

MINUTES OF THE 24th MEETING OF THE RE-CONSTITUTED EXPERT APPRAISAL COMMITTEE ON ENVIRONMENTAL IMPACT ASSESSMENT OF THERMAL POWER & COAL MINING PROJECTS

The 24th Meeting of the reconstituted Expert Appraisal Committee (Thermal Power) was held on **30th & 31st October, 2014** at Brahmaputra Conference Room, Vayu Wing, First Floor, Indira Paryavaran Bhawan (new building), Jorbagh, New Delhi-110003. The members present were:

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| 1. Dr. C.R. Babu | - | Vice Chairman (Acting Chair) |
| 2. Shri T.K.Dhar | - | Member |
| 3. Shri A.K. Bansal | - | Member |
| 4. Shri N.K. Verma | - | Member |
| 5. Shri G.S. Dang | - | Member |
| 6. Dr. Ratnavel | - | Member |
| 7. Dr. Saroj | - | Member Secretary |

In attendance: Dr. M. Ramesh, Scientist 'D', MoEF.

Shri J.L Mehta, Dr. S.D. Attri, Dr. S.S. Bala, Shri N.S. Mondal, Dr. Asha Rajvanshi 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 22nd EAC meeting held during 25th-26th September, 2014 were confirmed.

Item No. 2: CONSIDERATION OF PROJECTS

2.1 1320 MW (2x660) Coal Based TPP at Villages Bhawanipur Char and Sripur, Taluk Balagarh, District Hooghly, in West Bengal by M/s CESC Ltd. – reg. ToR

1. The project proponent made a presentation and inter-alia provided the following information. ToR for the above proposal was accorded on 08.09.2010 and validity was extended upto 07.09.2013 on 20.03.2013. Due to lack of firm coal linkage the final EIA/EMP report could not be completed within the validity period. Hence, the present proposal is for fresh ToR.

2. The land requirement is about 550 acres and 902 acres land is already under possession. There is no forest land involved in the project site and no R&R is involved. There are no National Parks, Wildlife Sanctuaries, Biosphere Reserves and Heritage sites within a radius of 10 Km from the site.

3. The coal requirement is 6.95 MTPA at 85% PLF with GCV of 3500 kcal/kg and will be met through long term domestic coal linkage, which is awaited. The recommendation for coal linkage was made by Dept. of Power, Govt. of West Bengal to Ministry of Power (MoP) and Ministry of Coal (MoC) and by CEA/MoP to MoC. The water requirement is 4,235 m³/h and will be sourced from River Hooghly. The approval has been accorded by CWC, Department of Irrigation, GoWB and Kolkata Port Trust.

4. Based on the information provided and the presentation made, the Committee sought the following and **deferred** the proposal.

- (i) Details regarding the project site being a riparine or an estuarine island.
- (ii) The tidal effect, if any, on the stability of the island
- (iii) Photographs of the project site
- (iv) Alterations made in the island
- (v) Whether the island is in the Fishing zone?
- (vi) Plant layout along with the breakup of the project area.
- (vii) Land use of the project site
- (viii) Project site on an Original toposheet
- (ix) Since WAPCOS have conducted study on the stability of the island, the concerned representatives shall present the findings before the EAC

2.2 Expansion of 330.5 MW Gas/Naptha based TPP by addition of 2x160 MW Coal based TPP in Distt. Nagapattnam, Tamil Nadu by M/s PPN Power Generating Company Pvt. Ltd. – reg. ToR

1. The project proponent and their environmental consultant, M/s. B S Envi-Tech Pvt. Ltd., Secunderabad made a presentation and inter-alia provided the following information. EC was accorded for 330.5 MW (Phase-I) TPP based on natural gas and naphtha in March, 1996 and is in operation since 2001. Further, EC was accorded for 3X360 MW (Phase-II) gas based TPP on 20.05.2011 in the same project site of 100 acres where the above coal based TPP is proposed. CRZ clearance for the marine facilities was accorded on 08.07.2011. However, the project could not be implemented due to non availability of domestic natural gas. The Ministry was requested to withdraw the EC given for the 3X360 MW (Phase-II).
2. The existing total project area is 436.7 acres of which the area required for the proposed expansion is 100 acres which is already in possession of PP. An area of 150 acres has been developed into green belt. Inter-state boundary is within 10 km. The proposed project cost is Rs. 1,649.34 crores. An amount of Rs. 2.5 crores has been spent for CSR activities. The coal will be imported from Indonesia and other sources. The water requirement is 105,672 KLD and will be sourced through sea water from Bay of Bengal.
3. Based on the information provided and the presentation made, the Committee recommended the standard TOR (as applicable) at **Annexure-A1** and **A2** for undertaking detailed EIA study and preparation of EMP in addition to the specific TOR as under.
 - (i) Considering the Hon'ble NGT's Judgment for the Nagapattanam area, cumulative impact studies for 10, 15 and 25 km radius shall be carried out.
 - (ii) Marine EIA study shall be carried out and EMP prepared accordingly.

(iii) Impact of brine mixing with water and outfall

2.3 2x250 MW Margherita Coal Based TPP at Village Saleki NC & Lekhapani, Tehsil Makum Mouza, Margherita Revenue Circle, District Tinsukla, Assam by M/s Assam Power Generation Corpn. Ltd. – reg. Amendment of ToR for revision of capacity to 1X660 MW super-critical TPP.

1. The project proponent and their environmental consultant, M/s. Ramky Enviro Engineers Ltd., Hyderabad made a presentation and inter-alia provided the following information. The above proposal was accorded ToR for 2x250 MW on 15.03.2013 and it is proposed to revise the capacity to 1X660 MW super-critical TPP. The baseline studies were conducted during Summer 2013.
2. The project area is 575 acres and 661 acres has been acquired. There are no National Parks, Wildlife sanctuaries or historical monuments within 10 km. The project cost is Rs. 4384 Crores. The coal requirement (1.83 MTPA) is 100% indigenous Margherita Coal from nearby North Eastern Coalfields Ltd (NECL). The water requirement is 2100 m³/h and will be sourced from Buridihing River (aerial 6.5 km W; pipeline 14 km). The water drawl permission has been obtained for 3300 m³/h.
3. *Based on the information provided and the presentation made, the Committee recommended the Amendment of ToR dated 15.03.2013 for revision of capacity to 1X660 MW super-critical TPP by prescribing the following additional ToR.*

(i) To optimize the project area and water requirement as per the CEA guidelines.

2.4 Expansion of 1X63 MW coal based TPP by addition of 1X180 MW at Billakuppam Village, Gummidipondi Taluk, Distt. Thiruvallur, Tamil Nadu by M/s Cauvery Power Generation Chennai Pvt. Ltd. – reg. ToR

1. The project proponent made a presentation and inter-alia provided the following information. Due to Inter-state boundary within 10 km, the proposal is being considered at the Centre. The EC for the existing Unit was accorded on 14.10.2010 by SEIAA, Tamil Nadu and the Unit is operational. Although the existing Unit is also located within 10 km of Inter State boundary, there was no intentional suppression of the fact at that time and it was an act of oversight. Hence, the proposal was considered at the State level and EC accorded by SEIAA.
2. The PP has originally applied for 2X180 MW. Accordingly, the committee has recommended for installation of a bi-flue stack of 220 m height as the cumulative capacity after expansion mandates the same. Upon deliberating the issue of stack height, the PP has confirmed that they intend to execute 1X180 MW in the first Phase and proceed with the second unit only after commissioning of the first one. Hence, they would like to revise the proposal to only 1X180 MW and install a stack of requisite height. The committee agreed for the same and recommended that for any further expansion, the stack height shall accordingly be suitably revised. The PP has submitted the revised application for 1X180 MW.
3. The existing project area is 22.96 acres and the proposed additional project area is 50.04 acres. There is no forest land involved in the project site and no R&R is involved. There are no National Parks, Wildlife Sanctuaries, Biosphere Reserves and Heritage sites within a radius of 10 Km from the site. River Araniyar flows at a distance of 5.5 km and Palavakkam

RF is at a distance of 3.6 km. The coal requirement is 2565 TPD and will be imported from Indonesia. The water requirement is 41 KLD and will be sourced from ground water and rain water harvesting.

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

(i) *The water requirement shall be met to the maximum extent possible from rain water harvesting.*

(ii) *Detailed justification for use of Air Cooled Condensing System in-lieu of Water Cooled Condensing System.*

2.5 2x660 MW Super critical TPP at Village Jamuchakada, Dist. Dhenkanal, Orissa by M/s. Chambal Infrastructure Ventures Ltd. – reg. re-consideration for ToR

1. The proposal was earlier discussed in the 20th Meeting of the EAC (Thermal) held during **28th – 29th August, 2014**, the minutes of which are as under:

Quote “At the outset, the committee noted that out of the three alternate sites proposed, none of them is suitable for siting of a TPP. One site was within Wildlife Sanctuary, the second site has already been allocated to NTPC, the third site is majorly double crop agricultural land. Therefore, only one site cannot be the criteria for appraising the project. In view of this, the committee **deferred** the proposal and could be reexamined only after exploring atleast two proper alternate sites” **Unquote.**

2. The PP has studied two other alternative possible sites and submitted the comparative study report on the three possible sites. The proposed site is at Jamuchakada (District Dhenkanal, Orissa) and the two alternative possible sites are at Chandrashekhar Prasad (Dist. Dhenkanal) and Jamunapasi (District Keonjhar, Orissa). The comparative features of the said three sites were presented and discussed. The site at Jamuchakada is preferred as it involves lower forest land and grazing land, presently no cultivation on land and identified by State Authorities for the project.

3. The proposed project area is 970.2 acres of which the forest land is 92.9 acres. The land will be acquired by IDCO and no R&R is involved. There are no National Parks, Wildlife Sanctuaries, Biosphere Reserves and Heritage sites within a radius of 10 Km from the site. The coal requirement is 5.92 MTPA and will be sourced from Mahanadi Coal-field (Talcher). The water requirement is 80,500 m³/d and will be sourced from River Mahanadi.

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

2.6 Expansion by addition of 2x660 MW (Unit 5&6) Imported Coal Based TPP of M/s Lanco Amarkantak Power Ltd. in Korba Tehsil & Distt., in Chhattisgarh – reg. EC reconsideration.

1. The proposal was earlier considered in the 46th, 58th and 72nd Meetings of the EAC (Thermal) held during April 9-10, 2012, October 8-9, 2012 and April 22-23, 2013 respectively, the minutes of which are as under:

Quote “The proposal is for expansion by addition of 2x660 MW (Units 5-6) Imported Coal Based Supercritical TPP at village Pathadi, in Korba Tehsil & Distt., in Chhattisgarh. There are two units under operation viz. Unit –I and Unit-II consisting each of 1x300 MW. Unit-III & IV (2x660 MW) are under implementation. Additional land requirement will be 550 acres, which is a single crop agriculture land, comprising of 250 acres of land for ash pond, 250 acres for water reservoir and 50 acres for external facilities. Total land requirement for 3240 MW will now be 1945 acres. The co-ordinates of the site including all six units and ash pond of Units-1,2,3&4 are located within Latitude 22^o13’12.76” N to 22^o14’55.36” N and Longitude 82^o43’17.77” E to 82^o44’9.37” E. Coal requirement will be 5.06MTPA at 85% PLF. Imported Coal will be obtained from Australia. FSA has been signed with M/s The Griffin Coal Mining Company Pty Ltd. Ash and sulphur contents in imported coal will be 10% and 0.5% respectively. About 0.506 MTPA of ash will be generated. Fly ash will be supplied to M/s ACC Keymore Cement Works of Katni, M/s Vedant Infrastructures, M/s KJSL Coal & Power Ltd. Infrastructures, M/s Gajanan Ash Bricks, M/s Ganpati Ash Bricks, M/s Ultratech Cements etc. Ash pond area will be 250 acres and co-ordinates of the ash pond site is located within Latitude 22^o12’41.75” N to 22^o13’9.44” N and Longitude 82^o42’19.82” E to 82^o43’19.28” E. Twin flue Stack of 275m shall be provided. Natural Draft cooling system will be installed. Water requirement of 85848 m³/day (31.33 MCM) will be sourced from the Hasdeo River through a pipeline at a distance of about 2.4km from the project site. Approval from Water Resource Department, Govt. of Chhattisgarh has been obtained. Sakti Reserve forest is at a distance of 10.7 km from the plant site. There are no National Parks, Wildlife Sanctuaries, Heritage Sites, Tiger/Biosphere reserves etc. within ten km of the project site. Public Hearing was held on 07.01.2012. Cost of the project will be Rs.7062.0 Crores.

In the 46th meeting, the Committee discussed point-wise compliance of TOR and the status of compliance of the conditions stipulated in the environmental clearance accorded for the earlier units. *The Committee desired that the status of compliance to the conditions stipulated in the environmental clearance for the earlier units shall be submitted to the Ministry within a fortnight.*

On the question of cumulative impact assessment of AAQ in the study area, the project proponent clarified that the assessment has been done based on their existing and proposed units. It was informed that no other source of air pollution in the 10 Km area exists or is proposed to be coming up as per the records available.

The Committee also discussed the issues raised in the Public Hearing and the responses made by the project proponent in the 46th Meeting. The Committee noted that major issues raised were regarding compensation for land acquired; employment of PAPs; community development; discharge of effluents into Jogi nallah affecting human and animal; noise pollution due to operation of existing units; fly ash/ dust falling on houses of villages and also affecting nearby agricultural land; non willingness of some villagers to part with land; adverse impact on ground water used for construction of plant etc. That these issues were addressed and committed by the proponent. The project proponent had also informed that no litigation was pending / filed pertaining to the power project.

On the issue of drinking water for villages and contamination of Joginalla, which was also an issue raised in the Public Hearing, the proponent informed that they are adopting a zero discharge system.

The Committee had also advised the proponent that radio activity in coal and ash needs be studied on a long term basis and mitigative action should be taken based on the outcome of the study. The project proponents were advised to avoid the acquisition of tribal land. That, however, in the event of extreme necessity, the relevant rules should be followed and then only carried out.

The Committee sought information regarding status of compliance to the conditions stipulated for the earlier phases of the project; cumulative impacts on the ambient air quality within 15 km of the plant; report on the transportation of coal, including coal handling capacity at ports and railway rolling stacks availability; report on the water availability in Hasdeo River; action plan for implementation of issues raised in Public Hearing and CSR plan and point wise response to representation received by MEF.

The proponent has submitted a detailed information on the above issues. As per the information shared the proponent appears to have complied with conditions stipulated in the environmental clearance granted for the previous phases. High efficiency electrostatic precipitators have reported to have been installed to control particulate emission below $50\text{mg}/\text{Nm}^3$; space provision has been made for installation of FGD; cooling towers with closed cycle cooling are installed. The company is achieving zero discharge and environment lab has been set up.

Cumulative impacts on the Ambient Air Quality (AAQ) have reported to have been assessed within 20km distance of the plant site. That the only power plant which is in operation within 15 km radius is the 1120 MW power station of Chhattisgarh State Electricity Board. The other thermal power plants which are operating near Korba are more than 15 km distance from the Lanco Power Station are 2600 MW of M/s NTPC at Korba; 2010 MW of M/s Balco; and 840 MW of CESB at Korba West. The overall ground level concentration at a distance of 20 km radius taking into account all the power plants of PM_{10} , $\text{PM}_{2.5}$, SO_2 and NO_x is $69.28\ \mu\text{g}/\text{m}^3$, $26.02\ \mu\text{g}/\text{m}^3$, $56.5\ \mu\text{g}/\text{m}^3$ and $33.5\ \mu\text{g}/\text{m}^3$ respectively. The values are noted to be within the prescribed standards.

Regarding coal transportation, it was informed that the coal will be imported from Griffin Coal Mining Pty Limited, Australia. The fuel supply agreement is for 5 MTPA. The coal will be imported to Vishakhapatnam Port or Gangawaram Port and then to the plant augmentation site at Korba in BOXN rakes. The company has submitted a letter of comfort to handle 2 MTPA of coal from Vishakhapatnam Port Trust. Company would also transport coal from the Gangawaram Port which has handled 14 MT of coal in 2011- 2012 and it is proposed to enhance the cargo handling capacity to 45 MT in next two years. The current handling capacity is 24 MT. As regards, the rail transportation from ports, rails rakes from both the ports are available. The company has submitted an application to railways for Rail Traffic Clearance (RTC). To meet the transportation requirement, the proponent will need 4 rakes per day on average. As per the report submitted, the requisite rakes for the transportation to Amarkantak unit 5 & 6 will be easily available.

As regards the water availability from Hasdeo River, the lean season capacity of the storages from Hasdeo Barrage at Korba up to the confluence of Hasdev with Mahanadi is reported to be 99.949 MCM. While the lean season allotment to the power plants and industries are reported

to be 86.952 MCM (after considering a cushion and net positive balance of 12.997 MCM). As per the hydrology study of the area, the construction of dams, barrages, antcuts and canals has resulted in storage of sufficient quantity of water for use during the lean months. The flow profile of Hasdeo River during lean months has increased with the construction of the water storage facilities and to meet the water requirement of Lanco Amarkantak Power project and other power plants / industries in the area.

A detailed action plan for implementation of issues raised during Public Hearing and CSR plan has been submitted. The issues raised in the representation received by the Ministry regarding employment and resettlement, environment conservation, pollution in the area and EIA report based on the old facts have been addressed. As per the information furnished, M/s Lanco have provided employment to 317 affected persons. One time capital CSR expenditure of Rs. 25 Crore, to be raised to 28 Crore, till the commissioning of the plant and annual CSR budget thereafter to be Rs. 5.60 Crores till the operative life of the plant. Annual Social Audit to be conducted by a reputed University in the vicinity. There is no displacement of families. Regarding environment conservation, high efficiency ESPs are in operation and there is no discharge of effluent outside the plant. Continuous monitoring for stack emissions is being carried. Green belt has been developed in 75 acres of plant area. The ground water analysis carried shows that the levels of various parameters are within the prescribed standards. Lanco Amarkantak project is located at a distance of 13 km from Korba and does not fall in the critically polluted area. The AAQ data has been collected in the post monsoon season from September - November, 2010 subsequent to issuance of TOR. As discussed during the meeting, the project proponent may explore the possibility of setting up of a cement plant capacity to consume bulk fly ash.

It was brought to the notice of the Committee that Chhattisgarh Environment Conservation Board (CECB) had issued show cause notice to the proponent for not complying with the conditions for green belt development and utilization of fly ash.

The Committee had therefore decided that the proponent should first provide the details regarding the show cause notice issued by the State Pollution Control Board before taking decision regarding the project.

On submission of the clarification the matter was again placed in its 58th meeting of EAC (Thermal) held during October 8-9, 2012 for re-consideration. The project proponent gave a presentation and informed the following:

That Unit-I & II (based on domestic coal) have been commissioned in November, 2010 and March, 2011 respectively. That Units-III & IV (based on domestic coal) are in advance stage of construction.

- That they have replied to the Show Cause Notice issued by Chhattisgarh Environment Conservation Board, which pertains primarily to emission of particulate matter; action plan for fly ash management; and action plan on green belt.
- That they have now decided to adopt 'Zero Discharge' concept and accordingly R.O System will be installed.
- That ammonia injection for SO₂ reduction is being undertaken.

In the said 58th meeting, the Committee observed that action plan undertaken for the issues mentioned in the Show Cause Notice of the CECB prior to the notice received and thereafter action plan for implementation in compliance to the notice shall be submitted. That the pollution

data not only for particulate matter but also for SO₂ prior to and after replying to notice shall be submitted. It was also decided that the details of R.O System including solid waste generated from R.O System handling and management shall be submitted. With respect to SO₂ reduction through ammonia injection, the project proponent need to submit details of SO₂ emission prior to adoption of the same and henceforth after adoption of the same. The Committee also expressed its concern regarding advisability of SO₂ injection and observed that the project proponent need to examine issue of oleum formation.

With regard to compensation and employment, the Committee noted that the Minister of Environment & Forests, while making an observation of a letter received from the Minister of State for Agriculture and Food Processing pertaining to the power project have desired that evidences on record shall be submitted.

The Committee observed that the project proponent need to submit action taken in specific to the issues raised in the public hearing.

The Committee also decided that details mentioned above shall be submitted in the form of an affidavit duly signed by an officer of appropriate seniority and notarised.

It was decided that the project proponent shall first establish compliance to the conditions stipulated for Units-I to IV and submit detailed compliance report vetted by the R.O of the Ministry and other agencies as applicable.

The Committee also decided that the project proponent shall introduce a Management Information System which indicates the environmental conditions / effective compliance monitoring of environmental conditions. Accordingly, the Committee decided that the project proponent need to submit details and action plan in this regard.

The Committee finally decided that the project proponent shall come with the compliance of the observations stated in the above preceding paragraphs and shall also prepare point-wise compliance of its earlier observations made in the 46th Meeting. Accordingly the proposal was deferred.

On submission of the clarification the matter was again referred to the Committee.

The project proponent made a presentation on the clarification sought in the 46th and 58th meetings and the status of compliance to the conditions stipulated in the environmental clearance of Unit-1 & 2 i.e 2x300 MW.

The project proponent informed that as on date total operational coal based thermal power capacity of the Lanco Group in India is about 3000 MW.

Discussing the issue of Show Cause Notice issued by CECB, the Committee felt that the status and action plan for implementation relevant with the show cause notice need to have been presented. It was also noted that the compliance report submitted by the Regional Office of the Ministry indicates that w.r.t green belt development the power station is non-compliant. The Committee noted the clarification provided by the project proponent that because of delay in land allotment and due to construction activities, the green belt development was behind schedule and hence revised action plan was submitted to CECB for issuing Consent for

Operation of Units-1&2. *The Committee observed that concrete action plan with material evidence to establish credible action taken in executing seriously the green belt development and management plan shall be submitted first.*

The Committee also advised the project proponent to examine some of the orders of the National Green Tribunal related to thermal power projects for which environmental clearances accorded by the Ministry have been stayed / cancelled. The Committee advised the project proponent to examine these judgments and integrate it with the project and submit its comparative analysis vis-à-vis the present proposal placed for consideration of the Committee.

The Committee also revisited the coal transportation study submitted by the project proponent. It was noted that the letter dated 15.07.2011 submitted, purportedly from the Port Authority mentions its capacity of catering only 2.0 MTPA as against the requirement of 5.0 MTPA. The Committee therefore sought detailed clarification on the issue.

The Committee also observed that cumulative impact assessment need to be re-assessed and submitted. It was also advised that the sulphur balance shall be re-worked and details submitted.

On the issue of firm water availability for 12 months for the power project, the Committee noted that the lean season allotment to the power plants and industries are reported to be 86.952 MCM, after considering a cushion and net positive balance of 12.997 MCM, which need to be examined further.

It was earlier reported in the last meeting that as per the hydrology study of the area, the construction of dams, barrages, antcuts and canals has resulted in storage of sufficient quantity of water for use during the lean months. That the flow profile of Hasdeo River during lean months has increased with the construction of the water storage facilities and to meet the water requirement of Lanco Amarkantak Power project and other power plants / industries in the area. The Committee felt that these statements need be duly explained with supporting records.

The Committee also clarified that water is a critical issue and unless it is satisfied fully on the availability of sustainable water source for a power project without compromise or conflict of interest with other competing sources, recommendation for environmental clearance cannot be made even if all other issues have been addressed. The Committee therefore decided that the project proponent shall furnish full details on the source of water i.e. Hasdoe River, the details of down stream recipients from the point of tapping for the power project and the flow data of the river for the last few decades.

On the issue of additional land of about 550 acres required for the expansion project, the Committee observed that even if the land proposed to be additionally acquired does not involve homestead oustees, it certainly may have involved marginalized farmers whose livelihood / sustenance are dependent on the land to be acquired for the project. The Committee therefore desired that details of such landless farmers who may be further marginalized shall be identified and details shall be submitted. In doing so the Committee advised that the project proponent may consult District Census data (2011).

The Committee also highlighted the study reportedly carried out by some International NGO, linking child mortality with thermal power plants. The Committee desired that information on

such cases may be complied, as may be available, and place before the Committee for its information and perusal.

The Committee recommended that the Ministry may like to initiate 'Carrying Capacity Study for regions like Korba and Raigarh in Chhattisgarh and Singrauli in U.P.-M.P.

In view of the additional clarifications/reports sought, the Committee deferred the proposal for re-consideration at a later stage" **Unquote.**

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, M/s. B S Envi-Tech Pvt. Ltd., Secunderabad made a presentation. After perusal of the presentation made and detailed discussion, the committee sought the following information.

- (i) Since there was non-compliance/partial compliance of some of the conditions of earlier EC, the latest certified compliance report from the Ministry's R.O. shall be submitted and presented.
- (ii) Clarification from the State Irrigation Department that the water from Anicut allotted to the project was meant for industrial use and would not adversely affect the irrigation/drinking water
- (iii) Detailed fly ash utilization with quantities till date and the utilisation proposed along with compliance to the fly ash utilization Notification. Back filling of ash is not permitted. The proposed 250 acres of ash pond is not recommended as there are already two ash ponds of 150 and 104 acres for the existing four units and the same could suffice for the proposed units if the PP complies with the fly ash utilization.
- (iv) Details of land use and the ownership along with status of acquiring of the 250 acres for water reservoir.
- (v) Photographs of the existing ash ponds.

The proposal was accordingly **deferred.**

2.7 3x660 MW (Stage-I: 2x660 MW; and Stage-II: 1x660 MW) Super Critical Coal Based TPP at Village Painampuram, in Muthukur Mandal, in Nellore Distt., in Andhra Pradesh by M/s Thermal Powertech Corporation (India) Ltd.- reg. Extension of validity of EC.

1. The proposal is for extension of validity of EC accorded by MoEF for the above project on 04.11.2009. The PP along with their environmental consultant, M/s. B S Envi-Tech Pvt. Ltd., Secunderabad made a presentation and provided the following information.
2. The important milestones of the project are Long term PPA for 25 years and Short Term PPA were signed with AP Discoms for 500 MW on 1st April, 2013 and Kerala Discoms for 175 MW on 31st March 2014 respectively. FSA signed with MCL for 4.273 MTPA Coal (70%) and Balance 30% is tied up through Indonesian Company. Signed BPTA/LTOA with PGCIL for 1320 MW and TPCIL-Nellore Pooling station Double Circuit

400 KV line was commissioned in August 2013. Approval for drawl of sea water from Bay of Bengal was accorded for 14,000 m³/h. The photographs of various units/facilities of the project including green belt development and CSR activities were also presented. Out of the total CSR budget of Rs. 32 crores, an expenditure of Rs. 12.98 crores was incurred till date.

3. The Unit –I and Unit-II are proposed to be commissioned during November, 2014 and January, 2015 respectively. Unit –III is planned to commission within 42 months from the financial closure and zero date which will be within the extended validity period of EC. Financial closure shall however, be dependent upon new coal linkage policy in place by Coal Ministry.
4. Regarding the reasons for delay in commissioning the project, there was a delay due to bored cast-in-situ (BCIS) piling and TG Foundation. The interruption of villagers in the initial stage of the project due to delay in closing of the boundary wall resulted in stopping of works for few days. The works of the sea water pump house was delayed by about four months due to Nilam Cyclone in the month of October. 2012.
5. *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 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.*

2.8 2x195 MW (Stage-II) Coal Based Muzaffarpur TPP at Village Kanti, in Muzaffarpur District, in Bihar by M/s Kanti Bijlee Utpadan Nigam Ltd. (A subsidiary of NTPC Ltd.) – reg. Extension of validity of EC.

1. The proposal is for extension of validity of EC accorded by MoEF for the above project on 09.11.2009. The PP made a presentation and provided the following information.
2. The units are under an advance stage of construction/erection. First unit is expected to be commissioned by March, 2015 and Second unit is expected to be commissioned by June, 2015. Cumulative expenditure on the project (till September' 2014) was about Rs. 2,500 Crores out of total project cost of Rs. 3,942 Crores. Photographs depicting the progress of work (more than 80 %) have been presented.
3. The delay in implementation of the project within the validity period of Environmental Clearance is attributed to delays having occurred in various project related activities beyond the control of PP.
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 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.*

2.9 4x660 (2640) MW Coal Based Thermal Power Plant near village Komarada, in Vizianagaram District., in Andhra Pradesh by M/s Alfa Infraprop Pvt. Ltd. - reg. Review of EC as per Hon'ble NGT directions.

1. The proposal was earlier discussed in the 16th Meeting of the EAC (Thermal) held during **July 1-2, 2014**, 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 m³) will join the drain and another part (3,10,489 m³) 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 Nagavali 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.” **Unquote.***

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 km² 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 km² 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 m³/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 (17th 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 SO₂ and NO_x 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 m³/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 APPCB/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 m³/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 m³/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 m³/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.*

2.10 Expansion of existing 155 MW CPP by installation of (175+3x27) 256 MW Imported Coal based Thermal Power Plant at Meramandali, Distt. Dhenkanal, in Orissa by M/s Bhushan Steel Ltd. – reg. re-consideration for EC

1. The proposal was earlier discussed in the 6th and 16th Meetings of the EAC (Thermal) held during **December 5-6, 2013 and 31st July and 1st August, 2014**, the minutes of which are as under:

Quote “1. At the outset, the committee was informed of the directions of closure notice under Section 33(A) of Water (PCP) Act, 1974 & 31A of Air (PCP) Act, 1981 issued by the Orissa State Pollution Control Board dated 19.11.2013 for the integrated steel plant and power plant at the above location (i) to close down the operation of Blast Furnace-II of the expansion project and Cold Rolling Mill forthwith (ii) to close down the operation of Boiler No-I of the new Thermal Power Plant of capacity 256 MW and stop installation activities of another two boilers of this power plant forthwith.

The Committee was also apprised of the complaint received from an NGO of Orissa regarding gross violation of Environment (Protection) Rules, 1986 by M/s Bhushan Steel Ltd./Bhushan Energy Ltd. by starting construction of two power plants at the above location without obtaining prior environmental clearance.

The committee was also informed of the observations of the MoEF Regional Office, Bhubaneswar that the EIA/EMP reports for the two proposed power plants (256 MW and 185 MW) by M/s Bhushan Steel Ltd. and M/s Bhushan Energy Ltd. were prepared for expansion independently without reflecting the cumulative impacts. It was suggested that an EMP on comprehensive study for the units together should be prepared.

In view of the above serious non-compliance/violations and lacunae, the proposal was deferred. The PP shall first comply with all the directions issued and

after receipt of compliance report from the Regional Office of MoEF and SPCB, the project could be reconsidered.

2. The PP vide letter dated 04.02.2014 has also informed the Ministry that they do not contest the allegation of violation and also requested for initiating action under the Environment (Protection) Act, 1986. The Ministry has taken action as per O.Ms dated 12.12.2012 and 27.06.2013 for consideration of proposals for EC involving violation of the Environment (Protection) Act, 1986/EIA Notification, 2006. Further, the PP has submitted the revised EIA/EMP based on the comprehensive study of all the units.

3. At the outset, the committee noted that the proposal is an expansion within the existing steel plant and certified report from the Ministry's R.O for compliance to the conditions stipulated in the ECs of the existing units has not been submitted by the PP. The same is a pre-requisite for consideration of the proposal.

4. After perusal of the presentation made and detailed discussion, the committee sought the following additional information and **deferred** the proposal. The committee also recommended for a site-visit by a sub-committee regarding fly ash disposal etc.

- i) *Certified compliance report from the MoEF R.O for the existing units.*
- ii) *Cumulative impacts including the proposed units and also the rise in temperature within 10/15 km, as applicable*
- iii) *Comparison of the data and predictions of the EIA/EMP report placed before Public Hearing and the addendum EIA/EMP report based on cumulative impacts.*
- iv) *Compliance to the action plan formulated by SPCB.*
- v) *Stack height shall be 220 m since the overall capacity is more than 350 MW.*
- vi) *Aerial view, photographs and action plan for Green belt development.*
- vii) *CSR activities undertaken and proposed along with budget.*
- viii) *Revised and detailed PH action plan along with budgetary provisions.*
- ix) *Response to the complaint received by the EAC/MoEF. ” **Unquote.***

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, M/s Visiontek Consultancy Services Pvt. Ltd., Bhubaneswar made a presentation and inter-alia provided the following information.

3. The proposed TPP will be installed within the existing 5.6 MTPA integrated steel plant premises. EC for expansion of the steel plant from 3.1 MTPA to 5.6 MTPA was accorded on 20.07.2012. The fuel proposed to be used is either 100 % Imported coal or 50 % Imported coal & 50% mix gas (BFG+ COG). The imported coal (max. 1.28 MTPA) will be sourced from Indonesia and the mix gas (3,00,000 Nm³/h) will be sourced from the steel plant. The Sulphur and ash contents in the imported coal will be 0.3 % and 6.0 % respectively. The

water requirement is 695 m³/h and will be sourced from the existing reservoir of steel plant which is connected to Brahmani River. No fresh permission is required. Induced draft cooling towers will be used. The project cost is Rs. 950 crores and the cost of Pollution control systems is Rs. 67.55 crores.

4. It is proposed to install 3 nos. 275 TPH CFBC imported coal fired boiler (Dual fired-imported coal/Coal tar/Mixed waste gases from (a) Coke Oven (b) Blast Furnace (c) BOF) to produce steam to run the 256 MW (1x175 MW + 3x27 MW) turbo-generators. The surplus steam generated from various boilers already installed e.g. CFBC, WHRB, CDQ boilers will also be used in 256 MW TPP.

5. The cumulative impacts of the AAQ have been assessed for 15 km radius. Base line data of AAQ monitored at twelve locations indicates that concentrations of PM₁₀, SO₂ and NO_x are varying from 37.1 µg/m³ to 62.4 µg/m³, 17.7 µg/m³ to 31.9 µg/m³ and 16.1 µg/m³ to 27.3 µg/m³ respectively. The predicted maximum incremental GLCs due to the proposed unit would be 35.15 µg/m³, 31.74 µg/m³ and 15.16 µg/m³ with respect to PM₁₀, SO₂ and NO_x respectively. The resultant concentrations are within the NAAQS. The PP has committed for installation of 220 m height of stack since the overall capacity is more than 350 MW.

6. Entire wastewater from plant will be treated and recycled. Existing ETP will be used to treat wastewater from cooling tower, boiler blow down and DM plant. Fly Ash – 0.072 MTPA and Bottom Ash – 0.038 MTPA will be generated with 100% imported coal. The ash from the existing Unit is being filled in the mine void of Jagannath colliery no. 4 of MCL. Bulklers are used for transporting the Fly Ash from plant to Jagannath mine Void and it is proposed to lay ash slurry pipeline from the plant to Jagannath mine void. Permission from Department of Water Resources, Govt. of Odisha and Consent to establish from SPCB, Odisha has been received. Fly Ash is being exported to neighboring countries like Bhutan, used for cement plants and road development. Fly ash brick making units of 4000 bricks per hour capacity have already been installed for producing bricks. The same method of ash disposal is envisaged for 100 % fly ash utilization of the proposed TPP which was recommended in the fly ash utilization Notification. A very small quantity of fly ash (3-5 %) can be utilized for brick manufacturing. The PP has filed petition before Hon'ble NGT for stay to continue mine void filling in line with another company who was granted stay for the same and the PP is confident of getting stay. If fly ash disposal into mine void is stopped for all the industries, it is planned to export the maximum quantity of ash for which the PP has already started the process. Manufacture of bricks in huge quantity can be envisaged subject to the Government's policy on red brick manufacturing etc.

7. Green belt /green area has been developed in 10 % of the total area of the existing steel & power plant complex till 2013-2014. Since, development of 33% of green area within the complex is very difficult, it is planned to develop 33% green areas within and outside the complex by 2017-18. *The committee observed that all the green areas like gardening etc. are not considered as green belt and also the proposal of PP to develop greenbelt outside the complex is not acceptable. The committee recommended that the PP shall develop three tier greenbelt all around the boundary totaling to 33 %, which is mandatory for all the industries/power plants.*

8. The Ministry's Regional Office has monitored the existing project on 01.10.2014 and inter-alia recommended that the PP shall submit an action plan for rain water harvesting and setting up of state-of-the-art environment laboratory. In response, the PP has submitted the

action plans for rain water harvesting and state-of-the-art environment laboratory. The study on rain water harvesting potential in plant area has been completed by M/s. S.M Water Solutions, Bhubaneswar and the report is being sent to CGWB for approval. The commissioning of Phase I and Phase II rain water harvesting systems are targeted for 30.05.2015 and 30.05.2016 respectively. An environmental monitoring laboratory is currently existing and the commissioning of state-of-the-art environment laboratory is targeted for 15.06.2015.

9. In compliance to the action plan formulated by SPCB for the CEPI regarding thermal power plants, 10 number of ESPs attached to WHRBs and 3 number of ESPs attached to BFPP have been designed for 50 mg/nm^3 with all the fields in operation. The results are well within the prescribed limit. All necessary permissions regarding HCSD/Mine void filling were obtained. Cast basalt lined slurry pipes have been procured and complete installations will be done in 24 months. Till then ash transportation will be done via road through bulkers. 41 online dust monitors have been installed in all major stacks with display facility. The data from one of these stacks is being transmitted to SPCB server through GPRS. 5 silos of 200 T at WHRB, 1 silo of 200 T at AFBC, 2 silos of 500 T & 200 T each at BFPP, 4 silos of 1000 T and 2 intermediate silos of 250 T at CFBC have been installed. 4 CAAQMS installed in the steel plant and power plant complex in consultation with SPCB. The data from one CAAQMS is being transmitted to SPCB server through GPRS. 17 settling tanks, 2 ETPs, 5 STPs, 2 BOD plants, 2 solar evaporation ponds and 3 lagoons were installed to ensure zero discharge except during monsoon where surface run off goes out through lagoons.

10. In compliance to the action plan formulated by SPCB for the CEPI regarding iron and steel sector, 10 ESPs have been installed in WHRB, 5 ESPs and 2 bag filters have been installed in dust generating points. All ESPs are equipped with pneumatic dust handling system. 17 settling tanks, 2 ETPs, 5 STPs, 2 BOD plants, 2 solar evaporation ponds and 3 lagoons were installed to ensure zero discharge except during monsoon. 41 online dust monitors have been installed in all major stacks with display facility. The data from one of these stacks is being transmitted to SPCB server through GPRS. 4 CAAQMS for installed in plant complex in consultation with SPCB. The data from one CAAQMS being transmitted to SPCB server through GPRS. SMS slag after making PS balls is being used in road construction and floor making inside plant area.

11. Public Hearing was conducted by the OSPCB on 23.08.2013. The Committee discussed the issues raised in the public hearing and the responses made by project proponent. It was noted that the major issues raised were regarding massive plantation programme by the PP, discharge of untreated black coloured affluent to River Brahamani, proper ash management and disposal, provision of adequate medical facilities, drinking water facilities and free electricity to the nearby villages etc.

12. An amount of Rs. 13.75 crores has been incurred for various CSR activities. The details have been submitted. A fund of Rs. 30 crores is earmarked for CSR activities over a period of 5 years. The PP also informed that they have recently committed for an old age home with a budget of Rs. 10 crores in addition to the Rs. 30 crores. Hence, the total budget for CSR shall be Rs. 40 crores for the next five years.

13. 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 specific conditions:

- i) Harnessing solar power within the premises of the plant particularly at available roof tops shall be carried out and status of implementation shall be submitted periodically.
- ii) A long term study of radio activity and heavy metals contents on coal to be used shall be carried out through a reputed institute and results thereof analyzed every two year and reported along with monitoring reports. Thereafter mechanism for an in-built continuous monitoring for radio activity and heavy metals in coal and fly ash (including bottom ash) shall be put in place.
- iii) A stack of 220 m height shall be provided with continuous online monitoring equipments for SO_x, NO_x and PM_{2.5} & PM₁₀. Exit velocity of flue gases shall not be less than 22 m/sec. Mercury emissions from stack shall also be monitored on periodic basis.
- iv) *Sulphur and ash contents in the imported coal to be used in the project shall not exceed 0.3 % and 6.0 % respectively at any given time. In case of variation of coal quality at any point of time, fresh reference shall be made to the Ministry for suitable amendments to environmental clearance condition wherever necessary.*
- v) High Efficiency Electrostatic Precipitators (ESPs) shall be installed to ensure that particulate emission does not exceed 50 mg/Nm³. Adequate dust extraction system such as cyclones/ bag filters and water spray system in dusty areas such as in coal handling and ash handling points, transfer areas and other vulnerable dusty areas shall be provided.
- vi) COC of atleast 5.0 shall be adopted.
- vii) Monitoring of surface water quantity and quality shall also be regularly conducted and records maintained. The monitored data shall be submitted to the Ministry regularly. Further, monitoring points shall be located between the plant and drainage in the direction of flow of ground water and records maintained. Monitoring for heavy metals in ground water shall be undertaken.
- viii) A well designed rain water harvesting system shall be put in place within six months, which shall comprise of rain water collection from the built up and open area in the plant premises and detailed record kept of the quantity of water harvested every year and its use.
- ix) Fly ash shall be collected in dry form and storage facility (silos) shall be provided. Unutilized fly ash shall be disposed off in the ash pond in the form of slurry. Mercury and other heavy metals (As, Hg, Cr, Pb etc.) will be monitored in the bottom ash as also in the effluents emanating from the existing ash pond. No ash shall be disposed off in low lying area.
- x) *In compliance to Hon'ble NGT's Order, no mine void and stone abandoned quarry filling of fly ash is permitted till further Orders.*
- xi) Ash pond shall be lined with HDPE/LDPE lining or any other suitable impermeable media such that no leachate takes place at any point of time. Adequate safety measures shall also be implemented to protect the ash dyke from getting breached.
- xii) Green Belt consisting of three tiers of plantations of native species around the plant and at least 50 m width shall be raised. Wherever 50 m width is not feasible green belt of 20 m width shall be raised and detailed justification shall be submitted to the Ministry. Tree density shall not be less than 2500 per ha with survival rate not less than 80 %. *Only native species shall be planted and the green belt development shall be expedited.*

- xiii) CSR schemes identified based on Public Hearing issues and need based assessment shall be implemented in consultation with the village Panchayat and the District Administration starting from the development of project itself. As part of CSR prior identification of local employable youth and eventual employment in the project after imparting relevant training shall be also undertaken. Company shall provide separate budget for community development activities and income generating programmes.
- xiv) As committed, a minimum amount of Rs 40.0 Crores shall be earmarked for CSR activities for the next five years. For proper and periodic monitoring of CSR activities, a CSR committee or a Social Audit committee or a suitable credible external agency shall be appointed. CSR activities shall also be evaluated by an independent external agency. This evaluation shall be both concurrent and final.
- xv) 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.

2.11 Expansion of existing (2x150) 300 MW TPP by installation of (165+20) 185 MW Imported coal based TPP at Meramandali, Distt. Dhenkanal in Orissa by M/s Bhushan Energy Ltd. – reg. re-consideration for EC

1. The proposal was earlier discussed in the 6th and 16th Meetings of the EAC (Thermal) held during **December 5-6, 2013 and 31st July and 1st August, 2014**, the minutes of which are as under:

Quote “1. At the outset, the committee was informed of the directions of closure notice under Section 33(A) of Water (PCP) Act, 1974 & 31A of Air (PCP) Act, 1981 issued by the Orissa State Pollution Control Board dated 19.11.2013 for the integrated steel plant and power plant at the above location (i) to close down the operation of Blast Furnace-II of the expansion project and Cold Rolling Mill forthwith (ii) to close down the operation of Boiler No-I of the new Thermal Power Plant of capacity 256 MW and stop installation activities of another two boilers of this power plant forthwith.

The Committee was also apprised of the complaint received from an NGO of Orissa regarding gross violation of Environment (Protection) Rules, 1986 by M/s Bhushan Steel Ltd./Bhushan Energy Ltd. by starting construction of two power plants at the above location without obtaining prior environmental clearance.

The committee was also informed of the observations of the MoEF Regional Office, Bhubaneswar that the EIA/EMP reports for the two proposed power plants (256 MW and 185 MW) by M/s Bhushan Steel Ltd. and M/s Bhushan Energy Ltd. were prepared for expansion independently without reflecting the cumulative impacts. It was suggested that an EMP on comprehensive study for the units together should be prepared.

In view of the above serious non-compliance/violations and lacunae, the proposal was deferred. The PP shall first comply with all the directions issued and after receipt of compliance report from the Regional Office of MoEF and SPCB, the project could be reconsidered.

2. The PP vide letter dated 04.02.2014 has also informed the Ministry that they do not contest the allegation of violation and also requested for initiating action under the Environment (Protection) Act, 1986. The Ministry has taken action as per O.Ms dated 12.12.2012 and 27.06.2013 for consideration of proposals for EC involving violation of the Environment (Protection) Act, 1986/EIA Notification, 2006. Further, the PP has submitted the revised EIA/EMP based on the comprehensive study of all the units.

3. At the outset, the committee noted that the proposal is an expansion within the existing steel plant and certified report from the Ministry's R.O for compliance to the conditions stipulated in the ECs of the existing units has not been submitted by the PP. The same is a pre-requisite for consideration of the proposal.

4. After perusal of the presentation made and detailed discussion, the committee sought the following additional information and **deferred** the proposal. The committee also recommended for a site-visit by a sub-committee regarding fly ash disposal etc.

- i) *Certified compliance report from the MoEF R.O for the existing units.*
- ii) *Cumulative impacts including the proposed units and also the rise in temperature within 10/ 15 km, as applicable*
- iii) *Comparison of the data and predictions of the EIA/EMP report placed before Public Hearing and the addendum EIA/EMP report based on cumulative impacts.*
- iv) *Compliance to the action plan formulated by SPCB.*
- v) *Stack height shall be 220 m since the overall capacity is more than 350 MW.*
- vi) *Aerial view, photographs and action plan for Green belt development.*
- vii) *CSR activities undertaken and proposed along with budget.*
- viii) *Revised and detailed PH action plan along with budgetary provisions.*
- ix) *Response to the complaint received by the EAC/MoEF. ” **Unquote.***

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, M/s Visiontek Consultancy Services Pvt. Ltd., Bhubaneswar made a presentation and inter-alia provided the following information.

3. The proposed TPP will be installed within the existing power plant of 110 acres. The fuel proposed to be used is imported coal from Indonesia and washery by products. The Sulphur and ash contents in the imported coal will be 0.3 % and 6.0 % respectively. The water requirement is 643.6 m³/h and will be sourced from the existing reservoir of steel plant which is connected to Brahmani River. Induced draft cooling towers will be used. The project cost is Rs. 924 crores and the cost of Pollution control systems is Rs. 70.7 crores.

4. Proposed power plant shall be adjacent to existing 2 X 150 MW power plant. Environmental clearance was accorded by SEIAA, Odisha for existing power plant on

15.12.2009. CFBC boilers, 2 x 425 TPH are proposed to generate steam to run 185 (165+20) MW steam turbine generators. Two cases under Water Act and Air Act have been registered at CJM, Dhenkanal.

5. The cumulative impacts of the AAQ have been assessed for 15 km radius. Base line data of AAQ monitored at twelve locations indicates that concentrations of PM₁₀, SO₂ and NO_x are varying from 37.1 µg/m³ to 62.4 µg/m³, 17.7 µg/m³ to 31.9 µg/m³ and 16.1 µg/m³ to 27.3 µg/m³ respectively. The predicted maximum incremental GLCs due to the proposed unit would be 35.35 µg/m³, 26.9 µg/m³ and 12.34 µg/m³ with respect to PM₁₀, SO₂ and NO_x respectively. The resultant concentrations are within the NAAQS. The PP has committed for installation of 220 m height of stack since the overall capacity is more than 350 MW.

6. Entire wastewater from plant will be treated and recycled. Existing ETP will be used to treat wastewater from cooling tower, boiler blow down and DM plant. Fly Ash – 0.08 MTPA and Bottom Ash – 0.04 MTPA will be generated. The ash from the existing Unit is being filled in the mine void of Jagannath colliery no. 4 of MCL and abandoned stone quarries at Hindol. Bulkers are used for transporting the Fly Ash from plant to Jagannath mine Void and it is proposed to lay ash slurry pipeline from the plant to Jagannath mine void. Permission from Department of Water Resources, Govt. of Odisha and Consent to establish from SPCB, Odisha has been received. Fly Ash is being exported to neighboring countries like Bhutan, used for cement plants and road development. Fly ash brick making units of 4000 bricks per hour capacity have already been installed for producing bricks. The same method of ash disposal is envisaged for 100 % fly ash utilization of the proposed TPP which was recommended in the fly ash utilization Notification. The PP has filed petition before Hon'ble NGT for stay to continue mine void filling in line with another company who was granted stay for the same and the PP is confident of getting stay. If fly ash disposal into mine void is stopped for all the industries, it is planned to export the maximum quantity of ash to the neighboring countries for which the PP had already initiated export to M/s. Pendent Cement, Bhutan where one trial consignment has been exported on trial basis and recently the same has been approved for regular dispatch. The PP is also in touch with few other clients in Bangladesh and expected to secure some orders. Manufacture of bricks in huge quantity can be envisaged subject to the Government's policy on red brick manufacturing etc.

7. Green belt /green area has been developed in 10 % of the total area of the existing steel & power plant complex till 2013-2014. Since, development of 33% of green area within the complex is very difficult, it is planned to develop 33% green areas within and outside the complex by 2017-18. *The committee observed that all the green areas like gardening etc. are not considered as green belt and also the proposal of PP to develop greenbelt outside the complex is not acceptable. The committee recommended that the PP shall develop three tier greenbelt all around the boundary totaling to 33 %, which is mandatory for all the industries/power plants.*

8. The Ministry's Regional Office has monitored the existing project on 01.10.2014 and inter-alia recommended that the PP shall take suitable corrective measures to reduce the noise levels and submit an implementation schedule for rain water harvesting. In response, the PP has submitted an action plan for rain water harvesting. The study on rain water harvesting potential in plant area has been completed by M/s. S.M Water Solutions, Bhubaneswar and the report is being sent to CGWB for approval. The commissioning of Phase

I and Phase II rain water harvesting systems are targeted for 30.05.2015 and 30.05.2016 respectively.

9. In compliance to the action plan formulated by SPCB for the CEPI regarding thermal power plants, 10 number of ESPs attached to WHRBs and 3 number of ESPs attached to BFPP have been designed for 50 mg/nm³ with all the fields in operation. The results are well within the prescribed limit. All necessary permissions regarding HCSD/Mine void filling were obtained. Cast basalt lined slurry pipes have been procured and complete installations will be done in 24 months. Till then ash transportation will be done via road through bulkers. 41 online dust monitors have been installed in all major stacks with display facility. The data from one of these stacks is being transmitted to SPCB server through GPRS. 5 silos of 200 T at WHRB, 1 silo of 200 T at AFBC, 2 silos of 500 T & 200 T each at BFPP, 4 silos of 1000 T and 2 intermediate silos of 250 T at CFBC have been installed. 4 CAAQMS installed in the steel plant and power plant complex in consultation with SPCB. The data from one CAAQMS is being transmitted to SPCB server through GPRS. 17 settling tanks, 2 ETPs, 5 STPs, 2 BOD plants, 2 solar evaporation ponds and 3 lagoons were installed to ensure zero discharge except during monsoon where surface run off goes out through lagoons.

10. Public Hearing was conducted by the OSPCB on 23.08.2013. The Committee discussed the issues raised in the public hearing and the responses made by project proponent. It was noted that the major issues raised were regarding massive plantation programme by the PP, discharge of untreated black coloured affluent to River Brahamani, proper ash management and disposal, provision of adequate medical facilities, drinking water facilities and free electricity to the nearby villages etc.

11. An amount of Rs. 13.75 crores has been incurred for various CSR activities. The details have been submitted. A fund of Rs. 30 crores is earmarked for CSR activities over a period of 5 years.

12. 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 specific conditions:

- i) Harnessing solar power within the premises of the plant particularly at available roof tops shall be carried out and status of implementation shall be submitted periodically.
- ii) A long term study of radio activity and heavy metals contents on coal to be used shall be carried out through a reputed institute and results thereof analyzed every two year and reported along with monitoring reports. Thereafter mechanism for an in-built continuous monitoring for radio activity and heavy metals in coal and fly ash (including bottom ash) shall be put in place.
- iii) A stack of 220 m height shall be provided with continuous online monitoring equipments for SO_x, NO_x and PM_{2.5} & PM₁₀. Exit velocity of flue gases shall not be less than 22 m/sec. Mercury emissions from stack shall also be monitored on periodic basis.
- iv) *Sulphur and ash contents in the imported coal to be used in the project shall not exceed 0.3 % and 6.0 % respectively at any given time. In case of variation of coal*

- quality at any point of time, fresh reference shall be made to the Ministry for suitable amendments to environmental clearance condition wherever necessary.*
- v) High Efficiency Electrostatic Precipitators (ESPs) shall be installed to ensure that particulate emission does not exceed 50 mg/Nm³. Adequate dust extraction system such as cyclones/ bag filters and water spray system in dusty areas such as in coal handling and ash handling points, transfer areas and other vulnerable dusty areas shall be provided.
 - vi) COC of atleast 5.0 shall be adopted.
 - vii) Monitoring of surface water quantity and quality shall also be regularly conducted and records maintained. The monitored data shall be submitted to the Ministry regularly. Further, monitoring points shall be located between the plant and drainage in the direction of flow of ground water and records maintained. Monitoring for heavy metals in ground water shall be undertaken.
 - viii) A well designed rain water harvesting system shall be put in place within six months, which shall comprise of rain water collection from the built up and open area in the plant premises and detailed record kept of the quantity of water harvested every year and its use.
 - ix) Fly ash shall be collected in dry form and storage facility (silos) shall be provided. Unutilized fly ash shall be disposed off in the ash pond in the form of slurry. Mercury and other heavy metals (As, Hg, Cr, Pb etc.) will be monitored in the bottom ash as also in the effluents emanating from the existing ash pond. No ash shall be disposed off in low lying area.
 - x) *In compliance to Hon'ble NGT's Order, no mine void and stone abandoned quarry filling of fly ash is permitted till further Orders.*
 - xi) Ash pond shall be lined with HDPE/LDPE lining or any other suitable impermeable media such that no leachate takes place at any point of time. Adequate safety measures shall also be implemented to protect the ash dyke from getting breached.
 - xii) Green Belt consisting of three tiers of plantations of native species around the plant and at least 50 m width shall be raised. Wherever 50 m width is not feasible green belt of 20 m width shall be raised and detailed justification shall be submitted to the Ministry. Tree density shall not be less than 2500 per ha with survival rate not less than 80 %. *Only native species shall be planted and the green belt development shall be expedited.*
 - xiii) CSR schemes identified based on Public Hearing issues and need based assessment shall be implemented in consultation with the village Panchayat and the District Administration starting from the development of project itself. As part of CSR prior identification of local employable youth and eventual employment in the project after imparting relevant training shall be also undertaken. Company shall provide separate budget for community development activities and income generating programmes.
 - xiv) As committed, a minimum amount of Rs 40.0 Crores shall be earmarked for CSR activities for the next five years. For proper and periodic monitoring of CSR activities, a CSR committee or a Social Audit committee or a suitable credible external agency shall be appointed. CSR activities shall also be evaluated by an independent external agency. This evaluation shall be both concurrent and final.
 - xv) An Environmental Cell comprising of at least one expert 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.

Any other items with the permission of the Chair.

3.1 2x660 MW Coal based Katwa STPP at Villages Srikhanda and Koshigram, near Town Katwa, District Burdwan, West Bengal by M/s NTPC Ltd. – reg. ToR

1. The project proponent made a presentation and inter-alia provided the following information. Katwa STPP (2x600 MW) was conceived by M/s West Bengal Power Development Corporation Limited (WBPDC) and EC for 2x600 MW capacity was accorded to WBPDC by the Ministry on 01.05.2008. After accord of EC, WBPDC started various activities related to land acquisition, construction of boundary wall and office complex etc. Subsequently, WBPDC decided to change the capacity of project to 2x800 MW and revised TOR for 2x800 MW was accorded by the Ministry on 13.05.2011. The project was transferred to NTPC on 27.02.2014 and the capacity of the project was finalized by NTPC as 2x660 MW (based on super critical units) in place of earlier proposed sub-critical units of 2x600 MW. NTPC had requested the Ministry for revalidation, transfer and change in capacity of the EC. However, the Ministry has recommended for a fresh application for the TOR.
2. The land requirement is 911 acres of which about 781 Acres (556 acres acquired + 225 acres to be acquired) is private land and 130 acres is Government land. In addition, about 50 acres of land is proposed to be leased for labour colony. There is no change in location of the project site for which EC was accorded by the Ministry. There are no major industries within 10 Km. from the proposed site. There is no ecologically sensitive area such as Biosphere Reserve, National Park and Wildlife Sanctuary within a radius of 10 Km. from the site.
3. The coal requirement is 7.5 MTPA based on GCV of 3000 kcal/kg and 90% PLF. The total pool of coal sources of WBPDC and receivables from CIL (initially) and Deocha-Pachami Captive Coal Block of WBPDC from April, 2018 is available. The water requirement is 4100 m³/h and will be sourced from Bhagirathi River. Ministry of Shipping, Road Transport & Highways, has already accorded clearance for consumptive use of 42 Cusecs of water from Bhagirathi River on 23.10.2006 and Dept. of Irrigation & Waterways, Govt. of WB has accorded NOC on 28.05.2007.
4. *Based on the information provided and the presentation made, the Committee recommended the standard TOR (as applicable) at **Annexure-A1** for undertaking detailed EIA study and preparation of EMP.*

3.2 Expansion of Ramagundam STPP by addition of 2x660 MW (Stage-IV, Telangana STPP, Phase-I) at village Ramagundam, in Ramagundam Mandal, in Karimnagar Distt., in Telangana by M/s. NTPC Ltd. - reg. amendment of ToR for revision of capacity to 2X800 MW

1. The project proponent made a presentation and inter-alia provided the following information. NTPC is presently operating a coal based 2600 MW (Stage-I, II & III) Thermal Power Station at Ramagundam in Karimnagar District of Telangana. TOR for carrying out EIA study for Ramagundam STPP Stage-IV (Telangana STPP, Phase-I) for 2x660 MW was

accorded by the Ministry on 16.09.2014. The present request is to amend the TOR with revised capacity/configuration of 2x800 MW for submission of Final EIA/EMP report.

2. It is proposed to allocate 100% power to Telangana State subject to approval by Ministry of Power. Considering the location and optimization of available space at both locations to accommodate 4000 MW, 800 MW units have been proposed. Telangana STPP, Ph-I (2x800 MW) to be located within NTPC's existing Ramagundam Station MGR unloading bulb. Telangana STPP, Ph-II (3x800 MW) proposed to be set up in the land where M/s BPL's Project was to come up in nearby area (for this NTPC shall approach Ministry in due course).

3. About 250 acres of land is available inside MGR bulb for 2x800 MW units. Govt. Land to the tune of 600 acres is expected to be made available by State Govt. The water requirement is 45 Cusecs with AWRS and shall be sourced from Sriram Sagar Dam/ Yellampalli Barrage on River Godvari at a distance of approximately 12 Km.. Water commitment available for RSTPP shall be sufficient to meet the water requirement for proposed expansion. However, Govt. of Telangana has also assured that water shall be made available for the proposed power plant.

4. Coal requirement for the project is estimated as 7.37 MTPA (20197 T/day) corresponding to 90% PLF considering station heat rate of 2247.97 kcal/kWh. Presently coal is sourced from SCCL and the same is transported through MGR system. Govt. of Telangana has conveyed in-principle approval for transfer of coal linkage accorded to erstwhile BPL plant for 600 MW (3.5 MTPA) to NTPC for the project vide letter from Govt. of Telangana dated 13.10.2014. Further, Govt. of Telangana has requested Ministry of coal (MoC), Govt. of India vide letter dated 04.10.2014 to allot 8 MTPA coal for Telangana STPP Phase-I (2x800 MW) starting from 01.04.2018. Considering the limitation in coal availability from SCCL, coal may be sourced either from SCCL or other sources i.e. MCL & SECL through coal.

5. *Based on the information provided and the presentation made, the Committee recommended the Amendment of ToR dated 16.09.2014 for revision of capacity to 2X800 MW by prescribing the following additional ToR.*

(i) Ash pond shall be restricted to 400 acres.

(ii) Land use classification of the proposed ash pond.

(iii) Detailed fly ash utilization till date and proposed plan along with compliance to the fly ash utilization Notification.

3.3 Proposed Site Visit of Sub-Committee of EAC to the following projects

- (i) Expansion by addition 2x830 MW (Phase-II) Supercritical Imported Coal fired Based Thermal Power at Village Tunda Wand, in Mundra Taluk, in Kutch Distt., in Gujarat by M/s. Coastal Gujarat Power Ltd. - reg. EC**
- (ii) 3300 MW (5X660 MW) Power Project at Village Bhadreshwar, Mundra Taluk, Kutchh Distt., in Gujarat by M/s Kutchh Power Generation Ltd. – reg. ToR**

1. The above proposals were appraised by the Committee in its 18th and 22nd meetings held during 31st July -1st August, 2014 and 25th - 26th September, 2014 respectively. It was decided by the committee that a site visit by a sub-committee of the EAC is a necessity before

taking a decision for the TORs, as the area is ecologically sensitive and the damage to mangroves in the area has been reported. The Ministry referred the matter to EAC for further clarification on the site visit. Site visits to the UMPPs are critical to assess the impacts on the ecological sensitivity, (fishery, mangroves, and river, estuarine and sea waters), and to suggest mitigative measures to adverse impacts.

2. The Committee inter-alia observed that the proposal of M/s. Coastal Gujarat Power Ltd. is an expansion project in the existing UMPP located in ecologically sensitive area where another TPP of 3000 MW is also located which is close to Mitha River and Gulf of Kutch. Further, the Ministry's R.O compliance report of the EC of existing UMPP show that some of the conditions like mangrove plantation, green belt etc. are either non-complied/partly complied. Fishery zones are also located within 10 km radius.

3. In view of above the committee re-iterated the need for a site visit by a sub-committee before the ToR is accorded to the above proposed projects.

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

Terms of Reference (TOR):

- i) Vision document specifying prospective long term plan of the site, if any, shall be formulated and submitted.
- ii) Certified compliance report from the Regional Office of MoEF for the conditions stipulated in the environmental and CRZ clearances of the previous phase(s), as applicable, shall be submitted.
- iii) Executive summary of the project indicating relevant details along with recent photographs of the approved site shall be provided. Response to the issues raised during Public Hearing and to 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.
- iv) Harnessing solar power within the premises of the plant particularly at available roof tops and other available areas shall be formulated and status of implementation shall be submitted to the Ministry.
- v) The coordinates of the approved site including location of ash pond shall be submitted along with topo sheet (1:50,000 scale) and confirmed GPS readings of plant boundary and NRS satellite map of the area, shall be submitted. Elevation of plant site and ash pond with respect to HFL of water body/nallah/river shall be specified, if the site is located in proximity to them.
- vi) Layout plan indicating break-up of plant area, ash pond, area for green belt, infrastructure, roads etc. shall be provided.
- vii) 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 and revised layout (as modified by the EAC) shall be provided.
- viii) Present land use as per the revenue records (free of all encumbrances of the proposed site, shall be furnished. Information on land to be acquired) if any, for coal transportation system as well as for laying of pipeline including ROW shall be specifically stated.
- ix) The issues relating to land acquisition and R&R scheme with a time bound Action Plan should be formulated and clearly spelt out in the EIA report.
- x) Satellite imagery or authenticated topo sheet indicating drainage, cropping pattern, water bodies (wetland, river system, stream, nallahs, ponds etc.), location of nearest villages, creeks, mangroves, rivers, reservoirs etc. in the study area shall be provided.
- xi) 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 Office of the Chief Wildlife Warden of the area concerned.
- xii) 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 fill material required; its source, transportation etc. shall be submitted.
- xiii) 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 to be acquired is developed alternatively and details plan shall be submitted.

- xiv) A mineralogical map of the proposed site (including soil type) and information (if available) that the site is not located on economically feasible mineable mineral deposit shall be submitted.
- xv) Details of 100% fly ash utilization plan as per 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.
- xvi) Water requirement, calculated as per norms stipulated by CEA from time to time, shall be submitted along with water balance diagram. Details of water balance calculated shall take into account reuse and re-circulation of effluents which shall be explicitly specified.
- xvii) Water body/nallah (if any) passing across the site should not be disturbed as far as possible. In case any nallah / drain has to be diverted, it shall be ensured that the diversion does not disturb the natural drainage pattern of the area. Details of diversion required shall be furnished which shall be duly approved by the concerned department.
- xviii) 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.
- xix) 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.
- xx) 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/creek/ 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.
- xxi) 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. Commitment regarding availability of requisite quantity of water from the Competent Authority shall be provided along with letter / document stating firm allocation of water.
- xxii) Detailed plan for carrying out rainwater harvesting and its proposed utilization in the plant shall be furnished.
- xxiii) Feasibility of zero discharge concept shall be critically examined and its details submitted.
- xxiv) Optimization of COC along with other water conservation measures in the project shall be specified.
- xxv) Plan for recirculation of ash pond water and its implementation shall be submitted.
- xxvi) 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.
- xxvii) Socio-economic study of the study area comprising of 10 km from the plant site shall be carried out by a reputed institute / agency which shall consist of detail assessment of the impact on livelihood of local communities.
- xxviii) 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.
- xxix) 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.
 - xxx) 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. Sustainable income generating measures which can help in upliftment of poor 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.
 - xxxii) 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.
 - xxxiii) 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.
 - xxxiiii) Assessment of occupational health as endemic diseases of environmental origin shall be carried out and Action Plan to mitigate the same shall be prepared.
 - xxxv) 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 years shall be conducted with an excellent follow up plan of action wherever required.
 - xxxvi) One complete season site specific meteorological and AAQ data (except monsoon season) as per MoEF Notification dated 16.11.2009 shall be collected and the dates of monitoring recorded. The parameters to be covered for AAQ shall include SPM, RSPM (PM10, PM2.5), SO₂, NO_x, Hg and O₃ (ground level). The location of the monitoring stations should be so decided so as to take into consideration the pre-dominant downwind direction, population zone, villages in the vicinity and sensitive receptors including reserved forests. 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.
 - xxxvii) A list of industries existing and proposed in the study area shall be furnished.
 - xxxviii) Cumulative impact of all sources of emissions (including transportation) on the AAQ of the area shall be well assessed. 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 wind roses should also be shown on the location map as well.
 - xxxix) Radio activity and heavy metal contents of coal to be sourced shall be examined and submitted along with laboratory reports.

- xxxix) Fuel analysis shall be provided. Details of auxiliary fuel, if any, including its quantity, quality, storage etc should also be furnished.
- xl) Quantity of fuel required, its source and characteristics and documentary evidence to substantiate confirmed fuel linkage shall be furnished.
- xli) 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 ii) For proposals based on imported coal, inland transportation and port handling and rolling stocks /rail movement bottle necks shall be critically examined and details furnished.
- xl iii) 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 iv) 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 v) 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.
- xl vi) The DMP so formulated shall include measures against likely Tsunami/Cyclones/Storm Surges/Earthquakes etc, as applicable. It shall be ensured that DMP consists of both on-site and off-site plan, complete with details of containing likely disaster and shall specifically mention personnel identified for the task. Smaller version of the plan shall be prepared both in English and local languages.
- xl vii) Detailed plan for raising green belt of native species of appropriate width (50 to 100 m) and consisting of at least 3 tiers around plant boundary (except in areas not possible) with tree density of 2000 to 2500 trees per ha with a good survival rate of about 80% shall be submitted. Photographic evidence must be created and submitted periodically including NRSA reports.
- xl viii) Over and above the green belt, as carbon sink, additional plantation shall be carried out in identified 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.
- xl ix) 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 system of reporting of non compliances / violations of environmental norms to 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.

- l) Details of litigation pending or otherwise with respect to project in any court, tribunal etc. shall invariably be furnished.

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 agency shall be submitted.
- c) The soil levelling 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 bunds should be strengthened and desilted.
- d) Additional soil for leveling of the sites should be generated as far as possible within the sites, in a way that natural drainage system of the area is protected and improved
- e) Marshy areas which hold large quantities of flood water shall 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. The outfall should be first treated in a guard pond (wherever feasible) and then 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 of **Fishermen Welfare Fund** should be created out of CSR grants not only to enhance their quality of life through 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 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 is fertile agricultural land used for paddy cultivation.

(Dr. 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. Ratnavel)
Member Secretary

(Dr. Saroj)
Member Secretary