korba, Chhattisgarh by M/s. Lanco Amarkantak Power Ltd. – reg. EC Validity.**

1. The PP made a presentation and inter-alia provided the following information. EC was accorded to the above proposal by the Ministry on 26.05.2010. CTE was accorded by Chhattisgarh Environment Conservation Board (CECB) on 11.10.2010.

2. Regarding the progress made, 514 acres of land was acquired by CSIDC for Unit -4 and leased to the PP on 05.11.2011. 20 MCM per annum of water was allocated by the State Water Resources Department (WRD) on 03.12.2009. Letter of Assurance (LoA) for Linkage Coal was obtained from SECL on 03.06.2010 and Fuel Supply Agreement (FSA) was signed on 28.08.2013 for 2.74 MMTPA. Financial Closure was achieved on 25.03.2011. An amount of Rs. 3,236 Crores was incurred out of total project cost of 4,900 Crores as on 31.12.2014. Physical Progress of the Project is 72% and financial Progress is 66 % as on 31.12.2014. The detailed progress of various units/facilities along with photographs was presented. Green belt development is in progress and an overall greenbelt development for total station has been completed in 267 acres out of 405 acres. The Unit is scheduled for synchronization by September, 2016.

3. Regarding the reasons for delay in implementation of the project, there was a delay in land acquisition by Government of Chhattisgarh for BoP areas and there were delays in financial tie-up with financial institutions and banks. There were delays due to mid ways change in Policy guidelines by Government which includes withdrawing Duty-draw Back Benefits and introduction of refundable FDR mechanism under revised Mega Power policy. There was a delay in obtaining sanction of BG limits to furnishing BG for clearing of material from Customs. There was a damage to LP rotor during unloading at Vizag Port which resulted in sending back the same to OEM at China for repair work and is still pending for delivery.

4. *Based on the information and clarifications provided, the Committee noted that the project is in an advance stage of implementation and decided that, in public interest, the request for extension can be agreed to till 31.12.2017 in accordance with the provisions of EIA Notification, 2006. The Committee further recommended that additional conditions which were earlier not prescribed but relevant now be stipulated while issuing the extension of validity.*

## **2.6 Expansion by Addition of 800 MW Supercritical Coal Based Kothagudem Thermal Power Station (Stage-VII), at Tehsil Palwancha, Distt. Khammam, Telangana by M/s Telangana State Power Generation Corporation Ltd. (TSGENCO) - reg. EC**

1. The PP along with their environmental consultant, Ramky Enviro Engineers Ltd., Hyderabad has made a presentation and inter-alia provided the following information. The ToR for preparation of EIA/EMP report was accorded on 26.09.2012. The EIA/EMP report after conducting Public Hearing was submitted to the Ministry for consideration of environmental clearance.

2. Total land required for proposed KTPS Stage-VII is 460 acres i.e. 0.575 acre/MW which is less than the land requirement as per CEA norms (0.67 acre/MW). Existing vacant land of 230 acres will be used for the proposed expansion unit (main plant, coal handling, railway siding, raw water reservoir, roads, etc.) Additional land of 230 acres which is dry agriculture land is being acquired for ash pond only. Kinnerasani Wildlife Sanctuary spread over an area of 635.40 km<sup>2</sup> is around 1.2 km NW from the project site. The proposal was recommended by the Standing committee of NBWL in its 32<sup>nd</sup> meeting held on 25<sup>th</sup> January, 2015. The cost of the project is Rs. 5,291.15 crores. The capital cost and recurring cost of EMP will be Rs.282 crores and Rs.15 crores/annum respectively. The cost towards Ecological Management Plan is Rs. 32.0 Crores.

3. The existing Units total capacity is 1720 MW (4X60, 4X120, 2X250 and 1X500). The 60 MW and 120 MW Units were commissioned during 1966-67 and 1974-78 respectively. These old Units were renovated and modernized during 1998-2004 at a total investment of Rs. 604 crores and their performance is quite reasonable. It is proposed to phase out the 60 MW Units during 2023-24 and the 120 MW Units during 2018-19. *However, the Committee recommended that all the old units of 60 and 120 MW shall be phased out by 2018-19.*

4. Regarding the certified compliance report of the Ministry's R.O. for the monitoring done on 18-19.11.2014 for compliance of EC conditions by the existing Units, the PP submitted that provision is made in the project cost for installation of STP in the residential town ship of KTPS complex duly connecting all the existing quarters and proposed quarters to be constructed under KTPS VII stage. The STP will be taken up on priority immediately after commencement of KTPS VII stage works. On the observation regarding in-effective fly ash utilization, it was submitted that efforts are being made with nearby cement companies for lifting of fly ash from KTPS complex as most of the cement companies are located far away from the plant. Also 25 Nos Brick Industries are located around KTPS complex to whom the fly ash is being supplied at free of cost. Experimental studies were taken up at M/s. SCCL mines near Bhoopalpally, Warangal Dist. for promotion of ash utilization in mine stowing. The same will be taken up at M/s. SCCL mines near Kothagudem after acceptance of the results of mine stowing at Bhoopalapally Mines. Recycling system for utilization of ash pond water is also provided at KTPS complex and the water is being utilized for ashing and green belt development in the plant. However, ash pond water being discharged in the nearby agriculture fields after decantation of ash water as per the request of the farmers only as a special case particularly during drought period. TSS of the decanted ash water is well within the statutory limits.

5. On the observation that frequency of AAQ monitoring & parameters have not been conformed with CPCB guidelines, it was submitted that frequency and monitoring of parameters of Ambient Air Quality will be followed as per CPCB guidelines. Procurement of two more CAAQ monitoring stations is also under process and Purchase order is placed on M/s. Environment SA India Pvt Limited, Navi Mumbai and equipment are expected at site by end of March, 2015. As soon as the equipment is received at site, they will be installed and connected to PCB web site. Regarding uploading of six monthly monitoring reports along with monitored data on the website of the company, the same will be complied. Regarding not obtaining PLI, it was submitted that the same has been obtained on 21.02.2015.

6. Originally, the requirement of coal for the project is envisaged from Suliary Belwar Coal Block, Madhya Pradesh being developed by State Mineral Development Corporation and the EIA/EMP was prepared accordingly. However, the said coal block was inter-alia cancelled by the Hon'ble Supreme Court. Hence, it is proposed to meet the coal requirement of 3.95 MTPA /12,023 TPD (based on GCV of 3700 kcal/kg) from SCCL. The analysis of fuel shows that ash content is 38% and sulphur content is 0.62%. MoU has been entered with M/s SCCL, a Govt. of Telangana State undertaking for supply of 4.0 MTPA coal to the proposed Unit. The quality of coal offered by SCCL is similar to the quality of coal originally proposed from Suliary Belwar Coal block. Coal transportation will be done by wagons, necessary line side equipment and signaling arrangement for rake movement will be provided.

7. Water requirement is calculated as 2.5 m<sup>3</sup>/h/MW, which is less than CEA norm 3.0 m<sup>3</sup>/h/MW. Permission for drawl of water was obtained from Irrigation & CADD Department, Govt. of Telangana to draw 25 cusecs of water throughout the year (0.8 TMC) through existing pipeline laid from Godavari River near Burgampahad, Bhadrachalam Mandal, Khammam District. Annual quantity of water available in the River is more than 2000 TMC out of which

only 0.62 TMC is required for the project. The optimum COC of cooling tower water is considered as 5.0 after evaluating several factors and experience gained in the existing stations.

8. For rain water harvesting, roof water collection tanks will be provided in the Plant & Colony areas to recharge the ground water. Rain water harvesting pits will be provided along the storm water drainage network at definite pitch. Storm water drainage system consists of well-designed network of open surface drains with bottom stone pitched for better infiltration / recharge of rainwater into ground will be provided. Rainwater harvesting pits will be provided along the drains at equal intervals so that all the storm water is efficiently drained off without any water logging. The wastewater generated 444 m<sup>3</sup>/h will be treated in ETP and reused for dust suppression, bottom ash slurry of stage VII, greenbelt, etc. and maintains zero discharge concept.

9. For meteorological and AAQ data, baseline data collection has been carried out during the Post monsoon season (Sep. to Nov. 2012). *The committee noted that AAQ data submitted for December, 2014 is exceeding the limits. Hence, recommended that the annual average data and January-February, 2015 data shall be submitted.* 100 % dry fly ash collection facilities are proposed for the expansion unit. Action plan has been drawn for 100% fly ash utilization as per the fly ash Notification. M/s. My Home Cements have given consent for lifting of 40,000 to 50,000 MT of fly ash per annum from the proposed Plant.

10. Hydro-geological study of the area has been conducted through M/s. National Institute of Hydrology (NIH) to assess the impact on ground and surface water regimes. Kinnerasani reservoir is the major surface water body in 10 km radius (8 km NW). Karaka vagu and Kodipunjula vagu passes within 10 km radius in dry condition except for seasonal flows during monsoon season. Vertical Electrical Soundings were carried at 18 locations. As per the VES the first layer thickness is up to 12.5 m and the second layer thickness is up to 57.5 m. Major soil types found are clay and silty clay in proposed ash pond area. The assessment of groundwater quality in and around the plant area indicates there is no impact of colony sewage on groundwater. Water samples were analysed for heavy metals (As, Cd, Cu, Pb, Hg and Zn) and compared with BIS 2012 standards and found within limits except Hg. Based on hydrogeology, soil properties, existing groundwater levels, contaminant plume direction (leaching from ash pond) has been demarcated using MODFLOW software. The leaching direction is mainly into the Kinnerasani River and leaching analysis indicates that there is less scope for leaching contaminant from ash pond to groundwater as long term process. There is no diversion of any nallah/drain in the proposed project area & ash pond area. The proposed plant is more than 500 m away (1.0 km) from the HFL of the nearest stream, Karakavagu.

11. Detailed socio economic survey to assess the impact on livelihood of local communities was carried out through an expert agency, M/s. Centre for Management & Social Research (CMSR), Hyderabad. The household survey was conducted by a structured questionnaire that covered the household level socio-economic profile, livelihood dynamics and educational and health status. The sample consists of 270 households spread across the habitations of: Kotha Suraram, Patha Suraram, Pandurangapuram, Somulagudem, Seethanagar Colony, Basavataraka Colony, Bikku Thanda, Pullaiahgudem, Punukulu, Kodipunjulavagu, Pusala Thanda, Devija Thanda, Nagaram, Yanambailu, Vengalaraonagar Colony, Prasanthinagar, Bollerugudem, Gattaiahgudem, Karaku vagu. Around 36.67% depend on the farm wage labour, followed by cultivation (28.52%) and non-farm wage labour (22.96%). A majority of those who reported non farm activities work at KTPS, Sponge Iron Plant NMDC, Nava Bharat Ferro Alloys and many other ancillary units.

12. The total capital cost and recurring cost of the various CSR activities are mentioned as Rs. 21.16 Crores (0.4% of the proposed project cost of Rs. 5257.12 Crores) and Rs. 4.23 Crores (0.08% of the project cost) respectively. M/s CMSR suggested various CSR activities along with financial provisions and implementation schedule. The activities are Drinking Water, Sanitation, Education, Health care, Infrastructure Development, Livelihood Enhancement & Youth Empowerment, Environment/Greenbelt Development, Assistance to vulnerable groups, Rehabilitation of Physically Challenged Land losers. Under CSR budget, a provision is made for training of local people to upgrade their skills for getting employment in the project and other companies. The budget allotted for Livelihood Enhancement & Youth Empowerment is around Rs. 19.04 lakhs/annum. Similarly, tribal issues have been studied and necessary provisions are made in the action plan to upgrade the skill and improve socio economic conditions and the budget allotted for assistance to vulnerable groups is Rs.34 Lakhs/annum.

13. A disaster management plan along with risk assessment study including fire and chemical hazards due to storage, handling and usage was carried out. Fire detectors and toxic gas detectors will be put in appropriate place for early warning at all potential locations where accidents can occur, with the provision for alarms. Plantation of native species of 2 to 3 years aged plants will be taken up in 50 to 100 m wide in 3 tiers around plant boundary and tree density will be maintained around 2000 to 2500 plants/ha.

14. It is proposed to tap the solar power by Installation of P.V Solar Plant (with seasonal tilt mechanism) on roof tops of Administrative and Power house buildings at an estimated cost of Rs. 3.2 Crores to generate 400 kW power for plant internal loads. Tenders are invited for establishing 5 MW solar power plant in the vacant lands of KTPS complex. TSGENCO is the pioneer in the establishing of solar plant by putting 1 MW plant at Jurala (Mahaboobnagar Dist.) and is operating with 20% PLF.

15. Public hearing/public consultation was conducted by the State Pollution Control Board on 25.07.2014. It was noted that the issues raised in the public hearing include regularization of the services of outsourcing employees, employment to locals, compensation to land losers, uninterrupted power supply in the Paloncha Town, CSR activities, taking back of 409 Nos. of ST casual laborers (EPF issue), justice for the tribal people in terms of jobs, welfare etc. The Committee discussed the issues raised in Public Hearing, the responses made by Project Proponent including the action plan for compliance.

16. *After detailed deliberations, the Committee sought the following information and **deferred** the proposal*

- (i) Action plan along with MoUs etc. for fly ash utilization.*
- (ii) Commitment for no additional land for ash dyke. Fly ash utilization shall be enhanced and the existing ash dykes shall be utilized for disposal of the unutilized ash.*
- (iii) Action plan for rehabilitation of the existing ash dykes.*
- (iv) Drainage pattern of the area*
- (v) Commitment for STP with timeline*
- (vi) Details of existing effluent treatment*
- (vii) AAQ data, annual average and January-February, 2015 data along with calibration certificate.*
- (viii) Commitment for phasing out all the old units of 60 and 120 MW by 2018-19.*

**2.7 4x660 (2640) MW Coal Based Thermal Power Plant near village Komarada, in Vizianagaram District., in Andhra Pradesh by M/s Alfa Infraprop Pvt. Ltd. - Review of EC as per Hon'ble NGT directions.**

1. The proposal was earlier discussed in the 16<sup>th</sup> and 24<sup>th</sup> Meetings of the EAC (Thermal) held during **July 1-2, 2014 and 30<sup>th</sup> -31<sup>st</sup> October, 2014 respectively**, the minutes of which are as under:

**Quote** “1. The above proposal was accorded EC by MoEF on 15.03.2010. Subsequently, the EC was challenged in the Hon’ble National Green Tribunal (NGT) in Appeal No. 9/2011 (NEAA Appeal No. 10/2010). Hon’ble NGT vide its Judgment dated 13.12.2013 has kept the EC under suspension for a period of six months with the directions to carry out the re-exercise of ‘appraisal’ within the said period, by calling for response from the Project Proponent in respect of all concerns and objections even if they are minor in nature and consider the objections and concerns along with the response given by the Project Proponent at the time of meeting to be convened and conducted for the said purpose, after giving an opportunity to the Project Proponent to be present at the time of that meeting. The EAC is directed to consider each and every issue separately and independently and record the reasons either for rejecting or accepting the concerns and objections and also the response by the Project Proponent thereon enabling thereby to understand both the Project Proponent and Objectors, ensuring transparency in the process of recommending either for acceptance or for rejection of the EC by the regulatory authority, namely the MoEF.

2. The EAC was directed to discuss the following items in detail, even if these have already been taken into consideration and add specific mandatory conditions as appropriate,

- (i) *Impact of the project on drainage and surface hydrology during the normal and monsoon conditions. The specific engineering interventions required to be made to preserve the hydrological integrity of the area should be clearly delineated as a mandatory condition.*
- (ii) *The EAC is directed to call for an action plan for maintaining the drainage system from the Project Proponent, scrutinize the same from both engineering and environmental angles and stipulate mandatory conditions, if so required, in the list of conditions.*
- (iii) Prior to the issuance of the consent to operate, the Andhra Pradesh Pollution Control Board is specifically directed to satisfy itself in terms of design, projected efficiency levels of various treatment units and the quality characteristics with regard to the discharge of treated wastewater into river Janjavathi.
- (iv) *The EAC is directed to review its appraisal process with regard to issues raised in the public hearing and give attention to points missed by it, if any, during the earlier process of appraisal and stipulate additional conditions, if so warranted.*
- (v) *The EAC is directed to discuss the ecological aspects of the flood plain of the riverine systems in the vicinity of the proposed project and impose conditions, if required, to be followed by the Project Proponent.*

3. The project proponent has submitted the reply on 13.06.2014. Accordingly, the matter was placed before the EAC in the present meeting, wherein the PP and their environmental consultant & hydro geology consultant i.e. M/s Vimta Labs, Hyderabad & Hydro-Geo Survey Consultants Pvt. Ltd., Jodhpur respectively made a detailed presentation and provided the following information:

4. The Plant falls in the catchment area of two Rivers, Jhanjavati and Nagawali. Both the Rivers are perennial and meet at a distance of 1.5 km in South East of the Plant. The micro-watershed map of the plant area shows 17 micro- water sheds having limited surface runoff to very small catchments, mostly collected in 17 existing village tanks. Vanakabadi Gedda, a tributary of River Jhanjavati is passing through the south-western part of the plant and a dam is being constructed at 1.5 km upstream of the proposed power plant.

5. With the construction of the plant, out of 17 existing village tanks, the area of 11 tanks will be used for the plant, ash pond and water reservoir. Six village tanks located in open area in south-eastern part of the plant will not be disturbed and receive water from their micro watersheds and also diverted harvested rain water. The surface water regime of the plant will not be affected as Vanakabadi Gedda will continue to flow through a diversion drain getting overflow of the dam and meeting river Jhanjavati. A part of the roof top rain water from the plant buildings (2,59,200 m<sup>3</sup>) will join the drain and another part (3,10,489 m<sup>3</sup>) will meet Komarada village tank just outside the plant in its north-eastern direction which can be pumped for irrigation.

6. The State Govt. is constructing Vanakabadi Gedda water reservoir, at 1.5 km upstream of the plant in the north western direction. After construction, its length, height and storage capacity will be 630 m, 13 m and 1.99 TMC respectively. Its catchment area of 17.35 sq.km lies on the north western side of the dam. After revision of its command area by the A.P Water Resources Department, it will irrigate the north eastern part and western part outside the plant area without any reduction of its original command area. After the construction of water reservoir, which is being constructed on Vanakabadi Gedda, its downstream flow will be stopped. In case of overflow, the water will take its original course which passes through the plant area along its western boundary. It is proposed that the Gedda will be diverted along the western boundary of the plant and will join River Jhanjavati. The drain will be 2470 m in length, 2.07 in depth, 26 m width and flow capacity of 242 cumecs. Hence the catchment area, its storage capacity and its finally joining River Jhanjavati will not be affected by the plant.

7. It will be ensured that the units proposed for the treatment of effluent will be verified by APPCB before issuing consent to operate. The detailed design will be prepared and implemented at the time of detailed engineering. The wastewater will be treated and discharged into downstream of confluence point of River Jhanjavati and Nagawali after the water quality matches the APPCB/CPCB standards. Continuous monitoring of effluent discharge will be undertaken and it will be ensured that when discharge enters the natural drain the ambient temperature will be maintained.

8. An action plan along with budget for all the issues (person wise) raised in the Public Hearing was presented.

9. There are no National Parks, Wildlife Sanctuaries, Biosphere Reserves, Migratory Corridors and Schedule-I species in the study area. The core zone/project area does not involve any forest land, has undulating terrain with sporadic vegetation devoid of trees and does not harbor any endangered or endemic flora & fauna. The buffer zone has 21 RFs & 2 PFs, one Major River & its tributaries, seasonal ponds, one reservoir and does not cross any habitat of conservation importance or migratory corridors of any species and has no presence of Schedule-I species. The major area of the buffer zone was under agriculture & scrubland.

10. The anticipated impacts on the floodplain areas and the riparian ecosystems are considered low as there are no sensitive ecosystems or species in this area. It is anticipated that the project activities will have negligible impacts on the geographical range of species, introduction of weeds, ecosystem resilience, habitat fragmentation and degradation. The usage of water by the project shall not impact the irrigation of the agricultural land in the downstream of the project as the irrigation is through canal system & bore wells while the drawl and discharge of water is at the confluence point of Nagawali and Jhanjavathi Rivers.

11. *The Committee discussed with the project proponents and their experts who responded to the issues raised by Hon'ble NGT in greater depth and found that more detailed information on the hydrology and riparian ecosystems, conservation of waterbodies, waste water treatment scheme and action plan for addressing public hearing issues is required before taking final decision on the EC issued. Consequently, the Committee desires the following information for its further consideration:*

- (i) Clarification on waterbodies whether the waterbodies in the project area are water tanks or ponds and their utility for local community.*
- (ii) Size and depth of waterbodies and the water levels in dry and monsoon seasons and their impacts on the ground water levels in the bore wells of surrounding villages, particularly within the radius of 10 km.*
- (iii) Details of the Vanakbadi Gedda stream with respect to: (a) its catchment in the upstream of the existing dam, (b) pondage area of the reservoir, (c) dry and monsoon seasonal flows in the downstream, (d) the extent of flood plains of the stream within the stretch of the project area, (e) the riparian ecosystems within the stretch of the project area, and (f) flood zoning of the stream.*
- (iv) Details of the flood plains of both the Rivers (Jhanjavati and Nagawali) and the riparian ecosystems that exist in the stretches outside the boundary of the project area and the ecological services provided to the local communities including recharging of the ground water to maintain the level in bore wells, number of bore wells and renney wells located in the flood plains of both the rivers.*
- (v) Details of the extent of flood plains of the rivers and streams, included in the project and the land use of it in the project and the mitigation measures proposed to prevent flood waters entering into the project area and its impact on the floods in the downstream of the River due to narrowing of floodway.*
- (vi) Details of dams/barrages/weirs on the two Rivers, if they are located within 10 km radius of the project area and the volume of the water available in dry and monsoon season, and the impacts of withdrawal of water from the Rivers on the availability of water for irrigation and to maintain the downstream ecology.*
- (vii) The existing 17 ponds within the project site shall not be disturbed and the plant layout shall be revised so as to avoid the diversion of Vanakabadi Gedda stream.*
- (viii) Scientific explanation for rise in temperature due to the proposed plant and acid rains.*
- (ix) Consolidated action plan for public hearing issues.*
- (x) Mitigation and management measures for the conservation of flood plain such as greenbelt development (50 m width), embankment of stream, no dumping of solid waste etc.*
- (xi) The wastewater treatment scheme shall be studied in detail and submitted. The concerned senior officials of APPCB are also invited for the EAC meeting when the matter would be considered by the EAC*

2. On submission of information by the PP for the above aspects, the matter was again placed before the EAC in the present meeting for its re-consideration, wherein the PP and their environmental consultant & hydro geology consultant i.e. M/s Vimta Labs, Hyderabad & Hydro-Geo Survey Consultants Pvt. Ltd., Jodhpur respectively made a detailed presentation and inter-alia provided the following information.

3. The breakup of the land use of the project area certified by Tehsildar show that out of the total area of 1675 acres, the minor ponds consist of 52.19 acres. All these natural ponds have limited water storage of which 30 to 40 % is contributed as ground water recharge around each pond and rest gets evaporated/consumed by stray cattle. The water table therefore is very shallow, less than 0.3 m below the ground level in the area around these

natural water bodies. There are no open wells/bore wells for irrigation in the plant area while within the 10 km radius buffer zone, the main source of irrigation is by canals supplying 86.40 MCM of water. The buffer zone covering 316 km<sup>2</sup> has only 180 open wells and 330 bore wells for irrigation yielding 11.23 MCM of ground water against the long term ground water recharge of 50.37 MCM. As there is no irrigation within the plant area and no wells or bore wells, the 17 water bodies located in the plant area do not have any impact on ground water resources of the plant area. *The PP confirmed that the existing ponds will not be disturbed during construction and operation phase of the plant.*

4. The Catchment area of Vanakabadi water reservoir is 15 km<sup>2</sup> up its water reservoir/tank. The Irrigation-Sub Division, Parvathipuram indicated that once the reservoir is fully constructed, the pondage /water spread area will be about 20 ha. The maximum and minimum flow of Vanakabadi Gedda ranges from 136 cumecs during flood period while in summer it is less than 10 cumecs. *The PP confirmed that no activities of the power plant will fall in the flood zone area.*

5. The adjoining areas of Vanakabadi gedda stream within the stretch of the project area have mostly agricultural land which are single crop or uncultivated fields. The riparian ecosystem of the stream comprises of few large trees with mostly shrubs and weeds. The species represented by large trees are Anogeissus accuminata, Mangifera indica, Azadirachta indica, Anacardium occidentale, Tectona grandis and some Sal re-growth. Near the villages, the riparian ecosystem is represented by Ficus bengalensis, Musa sp., Bamboo clumps Terminalia sp. and Tamarindus indica. The herbs and grasses occurring are Echinochloa crusgalli, Dentella repens, Bacopa monnieri, Fimbristylis miliacea, Panicum repens. Some of the weeds noted from the riparian ecosystems of this stream are Ludwigia octovalvis, Portulaca quadrifolia, Basilicum polystachyaon, Lindernia ciliate, Monochoria vaginalis and Marsilea quadrifolia. There are no major fauna observed in this stretch of the stream. Mostly the fauna was represented by three striped palm squirrel and birds such as weaverbird, red vented bulbul, common myna, white breasted kingfisher, pond heron, spotted dove, purple sunbird and leaf warbler.

6. The flood basin is uncultivable land and is a barren land having sparse vegetation. The cultivable area outside the flood basin is either rainfed or irrigated by the canal. The ground water abstraction for irrigation from wells is hardly 20 % of the long term recharge of the buffer zone by rainfall and return flow of irrigation water so no artificial ground water is required otherwise it will create water logging. There are no Ranney wells, open wells and bore wells located in the flood plains of both Rivers. On the contrary, during summer when water level in river goes down, there is base flow of ground water in the River as water table on the banks of River is at higher elevation than the River bed.

7. Flood hazard zonation mapping done for Jhanjavati River shows that during maximum reported flood of 6,000 cumecs, the High Flood Level (HFL) will be 14 m below the elevation of the southern boundary of the plant and 700 m away. Similarly, in case of Nagavali River, at maximum flow of 90,000 cumecs, the HFL will be 22 m below the eastern boundary of the plant. So, there will not be any adverse impact of the floods on the plant and therefore no mitigations measures are warranted.

8. The PP has been permitted to draw 8,000 m<sup>3</sup>/h from the Thotapali barrage during the flood period. So, any drawl of water from Nagavali River is surplus water and it is not going to affect the availability of water for irrigation in its command area. A stream gauging station maintained by CWC at the downstream side near Srikakulam shows that annual 4665 MCM

(2006-07) of water was lost to the sea and normally it ranges from 2000 to 4000 MCM every year.

9. The PP commits that the existing 17 water bodies/ ponds will not be disturbed. Further, the Vanakabadi Gedda stream will not be diverted. Efforts will be made to see that water does not enter the plant by providing the necessary stony revetments in addition to providing safe zone of 60 m and plantation of 50 m on either side.

10. Temperature has been monitored for one day (17<sup>th</sup> July, 2014) at one of the mega power plant. Graphical representation of temperature variation within the plant and at about 3.5 km away from the power plant shows that the ambient temperature outside (3.5 km) the power plant was lesser than the temperature inside the power plant. It shows the typical output from CFD model showing good stack operation without downwash. It also shows how quickly the plume will cool after exiting from the stack. It can be observed that the temperature of the plume is reducing as the plume gets dispersed and the process is taking place at a height of about 275 m. Hence, no significant increase in the ambient temperature in nearby area of the project due to power plant is anticipated. Moreover, the PP will adopt latest technology i.e. super critical technology and tree plantation will be taken up in an area of about 438 acres which will help to mitigate the possible temperature rise in and around the project area

11. In India, according to Environmental Meteorology Unit, India Meteorological Department (IMD), the chances of acid rain occurring in India are unlikely. This is because of tropical climatic conditions and predominantly alkaline-rich soils of the country have a neutralizing effect on the pollutants. As dust particles in the country are alkaline in nature, acid rain causing gases such as SO<sub>2</sub> and NO<sub>x</sub> get neutralized. The proposed power plant is based on super critical technology and will utilize imported coal of sulphur content of 0.8%. Stack of 275 m height will be provided to disperse the gaseous emissions. Space provision will be kept in the layout for providing FGD system, if required at a later stage. Hence, the chances of acid rain due to the proposed power plant is unlikely.

12. The budgetary action plan on the public hearing issues i.e. Land and Rehabilitation & Resettlement, employment, source of water, water pollution, Air and Noise Pollution Control, Solid waste management, socio economic development, rise in ambient temperature and acid rain was presented and discussed.

13. Regarding Floodplain Restoration and Management, Vanakabadi Gedda stream in the project area will not be diverted but shall be deepened to accommodate floodwater during monsoon. An embankment shall be constructed for the Jhanjavathi River adjoining the southern boundary of the project to protect against denudation during high water with high Velocity. Check dams shall be constructed on Vankabadi stream for ground water recharge and usage of water during the lean period. Fencing/ boundary wall shall be constructed around the project area adjoining the stream and the River and storm water drains shall be constructed in the project area.

14. Regarding Greenbelt Development, Greenbelt will be developed along the boundary of the project at least 50 m wide. Native and local species will be used for plantation activity. Species will be given preference that are flood and drought resistant. Plantation will be carried out in five rows along with inter-spaces to be planted with bushes and shrubs.

15. Regarding Conservation of Water and Water Bodies, it will be ensured that the existing ponds in the project area will not be disturbed for construction or civil works and will also be maintained during operational phase. Only stilts will be erected in the ponds, if required,

during the construction phase. Surface drainage will not be disturbed and no wastewater will be discharged in the water bodies to avoid eutrophication. Proper channels will be excavated to maintain the ponds and its overflow to the down-stream areas. Implementation of water conservation measures and reuse and recycle of water (STP water to be used for green belt) will be ensured.

16. Regarding Solid Waste Management, no solid waste will be dumped in the floodplain areas and no dumping or discharge of waste in water bodies will be done. Inorganic and hazardous waste will be collected from all the facilities and dispatched to authorized dealers for further processing. Regarding Flood Safety, Preparedness and Emergency Response, Demarcation and sign posts for flood level warning notice, elevated road construction for efficient maneuvering during flood emergency, emergency response team with on-site and off-site response plan, flood emergency kits (first aid kit, preserved food, life boats, protective clothing and firefighting kit) will be provided.

17. About 324 m<sup>3</sup>/h of wastewater will be treated and discharged into downstream of confluence point of River Janjavathi and River Nagavali after the water quality matches the APCCB/CPCB discharge standards. Continuous monitoring of effluent discharge will be undertaken and it will be ensured that when discharge enters the natural drain the ambient temperature will be maintained.

18. After evaluation of the documents submitted, the detailed presentations made on the investigations undertaken on the hydrological ecosystems by experts and discussion with them and the project proponents, the committee submits the following:

- (i) The surface drainage patterns within the core area is, to a large extent, unaltered as the 17 ponds located within the core area will be preserved and channelize the surface runoff into the ponds. Further, the connectivity between ponds and between ponds and Rivers should not be disrupted. Additional EC conditions will be stipulated to this effect.
- (ii) There is a discrepancy in the area covered by ponds and the EAC requested the PP to clarify on discrepancy.
- (iii) Detailed investigations on hydrological regimes and flood ways of River systems and their catchments have been studied. The activities of the TPP will not alter the hydrological regimes of the Rivers nor the flood plain ecosystems are impacted. In fact a thick 50 m wide green belt is stipulated all along the periphery to serve as buffer for the vegetation on the embankments and flood plain natural and agricultural ecosystems. The Vanakabadi will not be diverted, a condition to this effect will be stipulated in EC.
- (iv) Flood zoning studies suggested that the area of TPP is above HFL of streams and no flood plain is encroached. This is evident by the fact that HFL of Janjavathi River is 14 m below the southern boundary of the plant area which is 200 m away from the River and that of HFL of Nagavali River is 22 m below the eastern boundary of the plant area.
- (v) The source of water for the plant is the surplus flood (monsoon) water (8,000 m<sup>3</sup>/h) from Thotapalli barrage on Nagavali River. At present, about 2000 to 4000 MCM of water every year is discharged into sea which is about 175 km from the reservoir. The high flows are needed to maintain the downstream ecology of the River, but the project proponent should ensure high flows during monsoon season in the downstream for maintaining the downstream ecology. This is possible because excess of water above 8,000 m<sup>3</sup>/h is available during monsoon.
- (vi) No ground water is extracted and hence no impact on the ground water. In fact there is a base flow of ground water into the River as the water tank on the banks of River is at higher elevation than the Riverbed.

- (vii) About 324 m<sup>3</sup>/h wastewater, after passing through the guard pond and treatment to the level comparable to that of the quality of discharge wastewater as per the APPCB/CPCB discharge standards, will be discharged into the confluence point of Janjavathi River with Nagavali River. A condition to this effect will be stipulated in EC.
- (viii) As for the rise in temperature, it is expected that heat load in the plant area will be higher as compared to the control areas and this can be mitigated by thick green belt around the plant area. The rise in temperature outside the plant area is not expected, as the data collected show that plume exiting from the 275 m high stack gets cooled as it diffuses and the ambient temperature of the area at 3-5 km distance from one existing power-plant is less than that of the plant area.
- (ix) Acid rain due to TPPs in India has not been reported, as evident from the fact that acidic sulphate soils have not been reported, nor acidic water in surface waterbodies although there is a slight decrease in pH in some forest soils which might be due to many factors.
- (x) The PI with the help of an ecologist undertook detailed investigations on riparian ecosystems. There will be no measurable impacts in the riparian ecosystems in the area because : (i) no withdrawal of water from the streams, rivers but from a barrage located in the downstream of the plant area, (ii) there are no endemics, rare and endangered aquatic biota, (iii) invasive weeds exist due to anthropogenic disturbance, (iii) only surplus monsoon water from the barrage is used for the plant, (iv) no discharge of untreated waste water into river system, (v) a thick green belt will be created around the plant to prevent any impacts due to fugitive emissions. Consequently, the activities of the plant may not have adverse impacts on the riparian ecosystems.
- (xi) The APPCB should ensure that the quality characteristics of discharge should match with standards and continuous monitoring at the discharge point should be carried out.
- (xii) Regarding public hearing issues, some additional information is sought by EAC.

The committee would deliberate further after receiving the information on the following:

- (i) *Clarification on the discrepancy in pond area*
- (ii) *Land use of the flood zone area of the Vanakabadi gedda stream within the project area*
- (iii) *Justification for the rise in temperature and commitment on generating temperature profile after the commencement of the plant and advised to raise thick greenbelt to moderate the temperature.*
- (iv) *Detailed Action Plan to Public Hearing issues person wise instead of issue wise*
- (v) *Period of the water withdrawal from the River.*
- (vi) *Reply to the issues raised in the latest representation of NGO, Samata.” **Unquote.***

19. On submission of information by the PP for the above aspects, the matter was again placed before the EAC in the present meeting for its re-consideration, wherein the PP and their environmental consultant & hydro geology consultant i.e. M/s Vimta Labs, Hyderabad & Hydro-Geo Survey Consultants Pvt. Ltd., Jodhpur respectively made a detailed presentation and inter-alia provided the following information.

20. Regarding clarification on the discrepancy in pond area, it was submitted that, the pond area has been calculated after measuring the area of the each pond as shown in the topo sheets of survey of India. This has been confirmed by the satellite imagery of the area which is latest for the year 2013. The project site has also been physically visited and field verification

had been carried out by the team of hydro-geological experts from M/s Vimta Labs Limited and their empanelled experts M/s. Hydro-Geo Survey Consultants Pvt Limited, Jodhpur who are accredited by NABET/QCI. It has been reported by the Tehsildar, Komarada that the total area of the tank bed of 17 ponds within the plant area is 52.21 acres or 21.13 ha against the area estimated by HHCPL as 18.25 ha. The difference in the area i.e. 2.88 ha could be attributed to the geo-morphological changes, which might have occurred over a period of time.

21. Regarding land use of the flood zone area of the Vanakabadi gedda stream within the project area, it was submitted that, the area of the Vanakabadi gedda stream in the stretch of the project which can be considered under the flood zone is approximately 22,000 sq.m. This has been calculated based on the land use data obtained from the district revenue authorities. The area which can be classified as riparian ecosystem of the gedda is not more than 2000 sqm and the remaining area is mostly agricultural land which are mostly single crop or uncultivated land. The riparian ecosystem of the stream comprises of few large trees with mostly shrubs and weeds.

22. Regarding mitigation measures for the likely temperature rise, it was submitted that, as a mitigation measure, thick tree plantation is proposed within the project premises. This will act as buffer zone and prevent the heat spreading outside the premises and will control rise in the temperature within the area. Three tier green belt with rich to a great extent canopy as per CPCB guidelines will be maintained. Native species with rich canopy will be planted in consultation with the local forest authorities. Further, maintenance of heat radiating equipment will be done regularly. The steam leakages will be controlled by constant monitoring. Temperature profile will also be generated after the commencement of the plant to observe the rise in temperature.

23. Regarding Public Hearing issues, the Committee deliberated at length on each of the issue, the response of the PP at the time of PH, the Action Plan/further response with budetary provisions.

24. Regarding period of water withdrawal from the River, Irrigation and CAD Department vide G.O MS No. 86 dated 17.11.2012 has allocated 1.25 TMC of surplus water from the run of the River during flood season from the upstream of Thotapally barrage when the reservoir level is above FRL. The permission has been accorded for a period of 25 years or useful plant life whichever is earlier. The water shall be collected during the flood season and stored in the adequate capacity at the project site and same shall be used for plant operation during the remaining period of the year.

25. Regarding preservation of water bodies, the ponds which are present within the proposed project site shall not be disturbed with an aim to maintain surface hydrology, surface flow and the natural aquatic habitat. Perennial ponds will be maintained and small ephemeral ponds will be filled. Only stilts will be erected in the ponds, if required during the construction phase. Surface drainage will not be disturbed and wastewater will not be discharged in the water bodies to avoid eutrophication. Proper channels will be excavated to maintain the ponds and its overflow to the downstream areas. Implementation of water conservation measures and re-use and recycle of water will be ensured.

26. The Committee discussed each of the issues raised by NGO, Samata in their earlier letter and in the letter dated 22.02.2015. The reply of PP to each of the issue was also deliberated upon.

27. The PP submitted that the validity of EC will expire on 15.03.2015. The project could not be implemented because of the litigation filed by NGO and the case has continued for a long time. Hence, extension of validity of EC was requested. The updated Form-I, in this regard was submitted.

28. Based on the information and clarifications provided by the Project Proponent and detailed discussions held on all the issues, the Committee recommended the project for **re-instating and extending the validity of the environmental clearance** subject to stipulation of the following conditions in addition to those stipulated in the EC.

- i) The 17 ponds located within the core area shall be preserved and the surface runoff shall be channelized into the ponds. Further, the connectivity between ponds and between ponds and Rivers should not be disrupted.*
- ii) The activities of the TPP shall not alter the hydrological regimes of the Rivers nor the flood plain ecosystems. A thick 50 m wide green belt shall be developed all along the periphery to serve as buffer for the vegetation on the embankments and flood plain natural and agricultural ecosystems.*
- iii) The Vanakabadi gedda stream shall not be diverted and no flood plain shall be encroached.*
- (iv) Shall ensure high flows during monsoon season in the downstream for maintaining the downstream ecology. No ground water shall be extracted.*
- (v) The wastewater shall pass through the guard pond and treated to the level comparable to that of the quality of discharge wastewater as per the APPCB/CPCB discharge standards, and discharged into the confluence point of Janjavathi River with Nagavali River.*
- (vi) The APPCB should ensure that the quality characteristics of discharge should match with standards and continuous monitoring at the discharge point should be carried out.*
- (vii) An Environmental Cell comprising of at least one expert each in environmental science/engineering, ecology, occupational health and social science, shall be created preferably at the project site itself and shall be headed by an officer of appropriate superiority and qualification. It shall be ensured that the Head of the Cell shall directly report to the Head of the Unit who would be accountable for implementation of environmental regulations and social impact improvement/mitigation measures. The environmental cell shall also work in close coordination with the local community, SPCB, CPCB and MoEF&CC.*

#### **2.7A 2x660 MW Khargone Super Critical Thermal Power Project at Village Selda and Dalchi, Khargone District, Madhya Pradesh by M/s. NTPC Ltd. - reg. EC**

1. The project proponent along with their environmental consultant, M/s Vimta Labs, Hyderabad made a presentation and inter-alia provided the following information. ToR for carrying out EIA study for Khargone STPP was accorded by MoEF&CC on 09.12.2010, which was valid till 08.12.2013. Public Hearing was conducted by the MPPCB on 24.01.2012 and the minutes of PH were forwarded to MoEF&CC on 14.03.2012. However, the final EIA report could not be submitted to MoEF due to non-availability of firm coal linkage. The proposal was re-appraised by the EAC and fresh ToR for EIA/EMP were accorded by the Ministry on 25.07.2014 with exemption of Public Hearing. In accordance with the TOR and based on one season (October-December, 2014) baseline data, a EIA report has been prepared and submitted to the Ministry.

2. The land requirement is about 1370 acres for the Power Plant & its associated facilities of which about 1081.58 acres is already in possession of NTPC. The Latitude and Longitude of the Main Plant, Ash dyke and Township are: 22°03'11" N-22°04'13" N, 22°03'11" N-22° 04'13"

N, 22°04'18" N -22° 04'44" N and 75°50'49" E-75°52'26" E, 75°49'52" E-75°50'58" E, 75° 51'25" E-75°52'00" E. There are no National Parks, Wildlife Sanctuaries, Biosphere/Elephant/Tiger Reserves, Heritage sites within 10 km of the project site. There are no major settlements within 5 km from the proposed site and no major industries within 10 km. Nearest railway station is Sanawad on Indore-Khandwa meter gauge about 30 km and Indore- Khandwa SH-27 is about 30 km from the site. The project cost is about Rs. 9,181 Crores and the cost towards environmental protection is about Rs. 1,421.2 Crores. The R&R Package formulated after discussions in the VDAC meetings was deliberated and finalized after few modifications in the meeting of the Committee of Secretaries, Govt. of M.P. Land rate and R&R benefits package was approved by Cabinet, GoMP on 12.09.2012 in consultation with stakeholders. There are no tribal population among the affected families.

3. The coal requirement is about 6.51 MTPA based on average gross calorific value of 3,500 kcal/kg and will be met from Pakribarwadih captive coal block allotted to NTPC on 11.10.2004. EC and FC for the coal block were accorded by the Ministry on 19.05.2009 and 17.09.2010 respectively. The Sulphur content and ash content in the coal are 0.4% - 0.5% and 40 - 43% respectively. The coal transportation shall be by Rail. One Twin flue stack of 275 m height will be installed.

4. AAQ data has been monitored for one additional season i.e., October to December, 2014. The monitoring locations have been selected as per the ToR. The values of PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO, Ozone and Hg were observed to be in the range of 16.2 – 31.5 µg/m<sup>3</sup>, 27.0 – 56.7 µg/m<sup>3</sup>, 8.8 – 14.2 µg/m<sup>3</sup>, 9.9 – 15.9 µg/m<sup>3</sup>, 201 – 263 µg/m<sup>3</sup>, 4.7 – 8.2 µg/m<sup>3</sup> and < 0.001 µg/m<sup>3</sup> respectively. AAQ modelling has been carried out for assessing incremental Ground Level Concentration (GLC) which were found to be 0.99 µg/m<sup>3</sup>, 29.8 µg/m<sup>3</sup> and 13.2 µg/m<sup>3</sup> for PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>x</sub> respectively. The resultant concentrations of PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>x</sub> are 57.69 µg/m<sup>3</sup>, 44.0 µg/m<sup>3</sup> and 29.1 µg/m<sup>3</sup> respectively which are well within the NAAQS.

5. The water requirement of 4815 cum/h (47.2 Cusecs) will be sourced from Omkareshwar dam on Narmada River. Govt. of Madhya Pradesh vide letter dated 02.02.10 had accorded commitment for 55 Cusecs of water from Narmada River for the project. CWC had also accorded concurrence for the withdrawal vide letter dated 27.07.2012. The plant would be designed on zero discharge concept in normal circumstances. Water requirement for the Project shall be optimized with designed COC of 5 for conservation of water. Area Drainage study has been conducted through National Institute of Hydrology (NIH), Roorkee and accordingly, all necessary care will be taken for proper designing of drainage of plant & surrounding area taking into consideration the natural drainage pattern.

6. The fly ash utilization/management shall be done as per MOEF Gazette Notification on utilization of fly ash dated 03.11.2009. It is estimated that about 8000 tonne/d i.e. about 2.60 MTPA of fly ash would be produced in the power generation process. In order to assess ash utilization potential in the vicinity of proposed power plant, a market survey was undertaken by NTPC through M/s Fly Ash and Technology Management Associates (FTMA). The survey covered cement plants located within 100/300/500 km, brick manufacturing plants and major construction activities within the 100 km radius of Kharbone STPP. It is estimated that about 0.5 MTPA, 1.0 MTPA and 1.1 MTPA of fly ash will be utilized in Cement & RMC sector, fly ash bricks and Roads & Highway embankment respectively.

7. A detailed socio-economic study for the affected area has been conducted through Indian Institute of Social Welfare & Business Management (IISWBM), Kolkata. From the analysis of socio-economic profile of the region, it can be concluded that the basic amenities and infrastructural facilities like education, health, electrification, banking and road

networking are only accessible to a few sections and small areas of rural society in the project area. Special emphasis for village developmental work may be given to the villages/hamlets, which are under Selda-Balabad GP as around 81% PAPs are falling under this GP followed by Dalchi GP. The PAVs having more than 50% of the total PAPs concentration are to be taken up on first priority.

8. A comprehensive Community Development Plan has been formulated (including mainly Education, Health, Infrastructural works, Drinking water facility, training for income generating schemes etc. ) in consultation with stakeholders and District administration under approved R&R plan for Khargone project. About Rs.105.72 Crores has been allocated for R&R, Community Development and Initial Community Development programmes.

9. Public hearing/public consultation was conducted by the State Pollution Control Board on 24.01.2012. It was noted that the issues raised in the public hearing include control of air pollution, compensation for land, water for irrigation, employment and training to locals, green belt development, ash management, CSR etc. The Committee discussed the issues raised in Public Hearing and the response of Project Proponent.

10. The Committee noted that there is no significant variation in the baseline data generated in 2011-12 and that of Oct.–Dec., 2014. However, it was suggested that the same may be advertised in two leading newspapers of which one in vernacular language for public information and seek comments, if any. The PP has done so on 26.02.2015 in a Hindi newspaper (Dainik Bhaskar) and English Newspaper (Hindustan Times).

11. Based on the information and clarifications provided by the Project Proponent and detailed discussions held on all the issues, the Committee *recommended the project for environmental clearance* subject to stipulation of the following additional specific conditions:

- i) *Coal transportation shall be by Rail only*
- ii) *The sulphur and ash content of coal shall not exceed 0.5 % and 43 % respectively. In case of variation of quality at any point of time, fresh reference shall be made to the Ministry for suitable amendments to the environmental clearance.*
- iii) Latest authenticated satellite imagery shall be submitted on an annual basis to monitor the alterations of the area.

## **2.7B 1980 (3x660) MW Super Critical Imported Coal Based Ghatampur Thermal Power Station at Tehsil Ghatampur, District Kanpur Nagar, Uttar Pradesh by M/s Neyveli Lignite Corporation Ltd. – Re- Consideration for EC.**

1. The proposal was earlier discussed in the 6<sup>th</sup>, 11<sup>th</sup> and 28<sup>th</sup> meetings of the EAC (Thermal) held during **5-6, December, 2013, 13-14, February 2014 and 23-24 December, 2014** the minutes of which are as under:

**Quote.** “The proposal is for setting up of 1980 MW (3x660 MW) Thermal Power Plant in Ghatampur, Kanpur, Uttar Pradesh by M/s Neyveli Lignite Corporation Ltd. The ToR for preparation of EIA/EMP report was accorded on 28.12.2011. The EIA/EMP report after conducting public hearing was submitted to the Ministry for consideration of environmental clearance. The project proponent along with their environmental consultant, M/s Vimta Labs Ltd., Hyderabad made a presentation and provided the following information:

The total project area is 1886 acres including ash pond area and township. The breakup of land use is 190.19 acres of single crop, and 1694.42 acres as others. Regarding the

status of land acquisition, there was no clarity and commitment provided. As per the TOR issued there were 1032 project affected families. However, there was no mention about the detailed rehabilitation plan. On the contrary, it was informed that the disbursement of compensation for 7 villages is in progress with the approval of the State Govt. and for the 8<sup>th</sup> village it has not been initiated. *In view of this, the committee desire to know the details of the land use pattern, land acquired, to be acquired, compensation to the affected families etc.* The total project cost is Rs. 14375.4 crores.

There are no national parks, wildlife sanctuaries, biosphere/tiger reserves etc. within 10 km of the plant. There are four reserve forests in the study area viz. Mannjhupur R.F at 3.4 km in the west direction, Chandupur East Block R.F. at 4.0 Km in the west direction, Badanpur R.F. at 4.0 Km in the west direction and Chandupur West Block R.F at 6.0 km in the west.

The coal requirement would be 8.511 MTPA. The Ministry of Coal has allocated Pachwara South Coal Block for the project on 25<sup>th</sup> July, 2013. The proposal for environmental clearance of the aforesaid coal block was submitted to MoEF and as informed was considered for ToR for preparation of EIA/EMP in the EAC meeting held on 26.11.2013. The coal block involves about 50% of forest land and the proposal for forest clearance was submitted to the concerned DFO, U.P.

The Total water requirement is estimated to be 6275 m<sup>3</sup>/hr (150.6 MLD), which will be met from River Ganga (seepage water from West Allahabad branch canal near Bidhnu Kasba Village). The permission for water drawl has been obtained from the Govt. of U.P. on 6<sup>th</sup> June, 2012. *The committee noted that the present proposal for water drawl may affect the agriculture and irrigation of farmers. Hence, alternate options for water drawl shall be explored and the details of conservation of seepage water by lining shall also be submitted. A plan for sustainability of ecology also needs to be submitted.*

Public hearing/public consultation was conducted by the Uttar Pradesh Pollution Control Board held on 23.03.2013. It was noted that the issues raised in the public hearing include ash utilization, employment, pollution of River Yamuna, damage to the crops near by and compensation for the land. The Committee discussed the issues raised in Public Hearing and the responses made by Project Proponent.

*The committee noted that Pachwara South Coal Block was allocated for the project only on 25.07.2013, whereas the EIA/EMP report was prepared prior to it. Therefore, a detailed clarification was sought from the PP regarding the basis for the predictions on ambient air quality data etc. submitted in the EIA/EMP report. The characteristics of coal from Pachwara South Coal Block also need to be submitted. The committee also noted that the environmental clearance & Stage-I forest clearance for the coal block will take substantial time and are mandatory as per the policy of MoEF.*

*Further, the committee noted that detailed MOU for ash utilization has not been submitted. As far as, ash pond area is concerned, it was felt that it needs to be optimized. The ash pond shall be lined by HDPE as the project is in the Ganga Basin and the ash dyke embankment shall be stone pitched. The committee noted the PP did not submit any permission letter /assurance from Railways for transportation of coal. As the project involves 1032 affected families, a detailed R&R plan needs to be submitted. With respect to CSR, an action plan with budgetary provisions for (i) Capital cost @ 0.4% of the Project Cost during the construction phase (ii) and thereafter expenditure towards annual Recurring CSR @ 0.08% of the Project Cost indicating the activities needs to be submitted.*

*In view of the above short comings, the proposal was **deferred** for reconsideration at a later stage.*

On submission of information by the PP for the above aspects, the matter was again placed before the EAC for its re-consideration and the following information was provided by the PP and their environmental consultant.

The land use pattern for 1886 acres at the time of land acquisition was submitted. Conversion from the existing land use pattern to Industrial land has been issued by ADM, Kanpur Nagar. The PP has deposited an amount of Rs. 130.32/- Crores as per demand letter received from the Revenue authorities. More than 80% of land owners in the eight villages have given their consent for land acquisition. Land compensation distribution process to the individual owners is going on and the compensation details were submitted. The detailed R&R plan included in the compensation package along with calculation made for the R&R provision was submitted.

Alternate options for drawl of water were explored from River Yamuna and Ganga. After discussing various options available, the State Govt. has awarded the allocation of water from River Ganga. The water will be drawn from the River Ganga by effecting saving of water by strengthening the West Allahabad branch canal system by way of lining to prevent water leakage loses, wastage and also improving the optimization of water to the agriculture by construction of 122 check dams, thus improving the water table to benefit more no. of farmers dependant on agriculture. Apart from this, efforts will also be made to improve the optimal utilization of water by forming water users committees in collaboration with Irrigation Department as part of CSR initiative. The proponent is committed to develop greenbelt (479 acres) as per the norms by conservation and protection of local species as suggested by the committee.

Standard F Grade washed Coal has been considered for the Air Dispersion modeling while preparing the EIA/EMP report. New scenario considering a worst case of sulphur content at 1% and also at 0.7% is carried out. The Pachwara South coal block is in the Gondwana coal formation region. The occurrence of sulphur in this region is only in traces. The report/letter of GSI/CMPDI for the characteristics of coal from this region is submitted. NLC being an experienced Mining Company is confident of exploiting the coal reserves of the Pachwara south coal block to meet the power plant requirement for its commissioning. The required clearances are being vigorously pursued with various agencies.

The total ash generated from the power plant will be 2.89 Million Tonnes out of which 2.31 MTPA will constitute fly ash (80%) and the balance as bottom ash. M/s JK Cements have already given a commitment letter to lift the fly ash generated from the proposed Ghatampur Thermal Power Plant. They have agreed to lift 1.16 MT during the first year, 1.93 MT during the second year and 2.31 MT from the third year onwards. To this effect they have signed a Fly Ash off take agreement with NUPPL. The area provided for ash dyke is 427 acres which is well within the CEA norm of 495 acres for 3 x 660 MW plant. NUPPL is committed to line the ash dyke with an impervious lining to prevent seepage of ash water. As recommended in the Hydrological study done by NUPPL thro' Hydro-Geosurvey Consultants Private Limited, Jodhpur, it is proposed that the ash pond area, after compaction, will be provided with either clay layer of 300 mm thickness of permeability value of  $10^{-7}$  cm/sec to  $10^{-9}$  cm/sec for making it a fool proof impervious barrier or with HDPE lining so that no pollutants from fly ash and bottom ash join the surface or ground water.

Railways informed that no separate Rail Transport Clearance (RTC) is required as per the present Policy guidelines and no special permission/approval required for transportation of coal. Also the Zonal Railway have agreed in principle that Coal from Pachwara can be moved to GTPS. The letters of correspondence to support the same are submitted. CSR plan for construction phase @ 0.4% of project cost i.e Rs 57.50 Crores and during operational stage @ 0.08% of project cost i.e Rs 11.50 Crores per annum of project cost was submitted.

*The committee noted that the CSR details presented are only indicative. A detailed Action Plan needs to be worked out within next three months after taking views of Gram Sabhas and District Authorities. Further, a detailed clarification was sought from the PP regarding the resettlement colony etc. under the R&R plan.*

*The committee further deliberated on the source of water as seepage water from West Allahabad branch canal and recommended to explore the possibility of installation of ACC for conservation of water vis-à-vis the cost for lining of the canal etc. The committee also desired a commitment from the PP that no water shall be drawn from River Yamuna and that the water proposed to be drawn from West Allahabad branch canal throughout the year is sufficient for the project. The water drawl for the project shall not affect the water drawl for irrigation and drinking water.*

*The committee noted that the predicted SO<sub>2</sub> emissions based on baseline AAQ collected is high and shall be touching the AAQ standards. Hence, it was recommended that FGD shall be installed to minimize the sulphur emissions.*

*An original full scale satellite map from NRSA/NRSC showing the land use pattern needs to be submitted by the PP. As suggested by the EAC, the green belt species shall be revised and submitted. The MoU for fly ash utilization shall be revised and submitted. The permission letter of DRM for transportation of coal shall also be submitted.*

In response to the above, the PP provided following information/documents.

The satellite imagery details of the study area and compensation demand letters raised by the Land Acquisition Department inclusive of compensation towards R&R were submitted. As suggested by the EAC, the green belt species that would be planted were revised and submitted.

Regarding permission of Railways for transportation of coal, a letter dated 07.02.2014 from RITES Ltd. was submitted, which inter-alia states that Railway Ministry used to give permission letter/assurance for transportation of coal in the form of rail traffic clearance (RTC). However, as per the revised policy issued by Railway Board on 23.07.2012, Railways have dispensed with system of RTC for power plants. RITES is already preparing a feasibility report for the above power plant which will be submitted to Railways in due course. Considering the various options of the routes for transportation of coal Railways shall be in a position to transport the coal from mints the plant. However, final route for movement of coal shall be decided by the Railways after examination of the feasibility report.

The details of CSR activities proposed and undertaken along with budget were submitted. A MoU was signed with M/s JK Cement Ltd. for utilization of 100% fly ash from the third year of operation of the TPP. The MoU is valid for a period of five years from the date of commencement of lifting of fly ash, which is further extendable.

**The committee also noted that as per the existing policy of MoEF, the environmental clearance & Stage-I forest clearance for the linked coal block is a pre-requisite. Although the EC and Stage-I FC for the Pachwara South coal block allotted for the project are under process, it may take substantial time, therefore the proposal needs to be referred to the Committee once again when the EC and Stage-I FC for the linked Coal block has been obtained.**

*In view of the above, the proposal was **deferred** for reconsideration at a later stage.*

2. The PP has informed the Ministry that Secretary, MoC has requested Secretary, MoEF to consider the proposal of NLC to use the imported coal in Ghatampur TPS of NUPPL till such time the Pachwara South coal block is developed. The PP has signed a MoU with M/s. MSTC to supply the imported coal to the power plant. NUPPL has considered 3,700 GCV coal in EIA/EMP report and proposes to import through MSTC of coal quality equal to or higher than that envisaged in EIA/EMP report. The Railways has replied to PP that they are in a position to supply imported coal to the proposed power project by rail as per the logistic plan of railways. In view of above, the proposal was placed before the EAC, wherein the PP along with their environmental consultant, M/s Vimta Labs Ltd., Hyderabad made a presentation and inter-alia provided the following information.

3. Physical Possession of the entire land of project site has been given on 27.11.2014. MoC has allocated Pachwara South Coal Block on 25.07.2013. The drilling and exploration is being done by CMPDIL through M/s Maheswari Mining Pvt. Ltd., Raniganj since 11.01.2013. The drilling was started in the month of April 2013 and after completion of one bore hole, the rig was damaged & workmen were assaulted & beaten. The drilling was stopped in June, 2013. M/s NUPPL has submitted the application for Forestry Stage-I Clearance on 25.11.2013 but the same was returned mainly due to want of Mining Plan. For preparation of Mining Plan, detailed drilling & exploration and Geological Report are required. M/s Vimta Labs Ltd., Hyderabad has been engaged for carrying out EIA/EMP study. M/s Total Survey Consultancy, Ranchi has been engaged for carrying out DGPS survey works. The MoEF issued ToR on 25.02.2014. The CMPDIL was impressed upon through MoC for expediting detailed exploration of the block on 26.05.2014.

4. The MoC has sanctioned the Advance Action Plan (AAP) of Rs.1945 Lakhs on 02.07.2014. Several meetings of Mining Task Force (19.02.2014, 25.06.2014 and 19.09.2014) were conducted under Chairmanship of Dy. Commissioner, Dumka to address the problems faced in development of coal block in Dumka District and to create conducive environment for starting exploration. The CMPDIL has awarded Extension of Time to M/s Maheswari Mining Private Ltd., (MMPL) from July, 2014 to March, 2015. Again drilling was restarted on 30.07.2014 and after completion three holes, the drill rig was burnt on 05.09.2014 night & damaged by miscreants. The drilling has been stopped since 06.09.2014 and the same has not commenced so far. Unfortunately, none of the above awarded works namely drilling, surveying, EIA/EMP study are progressing due to poor law & order situation in Dumka District where coal block is situated despite NUPPL's efforts with District & State Administration. Efforts are also on to develop the Pachwara South Coal Block in two Phases i.e., Phase-I and Phase-II through Mine Developer and Operator (MDO) route, the NUPPL Board has approved the same in its meeting held on 03.11.2014.

5. Coal from all the ten seam zones are in general non-coking with high moisture (4.60% - 11.8%) mostly high ash (16.60% - 47.20%) medium to high volatile (21.5% - 34.0%). The fixed carbon ranges from 28.2% to 45.9%. The seam zones vary in grade mostly from C to G. The calorific value varies generally from 1834 Kcal/Kg to 5201 Kcal/Kg. Above fuel would be

appropriately blended and an aggregate GCV of 3700 kCal/kg will be obtained. Due to Law & Order problem, the exploration & drilling is being delayed. Further, the land acquisition and R&R activities is also tedious work in tribal dominated area. It is expected that the rated production would commence from 01.06.2024 based on the experience gained in development of neighbouring Central Pachwara Coal Block. Since the power plant will be ready for operation prior to 5 years from the commencement of coal from South Pachwara, there is an imperative need to utilize the imported coal to meet the requirement of GTPS.

6. Imported coal will be utilized for the project till such time the South Pachwara Coal Block attains the rated production. Accordingly, an MOU was signed with MSTC on 21.11.2014. The PP has adequate expertise in procuring the imported Coal. LOA has been given to M/s MSTC for supply of imported coal of GCV 4200 (ADB) for NLC's subsidiary company NTPL situated at Tuticorin, a Joint Venture Company of NLC Ltd., and TANGEDCO as per the requirement. The firm has already started supplying Coal to NTPL. The scope includes arranging vessels, delivery at Indian ports, handling, storage, port clearances, arranging railway rakes, loading, transportation, delivery at the delivery point i.e. coal receiving end of GTPS plant and unloading of coal at the GTPS. All other activities for clearing and forwarding of the consignments like Customs Clearance, coordination with Ports, Railways and any statutory authorities shall also be part of scope of work of the supplier. All liaisons, coordination with coal mine(s) outside India, coordination at Load port, Discharge Port, Railways handling agents etc., shall also be part of scope of work of the supplier. The supplier shall be responsible for quality control.

7. Steam Generator is designed for all the three combinations, i.e. 100% Indigenous Coal with GCV of 4000 kCal/kg, 70% Indigenous Coal with GCV of 4000 kCal/kg blended with 30% Imported Coal with GCV of 5500 kCal/kg – average GCV of 4450 kCal/kg and 100% Imported Coal with GCV of 4450 kCal/kg. The worst case maximum resultant 24 hourly concentrations for PM, SO<sub>2</sub> and NO<sub>x</sub> after implementation of the above project will be well within the CPCB Standards. For indigenous, blended as well as imported coal, the impact of PM<sub>10</sub> would be negligible in core or buffer zone of the Project. The incremental and resultant concentrations of SO<sub>2</sub> and NO<sub>x</sub> will be well within the NAAQ limits (2009 standards).

8. The distance of the project site from Pachwara South Coal Block and Paradip Port (for imported coal) is 970 Km and 1130 Km respectively. Railways have confirmed transportation of imported coal to GTPS site from Paradip Port as per their logistics plan. The budget for CSR activities for Construction Phase and Operation Phase shall be Rs. 57.50 Crores Rs. 11.5 Crores/Annum respectively. An amount of about Rs. 1.61 crores has been committed as on 01.12.2014. Entire fly ash quantity (2.31 MTPA) has been tied up with M/s JK Cements, however only when the ash handling system is not working, the ash dyke will be utilized. NUPPL is committed to line the ash dyke with impervious lining to prevent seepage of ash water. As recommended in the Hydrological study done by NUPPL through Hydro Geo survey consultants Private Limited, Jodhpur, it is proposed that the ash bund area, after compaction, will be provided with either clay layer of 300 mm thickness of permeability value of 10<sup>-7</sup> cm/sec to 10<sup>-9</sup> cm/sec for making it fool proof impervious barrier or with HDPE lining so that no pollutants from fly ash and bottom ash join the surface or ground water.

9. The representative of CEA informed that CEA is in the process of bringing out Guidelines for import of coal. This would be applicable as and when it is framed. The PP confirmed that they will comply with all the Government guidelines regarding import of coal in vogue as well as the future amendments, if any.

10. The Committee deliberated on the information provided by the PP and sought the following additional information. *The proposal was accordingly **deferred**.*

- (i) *Need to clarify the Sulphur content in the coal and a consistency to be maintained in all the documents (whether 0.5 %, 0.7% or 0.46%) and re-submit.*
- (ii) *Quality of ash generated needs to be re-submitted as per the import being done for TPP of NTPL situated at Tuticorin.*
- (iii) *Need to publish in local newspaper and on website, the environmental impact of the proposed change of source of coal from domestic to imported and seek comments giving a time-frame of one month. The concerned SPCB and the R.O. of MoEF&CC need to be informed accordingly. The comments received and the proposed action shall be submitted to the Ministry for further consideration.*
- (iv) *MoU for import of coal does not mention the quality and quantity. The same needs to be incorporated and agreed by both the parties **Unquote***

11. Upon the submission of above sought information, the proposal was again placed before the Committee wherein the project proponent along with their environmental consultant, Vimta Labs, Hyderabad made a presentation and provided the following information.

12. The maximum sulphur content in the coal to be imported from MSTC (7.65 MTPA) is 0.46%. In case of NTPL project, the imported coal will not be used as it is and only after blending with domestic coal it will be used. The quality of ash generated from NTPL project may not be comparable with GTPS project as 100% imported coal is proposed to be utilized in GTPS.

13. The data has been published in one English Newspaper (Hindustan Times) and 3-Hindi Newspapers (Amar Ujala, Swatantra Bharat and Jan Sandesh). Positive responses have been received to the press release and all the observations received are in favour of the project. The same was forwarded to MOEF by UPPCB with intimation to Regional Office of MOEF, Lucknow as per directive of the committee. No observation was registered on the PP's Web portal. An amendment is made in the MoU entered with MSTC for imported coal on 04.02.2015 specifying the quality & quantity of coal and agreed by both the parties.

14. Based on the information and clarifications provided by the Project Proponent and detailed discussions held on all the issues, the Committee *recommended the project for environmental clearance* subject to stipulation of the following additional specific conditions:

- i) *Latest authenticated satellite imagery shall be submitted on an annual basis to monitor the alterations of the area.*
- ii) *The guidelines for import of coal, as and when notified by the concerned Authority, shall be complied with.*
- iii) *The sulphur and ash content of coal shall not exceed 0.46 % and 6 % respectively. In case of variation of quality at any point of time, fresh reference shall be made to the Ministry for suitable amendments to the environmental clearance.*
- iv) *The coal transportation shall be by Rail only.*
- v) *As committed, a minimum amount of 0.4% of the capital cost of the project shall be earmarked as capital cost for CSR activities and 1/5<sup>th</sup> of the capital cost shall be earmarked as recurring cost per annum till the operation of the plant.*

**2.8 5x270 MW (1350 MW) Phase I TPP at Additional Amravati Industrial Area, Nandgaonpeth, Distt Amravati, Maharashtra by M/s RattanIndia Power Ltd. (formerly M/s Indiabulls Power Limited) - reg. Amendment of EC for extension of permission for temporary road transportation of coal.**

1. The PP made a presentation and inter-alia provided the following information. The project has been granted EC by MoEF for 1320 MW Capacity vide letter dated 27.02.2009 and was amended for revised capacity of 1350 MW vide letter dated 15.07. 2010. The validity of EC was extended for a period of 5 years vide letter dated 14.10.2014 with permission for transport of coal by road till 31.03.2015. Consent to Operate was granted by MPCB on 02.02.2015.

2. Regarding the current project status, Unit 1 & 2 are under commercial operation and the COD of Unit 3 was declared on 02.02.2015. The steam dumping of Unit 4 was completed and COD expected by 28.02.2015. The Boiler Light Up for Unit 5 was done, Steam Blowing completed and COD expected by 15.03.2015. The railway track laying including all major and minor bridges is completed. The Railways will carry out inspection before approval for opening of railway siding for movement. The photographs of various Units/facilities of the TPP and the railway line depicting the progress made were also presented.

3. Regarding the reasons for delay in completion of railway line, the railway Line is having EHV (132 KV) crossing. As per the technical requirement, modification of 132 KV line is needed to be done like Height Raising, Re alignment etc. To carry out EHV Modification, EHV Shutdown and Permission of MSETCL & Indian Railways was required. Approvals and Shutdown of EHV Line took long time. After long deliberations/persuasion, EHV Shutdown was provided on 02.02.2015. EHV Work delayed track laying and resulting in delay of OHE / S&T Work.

4. The Railways after inspection will open station for traffic and issue ARN. Thereafter, trial operations will be started. Track corrections etc. will be done during the test/trial runs and during first monsoon season, settlements of tracks and corrections are also expected. Final approval from Railways will take 4 to 5 months. In view of above and for smooth operation of plant, it is requested to extend permission for road transportation of coal by one year i.e. till 31.03.2016.

5. *Based on the information and clarifications provided by the Project Proponent, the detailed discussion and considering the status/progress of the project, the Committee recommended for extension of permission for temporary road transportation of coal by one year i.e. till 31.03.2016 subject to the following conditions.*

- i) The existing and likely impact (all the five Units under operation) of plying of trucks on the roads, human health, flora & fauna and general traffic shall be submitted by the SPCB to Ministry.*
- ii) The transportation by road shall be through mechanically covered trucks to the extent feasible, else through tarpaulin covered trucks.*
- iii) Periodic maintenance of the road shall be done by the project proponent at its own expenses and shall also facilitate the traffic control on the road in consultation with the State Government Authorities.*
- iv) Avenue plantation of 2/3 rows all along the road shall be carried out by the project proponent at its own expenses in consultation with the State Government Authorities.*

v) *The PP shall advertise in the local leading newspapers and place on the website, the temporary permission accorded by the Ministry for public information.*

**2.9 110 (2X55) MW Captive Power Plant at Village Patrapalli, Raigarh District, Chhattisgarh by M/s. Jindal Steel And Power Ltd. - reg. Amendment of EC for change in capacity from 2x55 MW To 2 x 70 MW.**

1. The PP along with their environmental consultant, M/s Min Mec Consultancy Pvt. Ltd., New Delhi made a presentation and inter-alia provided the following information. Jindal Steel & Power Limited (JSPL) is operating an Integrated Steel Plant Complex at Raigarh (Chhattisgarh) with Captive Power Plant. Environmental Clearance for the CPP (2x55 MW) was granted by MoEF&CC vide letter dated 17.08.2001. First unit of 55 MW was commissioned in the year 2002 and second unit was commissioned in 2004. JSPL proposes to enhance the operating capacity of CPP from 2x55 MW to 2x70 MW by fully utilizing the Maximum Economic Rating (MER).

2. *Upon detailed deliberations, the Committee recommended that the PP shall first obtain the concurrence/recommendation of CEA on the technical feasibility of the proposed change in capacity for further consideration. The proposal was accordingly **deferred.***

There being no agenda item left, the meeting ended with a vote of thanks to the Chair.

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**Terms of Reference (TOR):**

- i) 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.
- ii) Vision document specifying prospective long term plan of the project shall be formulated and submitted.
- iii) 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.
- iv) 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.
- v) 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.
- vi) 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.
- vii) 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.
- viii) Layout plan indicating break-up of plant area, ash pond, green belt, infrastructure, roads etc. shall be provided.
- ix) 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.
- x) 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.
- xi) 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.
- xii) The land acquisition and R&R scheme with a time bound Action Plan should be formulated and addressed in the EIA report.
- xiii) 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.
- xiv) 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.

- xv) 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.
- xvi) 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.
- xvii) 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.
- xviii) 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.
- xix) 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.
- xx) 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.
- xxi) 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.
- xxii) 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.
- xxiii) 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.
- xxiv) 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.
- xxv) Detailed plan for rainwater harvesting and its proposed utilization in the plant shall be furnished.
- xxvi) Feasibility of near zero discharge concept shall be critically examined and its details submitted.
- xxvii) Optimization of Cycles of Concentration (COC) along with other water conservation measures in the project shall be specified.

- xxviii) Plan for recirculation of ash pond water and its implementation shall be submitted.
- xxix) 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.
- xxx) 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.
- xxxi) 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.
- xxxii) 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.
- xxxiii) 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.
- xxxiv) 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.
- xxxv) 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.
- xxxvi) 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.
- xxxvii) 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.
- xxxviii) 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 PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, 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.
- xxxix) 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).
- xl) A list of industries existing and proposed in the study area shall be furnished.
- xli) 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.
- xl ii) Radio activity and heavy metal contents of coal to be sourced shall be examined and submitted along with laboratory reports.
- xl iii) Fuel analysis shall be provided. Details of auxiliary fuel, if any, including its quantity, quality, storage etc should also be furnished.
- xl iv) 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
- xl v) 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.
- xl vi) 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.
- xl vii) 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.
- xl viii) 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.
- xl ix) 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.
- l) 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.

- li) 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 CO<sub>2</sub> and other gaseous pollutants and hence a stratified green belt should be developed.
- lii) 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.
- liii) 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.

- liv) Details of litigation pending or otherwise with respect to project in any Court, Tribunal etc. shall invariably be furnished.

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**Additional TOR for Coastal Based TPPs:**

Over and above the TOR mentioned in **Annexure- A1**, 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.

(Prof. C.R. Babu)  
Vice Chairman (Acting Chair)

(Shri T.K.Dhar)  
Member

(Shri A.K. Bansal)  
Member

(Shri G. S. Dang)  
Member

(Shri N.K. Verma)  
Member

(Dr. S.D. Attri)  
Member

(Shri P.D Siwal &  
Shri N.S. Mondal)  
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(Dr. S.S Bala)  
Member

(Dr. Asha Rajvanshi)  
Member

(Dr. Saroj)  
Member Secretary