MINUTES OF THE 68TH MEETING OF RE-CONSTITUTED EXPERT APPRAISAL COMMITTEE ON ENVIRONMENTAL IMPACT ASSESSMENT OF THERMAL POWER AND COAL MINE PROJECTS

The 68th Meeting of the reconstituted Expert Appraisal Committee (Thermal) was held on **February 26, 2013** at Scope Convention Centre, SCOPE Complex, Lodhi Road, New Delhi. The members present were:

1.	Dr. C.R. Babu	-	Vice-Chairman
2.	Shri T.K. Dhar	-	Member
3.	Shri J.L. Mehta	-	Member
4.	Dr. G.S. Roonwal	-	Member
5.	Shri M.S. Puri	-	Member
6.	Dr. S.D. Attri	-	Member
7.	Dr.Saroj	-	Member Secretary

Shri V.P. Raja (Chairman), Member Secretary, CPCB; Dr. CBS Dutt, Dr. K.K.S. Bhatia and Shri V.B. Mathur were absent. The meeting was chaired by Dr C.R. Babu, Vice-Chairman.

In attendance: Sh. W. Bharat Singh, Deputy Director, MoEF.

The deliberations held and the decisions taken are as under:

CONFIRMATION OF THE MINUTES OF THE LAST MEETING.

The minutes of the 66th Meeting held during February 5-6, 2013 were deliberated and some minor changes were suggested and recommended for confirmation of the Chairman.

1. Expansion by addition of 500 MW (Stage-IV) Coal Based Thermal Power Plant at Feroz Gandhi Unchahar Thermal Power Station of M/s NTPC Ltd. at Raebareli District, in Uttar Pradesh - reg. Environmental Clearance reconsideration.

The proposal was earlier considered in the 64th meeting and 66th meeting held during January 7-8, 2013 and February 5-6, 2013, respectively. The project proponent in the 64th meeting gave a presentation and provided the following information:

The proposal is for expansion by addition of 500 MW (Stage-IV) Coal Based Thermal Power Plant at Feroz Gandhi Unchahar Thermal Power Station at Raebareli District, in Uttar Pradesh. The total existing capacity of the power plant is 1050 MW, consisting of Stage-I (2x210 MW); Stage-II (2x210 MW)

&Stage-III (1x210 MW). No additional land is required for the expansion by addition of Stage-IV (1x500 MW). The same will be accommodated within available land, which is about 2203 acres. The co-ordinates of the site are located within Latitude 25^{0}53'55" N to 25^{0}54'56" N and Longitude 81^{0}18'50"E to 81^{0}20'25"E. Coal requirement for the expansion will be 2.14 MPTA and will be obtained from:(a) Talaipalli Coal Block (1.0 MTPA; (b) 0.5 MTPA from Pakri Barwadih Coal Block; and (c)0.64 MPTA will be imported coal. Ash and sulphur content of blended coal will be 29-31% and 0.62%. Average Calorific value of the blended coal will be 4190-4470 kcal/kg. About 1428 T/day of fly ash and 357 T/day of bottom ash will be generated. Water requirement of 1980cum/hr will be sourced from Sharda Sahayak Canal (normally)/ Dalmau Pumped Canal (during the closer of Sharda Shayak Canal) through a pipeline which is adjacent to the plant boundary. Irrigation Department had allocated 125 cusecs of water for Unchahar TPP. The water requirement for Stage-IV shall be accommodate within the existing water allocation. No additional land is required for ash dyke for Stage-IV and the unutilized ash shall be disposed off in the existing ash dykes of Stage-I & Stage-II. The co-ordinates of the existing two ash dykes are as follows: Stage-I ash dyke are located within Latitude 25^{0}50'13" N to 25^{0}51'29" N and Longitude 81^{0}17'39"E to 81^{0}18'54"E and Stage-II ash dyke are located within Latitude 25^{0}57'07" N to 25^{0}57'50" N and Longitude 81^{0}21'19"E to 81^{0}21'58"E. Nearest town is Mustafabad located at about 3 kms in the west. Samaspur Bird Sanctuary located at 7.9 Km from the project site. Application for clearance from wildlife angle has already submitted to Chief wildlife Warden and conservation plan has been drawn in consultation with Chief wildlife Warden. There are no National Parks, Wildlife Sanctuaries, Heritage Sites, Tiger/Biosphere Reserves etc. within 10 km of the project site. Public Hearing was held on 26.04.2012. Cost of the project will be Rs2848.52Crores.

In the said 64th meeting, M/s NTPC also informed that the power plant was taken over from the then State Electricity Board, U.P and the PLF before take over was only 31%. After take over, the PLF increased to 69 % within first six months and is now operating above national average PLF of 73.29% at 93.28% and was ranked amongst the top 10 power plants.

The Committee had also discussed the issues raised in the Public Hearing and the response made by M/s NTPC Ltd. The major issues raised were regarding why study area of only 10 kms has been considered; afforestation and maintenance thereafter; access to medical treatment for local people; contribution of NTPC at local district level; pending issues in High Court and non-compliance of court orders; repair for roads from Unchahar to Salon; development of Joint Committee for local development; depletion of ground water level; local not getting electricity; acute problem of mosquitoes; disposal of ash generated from power plant; benefits to local people after NTPC's take over improved drastically; seepage due to ash dyke making land barren; regularly testing / monitoring of pollution within 10 kms etc.

With regard to afforestation, M/s NTPC Ltd. clarified that besides plantations done in their plant premises, afforestation in forests area had also been carried out in the last three years with the help of Forests Dept. They however had no control over the forests area. It was stated that CSR activities for Stage-IV would be undertaken for a separate budget beginning from the development of the project itself. It was also informed that in view of a circular by the Ministry of Power for provision of electricity within 5 kms from the power project, M/s NTPC Ltd. have undertaken feasibility study for providing infrastructural facilities for power supply within 5 kms radius of the project but its distribution will be done by the State Govt.

With regard to issue raised on pending High Court cases, M/s NTPC clarified that there was no case pending in the High Court as far as NTPC is concerned.

On the issue of repair/construction of road from Unchahar to Salon, M/s NTPC Ltd. stated that required amount of capital involved has already been paid to State PWD and repair/construction has since been completed. It was also stated that community development and social welfare schemes are undertaken based on need and requirement of local people and in consultation with the State Govt. and local people. That village development advisory committee (VDAC) consisting of Gram Pradhan, BDO and NTPC representative is already in existence and schemes in areas of health, education and vocational training have since been undertaken in consultation with it.

Regarding issue of ground water it was clarified that no ground water is extracted for the power project or any of its activity.

The issue of seepage from canals and alleged salinization of land is reported to be prevalent in the area. It was stated that NTPC has already undertaken a survey through IIT, Kanpur to study the problem of seepage around Umran Ash pond and report is awaited and action would be taken based on the recommendations made in the report. That as an interim measure, a drain has been constructed around the ash dyke. It was also stated that flyash utilization of NTPC Unchahar TPP is very high and only pond ash is being disposed off in ash dykes.

M/s NTPC also made a presentation on TOR point wise compliance and the status of compliance with the conditions stipulated in the environmental clearances accorded for earlier stages.

M/s NTPC informed that within 15 kms area there were no industrial activities including TPP and no new industrial project (including TPP) is known to be proposed and accordingly cumulative impact assessment taking into consideration of other activities has, therefore not been carried out. However while assessing the impact due to addition of Stage-IV, the baseline AAQ has

taken the existing units in the power station and other existing activities in the study area.

The Committee felt that Conservation Action Plan for birds in the Bird Sanctuary and the marshes if not already done need to be submitted for its perusal. The EAC pointed out that tripping due to bird hits on transmission line are a serious matter and the project proponent need to look into this seriously in their own interest. The Committee felt that the green belt development needs to be depicted with photographs along with layout of proposed green belt development.

The Committee also felt that the impact (if any) due to the project on the Ganga Action Plan may be furnished / clarified.

The Committee also observed that the fly ash management need to be revisited and a report submitted to this effect. It was also observed that monitoring report of ground water quality around ash pond should be carried out which would form a part of the condition in the environmental clearance for the Stage-IV.

In view of the shortcomings as pointed above, the proposal was deferred for re-consideration at a later stage in the 64th meeting. It was also decided that in case the information could be furnished timely, the matter could be placed in the next month for re-consideration.

On submission of clarifications on report on ash dykes; Conservation Plan for Marsh Lands and Birds; and documents on National Ganga River Basin Authority the matter was once again taken up in the **66th meeting** held during February 5-6, 2013.

On the issue of conservation action plan for Marshes and Birds, M/s NTPC informed that the conservation plan has been prepared based on the following studies:

a) Monitoring of Biological Quality of water quality of Samaspur Lake and Sai River by Central Pollution Control Board in the year 2002;
b) Bird hits on transmission lines of Feroz Gandhi Unchahar TPP by the Dept. of Wildlife Sciences, Aligarh Muslim University (2010), which was sponsored by M/s NTPC Ltd.;
c) Ecological sustainability of Samaspur Bird Sanctuary by The Energy Research Institute (TERI) in 2010 sponsored by the Ministry of Environment & Forests; and
d) EIA study of FG Unchahar TPP (Stage-IV) 2011 undertaken by M/s Vimta Labs Ltd., Hyderabad.

The Committee was also informed by M/s NTPC that an annual budget of Rs0.50 Crores is earmarked for conservation of the bird sanctuary and the marshes.

M/s NTPC also made a presentation on the recommendations of the Ganga Action Plan and stated the following:

That the Central Government vide notification dated 20.2.2009, has set up 'National Ganga River Basin Authority' (NGRBA) to ensure effective abatement of pollution and conservation of the River Ganga by adopting a holistic approach with the river basin as the unit of planning. That the Prime Minister is ex-officio Chairperson of the Authority, which has as its members, the Union Ministers concerned and the Chief Ministers of States through which River Ganga flows, viz., Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal, among others. That the functions of the Authority include all measures necessary for planning and execution of programmes for abatement of pollution in the River Ganga keeping with sustainable development needs.

It was also informed that under NGRBA, two High Level Committees have been constituted first viz. Standing Committee of NGRBA under the Chairmanship of Union Finance Minister of India. This Committee functions on behalf of NRGBA to periodically review and assess implementation of schemes. The second is the Empowered Steering Committee of NGRBA under the Chairmanship of Secretary (MoEF) constituted for sanction of projects and release of funds. The following information was also provided:

- That under the Mission Clean Ganga 2020, it will be ensured that by 2020 no untreated municipal sewage or industrial effluents flow into Ganga.
- Whereas a comprehensive Ganga River Basin Management Plan is being prepared by IIT Consortium, urgent action was required to treat the domestic sewage and industrial effluents to maintain ecological flow in river.
- Need for conserving and reviving wetlands in Ganga Basin, which will ensure greater flow in the river along its flood plain.
- The problem of solid waste need to be tackled in addition to untreated sewage.
- The treated final effluent, instead of being discharged into the river, may be used for irrigation, horticulture and industrial applications to the extent possible.
- Reuse of treated effluent is necessary to ensure flow of better quality water in river.
- A major component in the NGRBA programme framework pertains to dealing with CETPs to control industrial pollution. The states were advised to facilitate formation of Societies/ SPVs for creating proper common infrastructure and CETPs to treat effluents. The critical industries

mentioned are sugar, pulp and paper, tanneries and petrochemical industries.

M/s NTPC informed that old ash dykes viz. Arkha Ash Dyke is located in the south west direction at about 4.2 Km from the project site and Umran Ash Dyke is located in the north east direction at about 4.6 kms from the site. That ash is transported in slurry form and ash pond water is being recycled. That the same ash dyke is proposed to be used for Stage-IV also.

The Committee noted that the present ash pond location reportedly on the bank of Ganga need to be carefully studied to avoid any future calamity such as ash dyke breach. That any breach in the ash dyke will adversely affect drinking water from the river Ganga downstream and the seriousness of an accidental mishap maybe due to natural disaster cannot be ignored. The Committee therefore desired to know the possibility for location of ash pond elsewhere, away from the banks of River Ganga, to which M/s NTPC informed that availability of land in the area is a great difficulty.

The Committee therefore decided that a sub-group chaired by Dr. C.R. Babu and comprising of Sh. M.S. Puri; Sh. T.K. Dhar, EAC Member may undertake a site visit soon and submit a report.

In the view of the above the proposal was deferred for reconsideration at a later stage. It was also decided that a special meeting could be convened once the sub-group's report is submitted and the proposal could be taken up considering that the project is of National importance entailing additional 500 MW of power addition to the national grid.

On submission of the site inspection report the matter was again taken up in the 68th meeting held on February 26, 2013.

The Committee deliberated at length the site inspection report and noted the information provided by the sub-group as contained in the report summarized as under:

Feroz Gandhi Unchahar Thermal Power Station (FGUTPS) consists of 5 units of coal based power plant having 1050 MW capacity and is located in Unchahar in Rae Bareli district of Uttar Pradesh. Stage-I of the power station (2x210 MW) was commissioned by UP Rajya Vidyut Utpadan Nigam Limited (UPRVUN) in 1988-89 and was taken over by NTPC in the year 1992. NTPC commissioned Stage-II (2x210 MW) and Stage-III (1x210 MW) in 1999 and 2006, respectively. The present installed capacity of the power plant is 1050 MW. As per the EIA, no record of environmental clearance from MoEF nor No Objection certificate for Stage-I was made available to NTPC by UPRVUN. Environmental clearance for Stage-II was accorded to UPRVUN by MoEF, which was transferred to NTPC and environmental clearance for Stage-III was obtained by NTPC from MOEF.

No Objection Certificates for Stage-II and III were also obtained by NTPC from UP Pollution Control Board.

The total area of FGUTPS is 2203 acres which includes the main plant area of Stages-I, II and III having a total capacity of 1050MW and its two ash dykes. The ash dykes of these three stages (2x210 MW, 2x210 MW and 1x210 MW) are located near Arkha and Umran villages. The Arkha ash dyke spreads over an area of 600 acres and is located 4.2 km. south west of TPP on the northern side of Ganges. The Umran ash dyke covers over an area of 200 acres and is located 4.6 km north east of TPP and is surrounded by marshes all around. Pratapgarh Branch of Sharda Sahayak canal is located about 350 m north of the ash dyke.

The project was appraised again by EAC in its meeting held on 5th February, 2013, after submission of additional information by NTPC. During the presentation, it was observed that Arkha ash dyke is close to the northern bank of the river Ganges. The Committee, therefore, decided that a sub-group consisting of Sh. T. K. Dhar, Sh. M. S. Puri and Prof. C. R. Babu should visit the site and evaluate critically the following:

1. Whether the Arkha ash dyke is located on the flood plains of Ganges?
2. Whether the ash slurry from the dyke is discharged into Ganges and its flood plain?
3. Whether Umran Ash Dyke is discharging its effluents into Allahabad and Pratapgarh Branches of Sharda Sahayak Canal?
4. Whether ash dyke has any impact on the surrounding marshes and on Samaspur Bird Sanctuary?
5. Whether the existing two ash dykes are adequate enough to hold the additional ash generated by proposed Stage-IV unit?
6. Whether discharge from Arkha ash dyke has any impact on the quality of water in the downstream of Ganges?

The sub-group also sailed on the river Ganges by boat over a distance of about 10 km. covering both upstream and downstream from Arkha ash dyke. The sub-group also interacted with local communities living close to both the ash dykes. The sub-group also examined the marshes located around the Umran ash dyke and Samaspur Bird Sanctuary located at a distance of about 8 km from the boundary of the power station.

The entire FGUTPS is surrounded by fertile double/ multiple crop fields, marshes of various sizes and depths and sodic waste lands. Samaspur Bird Sanctuary is a network of marshes spreading over an area of about 800 hectares. The major function of these marshes is to hold the drainage from the fields and flood waters, recharge bore wells during dry season and also serve as common grazing land during dry season. Many of these marshes are converted into agricultural fields, the consequence of which is the salinisation of the entire area. *The diversity of the birds is very low possibly due to disturbance*

from local communities, who practice fishing and bird poaching. The crops grown during cold season are mustard, wheat, vegetables, spices and other condiments. The main power plant has thick greenbelt and the colony has a fairly dense tree cover. Agroforestry is common with *Eucalyptus* trees along the bunds and in small patches between the fields. Ash Dyke-I (Arkha Dyke) is located near Arkha village and is about 4.2 km. south west of main plant and is about 1 to 1.55 km. from the left bank of Ganga Channel (when sailing towards downstream from Arkha dyke). In fact, the southern embankment of the ash dyke perhaps touches the High Flood Line of Ganges. There are un-eroded alluvium mounds in the flood plain along the embankment of the ash dyke.

The second ash dyke (Umran dyke) is located at north east of Ganges and south west of Pratapgarh Branch of Sharda Sahayak Canal and east of Allahabad Branch of Sharda Sahayak Canal.

The Arkha ash dyke spreads over an area of about 600 acres near village Arkha. The height of the dyke varies from 5 to 7 meters. There are toe and garland drains. The width of the embankment at the top is about 7 m with a slope of 1(V):3(H). The outer surface of the embankment (downstream) is cemented with or without stone pitching. There are two lagoons with two cascade spillways to discharge excess rain water into one drain running along the south facing bund. This drain is almost 100 m from south facing embankment of the ash dyke. The height of embankment and depth of fly ash varies according to the ground level, the elevation of which (ground level) varies from 100 to 102 m and the gradient of the ground is from dyke towards the river.

The Katiha drain, which receives the spillover from the dyke, discharges from toe and garland drains besides catchment and drainage of vast surrounding fields, enters into main channel of Ganges after covering a distance of about 2 km. at Kotra Bahadurganj village. There is also a breakwater wall made of bricks and two spillways one on each of the two lagoons. These spillways have sumps on lagoon side and stairs (cascade) on the outer side. The sumps are covered with water hyacinth and Typha. The drain has Pistia, water hyacinth, duck weeds and algae. The water that enters into the drain from spillway is clear and transparent and devoid of fly ash particulate matter. No fly ash was deposited in the sediment of the drain. The drain water is also clear and transparent. Fly ash was observed at two locations on the outer face and top of the embankment facing the eastward. This might be due to spill over during the recent heavy rains/ spillage during transportation by trucks and also due to the fact that the fly ash level reached to the brim of the dyke. The top of dry fly ash was covered with patches of *Saccharumspontaneum* and there are some open patches of dry fly ash in the dyke that contribute to the dust blow.

No fly ash dust was observed on trees surrounding the dyke nor on the fields. There are marshes on the southern side of the dyke. No green belt was observed although *Eucalyptus* trees were found along the bunds of the field.

NTPC informed that the dyke was originally envisaged and designed by CEA for UP Rajya Vidyut Utpadan Nigam. NTPC reported that after taking over the project from UPRVUN, strengthening of the dyke, widening of the dyke top, provisions of internal drainage like sand chimney, sand blanket , Rock toe and toe drains for exiting the pore water, lagooning arrangement etc. were done with two lagoons. At present the dyke is divided into two lagoons of almost equal size. Each lagoon is provided with over flow spillway provided with energy dissipaters to exit the storm water from lagoon. The construction of ash water recirculation system is in progress.

The base of the dyke (natural ground level before construction of dyke) generally varied from RL 100 to 102 m. The HFL of Ganga River (main channel located at about 2 km from the toe of the dyke) is reported to be 94.435 meters. The width of top of dyke is 7m and RL of top of dyke is 107 m. The slope of the dyke towards Ganges is provided with 150mm thick ash cement mortar.NTPC also proposed to recirculate the water from toe drain to the ash water recirculation system.NTPC informed that piezometers are being installed (a total of 28 peizometers around Arkha Dyke and 16 peizometers around Umran dyke).

Above the starter dyke NTPC proposes to raise the height of the dyke by maximum of three raisings (three stages) of 3 m height each, raising by upstream method (inward raising). Each raising will be done on ash bed after doing foundation preparation, and shall be provided with internal drainage like sand chimney, sand blanket, rock toe and toe drains. NTPC informed that the design for the ultimate height will be done by Engineering Division of NTPC and the safety factor conforming with codal provisions of BIS/best engineering practice shall be considered while strengthening the dyke. The dyke embankment will be raised using ash as fill material and with earth cover. The fill material shall be placed in layers of 300 mm compacted thickness upto the desired height. The fill material shall be compacted to achieve dry density not less than 95% of maximum dry density. The slopes shall be pitched with ash bricks. To strengthen the dyke in addition to earth cover, the downstream slopes shall be provided with ash cement mortar of 150mm thick similar to that as provided in the existing dyke.

The Umran ash dyke is located to the west of Pratapgarh Branch of ShardaSahayakCanal and north east of main plant and spreads over about 200 acres. All around the ash dyke are marshes and the ash dyke is founded on marsh/ usar land. The RL of the marsh is 106 m and the height of the ash dyke is 10 m and the embankment is 116 m. There are toe and garland drains. The slopes of the embankment are 1(V): 3(H). The outer surface (downstream)

of the embankment is covered with stone and grasses. There are two lagoons out of which one is used as tailing pond. There is one spillway and the overflow is taken to ash water pump house using open RCC Channel/ underground pipeline for recirculation into main plant area. The water collected from Garland Drains is also re-circulated. Some of the spill over might be flowing into surrounding marshes. No spilling of fly ash was observed from the dyke. The spill over water is clear and transparent. Water hyacinth was observed in the lagoon.

The sub-committee traversed on the entire perimeter of the dyke. The upstream slope is protected by ash brick lining and the downstream slope is protected with rock rip rap from the base to mid height and from mid height the slope is protected with grass/turfing. There are two lagoons – one storage lagoon and one overflow lagoon. The overflow lagoon is provided with RCC spillway to drain the excess storm water. The decanted water is sent to the Ash Water Recirculation System pump house through the discharge channel. The decanted water was clear and transparent with no turbidity.

The Allahabad Branch and Pratapgarh Branch canals were observed at significant distances (700 m and 350 m respectively). As the water in these canals flow at levels 1-2 m above natural ground level, there is no likelihood of ash water seeping into the canals. Major portion of land area surrounding the dyke is marsh land. This area was earlier identified by NTPC for construction of dyke for Stage-III, but was not acquired due to high ash utilization. Both toe and garland drains are provided. The water from toe and garland drains is collected and pumped back into the discharge channel where it is collected and sent to ash water recirculation pump house for reuse in the plant. The entire dyke has been provided with garland pipe and the ash slurry is discharged through branching pipes connected from the garland pipe. The top of the Umran starter dyke is 116.2 m and the ground level is reported to be about 106 m. Above the starter dyke, NTPC proposes to raise the height of the dyke by maximum two raisings of 3 m each after which the ultimate level of the dyke will become 122.2 m.

The raising of Umran Ash Dyke will also be undertaken by upstream method and each raising shall be provided with internal drainage, rock toe and toe drain as described in case of Arkha dyke. Plenty of birds of different varieties in large flocks were observed in Umran Lagoon. The sump of the lagoon that receives the ash slurry is covered in some areas with water hyacinth and dry patches are covered with *Saccharum*. The open dry patches should be covered with *Cynodon* and *Saccharum*. No free floating plants were observed. The spill over water was clear and transparent while the water from toe and garland drains has some turbidity. The clear ash water overflow and is being recycled after mixing with toe drain and garland drain water; water from marshes is also drained into garland drains.

The sub-group also visited the mechanized brick manufacturing unit, where a stock of 4-5 lakh bricks was stored and few thousands were kept for curing. The sub-group advised NTPC to explore sale of ash bricks to local community even at subsidized rates to promote ash utilization. The area was kept neat and clean. The silos from where the dry ash was loaded into the trucks having closed containers. The operation was neat and clean and there was no escape of ash during loading. The ash was carried out to the cement plants located at distances varying from 30 to more than 90 km. The authorities informed that there is high demand of ash.

The main plant was operating at PLF of 90 to 95%. The sub-group was informed that the water requirement was about 52 cusecs. The members informed the authorities that the water uses was on higher side. The main plant was surrounded by thick green belt of about 10-15 m width with full grown trees such as *Eucalyptus*, *Leucaena, Delonix, Acacia* and their species. On the whole, the green belt was well developed. The nursery is also well established. The colony also has well developed green cover.

The river takes a series of meandering along its course and the sub-group sailed on manually operated boats along the upstream and downstream over a distance of about 10 km. from Arkha ash dyke. The river took the meander opposite to the Arkha ash dyke leaving a vast flood plain by the side of the embankment of the ash dyke. If the river shifts the meandering zone, the erosive force zone and shear zone will be severe on the embankment. The behaviour of 500 m wide river channel is unpredictable.

Water samples were collected from the middle of the channel in the upstream, one sample from the downstream from the Arkha ash dyke. The downstream sample was from the Katiha drain that passes along the embankment of Arkha ash dyke and also receives drainage from villages and agricultural fields. The water appears to be muddier than the mainstream water which has diesel like colour with lot of faecal matter. *A few dolphins were noted at Izura*. Many villagers were taking bath in both right and left banks. At one of the villages in the downstream, the villagers gathered on the bank of the river and there was a platform on the edge of the water front. From the platform, a half burnt body was dumped into the river. *According to one published account, more than 450 half burnt bodies float on the river at any given point of time. This was responsible for the pollution of the river. The chemical analysis of the samples did not reveal any heavy metal pollution in the Ganges water and the BOD, COD, NO3 and PO4 are well within the standard.*

Based on the observations made during the visit to Arkha ash dyke, Umran ash dyke, the main plant, the upstream and downstream of Ganges from Arkha ash dyke and discussions held with officials of NTPC and stake holders, the following **recommendations** are made by the sub-group:

i). The Arkha and Umran ash dykes are being managed by the authorities of FGUTPS in a way that no ash was detected in surrounding marshes and the Katiha drain that passes through the flood plain of Ganges before it joins the main channel of Ganges, and to which the spillover from Arkha ash dyke is being discharged. The spill over from both the ash dykes is clear and transparent and devoid of fly ash particulate matter. The water from Arkha ash dyke is not being recycled, but the water from Umran ash dyke is being recycled. Both the upstream and downstream of the open channel of the Ganges is highly polluted due to discharge of raw sewage from the villages located on the banks as well as agricultural run-off and anthropogenic activities such as throwing half burnt dead bodies into the river by villagers. There is no evidence that the pollution is caused by ash discharge.

ii). Although the southern embankment of Arkha ash dyke almost forms the bank of high flood level of Ganges on its northern bank, there is no incident of ash dyke breach norspill over of ash slurry or deposition of ash within the flood plains. As a precautionary measure, it is essential to have 2 or 3 water breaks and strong toe wall made of boulders at the base all along the embankment facing the flood plains of Ganga. Strong toe wall made of boulders is also needed on all other sides of the embankment, particularly along the marshes. The option for stone pitching on the downstream of the ash dyke may be examined.

iii). The Arkha Ash Dyke has many dried and exposed patches of ash on the top of the dyke. These patches should be grassed with *Cyanodon* and *Saccharumspontaeum* and other species of *Saccharum* to prevent dust blow on to the fields and villages. Similarly grassing should be done on the lagoons of the Umran ash dyke.

iv). No green belt was observed along the ash dyke. A thick green belt of at least 15 m width should be developed with species that can withstand high moisture and salinity such as *Terminaliaarjuna*, *Eucalyptus*, jamun etc.

v). The sumps in the lagoon near the spillways in the ash dyke should be planted with free floating plants such as duckweeds, *Pistia* and *Eichchornia* to absorb heavy metals. Plants like Typha and *Phragmites* should be planted close to the sump to clear the sump water before the water is discharged into the Ganges. *Phragmites* can be grown along the garland and toe drains.

vi). The fly ash utilization is fairly good with 90% ash is taken out from silos in closed containers without any dust emissions to cement plants. Only the bottom ash is pumped into the ash dyke in the form of slurry through pipes from the main plant. NTPC should examine the feasibility of utilizing the remaining 10% of the ash in the construction of roads and embankments.

vii). The green belt around the plant is good and there are hardly any emissions from stacks, although the stacks of the older units are emitting clean emissions. This is also evident from the ambient quality of the air. The sub-group observed that the amount of water used in the TPP is very high due to non-recycling of water from the fly ash system. The committee suggests that the amount of water required for FGUTPS should be 30 to 35 cusecs only.

viii). The waters of Pratapgarh and Allahabad Branches of Sharda Sahayak Canal, in between which the Umran ash dyke is located, did not show any contamination from ash.

ix). The Samaspur Bird Sanctuary is silted at most places and the water appears to be deep and the marsh area is invaded by water hyacinth. Typical marsh species such as sedges and grasses were not found. No submerged plants were observed. A few flocks of ducks were observed. The upland portion was highly sodic. Instead of planting native fruit yielding species and grasses, *Callistemon* and neem were planted. The forest department should restore these marshes.

x). In and around the TPP, there are marshes which serve as storage of flood waters and drainage from vast fields and also catchment from vast plains. These marshes not only recharge ground water which is source of water for thickly populated areas but also for agriculture in dry months. These are encroached and often cultivated into paddy fields. NTPC should evolve conservation action plan for these marshes in consultation with Forest Department.

xi). *The sub-group and NTPC officials met the district Magistrate and appraised him about the clean management of FGUTPS, but highlighted the problem of ash disposal for the proposed expansion of the plant. In the long run, NTPC needs the land for the ash dyke, for which local government's help is needed to allocate the land. The sub-group also highlighted the polluted water of Ganges due to discharge of raw sewage and dumping of half burnt dead bodies into the channel. The District Magistrate informed that he would visit the TPP and extend help whatever that is possible.*

xii). Based on the observations made on the existing ash dykes and taking into account the existing pattern of ash utilization, and the design proposed to increase the ash dyke height of Arkha ash dyke to accommodate additional ash generated by 1x500 MW unit, the committee recommends the proposed increase in Arkha ash dyke height subject to the conditions proposed under item (ii) above. Being close to the high flood level of Ganges, the committee suggests that in long run, there is a need for additional land to accommodate the ash generated by the TPP. This particularly so when the hazard of ash dyke breach due to shift in meandering of the main channel of Ganges is unpredictable.

xiii). The sub-group examined the site for main plant of the proposed 1x500 MW. The site has many trees of *Acaciaauriculiformis*, *Peltophorum*, and

Eucalyptus. The committee recommends that care should be taken to ensure that minimum number of trees should be felled for accommodating the main plant of 1x500 MW, and as compensation to the trees felled, 10 tree saplings for 1 tree to be felled should be planted within the main plant area.

xiv). The sub-group recommends that among the other activities proposed, NTPC should suitably address the grievances of the local community of providing drinking water out of the CSR funds for the year 2013-14 in respect of community in and around the ash dykes.

xv). Under one time CSR capital expenditure of Rs. 11.95 Crores agreed to be spent during first five years of Stage-IV (1x500 MW), NTPC among other things may include provision of supply of small fly ash brick making units in and around the ash dykes to few self-help groups for stoppage of clay brick making units to conserve natural clay, prevent air pollution as also furthering the use of fly ash by manufacturing fly ash bricks in and around the vicinity of the project besides providing sustenance to the locals.

xvi). The company, in consultation with local authorities, should also develop a suitable market place out of one time CSR funds for local community at an appropriate location. The market infrastructure developed could possibly be allotted to the local community in rotation (such as weekly/ fortnightly/ monthly), so that more no. of locals including women are benefitted from the same infrastructure. Besides their sustenance, this will go a long way to build a very high rapport with local community.

xvii). To monitor the quality of ground water beneath the ash dykes, piezometers should be installed within the ash dyke below the ground level. It is also important to know the amount of accumulated water beneath the ash. Periodic monitoring of water quality from marshes surrounding the ash dykes and Katiha drain, Allahabad and Pratapgarh Branches of Sharda Sahayak Canal and spillovers from spillways of ash dykes should be monitored.

The Committee accepted the findings of the sub-group and advised NTPC to adopt the recommendations made in the report. The Committee also provided a copy of the site visit report to representative of NTPC Ltd. for their perusal and necessary action.

Based on the information and clarifications provided the Committee recommended *environmental clearance for the proposed project* subject to stipulation of the following specific conditions besides the recommendations made by the Sub-Committee in its site inspection report:

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 stack of 275 m height shall be provided with continuous online monitoring equipments for SOx, NOx and $PM_{2.5}$& PM_{10}. Exit velocity of flue gases shall not be less than 22 m/sec. Mercury emissions from stack shall also be monitored on periodic basis.

iii) High Efficiency Electrostatic Precipitators (ESPs) shall be installed to ensure that particulate emission does not exceed 50 mg/Nm^3. 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.

iv) The project proponent shall regenerate degraded water body (if any) located nearby within 5.0 km atleast.

v) COC of 5.0 shall be adopted and water requirement shall be restricted to 35 cusecs.

vi) 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.

vii) Well designed acoustic enclosures for the DG sets and noise emitting equipments to achieve the desirable insertion loss viz. 25 dB(A) should be provided.

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

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) Long term study for radio activity and heavy metal in coal and fly ash, shall be carried out through institutes like AMD, Hyderabad, Central Power Research Institute, Bangalore, Mangalore University and report submitted to R.O of the Ministry from time to time.

xi) CSR schemes identified based on 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.

xii) Special package with implementation schedule for providing free potable drinking water supply in the nearby villages and schools shall be undertaken in a time bound manner.

xiii) An amount of Rs 11.95 Crores as one time investment shall be earmarked for activities to be taken up under CSR during construction phase of the Project. Recurring expenditure for CSR thereafter shall be Rs2.4Crores per annum till the life of the plant. Social Audit by a reputed University or an Institute shall be carried out annually and details to be submitted to MOEF besides putting it on Company's website.

xiv) Continuous monitoring of Ganges River quality shall be undertaken regularly and records maintained

xv) An Environmental Cell comprising of atleast one expert in environmental science / engineering, occupational health and social scientist, 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 organization who would be accountable for implementation of environmental regulations and social impact improvement/mitigation measures.

2 2x800 MW (Stage-I) Gadwarwara Super Thermal Power Project of M/s NTPC Ltd. near villages Gangai, Umaraiya, Mehrakheda, Chorbarheta, Dongergaon and Kudari, in Gadarwara Tehsil, Narsinghpur District, in Madhya Pradesh - reg. Environmental Clearance.

The proposal was earlier considered in the 66thMeeting held during February 5-6, 2013, wherein the project proponent gave a presentation and provided the following information:

The proposal is for setting up of 2x800 MW (Stage-I) Gadwarwara Super Thermal Power Project near villages Gangai, Umaraiya, Mehrakheda, Chorbarheta, Dongergaon and Kudari,in Gadarwara Tehsil, Narsinghpur District, in Madhya Pradesh. Earlier TOR was prescribed for 4x660 MW on 13.01.2011, which was subsequently requested for configuration change to 2x800 MW. The total land required for ultimate capacity will be 1990 acres, out of which 1350 acres will be required for Phase-I (2x800MW). Ultimate land requirement will be 1990 acres for 4x800 MW. About 318 acres is barren Govt. Land transferred to M/s NTPC by the Govt. of Madhya Pradesh. About 45 acres of govt. agricultural land is under transfer to M/s NTPC by the Govt. of M.P. Further 1580 acres is private agriculture land. The balance 47 acres is govt. barren land. The co-ordinates of the site are located within Latitude 22^{0}51'06" N to 22^{0}52'30" N and Longitude 78^{0}51'24" E to 78^{0}52'42" E. Coal requirement will be 8 MTPA at 90% PLF. The break-up of land for Stage –I (2x800 MW) will be 410 acres for main plant, CHP, water system, switchyard, BOP facilities etc; 50 acres for water reservoir; 150 acres for green belt; 400 acres for ash pond;

100 acres for township; and 240 acres for miscellaneous corridors. Coal will be obtained from Talaipalli coal block for which environmental clearance was accorded on 02.01.2013. Forest clearance for Talaipalli coal block has been obtained on 05.11.2012. Ash and sulphur contents in coal will be 40% and 0.5% respectively. Gross Calorific value of the coal will be 3900 kcal/kg. High Concentration Slurry disposal system for unutilized fly ash will be proposed. Conventional wet slurry disposal with Ash Water re-circulation system (AWRS) for disposal of bottom ash. Ash pond will be located 950 m away from Shakkar River. About 6400 TPD of fly ash and 1600 TPD of bottom ash will be generated. Ash will be supplied to Cement sector, RMC sector, Fly ash bricks manufacturers, roads and Highway embankment etc. Ash pond area will be 400 acres and co-ordinates of the ash pond site is located within Latitude $22^0$51'22" N to $22^0$52'30" N and Longitude $78^0$50'33" E to $78^0$51'24" E. Bi-flue Stack of 275m will be provided. Water requirement of 4675m^3/hr will be sourced from the Narmada river through a pipeline at a distance of about 30 km from the project site. A small weir will be constructed on the river for by the WRD, Govt. of Madhya Pradesh Govt. The weir will not entail any submergence and minimum flow at weir site will be 1350 cusecs. Water commitment for 125 Cusecs was also issued by the WRD. Govt. of Madhya Pradesh vide letter dated 19.05.2008. CWC vide letter dated 27.07.2012 also concurred the water availability confirmation accorded by State Govt. 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 20.06.2012. Cost of the project will be Rs.11404.62 Crores.

M/s NTPC also informed that the change in configuration from 2x660 MW to 2x800 MW recommended by the Committee in its 62nd Meeting held on December 4, 2012 is yet to be executed by the Ministry.

The Committee observed that the change in configuration was deliberated twice in the 58th Meeting held during October 8-9, 2012 and in the 62nd Meeting held on December 4, 2012. That the same was also a demand in the public hearing held for the power project and the change in configuration would generate more power per megawatt but the additional incremental adverse environmental impacts (due to 2x800 MW) in deviation from the earlier 2x660 MW as provided in the EIA/EMP report was also declared for information of all the stake holders by M/s NTPC Ltd. Throuh public advertisements calling for objections. That M/s NPTC had thereafter submitted details of public advertisements and informed the Committee that no objections were received. The Committee had also perused through the contents of the advertisements published and decided that the same is acceptable and had accordingly recommended that the change in configuration be made by the Ministry as needful.

The Committee further observed that the change in configuration is now only a technical requirement and the same could be carried out at the time of according environmental clearance.

M/s NTPC also made point-wise TOR compliance.

The Committee while deliberating the point-wise TOR compliance observed that some of the TOR prescribed seems to have been inadequately addressed.

As an example it was noted that at TOR point no. (xv) on the issue of hydro-geological study to be conducted by an institute of repute to assess the impact on ground and surface water regime, it was stated that a detailed hydro-geological study of the area will be conducted from an institute of repute and action plan for mitigation of impacts will be provided. M/s NTPC however clarified that hydro-geological study was done in-house and an area drainage study has been done by IIT, Roorkee and will be submitted. In addition it was stated that geotechnical study was carried out by M/s Arki Techno, Bhubaneswar, which will also be submitted.

In another TOR point no. (xvi), regarding study on impact on river ecology due to proposed withdrawal of water, the Committee noted that no such study seem to have been carried out either done in-house by M/s NTPC nor done through an institute. The Committee decided that a study done in-house through secondary data on the impact of river ecology and on impact of downstream recipients of the water from the river needs to be submitted.

On the issue of cumulative impact assessment, M/s NTPC stated that within 10 kms there are no industrial activities (including TPPs) and no new industrial project is being proposed. That accordingly cumulative impact assessment for AAQ may be irrelevant. It was however stated that while assessment of impact due to proposed 2x800 MW (Stage-I) was carried out, the baseline AAQ has taken the existing data of all activities in the study area.

The Committee discussed the issues raised in the Public Hearing and the responses made by M/s NTPC Ltd. It was noted that the major issues raised were compensation for farmers be paid at the earliest; construction for roads and bridges; civic amenities such as schools, hospitals; employment for land losers; depletion of ground water; plantations (green belt); dust (fly ash) generation and likely impact; demand for compensation in lump sum and not in installments; compensation to farmers in case of damages to crops due to ash; to set up 800 MW units instead of 660 MW units like in other projects of NTPC etc.

The Committee noted that M/s NTPC has not indicated the actual responses made in the public hearing held on 20.06.2012. The Committee therefore observed that M/s NTPC shall make a detailed presentation again indicating the issues raised, the response made by them and the action plan for implementation of the issues agreed/valid for implementation.

The Committee also noted that Fly Ash management for such a large power project is an issue requiring appropriate attention and desired that details fly ash utilization with documents to substantiate action plan (if any) shall be submitted.

The Committee also noted that ash pond will be located 950 m away from Shakkar River and the location indicated seems to be in the flood plain of the river. The Committee therefore decided the location of the ash pond need to be reviewed.

The Committee further observed that the water requirement mentioned seem to be very high and details of water availability study carried out by the State Water Resources Department, Govt. of Madhya Pradesh shall be submitted. It was also observed that water requirement need to be revised keeping the CEA norms and COC at 5.0 and a comparative statement therefore shall be submitted.

In view of the observation above, the Committee decided that the proposal be deferred for re-consideration only after the submission of requisite clarifications / documents /study reports.

On submission of documents/clarifications on (i) Report on identification of an alternative location for Ash Dyke; (ii) Hydro-geological study (in-house); (iii) Riverine ecology study (in-house); (iv) Area drainage study carried out by IIT, Roorkee; (v) water balance diagram with COC 5.0; (vi) Water availability study data; (vii) Coal characteristics of Talaipalli Coal Block; and (viii) Layout plan superimposed on toposheet with windrose diagram, the proposal was again placed before the Committee.

The Committee deliberated the area drainage study for main plant and ash dyke for the power project carried out by IIT, Roorkee and noted that a sufficient long period of rainfall data spread over 27 years have been used for the purpose of analysis and design for drainage for storm water. The Committee accepted the report and advised NTPC to follow the design recommendations of IIT, Roorkee in its drainage design.

The Committee observed that storage of water through weir being proposed may be fine, but at the same time the project proponent need to explore possibility of storage of excess monsoon water for use during lean season. The same could be by construction of barrage at appropriate location which could be carried out in close consultation with the WRD, Govt. of Madhya Pradesh.

The Committee again discussed the location of ash pond and deliberated the alternative sites identified by NTPC Ltd. and noted that the ash pond area appears to be near primary channel of two rivers and therefore advised that it shall be ensured that the ash pond design shall be such that no breach takes

place even in the worst case of natural calamity. The Committee also observed that since geology of the area indicates sandy loam and loamy soil, the ash pond need to be appropriately lined with impermeable media.

While discussing the fly as utilization plan, the Committee noted that 2nd ash pond for Stage-II (400 acres) can be considered only after the first ash pond is dispensed with by filling up of bottom ash and demonstration of 100% fly ash utilization established within 4 fours of commissioning of the plant. The Committee also suggested that the 2nd ash pond requirement should not arise and land earmarked can be converted for green belt and or water storage.

The Committee also observed that Narmada and its tributary flowing in the study area are important rivers, with large habitations dependent on the water source not only in Madhya Pradesh but also in other states where the river flows. The Committee therefore agreed that M/s NTPC shall initiate a long term study in due course of time to assess the ecology of the river downstream of the present project site at a different location especially at tapping points for drinking water supply and irrigation. *The Committee suggested that the study may be carried out by an institute of repute like IIT, Roorkee preferably within six months and report submitted to the Ministry. Thereafter the study shall be repeated after commissioning of both units of 2x800 MW and report once again submitted to the Ministry.*

The Committee deliberated the water balance chart/diagram and noted that the project proponent had taken due care of reducing water requirement by adopting COC of 5.0. It was observed that about 5 cusecs to river discharge is shown which could still be undone by adopting R.O system. *The Committee therefore observed that M/s NTPC shall explore setting up of R.O System. In doing so it was suggested that the R.O system could be so designed so as to take care of drinking water supply for the nearest villages as well.*

The issue of Public Hearing proceedings, responses made by M/s NTPC Ltd. and action plan for implementation was again re-visited. On the issue of R&R and compensation the Committee noted that an amount of Rs 158.83 Crores has been deposited by NTPC to the Collector, Narshinghpur and R&R Grant for 1318 acres for land possessed has already been disbursed. That an amount of Rs 75 Crores has been deposited for compensation to Land Acquisition Dept.

Regarding depletion of ground water, M/s NTPC informed that no use of ground water will be involved due to power project. That however extensive rain water harvesting as a normal practice in the project site. *The Committee noted the concerns expressed by the villagers and observed that NTPC shall also take up regeneration of ponds / surface water bodies in the 5 kms radius as part of its social welfare activities.*

The Committee also noted that an important point on landless laborers whose sustenance was by farming of the land now falling in the power plant site has been raised. M/s NTPC responded that R&R package provides for Rs 1.25 lakhs to each landless laborers and a list of such landless laborers is being finalized by the Distt. Administration, which will be paid rehabilitation grant in March, 2013.

The Committee noted the above and decided that M/s NTPC shall ensure such landless laborers are appropriately identified and the issue take up with the local administration for appropriate redressal.

The Committee also recommended that M/s NTPC shall set example for others to emulate and set up the power project as a model plant where ecology and development co-exists in great harmony.

Based on the information and clarifications provided the Committee recommended *environmental clearance for the proposed project* subject to stipulation of the following specific conditions over and above the other observation during deliberations made by the Committee to be met by project proponent which are as follows:

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 stack of 275 m height shall be provided with continuous online monitoring equipments for SOx, NOx and $PM_{2.5}$& PM_{10}. Exit velocity of flue gases shall not be less than 22 m/sec. Mercury emissions from stack shall also be monitored on periodic basis.
iii) High Efficiency Electrostatic Precipitators (ESPs) shall be installed to ensure that particulate emission does not exceed 50 mg/Nm^3. 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.
iv) The project proponent shall regenerate degraded water body (if any) located nearby within 5.0 km atleast.
v) COC of 5.0 shall be adopted.
vi) 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.
vii) Well designed acoustic enclosures for the DG sets and noise emitting equipments to achieve the desirable insertion loss viz. 25 dB(A) should be provided.

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

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) Long term study for radio activity and heavy metal in coal and fly ash, shall be carried out through institutes like AMD, Hyderabad, Central Power Research Institute, Bangalore, Mangalore University etc. and report submitted to R.O of the Ministry from time to time.

xi) CSR schemes identified based on 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 including constructing a market for sale of vegetables and other goods etc. at suitable locations for local community to be allotted on weekly/ fortnightly/ monthly basis and other income generating programmes.

xii) Special package with implementation schedule for providing free potable drinking water supply in the nearby villages and schools shall be undertaken in a time bound manner.

xiii) An amount of Rs 45.60Crores as one time investment shall be earmarked for activities to be taken up under CSR during construction phase of the Project. A detailed CSR Action Plan be furnished to the Ministry within 3 months. Recurring expenditure for CSR thereafter shall be Rs 9.2Crores per annum till the life of the plant. Social Audit by a reputed University or an Institute shall be carried out annually and details to be submitted to MOEF besides putting it on Company's website.

xiv) Continuous monitoring of Narmada River quality shall be undertaken regularly and records maintained

xv) An Environmental Cell comprising of atleast one expert in environmental science / engineering, occupational health and a social scientist, 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 organization who would be accountable for implementation of environmental regulations and social impact improvement/mitigation measures.

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