

**Minutes of the 63<sup>rd</sup> Meeting of the Expert Appraisal Committee for River Valley and Hydroelectric Projects constituted under the provisions of EIA Notification 2006, held on 26<sup>th</sup> - 27<sup>th</sup> December, 2012 at SCOPE Complex, New Delhi.**

The 63<sup>rd</sup> Meeting of the Expert Appraisal Committee (EAC) for River Valley and Hydropower Projects was held during 26-27<sup>th</sup> December, 2012 at SCOPE Convention Centre, Opposite Jawaharlal Nehru Stadium, New Delhi. The meeting was chaired by Shri. Rakesh Nath, Chairman. Dr. S. K. Misra and Dr. Praveen Mathur could not attend the meeting due to pre-occupation. The list of EAC Members and Officials associated with various projects who attended the meeting is Annexed.

The following Agenda items were taken-up for discussions:-

**1<sup>st</sup> Day (26.12.2012)**

1. **Agenda Item No.1: Welcome by Chairman and Confirmation of Minutes of the 62<sup>nd</sup> EAC Meeting held on 23-24<sup>th</sup> November, 2012.**

The Committee confirmed the Minutes and recommended for uploading the Minutes on the website of the Ministry of Environment & Forests.

**1<sup>st</sup> & 2<sup>nd</sup> Day (26.12.2012 and 27.12.2012)**

- 2.1 **Singtalur Lift Irrigation Project in Gadag District of Karnataka by M/s. Water Resource Department, Government of Karnataka – For Reconsideration of TOR.**

Shri D. Satya Murthy, Principal Secretary, Department of Water Resources, Government of Karnataka made a detailed presentation on the project and clarified the issues which were raised in the earlier EAC meeting. This project was earlier considered by the EAC at its meeting held on 30.03.2012. The following emerged from the presentation:

The Government of Karnataka proposes to utilize 18.55 TMC of water share under Krishna Water Tribunal for irrigation and drinking water supply by construction of a 10 m high (from the deepest foundation level) and a 387.5 m long barrage on Tungabhadra River upstream of Tungabhadra Dam. Out of 18.55 TMC, 15.991 TMC of water will be used for irrigation and 2.55 TMC will be used for drinking water purposes.

The project proposes to irrigate 77,197 ha of the command area by lift irrigation and will benefit 150 villages in Gadag, Koppal and Bellary Districts in Karnataka. Command area will receive irrigation from Head works through pumping/lifting. The total network of left bank canal will be 185.55 km and right bank canal will be of 40.13 km. Two lifts on right bank and 4 lifts on left bank shall be required to lift the water. The present cropping pattern is 100% Kharif over 68,922 ha and 17% of Rabi in 8,276 ha. The benefit cost ratio will be 1.604.

An important issue is quick and unhindered release of design flood of Tungabhadra river draining 19,483 Sq. km through the barrage whose tail water level is only 2-3 meter above the FRL of Tungabhadra reservoir. In the event of catastrophic flood

the back water level of Tungabhadra reservoir has to be checked so that free flow occurs through the barrage for the SPF condition.

Total land requirement for the project will be 4624.5 ha out of which submergence area is 1620 ha. Total forest land required will be 1.42 ha. Estimated cost for the project is Rs. 1894.50 Crores.

This project was earlier considered by the EAC in its meeting held on 30.03.2012. The EAC desired some additional information for appraisal of the project w.r.t location maps, Clear Command Area Map, L- Section of river with upstream and downstream projects with their FRL and TWL, drawing on which canal systems to be shown, spillway, section of dam and levels, detailed water balance with water availability in the river and its utilization, existing and proposed cropping pattern, plan for conjunctive use of surface and groundwater for irrigation, etc.

The Committee deliberated in detail on the observations made in the earlier meeting vis a vis the reply of Government of Karnataka and took a view that the project proponent should provide more technical information on C and D Ratio. Cropping Pattern and also on the suitability of horticulture crops for micro irrigation. The project proponent has proposed to provide micro-irrigation system for 20% area, which was appreciated by the committee.

The Committee after critically examining all environmental issues, recommended clearance for pre-construction activities subject to submission of information/clarification on the following additional issues –

- I. Effect due to construction of barrage on Tungabhadra Reservoir along-with flood cushion of the reservoir.
- II. Separate cropping plan along with their water requirement for the command area (about 20%) earmarked for introducing micro-irrigation system.
- III. Provide a map of the command area showing the disnet components shown on it and then supported by a map showing smaller area with further hierarchical details of the disnet. Explain the lift segments, surface distribution segments and hierarchical order of the disnet
- IV. The TB River L-section provided did not reveal location of abstraction. Therefore, the impact on the water environment of the D/S to the barrage after lifting large volume of water from the river and disposing it for consumptive use elsewhere could not be assessed.
- V. Tables in Annexure-11 are showing huge increase (4 times in several cases) in land productivity after the availability of irrigation water. Project proponent is to substantiate the assumed productivity values by comparing with any other irrigation project in Karnataka.
- VI. The contention of Annexure-12 that the same cropping pattern will be followed both under drip irrigation and under flow irrigation is unscientific. Consider introducing horticultural crops or some selected vegetable crops for practicing drip irrigation. The region selected for pressurized irrigation (drip, sprinkler etc) may be marked on the command area map in the EMP document with supporting explanatory notes. The statement in Annexure-13 on groundwater use for irrigation is unclear. A detailed explanation on whether the CADA plans to utilize groundwater for irrigation is to be provided.

VII. Reply to Sl.No. XVI shows that Water Resources Department of Karnataka has got a different notion about environmental flow requirements/norms at the downstream of the project. Please provide details about the environmental flows considered as downstream requirements.

### **Form-1**

- Under Sl. 21- provide the extent of forest land to be released by the Forest department
- Total extent of land (4624 ha) and its land/ land-cover pattern. Of this what is forest land and land/land cover affected due to submergence and other project activities. Provide FCC of the entire project area to show land/land-use pattern
- Sl. 1.2- Details of vegetation and agricultural which will be affected due to this project
- Sl. 1.3- Whether creation of reservoir of 1620 ha due to submergence will be a new land use? To be elaborated.
- Sl. 1.30 should be Yes; since biodiversity will be affected
- Environmental Sensitivity has to be assessed as forest land will be affected.
- The details of forest types and tree vegetation have not been provided in the Environment Chapter in PFR. This may be provided and it may be clarified if it is under the State Forests Department's Jurisdiction.

### **TOR**

- **Study area** – catchment area should be included .
- **(a) Maps** – Soil Map, Drainage map, contour map to be included.
- **(b)** 3 season sampling should be conducted. Sampling locations of all parameters in the project area should be shown on a map.
- Sources of secondary information will be revealed and citations are to included in reference list.
- **Biological Environment** –
  - (a) Forest types should be as per Champion & Seth (1968) classification.
  - (b) General vegetation should include all plant groups.
- **Environmental management Plan (EMP)** should include –
  - (a) R & R Plan** – The project will submerge 3 villages and 1317 structures (1241 private buildings, 24 public buildings and 52 temples). Submergence of temples being a sensitive issue, full care should be taken to address the problem. The number of project affected families particularly displaced families, though not yet ascertained by the project proponent which is likely to be more than a thousand. Therefore as per NRRP-2007 a separate Social Impact Assessment study is mandatory.
  - (b) Biodiversity and Wildlife Management Plan**
  - (c) Command Area Development (CAD)** - studies need detailed data collection and analysis pertinent to a flow irrigation project. Only low duty crops are proposed with 50% of Hy Jawar and maize coverage. Sample of OFD proposal for 10% of the command both on left and right need to be proposed

The compliance report submitted by the project proponent has not reflected the seriousness about the water use and its proper management for irrigation where the efficiency of water use is very low and irrigation is largest consumer of fresh water. This aspect needs to be highlighted in the project plan.

The project will accordingly be considered for issue of TOR on receipt of the above information/clarification from the Government of Karnataka.

## **2.2 Lower Penganga Irrigation Project in Adilabad District of Andhra Pradesh by M/s. Irrigation & CAD Department, Government of Andhra Pradesh- For Reconsideration of TOR.**

The Commissioner, Planning & Development of Godavari Basin, I&CAD Department of Government of Andhra Pradesh made a detailed presentation on the project. This project was earlier considered by the EAC in its meeting held on 12-13<sup>th</sup> October, 2012.

The Committee noted that the Environmental Clearance for the Lower Penganga project was accorded on 17.05.2007 for the Maharashtra portion. While awarding environmental clearance, the Government of Andhra Pradesh was instructed to apply separately for the Environmental Clearance for the Andhra Pradesh. Accordingly, the Government of Andhra Pradesh has submitted its application and requested for Scoping Clearance for the preparation of EIA/ & EMP report for the A. P. portion of Lower Penganga Inter State Irrigation Project. The project was discussed in the 61<sup>st</sup> EAC meeting held on 12-13<sup>th</sup> October, 2012. The Committee requested the project proponent to come with project details and furnish a copy of DPR of the project for reconsideration.

The Lower Penganga Project (LPP) is an Interstate Irrigation project between Maharashtra and Andhra Pradesh proposed and proposed on the river Penganga, a tributary of river Godavari. As per agreement between the two states, it was agreed by them to share water in 88:12 ratio village, Ghatanji Taluq of Yavatmal District of Maharashtra. The irrigation potential envisaged under the project is 1,40,818 ha in Maharashtra and 19,232 ha in Andhra Pradesh. The submergence area lies entirely in the State of Maharashtra. The total land required for the joint project is 19335.26 ha of land, 500.48 ha is private land and 8.78 ha is forest land. The Tippeshwar Wildlife Sanctuary is only 2 km away from the link canal. The total cost of the project is about Rs. 1111 Crores.

The Committee after detailed discussions on the environmental related issues, recommended the project for scoping clearance with the following additional TOR's:

- Baseline environmental monitoring shall be carried out for 3 seasons (i.e., pre-monsoon, monsoon and post-monsoon seasons) covering one calendar year.
- There is no mention of Rotational Water Supply system i.e “Warabandhi” in the DPR and Government of Andhra Pradesh should consider for implementation of a suitable Rotational Water Supply System for the efficient use of water in the proposed command area. The status of the Water Users Association (WUA) shall be specified at the time of the presentation of EIA & EMP report, particularly with respect to their functioning and achievements.
- Pressurized and water saving irrigation methods such as drip, sprinkler etc for at least 10%

of the command area should be introduced on five well-distributed locations in the command area each measuring about 500 ha at project cost and to be maintained under the project. For such areas, suitable crop plan may be evolved and described in the EIA/EMP.

- As per the requirement of the project, the baseline environmental monitoring for water and soil samples shall be collected and analyzed at 20 locations each. The remaining attributes such as meteorology, ambient air & noise quality and socio-economic should be monitored as per the draft TOR and presented in the EIA report.
- The detailed geological mapping of the dam site is necessary. The extent of coal fields in the command area is essentially required to be mapped. Most of the irrigation area falls under the coal mining areas. Since all coal mining areas are not any future agricultural uses, therefore clear identification of existing coal field is required.
- The command area has undulating terrain yet, there is no land development proposed. Therefore, an appropriate land development plan is to be presented in EIA/EMP report. This plan should have the standard on farm development (OFD) works, as proposed by the MoWR.
- The methodology followed for the assessment of flora and fauna in the project study area should be furnished along with the EIA/EMP report. As per the requirement of the project, a total of 15 sampling locations should be considered for the baseline data collection under biological environment,
- The Tippeshwar Wildlife Sanctuary is 2 Km away from the intake canal and hence “No objection certificate” should be obtained from the PCCF, Government of Maharashtra along with clearance from NBWL.
- The EIA/EMP study should be carried-out with the QCI-NABET accredited Consultants consultancy only without which the EIA/EMP report may not be considered for Environmental Clearance.

### **2.3 Revalidation of TOR and revision of Capacity from 140 MW to 186 MW for Dikhu HEP in Longleng District of Nagaland by M/s. Manu Energy Systems Pvt. Ltd.**

The project proponent, through their Consultants made a detailed presentation and the following emerged.

Scoping clearance was accorded to Dikhu Hydro-electric project vide MoEF letter No:J.12011/18./2008-IA.I dated 29.12.2008 for 140 MW. Field data collection for EIA study report has already been completed for all the three seasons and DPR has since been prepared and submitted to CEA for review and issue of TEC on 03.04.2012. Hydrology have been approved vide CEA letter No.2/NGL/4/CEA/2010-PAC/4671-93 dated 18.10.2010 and Power Potential Studies have been approved vide their letter No.2/NGL/4/CEA/2010-PAC/2692-93 dated 05.05.2011. Based on the updated hydrology, CEA has approved a capacity of 186 MW keeping in view the available potential. Therefore, optimized capacity of 186 MW (3 x 62 MW) has been finally adopted for further development/ implementation. Govt of Nagaland has already accorded acceptance of this enhanced capacity vide Letter No.PWR/W-21/96 dated 26.03.2012.

The major changes in the project due to enhancement of capacity form 140 (4 x 35) MW to 186 (3 x 62) MW are below:

- Height of dam have changed from 98 m to 112 m
  - Submergence area increased from 1302.46 ha to 2320 ha. Total land requirement shall be 2440 ha.
  - Project doesn't involve any physical displacement. Only land belonging to 15 villages is proposed to be acquired.
  - Gross 90% dependable annual energy increases from 518.61 MU to 626 MU.
  - Rated discharge per unit increases from 45.7 cumec to 72.41 cumec
1. Entire land involved in the project is non-forest land. The Committee pointed out that 'forest land' has to be viewed as per Honourable Supreme Court's observations for dictionary meaning of forest. It cannot be classified as non-forest merely due to the fact that said land belongs to private owner. Project proponent clarified that the State Government is also co-owner of the project and forestland diversion will be taken care of by State Government as per applicable laws, such as obtaining Forest clearance.
  2. Water availability has been worked out based on G & D data observed at gauge stations for the last 31 years from 1978-79 to 2008-09 by CWC located at Sibsagar (CA: 3610 Km<sup>2</sup>), which is about 50 km downstream of the proposed dam site. Ratio of the catchment area Dikhu/Sibsagar = 2845/3610) works out to be 0.788. Hydrology and Power Potential studies have been approved for enhanced capacity of 186 MW whereas installed capacity at the time of Scoping Clearance was 140 MW. Therefore, TOR Needs to be revalidated for 186 MW. Secondly, Completion of socio-economic surveys and finalizing of EIA/EMP reports will take some more time; to be followed by Public Consultation process and submission of final report for appraisal and as per MOEF's office memorandum dated March 22, 2010, validity of TOR will expire on 28<sup>th</sup> December 2012 i.e. on completion of four years period. In view of these, TOR validity needs extension for another 2 years period.

The Committee expressed concern about river likely to run dry during non-peaking hours. It was clarified by the project proponent that during lean season, provision has been made for continuous ecological releases calculated based on 20% of average flow available during four leanest months corresponding to 90% dependable year. During most of the monsoon months, project would be running at full capacity and it being a dam toe project, substantial flow will be available in river downstream of dam during this period. However, the Committee felt that during other months when peaking varies from 4-6 hours, adequate ecological releases is to be maintained to ensure that river does not run dry.

The Committee also deliberated on the baseline data collected for EIA study and noted that as there is no change in the study area and substantial baseline data have been already collected, the same set of data can be used for EIA/EMP.

After further deliberations, the Committee recommended revalidation of TOR for enhanced capacity of 186 MW and extension of TOR for another two years with the following observations to be incorporated in the study as additional ToRs:

- EIA/EMP reports should clearly give 90% flow series along-with four years' observed data in form of a table along with ecological releases.

- A site specific study may be carried-out for establishing the proper environmental flow release during monsoon, non-monsoon and lean months corresponding to the 90% dependable year. Release of minimum environmental flow must mimic the pre-dam flow pattern of the river for sustaining the aquatic bio-diversity together with downstream user need and accordingly, water withdrawal for power generation is to be regulated. Minimum environmental flow release would be 20% of average of four lean months of lean period, 20-30% of flows during non-lean and non-monsoon period and 30% of average flow including spillage during monsoon period corresponding to 90% dependable year.
- The diversion of this land may require clearance under the Forest (Conservation) Act, 1980. Necessary Forest Clearance is to be obtained by the project proponent from competent Authority, since the forest area involved is protected under national legislation, even if it is under private ownership (dictionary meaning of forest as per WP 202 in Hon'ble Supreme Court of India).
- Present muck disposal norms to be adhered to by the Project Proponent and EIA/EMP to factor into impact due to operational and constructional parameters also.
- Out of 2440 ha of estimated land requirement, 950 ha is forests land. The land use pattern specially the land that would come under submergence and that would be affected due to other project related activities is to be provided.
- Environmental sensitivity is to be assessed adequately as there may be loss of native species as 950 ha of forests land will be affected.
- The project and influence/study area has to be shown (which should include catchment, submergence area, HRT area between d/s of dam and power house, tributaries and d/s of power house) in a proper map including classification of land use to be covered. Also juxtaposition in contour/slope map should be attempted for better understanding.
- Detailed methodology to be followed including type of instruments and techniques of analysis to be indicated.
- Secondary sources of information to be clearly cited and citations to be included in a reference list.
- Valuation of Bio-diversity and Eco-system services is to be carried out following appropriate literature/books/papers.
- **Biological Environment** should include the following -
  - Forest type should be as per Champion & Seth's (1968) classification; number and species of trees in the submergence area and their basal area will be calculated for valuation.
  - Cane, Bamboo spp.
  - Amphibians" after herpetofauna; Under faunal elements
- **Environment and Ecological Aspects – Floristics:** Only 163 flowering plants have been reported to occur in the vegetation. No Pteridophytes, Bryophytes and Lichens; and endemic tree species, and RET plant species reported. This should be rechecked and revalidated.
- **Wildlife:** Curiously, no Amphibians (which indicate health of the ecosystem both terrestrial and aquatic) have been documented. Amphibians should form a component of faunal documentation during baseline studies.

## **2.4 Ithun-I HEP (86 MW) project in Lower Dibang District of Arunachal Pradesh by M/s. JVKIL Consortium Ltd.- For TOR**

Ithun-I project is on river Ithun in Lower Dibang valley District of Arunachal Pradesh. The project area falls under Hunli and Desali circles of Lower Dibang Valley District. The Project proponent made a detailed presentation for the scoping clearance of Ithun I (86 MW) HE project. The following emerged from the presentation:

The project involves construction of a barrage of 25 m height with FRL at 667 m and top of the dam at 669 m on the river bed elevation of 644 m. The project involves a 5.65 km long HRT of 6 m dia; a 200 m long surface de-silting chamber, 8.5 m dia and 62 m high surge shaft; 2 penstocks of 3.2 m dia and a surface power house with gross and net head as 107.67 m and 98.17 m respectively. The Developer explained that after detailed investigation HRT length may get altered/reduced to about 5 Km. The catchment area at diversion site is 841 sq km with design flood discharge (SPF) of 3690 cumec. Design discharge for the project is 96.94 cumec. Elevation of the catchment varies from 644 m to 4500 m and length of Ithun river from origin to diversion site is 49.82 km.

Upstream of Ithun-I HEP situated is Ithun II HE project (48 MW); on downstream side there is no planned project. However, reservoir of Lower Dibang Valley Multipurpose Project on Dibang river will spread along Ithun river as well. Longitudinal Profile of Ithun river was presented and it was submitted that clear distance between upstream proposed Ithun II HEP and reservoir tail of Ithun I project is 1.2 km while distance between TWL of Ithun I HEP and reservoir tail of downstream Dibang multipurpose project is 1.1 km.

Total land requirement for the project is 76 ha of which 46 ha is forest land and 30 ha is private land.

The flow series for the project has been generated on catchment area proportion method on the basis of CWC approved 10 daily water availability series for 23 years (1986-87 to 2008-09) of Tangon Limb of adjacent Etalin HEP. Rainfall data was collected from 10 Rain Gauge Stations in Diabng Valley, out of which one RG station viz. Dunli falls in Ithun I catchment. Rainfall-Elevation relationship was developed for Eatlin-Tangon cathcment and Ithun I cathcment and variability factor was derived as 1.19. However, a 10% correction was applied to be on conservative side.

The Committee expressed satisfaction over provision of ecological flows during lean season which are proposed as 20% of average of four leanest months of 90% dependable year but expressed concern over ecological flow releases during monsoon season and rest of the months. The EAC asked to keep a provision of 30% of average of monsoon months of 90% dependable year and 20-30% during rest of the months. After ensuring ecological releases, available flow shall be used to work out power potential studies and installed capacity of the project is to be worked-out accordingly.

The Committee after further deliberations recommended scoping clearance for which following issues are to be addressed in EIA/EMP reports:

- Since the study area involves good forest, emphasis should be attached on RET and endemic species in EIA/EMP Studies.
- Study should include number of species, trees, both in submergence and their basal area etc



- Impacts due to influx of population should be properly assessed and addressed.
- A site specific study may be carried-out for establishing the proper environmental flow release during monsoon, non-monsoon and lean months corresponding to the 90% dependable year. Release of minimum environmental flow must mimic the pre-dam flow pattern of the river for sustaining the aquatic bio-diversity together with downstream user need and accordingly, water withdrawal for power generation is to be regulated. Minimum environmental flow release would be 20% of average of four lean months of lean period, 20-30% of flows during non-lean and non-monsoon period and 30% of average flow including spillage during monsoon period corresponding to 90% dependable year.
- The project and influence/study area has to be shown (which should include catchment, submergence area, HRT area between d/s of dam and power house, tributaries and d/s of power house) in a proper map including classification of land use to be covered. Also juxtaposition in contour/slope map should be attempted for better understanding.
- Detailed methodology to be followed including type of instruments and techniques of analysis are to be indicated.
- Secondary sources of information to be clearly revealed and citations to be included in a reference list.
- Valuation of Bio-diversity and Eco-system services is to be carried out following appropriate literature/books/papers.
- **Biological Environment** shall include the following –
  - Forest type should be as per Champion & Seth's (1968) classification; number and species of trees in the submergence area and their basal area will be calculated for valuation.
  - Cane, Bamboo spp.
  - Amphibians” after herpetofauna; Under faunal elements
  - General vegetation pattern should include “Pteridophytes”.
  - Include “Number” before “size of Quadrats”.
  - GPS reading of occurrence of RET species will have to be recorded for conservation and rehabilitation purpose.
  - Under faunal elements include “Amphibians” to be included after herpetofauna.
  - 46 ha forest land diversion has been proposed. The area is rich in biodiversity and hence proper effort to document the same is to be made. Special effort is needed to document nocturnal species of mammals for which the areas is known. Use of camera traps is highly recommended. The personnel engaged for faunal surveys should be well experiences with surveys in the north-eastern region.
  - Environmental Management Plan shall include-
    - Wildlife Management Plan and
    - Inventorisation of Lichens, and endemic tree species, and RET plant species may be undertaken etc.

## **2.5 Reoli-Dugli Hydropower Project (410 MW+ 10 MW) in Lahaul-Spiti District of Himachal Pradesh by M/s L&T Himachal Hydropower Limited-Reconsideration of TORs.**

The project proponent earlier presented the Reoli–Dugli (410+10 MW) hydroelectric project on 7-8<sup>th</sup> September, 2012 and 26-27<sup>th</sup> December, 2012. The followings emerged from the presentation.

The project envisages construction of 75 m high concrete gravity dam across river Chenab between the confluence of Darhi nala and Reoli nala with River Chenab. This is a run-of-the-river scheme and located in between the downstream of Seli HEP and upstream of Purthi HEP projects. The reservoir has a live storage capacity of 8.32 MCM between FRL 2489 m and MDDL of 2472.5m. Four power intakes are located on the right bank upstream of the dam to tap the design discharge from the river for power generation. The water from the intakes will be conducted through four underground de-silting chambers, where silt of 0.2mm size and above would be removed. Silt free water from the de-silting chamber would be led through a 10.7 km long head race tunnel (HRT), which ends in a 36m dia surge shaft, provided to take care of transients in the system. Water is then led to an underground powerhouse housing four generating units each of 105 MW capacity coupled with Francis turbines through two steel lined pressure shafts. The normal Tail Water Level of the project as allotted by the Govt. of Himachal Pradesh is 2333.2 m. Water from the power house is led back into the river through a tail race tunnel. The project proponent proposes to release 11.22 cumecs during the lean season (20% of average inflow during that period), 21.11 cumecs during the non-monsoon, non-lean period (20% of inflow during that period), and 18.92 cumecs in the monsoon period so that 30% of the average inflow during that period is maintained downstream of the dam. Further, to utilize the release of environmental flows during the lean season, a secondary power intake is also proposed in the body of the dam on the right bank of the river. Water drawn is led into a pressure shaft embedded in the body of the dam and taken to a surface powerhouse at the toe of the dam, which houses 1 unit of 10 MW (with an additional 10MW unit as standby during maintenance). Water from this secondary power station are let back into the river at the toe of the dam through a tail race tunnel (TRT).

The project would require 182 ha forest land under various project appurtenances and facilities out of which approximate 66 ha land shall come under submergence. There is no displacement of population. Hence resettlement & rehabilitation (R&R) is not envisaged in the project.

There is no National Park/ Wildlife Sanctuary/Biosphere Reserve/Historical Monuments in the project area. Total cost of the project is about Rs. 2604 Crores and construction of it will be completed in 7 years.

The Committee was informed that the domain levels of Reoli-Dugli project given by Govt. of Himachal Pradesh has FRL at 2489 m and leaves only 148 m free stretch between TWL of Seli HEP and FRL of Reoli Dugli, which is detrimental for the environmental health of the river. On account of this concern, the project proponent has been asked by the EAC to lower the FRL so that at least 1 km free stretch is available between the two projects. The project proponent informed that to leave 1 km free stretch the FRL has to be lowered by 5.1 m and explained that lowering of the FRL at the present location requires lowering of the MDDL to account for live storage provisions as stipulated in Indus Water Treaty (IWT) which is not possible from structural design considerations. The site conditions are also not suitable for shifting of the dam further downstream due to presence of Harsar nala about 400m d/s on the left bank (catchment area – 65 sq.km.) with fluvio glacial deposits on either bank ruling out any dam location. Further d/s, the valley becomes very wide (with no rock abutments, particularly on the left bank) right upto Tindi village (El.2435m) located about 2.7 km downstream. Any location d/s of this site (Tindi village) will submerge Tindi, highway (> 2.5 km), helipad, dense deodar forest & the agricultural fields on the right bank.

The 148 m free stretch in between u/s and d/s projects is a matter of concern for the EAC. Hence the project proponent was directed to revise the project so that a minimum 1 km free stretch

of the river is left. The EAC was of the view that IWT provisions only stipulate about the maximum pondage limit and opined that for keeping 1 km free stretch of river between two projects the pondage can be reduced, if so required, to attend to environmental requirements. To meet this requirement the project proponent came back with a revised proposal with the FRL at EL 2483.9 m by lowering the allotted FRL of 2489 m by 5.1 m to and submitted the followings:-

- 1) The pondage inter-alia the MDDL is governed by IWT (Indus Water Treaty) provisions. With the FRL at EL 2489.0 m and the MDDL fixed at EL 2472.5 m, L&T had provided a pondage of 8.32 MCM which is within the maximum permissible limit stipulated under IWT in their original proposal. However, in this case the free stretch of river works out to only 148 m.
- 2) As brought out above, the FRL is to be lowered to EL 2483.9 m for providing a 1 km free river stretch. Since from design considerations (sediment management and energy dissipation aspects) the MDDL cannot be lowered below EL 2472.5 m at the present location, the pondage reduces to 5.24 MCM with the FRL at EL 2483.9 m.
- 3) Under the circumstances, the proposed configuration of Reoli Dugli will have FRL at EL. 2483.9 m, MDDL at EL. 2472.5 m and the normal tail water level at EL. 2333.2 m. There is an obvious loss of head with concurrent loss of energy output from the project.
- 4) The environmental releases in the Lean season and the Non-monsoon, Non-lean season would be 11.22 cumecs (20% of inflow) and 21.11 cumecs (20% of inflow). Since the monsoon flows of Chenab are very high, 8.75 cumecs is proposed as environmental release in monsoon so that the downstream flow is about 28% of the average inflow during that period instead of the originally proposed 30%. This will compensate for the loss of energy to some extent and help in keeping the installed capacity of the project as allotted. This flow will get supplemented as the intervening catchment area between Reoli Dugli dam site and Power House is 172 sq km which will also yield about 12.5 cumecs in monsoon and contribute to the downstream flow. The largest nallah, Harsar, with about 67 sq km of catchment area is located just 400 m downstream of the dam.

The committee has taken a note that due to environmental reasons, the live storage may be reduced from the maximum permissible under Indus Water Treaty, if necessitated by site conditions or design considerations. The committee also noted that the environmental release proposals are acceptable considering the circumstances.

The Committee after critically examining all environmental issues, recommended clearance for pre-construction activities with the following additional TOR:-

- Details geological survey and structural mapping around proposed reservoir and as well as power house site.
- Presence of species such as Snow Leopard, Bharal or Ibex shall be explored during winter season.
- Aqua- fauna like macro-invertebrates, zooplankton, phytoplanktons, benthos, periphytons, macro-benthos, etc. shall be studied.
- Availability of fish species namely *Diptychus maculatus* in the project area shall be explored.
- Impact of 11 km long HRT on avi-fauna and riverine birds and impact of tunneling and diversion of 11 km long HRT on avi-fauna and riverine birds also needs to be assessed.
- Stocking of brown trout & Arctic Char in the river stretch and reservoir area, including creation of hatcheries to be explored.

- Dam break analysis & Disaster management plan should consider flood plain mapping for dam break flood scenario considering two dams, viz., Seli, Reoli-Dugli in series. The outputs of Dam Break Model would be illustrated with appropriate graphs and maps clearly bringing out the impact of dam break scenario.
- The project proponent is to include a Drainage Map (required for CAT Plan), Forest Type Map, Map showing Sampling locations for different parameters of Baseline data. If the area is snow covered then instead of winter season, post monsoon season for base line data studies can be selected.
- The environmental releases in the Lean season and the Non-monsoon, Non-lean season would be 11.22 cumecs (20% of inflow) and 21.11 cumecs (20% of inflow). Since the monsoon flows of Chenab are very high, 8.75 cumecs is proposed as environmental release in monsoon so that the downstream flow is about 28% of the average inflow during that period instead of the originally proposed 30%. This will compensate for the loss of energy to some extent and help in keeping the installed capacity of the project as allotted. This flow will get supplemented as the intervening catchment area between Reoli Dugli dam site and Power House is 172 sq km which will also yield about 12.5 cumecs in monsoon and contribute to the downstream flow. The largest nallah, Harsar, with about 67 sq km of catchment area is located just 400 m downstream of the dam.
- **Following Biological Environment:**
  - Characterization of Forest types should be as per Champion & Seth's classification (1968).
  - Faunal elements : Include 'Amphibians'.
- Impact on Ecology in to also include 'Loss of forests and biodiversity' during Construction & Operational Phases including Terrestrial Flora.
- Valuation of Bio-diversity and Eco-system services is to be carried out following appropriate literature/books/papers.

## **2.6 Lower Tapi Lift Irrigation Scheme in Jalagaon District of Andhra Pradesh by M/s. Tapi Irrigation Development Corporation, Government of Maharashtra – For Environmental Clearance.**

The project proponent made a detailed presentation on the project and the following emerged:

The Lower Tapi project is proposed on the river Tapi in Jalagaon District of Maharashtra and proposed to construct 16.76 m high long weir to store water & lift and utilize for irrigation, drinking water and industrial purposes. The proposed project will help to provide irrigation facilities for 25,657 ha of area in 85 villages in Jalagaon and Dhule Districts. The gross command area (GCA) is 40,091 ha and culturable command area (CCA) is 32,072 ha. The project envisages construction of a gated spillway on Tapi river with a gross storage of 262.58 Million cubic meters. The total catchment area of the project is 16,317 Sq.km. The total land requirement is about 3737 ha. The submergence area is 3390.16 ha (private land-2792 ha + 595.04 ha revenue land + 3.12 ha forest land). No Wildlife Sanctuary/National Park/Archaeological monuments are present within 10 Km radius of the project. A total of 11 villages (fully-6 + partially-5) consisting of 1989 families are likely to be affected by this project. The R&R plan of Government of Maharashtra will be followed for the project affected families. The total cost of the project is about Rs.1905.52 Crores.

The Committee after detailed discussions on the project observed the following:

- Wildlife and avifauna section is very sketchy and no methodology for study not

mentioned. Sample sites are to be shown on map. No sources of secondary information have been mentioned. Species like Tiger have been indicated to be present in the area. This needs to be ascertained since Tiger's presence indicates a high value of the area from bio-diversity conservation angle. The list of avifauna is very deficient with only 17 species listed. The data is to be for 3 seasons.

- The existing status of the report is rather poor as a number of issues on geological aspects are being neglected. The proposed command area has not been clearly given. It is understood that many existing lift irrigation schemes are not functioning in Maharashtra. There are number of complaints from local committees which seem to be serious considering huge expenditure on earlier irrigation projects in Maharashtra. Hence, the entire study should be carried-out afresh.
- The project will affect 11 villages (6 villages fully and 5 villages partially), and a very large number of families will be displaced. There should be a detailed study on social impact of the project. As per NRRP 2007, "whenever it is desired to undertake a new project or expansion of an existing project, which involves **involuntary displacement of four hundred or more families en masse in plain areas, or two hundred or more families en masse in tribal or hilly areas**, DDP blocks or areas mentioned in the Schedule V or Schedule VI to the Constitution, the appropriate government shall ensure that a Social Impact Assessment (SIA) study is carried out in the proposed affected areas in such manner as may be prescribed". Therefore, a Social Impact Assessment (SIA) is mandatory for Lower Tapi Lift Irrigation Scheme as it will cause en masse displacement of inhabitants.
- Regarding the Rehabilitation & Resettlement plan, it is suggested that the project proponents should not restrict themselves only to the R & R Plan of the Government of Maharashtra, 1986 and 1999 (as mentioned in Chapter 7, page 120 of the report submitted), rather they should consult the NRRP 2007, and make provision to have the best of both national and state government policies.
- In the revised check list on Page-5, explain: "Financial return at the end of 10<sup>th</sup> year after completion is 0.213". Vide Page-9 Item-D, the return from irrigated area is shown to be about 6 times of the return before irrigation. This should be based on higher crop productivity. Project proponent (PP) to give some information on the irrigated area productivity of some crops assumed for project design, its corroboration from any other existing irrigation projects in Maharashtra for the same crops and the corresponding un-irrigated area productivity.
- It is seen from Pages-9, 10 that 50% irrigation development will be accomplished in the last two years of the 10-year project completion period and the remaining 50% would have been completed during the first 8 years. In the same way, the PP to give a year-wise phasing of the activities under CAD and OFD works, which have been standardized by the MoWR, GOI. In other words, expand the information base of Items-1, 2 and 4 under C on Page-8 (by including field drains, land consolidation and field rectangularization, land development, conjunctive use of surface and groundwater, rotational water distribution system, details of lining of the water conveyance system if flow irrigation is to be adopted using the lifted water, introduction of water saving pressurized irrigation, etc.).
- Tables given on Page-14, should accompany a comparison with the corresponding information at the planning stage of the D/S projects to know the performance of the earlier projects and how that has been utilized in the planning of the new project. Therefore, the information sought under the second bullet may please be collected and shared with the EAC.

- By citing tabular information of Page-16, a case has been made for not providing canal system but only outlet, if there is no response from the farmers in adopting lift irrigation. But from the same information, it is found that while flow irrigation in the past had steadily increased from 13% (in 1991-92) to 24% (in 1995-96), with an interim high of 27% (in 1994-95); the lift irrigation had been fluctuating between 73% and 87%, with an overall downward trend from 87% (in 1991-92) to 76% (in 1995-96). Hence, it may be more prudent to provide for all structural facilities required for practicing flow irrigation. Providing outlet only will lead to unscientific and inefficient use of the precious lifted water at a high cost that must be avoided.
- Lift irrigation itself is more expensive than the gravity irrigation (reflected in the approximate per hectare project cost of Rs. 5.00 lakhs/ha of GCA; Rs. 6.00 lakhs/ha of CCA and Rs. 7.5 lakhs/ha of ICA on Page-4). Use of expensive lifted water by letting it flow over the land unguided is not at all justified. The design concept of the project seem to be at least 50 years old and does not take into consideration either the hue and cry all over the world on fresh water crises or the development in irrigation technology and irrigation water management in the last 50 years.
- The Consultant has not given their accreditation certificate by NABET in the EIA report. TOR compliance certificate was also not given in the EIA report. Thus, the requirement, as per MOEF Circular no. J-11013/41/2006-IA (II) (I) dated 4.8.2009 has not been found to have complied. The consultant, who was replying to all the questions of EAC members, has also not been given under discloser section which is not in line with QCI/NABET guideline. This may be explained.

The committee thus, observed that the information is incomplete. The project in its present form is not a complete lift irrigation scheme and is a scheme of only lifting water with some outlet provisions. The Committee did not find any attempt by the project authority to ensure that the lifted water is distributed efficiently and equitable among the targeted beneficiaries, without causing any secondary problems in the area proposed to be commanded by the lifted water. Therefore, the committee suggested that all requisite documents complete in manner incorporating above information may be submitted for further consideration of the project

## **2.7 Arpa Bhasajhar Barrage Project in Bilaspur District of Chattisgarh by M/s Water Resources Department, Government of Chattisgarh – for Reconsideration of TOR.**

The project proponent made a detailed presentation on the project and the following emerged:

This is a major Irrigation project proposed on Arpa River to provide irrigation facilities in 25,000 ha of land in 92 Villages of Kota, Bilha and Takhatpur Blocks in Bilaspur District. The project envisages construction of 12.35m high and 138 m long barrage across River Arpa for providing irrigation in 25000 ha and also to meet drinking water requirement as well as industrial use. The catchment area of the project is 7811 Sq.km. The total land requirement is about 802.105 ha, out of which 442.350 ha is forest land. Total submergence is 653.586 ha. (Forest land-384.262 ha + 58.088 ha is revenue forest land + 56.46 ha is private land and 154.770 ha is other land). There is no National Park/Wildlife Sanctuary/Biosphere Reserve/Historical Monuments in the project area. No rehabilitation is required for this project. The total cost of the project is 606.43 Crores and construction will be completed in 5 years. The CWC has given in-principle consent for the project for preparation of the DPR.

The project was earlier considered by the EAC in its meeting held on 12-13 October, 2012. Based on the observations, the project proponent submitted details of the project deliverables in the PFR along with the draft TOR as per the guidelines of the MOEF which were found to be in order.

On being asked about the CAD & OFD, the project proponent showed a sample plan of a minor in which all the details i.e. Water course, field channel, field drains and other relevant features indicated made available to the committee. It is also assured by the project proponent that Command Area Development (CAD) and OFD Progress activities will co-terminus with the project completion. The Command Area has high percentage of ground water development and good feasibility of ground water recharge.

The Recycling of water, change in cropping pattern and change in Irrigation policy may effectively maintain the recharge of ground water resources in the district. Therefore, this is to be factored.

The project proponent presented that agriculture is the chief occupation of the state with paddy being the main crop.

This barrage is intended to divert water to minimize the crop failure in command area. This will increase the Irrigation percentage of state from 31.8% to 33.2% and beneficiaries of about 96930 cultivators.

After detailed deliberations and discussions on all the environmental issues, the Committee recommended the project for scoping clearance with the following additional TORs:

- For studying the command area 15-20 sampling sites to be selected for soil samples. Surface water and ground water studies to be included in the EIA report.
- As presented by the project proponent, earmark 10% of command area i.e. about 2500 ha in 5 blocks of 500 ha each for commissioning the pressurized (drip/sprinkles etc.) irrigation system for optimizing water use.

## **2.8 Discussion of Basin Study for Lohit River Basin in Arunachal Pradesh by M/s. WAPCOS.**

The project proponent did not attend the meeting and hence project was not considered.

## **2.9 New Ganderbal HEP (93 MW) Ganderbal District of Jammu & Kashmir by M/s. Jammu & Kashmir State Power development Corporation Ltd- For Environmental Clearance.**

Shri. Zahoor Ahmed Chat, Executive Director, J&K SPDC Ltd made a detailed presentation of the project covering the entire project area showing the location of the barrage site, submergence area, location of other project components and also downstream reaches. Following emerged from the presentation:

This is a run-of-the river scheme project conceived on river Sindh (a tributary of Jhelum) in District Ganderbal of Jammu & Kashmir with its head works upstream of the existing weir of old Ganderbal HEP (15MW) which caters for drinking water supply of Srinagar town and irrigation demand of 1578 ha command area through Sindh power

canal. The New Ganderbal HEP (93MW) has thus, been conceived as replacement of existing 15MW Ganderbal HEP, commissioned in the year 1951 as Stage-1st (9MW) and 1956 Stage-2nd (6MW). Because, the erstwhile project has been found giving recurring trouble due to damages/slides in highly dilapidated water conductor system, de-rated machinery, which remains under regular outage due to O & M problems. About 750 m u/s of the proposed project, the tail race of the existing US HEP-II (105 MW) discharges into river Sindh. The Full pond level has been fixed at EL 1746 m so that the normal tail water of EL 1746.8m of USHEP-II is not interfered.

It was noted that the scheme has been conceived with its head works 140 m upstream of the existing weir so that power generation and water requirement of irrigation of drinking water supply are not adversely affected during the construction phase. The head works shall comprise of 72.03 m long barrage with 7 bays, under sluice portion with crest level at EL 1736.5 m and spill way bays with crest level at EL 1739.5 m for passing high flood discharge of 2600 cumecs. The full pond level and dead storage level have been fixed at EL 1746 m and 1742 m respectively. The barrage shall have a very small pondage of 0.29 MCM.

On the upstream of under sluices RCC tunnel silt excluder with discharge capacity 18 cumec has been proposed. An inlet structure 45 m wide having 7 bays at crest level EL 1741 m shall be provided for a design discharge of 109 cumec. One bay of the inlet structure shall function as regulator for irrigation duct, RCC duct of internal size 185 m length and size 5.8 m x 2.5 m with design discharge 15 cumec. To the downstream end of the inlet structure 2 nos. basin of size 70 m, 34m X 7m twin chamber hopper type surface de-silting basin to exclude sediment particles up-to 0.2 mm shall be provided with a common RCC duct silt flushing arrangement discharging downstream of the under sluices. The head regulator with crest level at EL 1741.50 m has been designed to abstract 94 cumec discharge which shall conducted to de-silting tank to exclude minimum 0.20 mm size particles. From the downstream end of collection pool, through power intake 10.99 km long, 5.5 m diameter horse shoe shaped HRT with 0.3 m thick cement concrete lining has been proposed for a design discharge of 78.38 cumec of water to 20 m dia and 58 m high-restricted orifice type surge shaft from which 4.3 m diameter circular underground pressure shaft in 88 m length extends. Three number circular steel lined penstocks 2.5 m diameter, 265 m length shall be provided to carry 72.38 cumec discharge to 3 unit power house (31 x3 MW) After generation of power the discharge shall be reverted to river discharged through 1.407 km long tail race channel.

At RD 8.945 km, a separate branch tunnel shall bifurcate from HRT to carry and convey 6 cumec of water for drinking purpose. The power channel of the existing Ganderbal project, on the other hand, shall be used, after proper renovation, as irrigation canal to meet the existing irrigation requirement.

The total land requirement is 63.70 ha of which forest land is 27.2 ha, private land is 24 ha and revenue land is 12.5 ha. The sanction for diversion of 27.20 ha Forest land has been accorded by Govt. Vide G.O. No. 175-FST of 2012 dated 2.4.2012. It was informed that State land stands fully transferred and 11 ha of private land already acquired.



## Chapter 1.

The Public Hearing for the project was conducted on 4th May 2011 at Prang Village in Ganderbal District of J&K. Proceedings of the Public Hearing and the issues raised there-in are covered in the EIA & EMP reports.

The catchment area at the barrage site Prang is 1352 sq. km out of which 207 sq. km is under permanent snow cover. The design flood study have been examined by the CWC, New Delhi which recommended SPF of 2599 cumec (say 2600 cumec) for the design of the project features. Discharge series of 11 years from 200-01 to 2010-11 observed at G & D site Prang has been used for arriving at 10 daily flow series which stands approved by CWC vide letter no. HYD (North)/1/J&K/52/90-Hyd/593 date 9.9.2012. Annual energy generation in 90% dependable year is 392.72 Gwh as per power potential of 93MW approved by CEA vide No:-2/J&K/12/95-PAC/1787-88 dated 29.3.2012.

The project area falls in seismic zone IV and very close to zone V. The Peak Ground Acceleration (PGA) values for Maximum Credible Earthquake (MCE) and Design Base Earthquake (DBE) conditions estimated as 0.24 g and 0.16 g, respectively corresponding to Zone V as per study carried out by Department of Earthquake Engineering, Indian Institute of Technology, Roorkee (IITR) in case of URI HEP Stage I on Jhelum have been adopted in the design of the NGHEP.

The tabular presentation of flow available in the river considering contribution of intermediate catchment also (both in terms of volume and as percentage of average lean flow) after diversion of river water for drinking water supply and generation was also reviewed. The minimum environmental flow of 2.42 cumec, based on 20% of the average flow in four consecutive lean months in 90% dependable year (2007-2008) was stated to have been found adequate for spawning movement of fishes as fishes have been observed during study about 2.65 km d/s of barrage. The observed depth of water column was about 0.3 m adequate for movement of fishes.

The Sindh River has a catchment area of 132.26 sq km in the river reach d/s of the diversion site for NGHEP and up-to Tikebagh from where the Mar Kol takes off. The d/s catchment will contribute about 1.17 cumec discharge based on the average discharge of 12.03 cumec resulting from 1352 sq km catchment area u/s of diversion site. Bhramsari Nar mainly contributes the discharge with its origin near Harmukh Glacier EL 5148 and its small tributaries

The forest types classified into 4 groups in accordance with “Survey of Forest Types of India” by Champion and Seth 1968 (Group-12 -Himalayan Moist Temperate Forests, Group-13 -Himalayan Dry Temperate Forests, Group-14 -Sub-Alpine Forests and Group-15 -Moist Alpine Forests.)

A total of 26 trees species, 5 shrub species and 24 herb species have been recorded during survey. The RET species *Eremurus himalaicus* (a herbaceous species) and *Podophyllum hexandrum* species were observed in the study area. The findings of EIA Study were discussed at length and it was observed that the list of species should be provided as running text in the body of the report instead of putting it separately as Annexure. The plants used by locals for medicinal use were highlighted. The list of mammalian species was prepared based on the primary data and forest working plan.

Some species were sited during the primary survey viz. like Langur, Macaque, and Common mongoose were observed in various locations. The public consultation revealed the presence of Jackal (*Canis spp.*), Fox (*Vulpes spp.*), Black bear (*U. thibetanus*), Mongoose (*Helogale parvula*), Weasel (*Mustela Spp.*) in the study area. Further, 27 birds species were observed during survey. Common avifauna observed are Indian myna, House Sparrow, House Crow; Magpie Robin, Black Drongo, Babbler, Red Vented Bulbul. Eight (8) reptilian species were observed in the study area. Some Endemic, Threatened and Endangered species of mammals reported in study area.

Twelve species of fishes belonging to three orders (Cypriniformes, Siluriformes and Salomoniformes) and four families (Cyprinidae, Balitoridae, Sisoridae and Salmonidae) were recorded in the study area.

About 12.569 lakh m<sup>3</sup> of muck (17.849 lac cum) is expected to be generated out of which about 4.247 lakh m<sup>3</sup> of the muck will be utilized and balance 13.602 lakh m<sup>3</sup> will be disposed at 4 identified locations, of which 3 are more than 60 m to 5 km away from HFL of the river. The first muck dumping site D-1 shall hold backfill material behind the counter fort retaining wall constituting the right afflux bund In about 700m. All sites are well supported at the base with gabion structure at different elevation or the RCC retaining wall.

A total of 24 ha private land will be acquired. A total of 245 families (fully-9 + 236 partially) are likely to be affected due to acquisition of land. The NRRP-2007 Plan will be followed for the project affected families (PAFs) The R&R grant as per NRP 2007 has been worked out as Rs 439.37 lakhs. The issues raised during the public hearing were discussed at length and was observed that the public is in favour of project. Most of the issues have been agreed by the project proponent.

The EAC desired that the project proponent should adopt at-least 5 needy students per year during construction period of the project from local area to provide financial support for meeting full expenses of their vocational/professional courses. In the light of low female literacy rate, it was suggested that the preference should be given to the girls.

The following suggestions regarding text on methodology and the results of studies related to Flora and Fauna as contained in EIA report were made by the Committee for compliance:

- The sampling location should be as per the configuration of the project component like barrage site, submergence area, catchment area and the area between HRT to the tail race channel.
- Vegetation data as shown at Annexure should be elaborated separately covering for Angiosperms, Gymnosperms, Pteridophytes, Bryophytes should be given separately for all the sampling sites. It should also cover data for herbs/shrubs of angiosperms, Pteridophytes, and Bryophytes in different parts of the project.
- Under phytosociology – values are given for the ecological data but there is no inference or explanation to the data given. It should be elaborated
- In respect of faunal studies, it was suggested that the list of avi-fauna should include separately residential and migratory bird species.
- The Annexure XI of the EIA report reveals that there are 73 bird species in the study area whereas the Table 4.34 shows 13 species in the study area, while section 4.13.17 of the EIA report shows a total no. of 27 birds were observed during the survey.

- It was noted that the bio-diversity and Wildlife management plan is well addressed
- The study of the fish composition and aquatic life found in Sindh river at nearby springs is elaborate. However, the provision of Rs. 65 lakhs for establishing a hatchery was considered inadequate and should be increased to Rs. 85 lakhs. It was also suggested that the proposed width of (1.2 m) fish ladder should be examined to confirm to the size of fishes expected to move through it.
- The Consultant –EQMS- has not given their accreditation certificate by NABET in the EIA report. TOR compliance certificate was also not given in the EIA report. Thus, the requirement, as per MOEF Circular no. J-11013/41/2006-IA (II) (I) dated 04.08.2009 has not been found to have complied. The aquatic expert from Kashmir University, who was replying to all the questions of EAC members, has also not been given under discloser section. Two persons have been designated as EIA coordinator, which is not in line with QCI/NABET guideline. This may be explained.
- The catchment receives low (633 mm at Mahasibal close to PH site) to high of 1816 mm in Sonamarg. The river receives good snow melt flow, which is resulting in a specific yield of 1200 mm. The requirement of 20%-30% flow in monsoon in the river downstream of the barrage was explained against 12 to 24% shown in power study and justified by the proponent considering 132 Km<sup>2</sup> of downstream basin, which is likely to contribute 1.17 Cumec in lean season. As the river is a rich (40% Schizothorax plagiostomus) trout breeding and feeding zone, adequate flow in pre-monsoon and post monsoon is an absolute necessity. Therefore in the pre-monsoon period, depth of 0.8 to 1 m and velocity of 0.8 m/sec is desirable. The proponents were specifically advised to examine and maintain about 25-30% of flow in the 15 Km of deprived reach by limiting abstraction for power release accordingly. The release in the non-monsoon and lean season was found adequate.

After detailed deliberations, environmental clearance was recommended for the Project subject to the compliance to the issues raised and suggestions made by EAC as above.

## **2.10 Lower Orr Project in Shivpuri District of Madhya Pradesh by M/s. National Water Development Agency (NWDA) – For Reconsideration of TOR.**

Shri. R. K. Jain, Chief Engineer, NWDA made a detailed presentation on the project. The project was earlier considered by the EAC in its meeting held on 11-12<sup>th</sup> November, 2011. The Committee noted that the project details submitted earlier under Ken-Betwa Link Phase-II was not clear. It was also noted that the project involves more than 968 ha of forest land which will come under submergence due to construction of Orr dam in the project. Information on flora and fauna of this area have not been provided in Form-1. This should at least from secondary sources. The Committee suggested that the project may be named as Lower Orr project rather than Ken-Betwa Phase-II which has so many projects as TOR for this project will be considered only for this project as an independent scheme rather than for the whole Phase-II. Accordingly, the project proponent submitted Form-1 and PFR for Lower Orr project as an independent scheme.

The Lower Orr project is proposed on the river Orr near Didoni Village in Shivpuri District of Madhya Pradesh and proposed to construct a 34.031 m high and 2250 m long earthen dam to store 374 MCM of water and utilize the same for irrigation and drinking water purposes. A 91.260 Km long canal has been proposed on the left bank of the river. In addition to this, about 15 Km long feeder canal is also proposed to feed existing Angoori barrage from where water will be used in existing Datia irrigation canal system in Datia District. The proposed project will help to provide irrigation facilities for 67,126 ha of area in Datia and Shivpuri Districts. The gross command area is 77,559 ha and culturable command area is 44,751 ha. The pressurized irrigation

is proposed in 8,950 ha of area. The total catchment area of the project is 1843 Sq.km. The total submergence area is 2626.57 ha out of which 968.24 ha is forest land. A total of 12 villages (fully-7 + partially-5) consisting of 240 families are likely to be affected by this project. The total cost of the project is about Rs.668.83 Crores and will be completed in 5 years.

The Committee after detailed discussions on the project observed the following:

### **FORM 1:**

- **Form-A** has been used instead of **Form-1** As mentioned latest Form-1 has to be submitted with authorized signature as per amended EIA Notification, 2009

#### **1. Project Details:**

(i) **Short narrative:** The flora listed at the end does not confirm to be so. Instead, it appears to be a plant, such as trees, climbers, grasses, etc.; similarly, it appears that a few names of common animals and birds have been included without proper survey & investigation. There seems to be a very rich flora and fauna in the area which needs to be studied.

(ii) **Map showing forest land:** A large extent of RF and PF will be submerged and forest areas will get fragmented which will affect the movement of wildlife and their corridors. Therefore, clearance from Forest Department/ and Wildlife Wing may have to be taken.

### **PFR:**

(i) 8.2.3 **Flora and Fauna:** Description of forest should include scientific names of trees, shrubs and herbs, but only general description and common names of trees have been given. List of Medicinal plants though includes scientific names but there are spelling mistakes; names are not in italics; species names should not be written with capital letters.

(ii) 8.2.3.2.1 **Mammals:** The statement “Black Buck is the most beautiful animal sought after for flesh, skin and horns” is negative and unwarranted. Similar negative is the statements for wild pigs and rabbits (part of small game). This may be avoided in report

### **TOR:**

- It is not in the standard format and needs to be reformatted.
- Baseline Environmental Data: for 3 seasons to be collected in uniformly/ equally distributed locations in the project area
- Similarly, the EMP part is appear generalized with numerous statements/ items sometimes repetitive and not in the standard format; Compensatory Afforestation Plan is missing
- The faunal section 8.2.3.2 is full of mistakes and typographical errors. No reference has been provided for this information apparently flowing out of secondary literature. Clear information on presence of National parks also lacks. While there is a mention of a National Park in Sl. 8.2.3.1.13, neither its name nor its distance from the project has been given.
- The project area falls under Precambrian formations comprising Bundelkhand granites and granodiorites and granite gneiss, which are subjected to weathering. The over lying basalt of Deccan trap and underlying Vindhyan Group (intertrappean) are present. The detailed geological mapping of dam site is necessary. There are dug-well and tube-wells for irrigation purposes in the area. The demarcation of well in downstream and upstream reaches of the proposed dam are to be indicated in the map.
- Subsurface geological information may also be obtained from the boreholes data. Detailed geomorphological mapping is necessary for impact of inundation on the adjacent reaches of the river after the filling up of reservoir.
- The project will affect 12 villages and 240 families are likely to be displaced. In case the

displaced persons are tribal, a Social Impact Assessment must be carried out.

The project will be implemented by Government of Madhya Pradesh and the NWDA is the consultancy agency. The Government of Madhya Pradesh should depute the project implementing agency and it would be advisable that the agency concerned submit documents directly to the Ministry of Environment & Forests. The role NWDA in obtaining TOR while they will not be the project proponent was found to be obfuscating to the EAC.

The committee observed that the documents are incomplete; draft TORs proposed for an irrigation project was not available. Therefore, the committee suggested that all requisite documents complete in manner incorporating above information may be submitted for further consideration of the project

**2.11 Clarification on (A) Drinking Water Supply Project for the Chennai Metropolitan City – formation of new reservoir at Kannankottai & Thervai Kandigal Village in Gummidipoondi Taluk, Thiruvallur District of Tamil Nadu by M/s. Public Works Department, Government of Tamil Nadu –**

This is a Drinking Water Supply Scheme for the Chennai Metropolitan City in Tamil Nadu. The SEIAA, Tamil Nadu/Chief Engineer in their letters as well as during the presentation before the EAC mentioned the following:

- There are 2 existing water impoundments near Kannankottai village in Gummidipoondi Taluk of Tiruvallur District of Tamil Nadu and the site is near Chennai city. These water bodies receive rain water from its catchment and dry-up in summer.
- The present proposal is to divert surplus water from Krishna Canal of Andhra Pradesh by forming a reservoir by merging these 2 existing water impoundments to store 1 TMC capacity of water in the reservoir and the stored water ultimately will be used for drinking water purpose to Chennai Metropolitan city.
- The total land requirement for entire project area is approximately 602 ha which includes canal and reservoir areas.
- The merging of 2 existing water impoundments at Kannankottai Village will create an opportunity to store sufficient water for drinking water purpose for the surrounding population in the water - stressed region. In addition, the water available in surplus from Krishna Canal to be diverted through an off-take canal to the reservoir for charging.
- From the reservoir, a separate scheme will be prepared for water treatment and distribution of potable water.
- The proposed reservoir site is at lower elevation than the Krishna Canal water level which facilitates the recharging through gravity flow. The off-take canal is linking the Krishna Canal and reservoir is also taking water through gravity flow. The canal alignment is about 8.3 km long.
- There are no human settlements/household issues nearby and thus, R&R issues are not involved in the project
- Off-take canal is falling within the forest area for which proposal has been submitted for diversion of forest land & compensatory afforestation, to State Forest Department. Joint inspection was done and the proposal is under active

consideration of Forest Department of the State Government. Total forest land involved in the project is 22 ha.

- The project falls within 10 km from the Inter-State boundary of Andhra Pradesh
- Total project cost is about Rs.330 Crores and Government of Tamil Nadu has accorded administrative sanction for the same.
- The project neither proposes any hydro electric power generation component nor comprises any irrigation component and thus, has no command area

The Committee observed the following:

- The proposed scheme is a Drinking Water Supply to Chennai City. The drinking water supply scheme/component is not covered in EIA Notification, 2006 and the committee is mandated to appraise River Valley and Hydro Power Projects which are listed at item 1(c) of the Schedule to the Environment Impact Assessment Notification dated September, 14, 2006 (EIA Notification, 2006). As per this Notification, Hydro Power Projects with capacity  $\geq 50$  MW are of category 'A' and  $< 50$  MW  $\geq 25$  MW are category 'B' projects. The Irrigation Projects having a Culturable Command Area of  $\geq 10,000$  ha are of 'A' Category and below this are of 'B' Category. The 'A' Category projects are appraised at the Central level by Ministry of Environment and Forests through Expert Appraisal Committees (EACs) and the 'B' Category projects are appraised at State level through State Level Environment Impact Assessment Authorities (SEIAAs). As per the amendment of EIA Notification in 2009, the Irrigation Projects having a Culturable Command Area of  $\geq 10,000$  ha having no submergence are categorized as 'B' Category and shall be considered by SEIAAs. However, if a "B" category project is located in whole or in part within 10 km from the boundary of (i) Protected Areas notified under the Wild Life (Protection) Act, 1972; (ii) Critically Polluted areas as notified by the Central Pollution Control Board from time to time; (iii) Notified Eco-sensitive areas; and (iv) Inter-State boundaries and international boundaries, it will be treated as category 'A' category and shall be considered at Central level.
- In view of the above, the EAC expressed its inability to consider the project for the purpose of TOR/EIA/EMP etc as this does not fall within the purview and mandate of the EAC although, there may be some environmental issues which may be appropriately addressed by the project proponent. The drinking water schemes in fact do not attract the provisions of EIA Notification, 2006 and its subsequent amendment, 2009.
- The EAC however appreciated the approach and concerns of the State Government towards environmental protection for a project which is otherwise not covered under EIA notification.
- The proposal has been forwarded to the Ministry by the SEIAA along with Form-1. After further deliberations, the EAC concluded as under:
- The Ministry of Environment & Forests may write to SEIAA stating that the instant project does not attract the provisions of EIA Notification, 2006 and its subsequent amendment, 2009. The State Government may be requested to take the following steps:
  - Necessary clearance for diversion of forest land for the project to be obtained from the designated authority before commencement of the project

- Any other mandatory clearance/statutory permission from any other organization/department to be obtained by the project proponent
- Environmental safeguard measures/management plans may be implemented appropriately and in a timely manner.

**2.11 (B) Clarification on Drinking Water Supply Scheme to Tumkur, Bangalore (Rural), Kolar & Chikaballapur Districts by M/s. Karnataka Neeravari Nigam Ltd, Government of Karnataka for applicability of EIA Notification, 2006.**

This is a Drinking Water Supply Scheme to Tumkur, Bangalore (Rural), Kolar and Chikballapur Districts in Karnataka. The Principal Secretary, Government of Karnataka made a presentation and informed the following:

- Tumkur, Bangalore (Rural), Kolar and Chikballapur Districts in Karnataka are facing severe shortage of water supply for drinking and other needs and acute shortage is felt during summer.
- The present proposal is to divert excess floodwater from west flowing rivers such as Yettinahole, Kadumanehole, Kerihole and Hongadallahole located in Sakleshpur of Hasan District in Western Ghats region.
- Water is proposed to be collected through construction of small weirs
- The total quantity of water to be diverted is 679.483 M cum (24.01 TMC). Out of 24.01 TMC, 14 TMC of water is utilized to provide drinking water facility to Tumkur and Bangalore Rural Districts via gravity channel by 8 lifting facility & balance 10 TMC is proposed to be utilized in Kolar and Chikkaballapurs Districts which are facing severe shortage of drinking water.
- A reservoir with 10 TMC is proposed to be built near Deverayanadurga, Tumkur District for this purpose. Water is conveyed to the respective districts through raising main of 80 km and 55 km to Chikkaballapura and Kolar respectively
- The project also involves construction of about 250 Km long and 16 m wide canal ( to be covered) and also submergence of 2 villages.
- Approximately 1200 ha of land will be utilized for the storage reservoir, out of which 50% of the land is forest land and the rest is agricultural land.
- The streams (Yettinhole, Kudumanehole, Kerihole & Hongadahalla streams) which are close to Sakleshpura have been selected for harnessing water. The water will be harnessed up-to an elevation of 750 m only from the ridge point of the Western Ghat.
- The proposed project is planned in 2 phases. In all, about 8 diversion weirs are proposed to be constructed across the identified streams
- Total project cost is Rs.8323 Crores.
- The project neither proposes any hydro electric power generation component nor comprises of any irrigation component and thus has no command area

The Committee observed the following:

- The proposed scheme is a Drinking Water Supply to Chennai City. The drinking water supply scheme/component is not covered in EIA Notification, 2006 and the committee is mandated to appraise River Valley and Hydro Power Projects which are listed at item 1(c) of the Schedule to the Environment Impact Assessment

Notification dated September, 14, 2006 (EIA Notification, 2006). As per this Notification, Hydro Power Projects with capacity  $\geq 50$  MW are of category 'A' and  $< 50$  MW  $\geq 25$  MW are category 'B' projects. The Irrigation Projects having a Culturable Command Area of  $\geq 10,000$  ha are of 'A' Category and below this are of 'B' Category. The 'A' Category projects are appraised at the Central level by Ministry of Environment and Forests through Expert Appraisal Committees (EACs) and the 'B' Category projects are appraised at State level through State Level Environment Impact Assessment Authorities (SEIAAs). As per the amendment of EIA Notification in 2009, the Irrigation Projects having a Culturable Command Area of  $\geq 10,000$  ha having no submergence are categorized as 'B' Category and shall be considered by SEIAAs. However, if a "B" category project is located in whole or in part within 10 km from the boundary of (i) Protected Areas notified under the Wild Life (Protection) Act, 1972; (ii) Critically Polluted areas as notified by the Central Pollution Control Board from time to time; (iii) Notified Eco-sensitive areas; and (iv) Inter-State boundaries and international boundaries, it will be treated as category 'A' category and shall be considered at Central level.

- In view of the above, the EAC expressed its inability to consider the project for the purpose of TOR/EIA/EMP etc as this does not fall within the preview and mandate of the EAC although, there appear to be some environmental and R&R issues involved which may be appropriately addressed. Outcome of the WGEEP report may also have to be factored. The drinking water schemes, in fact, do not attract the provisions of EIA Notification, 2006 and its subsequent amendment, 2009.
- The EAC however appreciated the approach and concerns of the State Government towards environmental protection and its willingness to address the issues including R&R issues for a project which is otherwise not covered under EIA notification.

After further deliberations, the EAC concluded as under:

- The Ministry of Environment & Forests may write to Karnataka Neeravari Nigam Ltd, Government of Karnataka that the instant project does not attract the provisions of EIA Notification, 2006 and its subsequent amendment, 2009. The State Government, at the same time, may be requested to take the following steps:
  - Necessary clearance for diversion of forest land for the project to be obtained from the designated authority before commencement of the project
  - Any other mandatory clearance/statutory permission from any other organization/department to be obtained by the project proponent
  - An adequate R&R plan may be prepared and implemented wherever necessary, with adequate compensation to the project affected families
  - Environmental safeguard measures/management plans may be implemented in a timely manner.
  - During the construction period, environmental good practices such as dust suppression/ control, noise control etc to be followed.

**2.12 Shirapur Lift Irrigation Scheme Project in Solapur District of Maharashtra by M/s. Water Resources Department, Government of Maharashtra – For Reconsideration of TOR.**



The project proponent did not attend the meeting and hence project was not considered.

### **2.13 Lower Kopili Hydro Electric Project (96 MW) in North Cachar Hills District in Assam by M/s Assam Power Generation Corporation Limited - For TORs.**

The project proponent made a presentation on the Lower Kopili Hydroelectric Project on river Kopili in North Cachar Hills District of Assam. Following emerged from the presentation:

The proposed Lower Kopili HEP is downstream development of existing Kopili HEP. The project envisages utilization of the regulated discharge from Kopili HEP, spills of Khandong and Umrong Dam and the discharge from the intermediate catchment by creation of a reservoir and utilizing a gross head of about 114 m. The live storage in the reservoir will last for a few days only if the power generation is continued at full installed capacity in the Powerhouse.

As per the PFR, it was envisaged to generate (3x50 MW) i.e. 150 MW of hydropower. The rated discharge was envisaged as 172 cumec. During the course of presentation, it was confirmed by the project proponents that, after accounting for Environmental Flows, installed capacity has been reduced. The project proponents confirmed that Environmental Flow release shall be 20% of the average of the four lean months of 90% dependable year. In non-monsoon non lean season the release should be 20 to 25% of the average flows during the period in 90% dependable year. The environmental releases / spill during the monsoon season shall be 30% of average Monsoon flow for 90% dependable year

The revised scheme envisages to run at full potential in monsoon season and operate as a peaking station in non-monsoon season. The installed capacity of Project has been kept as 110 MW comprising of 2 units of 55 MW each. An auxiliary Power House having a capacity of 10 MW (2x2.5 MW+1x5 MW) has also been planned at the toe of the dam for utilizing the mandatory releases for ecological purposes.

The Project envisages construction of a 70.13 m high concrete gravity dam, about 20 km downstream of Kopili HEP Stage-I Power House. The Intake Structure comprises of trash racks located 35 m upstream of Lower Kopili Dam to carry a discharge of 118.00 cumec. A 7.25 m dia, 3.622 m long Head Race Tunnel is proposed. Surge Shaft of 25.0 m diameter, 52.69 m high with restricted orifice of 1.95 x 5.20 m rectangular shape provided as a riser shaft of 30.21 m height is also proposed. Pressure Tunnel of 5.20 m diameter, 648 m long upto bifurcation at 75 m upstream of D-line in the power house is also envisaged. 2 penstocks of 3.70 m diameter fully steel lined with lengths varying from 75 to 80 meters from bifurcation point to the power house will be provided. A surface power house with installed capacity of 110 MW, for utilizing the inflow from a catchment area of 2076.62 sq. km with a gross head of 122.63 m is proposed. An Auxiliary Power House of installed capacity of 10 MW is also proposed at the dam toe for generation of Power. The rated discharge in this layout is 118 cumec.

It was informed that the original proposal for 150 MW HEP has been abandoned and the present proposal has been conceptualized afresh.

The EAC appreciated the fact that the rated discharge has been reduced on account of release of Environmental Flows with a corresponding reduction in installed capacity.

After further deliberations, the EAC concluded as under:

- The free riverine stretch between FRL of Lower Kopili HEP and TWL of upstream Kopili HEP is about 6 km. There is no project downstream of the proposed Lower Kopili HEP.
- The EAC suggested that a PFR for the revised project configuration be submitted for consideration of issue of TOR to the project.
- Members could not comment as documents did not reach them.

#### **2.14 Change in installed Capacity from 4000 MW to 3097 MW for Etalin HEP in Dibang Valley District of Arunachal Pradesh by M/s. Etalin Hydro Power Company Ltd**

Scoping clearance was accorded to Etalin HE project on 30.11.2009 for 4000 MW installed capacity. The project proponent submitted that draft EIA/EMP report has already been prepared after completing data collection for all the three seasons as per TOR prescribed by MOEF. The following broadly emerged from the presentation made by the project proponent:

The project is located in Dibang Valley district of Arunachal Pradesh and envisages diversion of two rivers - Dri / Dibang (called Dri limb) and Tangon (called Tangon limb). The dam site of the Dibang limb of the project is located across Dri River near Yuron village about 22 km from Etalin. The Tangon limb consists of construction of dam about 800m downstream of Anon Pani confluence with Tangon river. The installed capacity for the scheme proposed on Dri limb is 1861.6MW, comprising of a small hydro scheme of 19.6MW at the toe of the dam on Dri river and six (6) units of 307MW each in the common underground powerhouse near Etalin village. The installed capacity for the scheme proposed on Tangon limb is 1235.4MW, including a small hydro scheme of 7.4MW envisaged at the toe of the dam on Tangon river and four (4) units of 307MW each in the common underground powerhouse. The total installed capacity of the project is, consequently, 3097MW. The headrace tunnel on Dri limb has length of 10.722 km while HRT along Tangon limb is 13045 km long.

The Committee was informed that during detailed investigation, hydrological studies were updated and submitted to CWC for approval. CWC used their own methodology and revised the water availability. This has resulted in substantial reduction in water availability for power generation. On the CWC approved hydrology, power potential study was carried out and submitted to CEA on 18.08.2011. Based on the report submitted & Hydrological studies, Power potential with installed capacity of 3070 MW was concurred by CEA vide letter dated 21.10.2011.

In order to utilize the aquatic releases, requirement of two additional Dam Toe Powerhouses (1x19.60 MW at Dri diversion and 1x 7.40 MW at Tangon diversion) were proposed. Detailed Project Report (DPR) was formulated & submitted to CEA with installed capacity of 3097 MW and same has been concurred by CEA vide letter dated 17.07.2012. DPR is at an advanced stage of concurrence by CEA. Draft EIA/EMP report has been finalized and is ready for submission to Arunachal Pradesh State Pollution Control Board (APSPCB) to undertake Public Consultation including Public Hearing.

It was also emphasized that in the new configuration of the project with reduced capacity, total land requirement for the project shall be reduced from 2222 ha to 1149.85 ha with submergence area coming down from 202 ha to 119.44 ha. Dam height above deepest foundation level in case of Dri dam increases from 90 m to 101.5 m and reduces from 150 m to 80 m in case of Tangon limb dam. However, FRL in respect of both the cases remain unchanged. New configuration of main power house shall be: 3070 MW (10x307 MW) and Dam Toe power house on Dri shall be 19.62 MW and Dam toe power house on Tangon shall be 7.40 MW.

The Committee enquired about flow series, flows utilized for power generation and releases proposed for ecological purposes in the new project configuration. Project proponents informed that a provision for ecological releases as 20% of average of four leanest months in 90% dependable year has been made and this shall be released on continuous basis through dam toe powerhouses, one on each diversion side. The Committee further enquired about the releases available in the river during monsoon and other months including explanation on the flow series in 90% dependable year, showing drawls in cumec in each 10 daily and flow left in the river.

The Developer explained that in approved TOR of 2009 for 4000 MW, there was a condition to get a project specific study carried out by some agency of repute to ascertain minimum releases required. This work has been awarded to CIFRI, who have already carried out two season's data collection during the months of May and October. Third season data will be collected during the month of January and report shall be available sometime in March 2013. The Committee however, noted that that the study does not cover the monsoon months.

After further deliberation, the Committee recommended the following:

- The project proponent would submit the CWC approved flow series data to enable the Committee to take a view on water drawls for power generation and thereby leaving adequate water in the river for maintaining ecological integrity
- A summary on original location and revised location of dams including their likely change in influence area and other parameters.
- The proponent shall submit the details of ecological flow to be maintained in the river.

The project will be considered on receipt of the above information/clarification.

## **2.15 Demwe upper HEP in Anjaw District of Arunachal Pradesh by M/s. Lohit Urja Pvt. Ltd - For upward revision in installed Capacity from 1050 MW to 1080 MW and extension & modification of TOR**

The project proponent and the consultants made a detailed presentation covering various aspects like Project background, Project status, Comparative salient features, Land requirement, Free flow stretch, Safe distance of muck dumping area from River, location of Protected area, Environmental flow releases, Progress of EIA/EMP Studies etc.

The Committee noted that initially, Scoping & ToR approval for the Demwe Upper HEP for Installed capacity of 1800 MW with FRL of 584 m was granted by MoEF in March 2008. Based on recommendation by EAC subgroup after the site visit, the same was supplemented by additional TOR in August, 2008. Thereafter, to avoid submergence of Hayuliang town and considerable road length

of strategic importance, the revised TOR for reduced FRL of EL 525 m with installed capacity of 1050 MW was approved by MoEF in December 2010 for the Project.

The project proponent informed that detailed project report (DPR) of Demwe Upper HEP was initially submitted to CEA in March, 2011 with Concrete Gravity Dam. However, during site investigations, it was revealed that bed rock has not been encountered even up to around 100 m depth in certain sections of the river bed. Removal of more than 100 m thick overburden for construction of Concrete Gravity Dam would be a difficult task and would also require large quantum of excavation for attaining the required foundation level for placing the concrete gravity dam. In view of the above factors and as suggested by CEA/CWC/GSI during consultations, a Concrete Faced Rock-fill Dam (CFRD) along with overflow Spillway section has been proposed in the revised DPR instead of a Concrete Gravity Dam envisaged earlier. The revised DPR envisaging Concrete Faced Rock-fill Dam (CFRD) and overflow spillway has been submitted to the Central Electricity Authority on 20.7.2012. The proponent further informed that as a part of Power Potential Study CEA has approved the installed capacity of the Project as 1080 MW vide letter dated 19.8.2011.

The Committee enquired about the changes in Project features and about the approved Water Availability Series. A comparative table of salient features of project with respect to the installed capacity viz-a-viz 1050 MW and 1080 MW was presented before the Committee and copy of Water Availability Series of Project as approved by CEA/CWC was also furnished to the Committee. The Committee noted that the total land requirement and submergence area has remained unaltered as was provided in the earlier approved TOR; i.e. about 964 ha and about 749 ha respectively. The Committee also noted that enhanced installed capacity of 1080 MW has not resulted in any basic changes like submergence area, FRL, land requirement, study area or location of the Project etc. except for change in type of dam to Concrete Face Rock Fill Dam (CFRD) and some minor changes in sizes of few project components, MDDL, Design discharge etc. The Committee is therefore of the opinion that the enhanced installed capacity of 1080 MW and design changes as above has not resulted in any changes in the project features like submergence area, FRL, land requirement etc and the study area remains same as per the approved TOR for 1050 MW.

The Committee further sought clarifications pertaining to the free flow stretch between consecutive upstream and downstream projects. The project proponents presented a L- section map showing free flow stretch and submitted that the as per the directions of Committee in the earlier TOR, a free flowing river stretch of about 2.2 km between downstream Project i.e. (1750 MW) Demwe Lower HEP and Demwe Upper HEP and about 3.8 km between upstream Project i.e. (280 MW) Anjaw HEP and Demwe Upper HEP will be maintained. The Committee appreciated the provisions made by the project proponents for maintaining the free flowing stretch of the Lohit River between consecutive projects.

The layout maps showing the distance of muck dumping sites from the river was shown the Committee and Committee noted that the proposed muck dumping sites are at a minimum distance of about 50 m from the river.

With regard to the clarification about the distance of the project from the nearest protected areas, Committee noted that the nearest protected area is Kamlang Wildlife Sanctuary, which is about 13.5 km aerial distance (and about 19 km along the river channel) away from the dam axis of the project and doesn't fall within 10 km radius of the project i.e. in the project study area. The map of the same on the topo-sheet was presented before the EAC.

The Committee enquired about the provision made for environmental flow release and asked about the mechanism for releases of environmental flow during the year. The project proponent

informed that initially, a provision of dedicated unit of 25 MW was made to release a continuous flow of around 35 cumecs to meet the prevailing stipulation of 10% of environmental flow releases during lean season in year 2008. Further, in compliance with amended TOR approved in Dec, 2010, in respect of 1050 MW Demwe Upper HE Project and as per the direction of the Committee, the provision for environmental flow release has been increased to 20 percent of the average lean season flow of the 90% dependable year. Accordingly a dedicated unit of 50 MW to release around 70 cumecs of discharge has been proposed in the DPR. The proponent also brought to the notice of the Committee that monthly environmental flow releases has also been recommended in the Draft Lohit basin study report. It was submitted that the recommendation of the draft report already considers the prevailing norms of environmental releases i.e. 30 % of average flow during monsoon months, 25 % of average flow during non-monsoon months and 20 % of average flow during lean season months at 90% dependable year.

The Committee enquired that whether the provision of dedicated unit of 50 MW will ensure the environmental flow release requirement of lean season only and how the environmental flow will release during the monsoon season shall be ensured. The project proponent has clarified that the project is a Dam toe Power House Project and total installed capacity of 1080 MW has a configuration of 5 turbines of 206 MW each and 1 turbine of 50 MW, hence there would not be any problem for environmental flow releases during monsoon season, as the same can be ensured by the appropriate combination, configuration and/or operation of turbines for power releases and dedicated unit for environmental flow release. It is further informed that the appropriate combination, configuration and/or operation of turbines will not have any bearing on the total installed capacity of the project, which will remain same as 1080 MW. The Committee was convinced with clarification and opined that the environmental flow as accepted by MoEF as a part of final Lohit Basin Study shall be ensured by the proponent. The same was agreed to by the project proponent.

The Committee expressed that Lohit River harbour various types of fishes and suggested that that a site specific study on aquatic fauna may be carried as a part of EIA/EMP report. The proponent informed that study on aquatic ecology has been conducted as per approved ToR. Further, a detailed study on aquatic fauna including fishes has also been carried out under Lohit basin report and the monthly environmental flow release has been recommended in draft basin report considering the various factors i.e. depth, velocity, flow etc for sustenance the aquatic ecology. However, Committee desired that a specific study of aquatic fauna for the project may be carried out based on the secondary data as available and incorporated in the EIA/EMP report. This was agreed by the project proponent.

The project proponents also informed the Committee about the status of Base line data collection and progress of EIA/EMP study. It was submitted that three seasons baseline data collection has been completed in accordance with the approved ToR. Socio-economic survey is yet to be done, which would be taken-up after approval of Project layout by CEA/CWC. The Committee opined that enhanced installed capacity of 1080 MW and design changes as above has neither resulted any change in the project features, submergence area, FRL, Land requirement etc nor any additional impact on study as well as project area from the Environment and Ecology point of view is envisaged, hence the scope of studies and study area remain same for the capacity of 1080 MW. Hence the Committee allowed to use the baseline data already collected/gathered in preparation of EIA/EMP report.

After examining all the environmental issues and clarifications submitted by the project proponent on various aspects, the Committee recommended the acceptance of the enhanced installed capacity from 1050 MW to 1080 MW, with following additional TORs:

## **Form-1**

### (ii) Activity

- Total extent of land (964 ha) and its land/ land-cover pattern. Of this what is forest land and land/land cover affected due to submergence and other project activities. Provide FCC of the entire project area to show land/landuse pattern
  - Details of vegetation and agricultural which will be affected due to this project
  - Whether there will be creation of reservoir and if so the area due to submergence. To be elaborated.
  - Fresh assessment may be needed since biodiversity will be affected
  - Environmental Sensitivity has to be assessed as large forest land will be affected. Any Defence installations in the project area
  - The details of forest types and tree vegetation have not been provided in the Environment Chapter in PFR. This may be provided and it may be clarified if it is under the State Forests Department's Jurisdiction.
- i. Environmental flow as accepted by MoEF as a part of final Lohit Basin Study shall be ensured by the proponent by appropriate combination, configuration and/or operation of turbines.
  - ii. A project specific study on aquatic fauna should be carried out based on the secondary data as available and incorporated in the EIA/EMP report.
  - iii. The EAC also recommended extension of validity of TOR for two more years to facilitate completion of remaining studies such as socio-economic studies, studies on aquatic fauna and also to complete revised engineering design & layout for enhancement capacity of 1080 MW.

The meeting ended with a vote of thanks to the Chair

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## Annexure

### **List of EAC members and Project Proponents who attended 63<sup>rd</sup> Meeting of Expert Appraisal Committee for River Valley & Hydro Electric Power Projects held on 26<sup>th</sup> – 27<sup>th</sup> December, 2012 in New Delhi**

#### **A. Members of EAC**

1.	Shri Rakesh Nath	-	Chairman
2.	Dr. B. P. Das	-	Vice-Chairman
3.	Dr. Aruna Kumar	-	Member
4.	Dr. S. Bhowmik	-	Member
5.	Dr. K. D. Joshi	-	Member
6.	Dr. (Mrs.) Maitrayee Choudhary	-	Member
7.	Shri G. L. Bansal	-	Member
8.	Dr. S. K. Mazumder	-	Member
9.	Dr. A. K. Bhattacharya	-	Member
10.	Dr. J. K. Sharma	-	Member
11.	Shri B. B. Barman	-	Member Secretary & Director, MoEF
12.	Dr. P. V. Subba Rao	-	MoEF

#### **B. Lower Penganga Irrigation Project in Adilabad District of Andhra Pradesh by M/s. I & CAD, Government of Andhra Pradesh- reconsideration of TOR**

1.	Shri J. Vijay Prakash,	-	Commissioner
2.	Shri Sridhar Rao,	-	Deputy Chief Engineer
3.	Shri K. Kareemulla Basha,	-	Manager

#### **C. Revalidation of TORs and revision of Capacity from 140 MW to 186 MW for Dikhu HEP in Longleng District of Nagaland by M/s. Manu Energy Systems Pvt. Ltd. (J-12011/18/2008-IA-I).**

1.	Shri Rakesh Mathur,	-	General Manager
2.	Shri Rama Rao,	-	Director, Manu Energy System (P) Ltd.
3.	Shri Vimal Garg,	-	Director
4.	Shri Arun Bhaskar	-	RSET
5.	Shri S. K. Garg,	-	RSET
6.	Shri Siva Koti,	-	Manu Energy System (P) Ltd.

#### **D. Ithun-I HEP (86 MW) project in Lower Dibang District of Arunachal Pradesh by M/s. JVKIL Consortium Ltd.**

1.	Shri Janarduana Verma,	-	JVKIL
2.	Shri Rajiv Kumar Sawarn,	-	Deputy General Manager
3.	Shri Siva Krishna N,	-	JVKIL

**F. Reoli-Dugli 420 MW Hydroelectric Power Project in Lahaul- Spiti Districts of Himachal Pradesh by M/s. L&T Himachal Hydro Power Ltd.- For reconsideration of ToR.**

1. Shri Ratnakar Pandey, - Manager
2. Shri A. Stephen Les, - Chief Consultant, WAPCOS
3. Shri S. M. Dixit, - Senior Engineer, WAPCOS
4. Shri Dweependra Nath, - Deputy General Manager
5. Shri Naresh Kumar, - Advisor (Project Planning)
6. Shri R. K. Thakur, - Consultant
7. Shri B. Bhattacharjee, - Head Technical

**G. Drinking Water Supply Project for the Chennai Metropolitan City- formation of new reservoir at Kannankottai & Thervai Kandigal Village in Gummidipoondi Taluk, Thiruvallur District of Tamil Nadu by M/s. Public Works Department, Government of Tamil Nadu-**

1. Shri R. Emaraj, - Chief Engineer
2. Shri N. K. Raman, - Superintending Engineer
3. Shri C. T. Sankar , - Executive Engineer

**H. Lower Tapi Lift Irrigation Scheme in Jalgaon District, Maharashtra by M/s. Hatnur Canal Division, TAPI Irrigation Development Corporation– Environmental Clearance**

1. Shri P. R. Bhamure, - Ex- Director
2. Shri V. D. Patil, - Superintending Engineer
3. Shri P. R. More, - Executive Engineer
4. Shri A. K. Suryavanshi, - AEI
5. Shri S. C. Amritkaur, - Superintending Engineer
6. Shri D. S. Deore, - Consultant
7. Shri K. R. Chandra - Consultant
8. Smt Nandin Choudhary - Consultant
9. Shri G. N. Jha - Consultant

**I. Arpa Bhisajhar Barrage Project in Bilaspur District of Chattisgarh by M/s. Water Resources Department, Government of Chattisgarh- for Reconsideration of TOR.**

1. Shri Xaxa, - Chief Engineer
2. Shri V. K. Shivalan, - Executive Engineer
3. Shri D. P. Pathak, - Sub Engineer
4. Shri B. L. Swankar, - Sub Engineer

**J. New Gnderbal HEP (93 MW) project in District Ganderbal of Jammu & Kashmir by M/s. Jammu & Kashmir Power Development Corporation Ltd- For Environmental Clearance.**

1. Er. Zahoor Ahmad, - Executive Engineer
2. Er. Hamid Mahmood Shah, - Assistant Engineer
3. Er. Bashir Ahmed War, - Assistant Engineer
4. Er. Yamesh Sharma, - EIA Coordination



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|----|------------------|---|---------------------|
| 5. | Kaleem Ahmed,    | - | Manager             |
| 6. | Dr. Alee Singh,  | - | Engineer            |
| 7. | Shri S. K. Jain, | - | Director (T)        |
| 8. | Dr. F. A. Bhat,  | - | Assistant Professor |

**K. Lower Orr Project in Shivpuri District in Madhya Pradesh by M/s. National Water Development Agency- For Reconsideration for TOR.**

- |    |                        |   |                         |
|----|------------------------|---|-------------------------|
| 1. | Shri R. K. Jain,       | - | Chief Engineer          |
| 2. | Shri N. C. Jain,       | - | Superintending Engineer |
| 3. | Shri O. P. S. Kushwah, | - | Superintending Engineer |
| 4. | Shri D. K. Sharma,     | - | Executive Engineer      |
| 5. | Shri S. K. Gwande,     | - | Assistant Engineer      |

**L. Drinking Water Supply Scheme, KNNL, Government of Karnataka – Clarification.**

- |    |                       |   |                         |
|----|-----------------------|---|-------------------------|
| 1. | Shri D. Satya Murthy, | - | Principal Secretary     |
| 2. | Shri R. Rudhravah,    | - | Managing director       |
| 3. | Shri R. Cheluvaranan  | - | Chief Engineer          |
| 4. | Shri Satish M,        | - | Superintending Engineer |
| 5. | Shri Santosh Kumar,   | - | Environment Consultant  |
| 6. | Shri Sandeep Nodiger  | - | HOD                     |

**M. Shirapur Lift irrigation scheme project in Solapur District of Maharashtra by M/s. Water Resources Department, Government of Maharashtra- for Reconsideration of TOR.**

- |    |                        |   |                     |
|----|------------------------|---|---------------------|
| 1. | Shri D. Salge Murthi   | - | Principal Secretary |
| 2. | Shri R. Rudvaiash      | - | Managing Director   |
| 3. | Shri Mathkarjurv B. G. | - | Chief Engineer      |
| 4. | Shri Odogangappa       | - | Executive Engineer  |
| 5. | Shri K. M. K. Sharma   | - | Assistant Engineer  |
| 6. | Shri Nledlue Kumar     | - | Consultant          |
| 7. | Dr. Vivas              | - | Env. Consultant     |
| 8. | Shri Santosh Kumar     | - | Consultant          |

**N. Lower Kopili HEP (150 MW) Project in Karbi Anglong & North Cachar Hill District of Assam by M/s. Assam Power Generation Corporation Ltd. – for TOR**

- |    |                    |   |                        |
|----|--------------------|---|------------------------|
| 1. | Shri Vijay Udva    | - | Managing Director      |
| 2. | Shri A. S. Barua   | - | CGM, APGCL             |
| 3. | Shri Saikar        | - | OSD, APGCL             |
| 4. | Shri U. Datta      | - | APGCL                  |
| 5. | Shri H. M. Sharma  | - | RE, APGCL              |
| 6. | Shri R. Kapoor     | - | APGCL                  |
| 7. | Dr. Aman Sharma    | - | Chief Engineer, WAPCOS |
| 8. | Dr. A. K. Sharma   | - | Chief Engineer, WAPCOS |
| 9. | Dr. Ashok Basistha | - | Deputy General Manager |

**O. Downward change in installed Capacity from 4000 MW to 3097 MW for Etalin HEP in Dibang Valley District of Arunachal Pradesh by M/s. Etalin Hydro Power Company Ltd.**

1. Shri Satish C. Sharma - President & CEO
2. Dr. J. K. Soni - Vice President
3. Shri nAnil Dhar - General Manager
4. Shri Souvik Khamrui - Manager
5. Shri Rajiv Sharma - Deputy General Manager
6. Shri R. S. Bhatia - Consultant, RSET
7. Shri Pramod Singh - Additional General Manager
8. Shri Rajesh Kumar Mahana - Additional Manager
9. Shri Gajendra Sharma - Additional Manager
10. Shri Abhey Pandey - Deputy Manager

**P. Upward revision in installed Capacity from 1050 MW to 1080 MW and extension & modification of Tor for Demwe Upper HEP in Anjaw District of Arunachal Pradesh by M/s. Lohit Urja Pvt. Ltd.**

1. Shri K. Seethayya - Director,
2. Shri Gagan Aggarwal - Sr. Vice President
3. Shri Y. Kumar - REST, Consultant
4. Shri S. S. Garhia - Consultant
5. Shri S. C. Sud - Consultant
6. Shri R. S. Bhatia - RSET
7. Shri Vimal Garg - RSET
8. Shri Arun Bhaskar - RSET
9. Shri Jaychandra Khandelwal - Additional General Manager
10. Shri Tarun Sarawagi - Chief Analyst

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