**MINUTES OF THE 59th MEETING OF EXPERT APPRAISAL COMMITTEE FOR RIVER VALLEY AND HYDRO POWER PROJECTS**

The 59th Meeting of the Expert Appraisal Committee for River Valley and Hydro Power Projects (EAC) was held on 20th-21st July, 2012 in SCOPE Convention Centre, Opp. Jawaharlal Nehru Stadium, Lodhi Road, New Delhi**.** The meeting was chaired by Prof J. K. Sharama for half a day on 20th July 2012 and for the remaining days by Shri Rakesh Nath. Dr. B.P. Das, Shri Bhattacharya and Prof Arun could not attend the meeting due to preoccupation. Dr. K.D. Joshi attended the meeting only for 20th July 2012. The list of EAC Members and Officials from various Projects who attended the meeting is enclosed at Annexure-1.

After welcoming the Members, the following Agenda items were taken up for discussion-

**20th July, 2012**

**1.** Agenda Item No. 1: **Welcome by Chairman and Confirmation of Minutes of 58th Meeting held on 1st -2nd June, 2012.**

The minutes were confirmed with the following revision-

(i) In item 2.1 -2.3, at page 5 point (i) may be replaced by "the same comments shall be applicable to all three projects".

**2.** Agenda Item No. 2: **Discussion on Environment Clearance to Gundia 200 MW Hydroelectric Power Project in Hassan and Dakshina Kannada Districts of Karnataka by M/s Karnataka Power Corporation Ltd. in view of recommendation of Western Ghats Ecology Expert Panel.**

In 58th Meeting of EAC held on 1st-2nd June, 2012, it was decided that Prof. J.K. Sharma, Dr. Nayar and Dr. Dhananjay Mohan shall meet and consolidate their views, which shall be presented in the next meeting. The views of them are summarized as below-

Dr. Dhananjai Mohan was of the view that although there has been a sincere effort by WGEEP to adopt a methodology which is objective and scientific but there are certain limitations in the same. The evaluation was fairly objective however, the assessment was relative and not absolute. The database used by WGEEP is incomplete and *yet to incorporate considerations of habitat continuity.* The grading on the basis of which the Ecologically Sensitive Areas (ESAs) have been classified also has some problems. In fact the panel itself felt that after the report is published, there could be further discussion, re-evaluation and revision

of ESAs and *'more fine scale borders of the ESAs can be developed with local inputs from the forest managers and the stake holders before they are legally declared as ESAs*'. The protocol and methodology provided for mapping ESAs is not final and requires further discussions. Thus the present exercise of identification of ESAs needs further refinement. Therefore, based on a data which is not final, the recommendation of WGEEP not to allow Gundia HEP seems unjustified. His specific comments on the five recommendations of WGEEP with respect to Gundia HEP are-

(i) Even though the panel had been given a specific task of examining the Gundia HEP, it failed to generate good scientific facts to evaluate the impacts and thus its recommendations are not based on rigorous scientific data. The recommendation is too general and lacks in facts (statements like large scale land cover changes) and so cannot be commented upon.

(ii) This recommendation may be put as an additional condition to the project proponent so that the temple town of Subramaniyam may not face water shortage. Rest of the recommendations is too general.

(iii) MoEF has in its letter dated 07.01.2010 has already asked KPCL to avoid diversion of 2 ha of primary dense tropical rain forest for construction of road at Yettinahole by constructing a bridge at the turning point. KPCL has accepted the suggestion in its compliance report dated May 2010. Similarly possibility of shifting the tunnel access to the main underground powerhouse which according to the WGEEP report is located in one of the few remaining primary evergreen forest patches may be explored.

(iv) Since, the classification criteria still need refinement as accepted in the WGEEP report, therefore, a decision on the basis of the ESZ classification in the report may not be reasonable at this stage.

(v) The final recommendation of not permitting the Gundia HEP in its entirety (3 stages and 2 phases) is thus not based on well researched facts and still uses general statements like '*loss of biodiversity and environment impacts would be significant*' while much of the discussion in the report doesn't seem to be supporting it.

Prof. J.K. Sharma was also of the view that since Gundia HEP has been placed under ESZ1 which means that all the eight parameters considered for delineation of ESZs are either equal or more than the Protected Areas which is not consistent with the state of affairs with regard to forest health and biodiversity mentioned for Gundia Basin by WGEEP experts. There was no hydrologist in the Team, the conclusions about height of the dam, limits of power

generations etc. seems more eco-centric. We need to have a trade off in the present scenario of growing demand for power. Dr. Sharma also felt that the specific recommendations for Gundia HEP by WGEEP is sweeping, vague and generalized and is not based on any exhaustive study in the Gundia forests. There are anomalies and contradictions in their own statements itself. The Team members and researchers visited the Project site from 29th-31st August 2010but the biodiversity study of the area has been made by Sukumar and Shankar (2010) which itself is not complete therefore based on this study such strong recommendation seems unjustified. There are many statements in the study indicating that the forests in Gundia basin are not unique in terms of biodiversity but degraded, encroached and exploited and the biodiversity found therein is found elsewhere in the WG also. Endemic nature of species, amphibians and fishes are endemic to Western Ghats and not of Gundia basin alone. The statement on Page 69, Para 4, a) Plants, lines 7 – 12 clearly shows that there is nothing unique in Gundia basin in terms of plant diversity which is not found elsewhere in the Western Ghats and whatever is there it is of less biomass due to removal of trees. Moreover, **t**he biodiversity part of the EIA of Gundia HEP was prepared by Dr. Sukumaran, who also happened to be the WGEEP member. Further, it is also seen from the report that the Gundia area is not harbored with unique species which are not found elsewhere in the Westertn Ghats. The area does not seem to be pristine or unique, but degraded and have species which are found elsewhere in the Western Ghats. The recommendations are based on secondary data and no ground truthing has been carried out. Therefore, the WGEEP Report appears to be biased and not based on long-term scientific field study but based on arm chair research using secondary data on a GIS platform. Moreover, the Ministry has also not approved the WGEEP Report yet.

In his opinion, the EAC has already looked into these aspects and after a site visit, the Hongadahalla Dam component of Phase I of the Gundia Project was not approved which ultimately reduced the forest area to be affected from 1041 ha to 478.96 ha and submersion area from 733 ha to 191.92 ha. Therefore, adopting the sustainable development, the EAC had recommended environmental clearance for the project which should not be withdrawn. Instead, some more mitigating measures may be suggested, as given by Prof. Dhananjay and there should be strict monitoring of the environmental conditions.

Prof. T.S. Nayar felt that the Western Ghats biota is a highly precious capital to be protected for posterity at any cost as it is the result of millions of years of evolution. The report of the Western Ghats Ecology Expert Panel (WGEEP) is a welcome attempt in this direction endeavoring to assess the Western Ghats biota in its entirety. The report, at the same time, is not without flaws, the biggest being, while it makes sweeping suggestions it assumes the approach that the report is comprehensive and thorough, and hence the suggestions put forward are to be considered as the final endorsements. The idea brought forward through Ecologically Sensitive Zones 'ESZ 1-3' and Ecologically

Sensitive Localities (ESL) are fine concepts but their fidelity with respect to the assigned values (Endemic species, IUCN listed mammal species, unique evergreen ecosystem, undisturbed forests, forest areas, elevations, slope, riparian vegetation) have not been investigated and proved. Action plans purely based on concepts which lack ground truthing, in spite of the fact that there are abundant chances for it, may find it difficult to take off. At least 25% of the designated ESZ1, 15% of ESZ2 and 10% of ESZ3 (% given arbitrarily with conservation value priorities) should at random be subjected to taxonomic and ecological investigations at least for two years and the result should be compared with appropriate assigned values so as to get scientific currency to the concept of ESZ as many of these zones still remain data deficient with respect to their biota. There are no conclusive evidences to prove that ESZ1 is the highest conservation value area, there can not have any scientific backing for the conclusion that Gundia enjoys the highest conservation value biota simply because Gundia is designated as an ESZ1 area. Gundia could be a high conservation value area but should be proved with supporting scientific evidences. WGEEP Chairman, along with two scientists (not in the panel) visited the site for 3 days followed by another visit with another person and a consultation meeting. It is clear that no judgment on biodiversity is possible within such a short duration. The basis of WGEEP's comprehension on the biodiversity of Gundia is from the report of Sukumar and Sanker (2010) because it heavily draws upon from this report. Precisely, as per the mandate, WGEEP has not specifically examined Gundia HEP but relied on already available report of Sukumar and Shanker, 2010. He observed that this report, although has certain flaws , provides highly valuable data on biodiversity of Gundia site when viewed in the light of the fact that it is the result of a mere two month study based on 16 days' field work. It is anybody's guess what would be the magnitude of its biodiversity if a thorough study was conducted for at least one year. The EIA conducted for Gundia HEP is also not too satisfactory and there are many discrepancies in the report. Lower groups of plants (Algae, Fungi, Lickens, Bryophytes and Pteridophytes) which could be abundant in forests like Gundia are sparingly reported. Most of the planktons are identified only up to genus level. The proponents have wrongly conceived what in-situ conservation is. Many of the conservation management strategies mentioned sound like very casual statements, not supported by good methodologies. In his opinion also Gundia site appears to be a good evergreen tropical forest with high concentration of endemic plant and animal species but they occur elsewhere in the Western Ghats except two species of amphibians and one species of insect which are confined to Gundia. There could be a possibility of occurrence of some unreported species in the EIA study for the porject, therefore; a detailed floristic and faunal survey of the area is required. It also seems the forests have high regeneration potential in degraded areas if left alone as degradation is the result of illegal logging and encroachment. He also felt that ESZ 1-3 categorisation provides only predicted or assumptive value without any scientific backing.

The Committee deliberated on the observations of the three experts and came to the conclusion that both the reports seems incomplete but at the same time, the revised EIA/EMP report of Gundia provided a good amount of information for the Committee to come to a conclusion. It is evident that there is no endemic species specifically of Gundia HEP region and there is no any species for which mitigation methods are not available. The damage due to submergence of flora and fauna of the area is mitigable. Moreover, the Committee had looked into these aspects at the time of site visit and had suggested some environmental measures which have been implemented by sacrificing one of the dams by the PP. In view of this, the Committee felt that there is no enough data and reason to go against the recommendations of EAC for environmental clearance for the Project hence reiterated its earlier recommendation with the following additional environmental conditions-

(i) Possibility of shifting the tunnel access to the main underground powerhouse, which is located in one of the few remaining primary evergreen forest patches, may be explored. The PP may also ensure that the temple town of Subramaniyam may not face water shortage owing to construction of the dams.

(ii) One more floristic and faunal survey covering all the different seasons may be carried out and submitted to the Ministry, before starting construction of the project. Such studies should cover all aspects of taxonomy and ecology, especially all the species present, types of their interactions, habitat specificity, habitat uses, gene flow systems etc. of organisms by specialists in respective fields. As two species of amphibians exclusively from Gundia region are reported which are new to the science, an amphibian specialist should be included in the survey team. Specialist groups may suggest after the study that fragmentation due to dam construction does not result in species loss. Each suggested management plan should be supported by sound methodology. Proponents may have to understand that ex situ conservation of animals is a huge task unlike it is projected in the EMP.

(iii) Besides the conventional conservation measures, possibilities of modern methods like micro reserves promoting natural regeneration and restoration of habitats, establishing lobster pots, fencing of habitats, biotope management, establishment of ecological corridors etc. may be explored and incorporated in management plans to conserve affected groups of plants and animals or population of individual species.

(iv) The Ministry, after reviewing the survey report, shall impose more mitigating measures, if required. The Project Proponent shall abide by the decision of the Ministry at that time.

The Committee felt that the Western Ghats are now are being included in the World Heritage List due to its unique biota and already about 1,821 dam structures are existing in the Northern Western Ghats, it is important to study the carrying capacity of the Western Ghats to accommodate more dams to prevent any species loss. The Ministry may undertake the same at the earliest.

**3.** Agenda Item No. 3: **Consideration of Project Proposals for Scoping and Environment Clearance**

The following project proposals were considered-

3.1 **Inter-Linking of Tambiraparani, Karumeniyar and Nambiyar Rivers in Tirunelveli and Thoothukudi Districts of Tamil Nadu by M/s. Public Works Department, Water Resources Organisation, Government of Tamil Nadu- Reconsideration for TORs.**

The project was earlier considered in 53rd Meeting of EAC held on 11th–12th November, 2011 but could not be discussed at length as the Committee members did not received hard copy of the documents. However, based on the presentation made by the Project Proponent, the Committee had asked for certain additional information which was submitted by the them.

Shri S. S. Ramasubbu, Member of Parliament from Tirumelveli, Tamil Nadu apprised the Committee regarding the importance of the project for the State of Tamil Nadu. He informed that the agricultural development in Tamil Nadu mainly depends on the surface and ground water irrigation. But the State has almost utilized its surface and ground water resources hence future expansion of irrigation and agriculture in Tamil Nadu depends on linking of rivers and tributaries and by utilizing the surplus unused flood water which flows into the sea. The present scheme aims at providing irrigation to the drought prone area of Sathankulam and Thisaiyanvilai Districts of Tamil Nadu through diversion of surplus flood from the perennial Tamiraparani River to the ephemeral Karuneniyar and Nambiyar rivers. This is the first interlinking of rivers project in Tamil Nadu and the project is very important for development of his constituency. The Committee appreciated his presence and interest in the project.

Shri Sampat Kumar, Chief Engineer along with his team presented that for utilizing the surplus flood water of river Thamiraparani, the Government of Tamil Nadu had sanctioned Rs. 369 Crores for construction of a flood carrier canal from Kannadian Channel to the drought prone area of Sathankulam, Thisaiyanvilai by interlinking Tamiraparani, Karumeniyar and Nambiyar Rivers in Tirunelveli and Thoothukudi Districts of Tamilnadu. The project area covers 4 Talukas in Tirunelveli District namely Ambasamudram,

Palayamkottai, Nanguneri and Radhapuram and 3 Talukas in Thoothukudi district namely Sathankulam, Thiruchendur and Srivaikundam. Tirunelveli and Thoothukudi which are in the southern most part of Tamil Nadu, about 600 km from Chennai.

The river Thamiraparani is one of the perennial rivers in South India. The river originates from eastern slope of Western Ghats and traverses a length of 120 Km through Tirunelveli and Thoothukudi Districts and confluences in Bay of Bengal near Punnakayal village of Thoothukudi District. There are 12 numbers of tributaries joining this River on its path of traverse. The area of the Thamiraparani river basin spreads over 5665 sq. km. The river system provides irrigation facility to 77,500 ha ayacut in both Tirunelveli and Thoothukudi Districts. Nine numbers of reservoirs have already been constructed across both, the river and its tributaries, namely Papanasam, Manimutharu, Servalar, Gadana, Ramanadhi, Gundar, Karuppanadhi, Adavinainarkoil and Vadakku Pachayar Reservoirs. There are eight numbers of anicuts constructed across Thamirabarani river namely Kodaimelazhagiyan, Nathiyunni, Kannadiyan, Ariyanayagipuram, Suthamalli, Pazhavoor, Maruthur and Srivaikundam anicuts.

The catchment area of Thamiraparani and its tributaries is 4536 sq. km. The annual yield from the river basin is estimated to be 48,487 Mcft (1373 M. Cum). After meeting the water requirement for irrigation, about 13,758 Mcft of water is surplus at the tail end of the river at the last anicut namely Srivaikundam Anicut and flows into the sea as unutilized, whereas certain areas, within the gross command area of the basin and adjoining basin namely Pachaiyar, Karumeniyar and Nambiyar are suffering scarcity of water. The coastal tracts of these districts are severely affected because of poor rainfall, poor ground water quality, sea water intrusion and shortage of ground water availability. The water from the existing third anicut namely Kannadian anicut shall be diverted by increasing the carrying capacity of the existing Kannadian Channel and making a new flood carrier canal from 6.50 km of Kannadian channel near Vellankuzhi village. This new flood carrier canal shall be of 73 km long and shall end at Theri village of Thisaiyanvilai. A percolation pond shall be made at Theri. Besides this, improvement to Kannadian Anicut of Thamiraparani river including formation of flood bank, two new check dams across Karumeniyar, one U/S and other D/S of Sathankulam Nazareth road, three link canals and three supply channels shall be constructed.

The water potential available is 4,040.57 Mcft which is more than the crop water requirement of 2,533.3 Mcft of the area.

The Committee desired to know that how it will be ensured that riparian rights of the people upstream are not affected. The PP informed that the flood carrier canal will be operated only at the time of flood when the surplus flows

of Thamiraparani River at the last anicut namely Srivaikundam anicut goes to sea as unutilized. Hence the existing irrigation under Thamiraparani river will not be affected under any circumstances. Moreover, the whole basin is under one Chief Engineer hence managing the water availability to all will be his responsibility.

The total land requirement for the project is 18.22.5 ha of wet land, 722.88 ha of dry land and 59.82 ha of poromboke land. The cost of land acquisition works out to be Rs. 2,098 Lakhs for the entire stretch. The estimate cost of the project is Rs. 369 Crores and project shall be completed in three years.

About 23,040 ha of land will be benefited out of which 5,220 ha of land will be stabilized, 818 ha of land will be bridged and 17,002 ha of land will be brought under new cultivation. The water table in the adjoining wells will be raised due to the project. The sub soil water to the nearby wells will be recharged. The sea water intrusion in the Sathankulam and Thisaiyanvilai areas shall also be checked, to some extent. The benefit cost ratio works out to 2.26:1. In addition to the above, the drinking and irrigation needs of 50 villages will also be met.

The Committee after detailed deliberations, recommended Scoping Clearance and approved the draft ToRs with the following additional ToRs for the preparation of EIA/EMP reports-

(i) For listing of flora and fauna in the region, besides survey in the field, the following documents may be referred to-

   a. Flora of Tirunelveli Hills. Manickam *et al*. (2008), Ist Volume dealing with flora and IInd Volume dealing with Illustrations. Bishen Singh Mahendra Pal Singh, Dehra Dun.

   b. Flora of Tamil Nadu Analysis Volume 1 (1983). Volume 2 (1987) and Volume 3 (1989). Botanical Survey of India, Coimbatore.

   c. Current Science Volume 80 (3), 2001, pages 378 - 452.

(ii) Give scientific names of plants and animals in the reports whenever they are referred to.

(iii) Give a brief on the importance of Koonthankulam Bird Sanctuary giving resident birds, migratory birds, seasons, breeding, hatchings etc. and effect of the project on the Bird Sanctuary.

(iv) Take permission from the National Wild Life Board, if necessary for Koonthankulam Bird Sanctuary.

(v) Specify what are the aquatic plants and animals in and around various tanks occurring in series.

(vi) Give separate list of existing structures and components for new construction.

(vii) Details of muck disposal plan and R&R issues.

3.2 **Ghogra Minor Irrigation Project on River Ajanal in District Sehore of Madhya Pradesh by Water Resources Department, Government of Madhya Pradesh- For ToRs.**

Government of Madhya Pradesh proposes to construct an earthen dam of 17.5 m height across Ajanal River, a tributary of Narmada at Nasrullaganj Tehsil in village Ghogra of Sehore District in Madhya Pradesh. It is a feeder reservoir to the downstream Ghogra medium tank project on the same river. It is a minor irrigation scheme having Culturable Command Area of 1650 ha and Gross Command Area of 1940 ha. The projects is a 'B' category project, however, since submergence area of this project falls within 10 km periphery of Kheoni Wildlife Sanctuary which is at 8.75 km from the outer limit of submergence area hence considered at the Central level.

The Catchment Area of the storage site is 26.75 sq. km. and 75% dependable yield is 7.365 mcm. There is no rain gauge station in the catchment area and rain fall data of Nasrullaganj rain gauge station for 53 years has been used. This yield can be stored upto FTL 378 m. Live storage shall be 6.43 mcm. This would result in a submergence of 140 ha of land out of which 25.97 is forest land, 88.85 ha is private land and 25.26 is Government land. No village is coming under submergence and 66 families shall be affected due to the project. MWL shall be 379.50 m and TBL shall be 381.50 m.

The total Ghogra command is of 7,000 ha out of which this tank will irrigate 1650 ha in 9 villages. The estimated project cost is Rs. 18.91 Crores hence the cost per ha works out to Rs. 1.14 lakhs.

The project has almost all the clearances including Forest Stage-1 and NBWL. Award for land acquisition has been passed and compensation has already been paid. Special rehabilitation package has been sanctioned by the State Government.

After deliberating on above mentioned points, the Committee was of view that the project size is so small and NBWL and forest clearances are already available, collection of three season baseline data shall be waste of time and efforts. The Committee felt that collection of two season data supplemented by good literature survey of existing data would be good enough to represent

the existing flora fauna and suggest mitigation measures for the same. The Committee recommended general ToRs for the project and suggested that the following documents may be referred while preparing EIA/EMP report for the project-

(i) Flora of Madhya Pradesh Volume I (1993), D M Verma *et al*.; Volume II (1997) V Mudgal *et al*.; Volume III (2001) N P Singh *et al*. Botanical Survey of India.

(ii) Supplement to the Flora of Madhya Pradesh (2001). K K Khanna *et al*. Botanical Survey of India.

(iii) Base line data for monsoon and post monsoon only may be collected.

### 3.3 Bansujara Dam Project on river Dhasan in Tikamgarh District of Madhya Pradesh by Water Resource Department, Bhopal, Government of Madhya Pradesh- For ToRs.

Government of Madhya Pradesh proposes to construct a concrete dam of 47.90 m height and earthen dam of 27.52 m across Dhasan river, a tributary of Betwa which ultimately meets with Yamuna. The dam site is in Tikamgarh Tehsil in Ban and Sujara villages of Tikamgarh District of Madhya Pradesh. It will have 13 spill ways having radial gates. The Culturable Command Area is 49,373 ha and the Gross Command Area shall be 58,468 ha.

The Gross capacity of the reservoir shall be 313.1 MCM and live storage capacity shall be 27.278 MCM. FRL/FTL shall be 311.8 m and MWL shall be 313.03 m. TBL and live storage shall be 316.08 m and 272.7 MCM respectively. Water spread area at FRL shall be 5201.7 ha and at MWL, it will be 7051 ha. Total land involved is 5201.7 ha out of which 57.49 ha is forest land, 2870.0 ha is Government land and 2274.21 ha is private land. Main canal is on left bank and shall be of 90 km with 36 km of distributaries having 68.2 km of minors/sub minors. Benefit cost ratio shall be 1:0.71. The estimated cost of the project is Rs. 834.82 Crores.

There is no National Park/Wildlife sanctuary/Biosphere Reserve in 10 km periphery of the project components.

Catchment area of the dam site is 3331.77 sq. km. and an average annual rain fall from the years 1917 to 1976 is 1192.78 mm. Design flood is 0.085 lakh cumec and 75% dependability run off at dam site is 0.0617 M.ham. Maximum PMF is 15,267 cumec. The annual yield has been computed based on the gauze data at Garrouli GD site of CWC.

A total of 24,655 persons shall be displaced in 21 villages. Three villages having 657 families would need rehabilitation. A cost of Rs. 236.9 Crores has been kept for R&R.

After detailed deliberations, the Committee recommended general ToRs for the project.

### 3.4 Morand and Ganjal Complex Irrigation Project in District Hoshingabad, Madhya Pradesh by Narmada Valley Development Authority –Reconsideration for TORs.

The Narmada Valley Development Authority (NVDA) of Government of Madhya Pradesh proposes construction of two Dams namely Morand and Ganjal on Morand and Ganjal Rivers respectively. These rivers are tributaries of Narmada River. The proposal was earlier considered by EAC in its 55th and 58th meetings held on 10th–11th February, 2012 and 1st-2nd June, 2012. The Committee had desired certain additional information which was presented by NVDA.

After recapitulating the purpose and salient features of the project, following information, as desired by the EAC was presented-

Clear maps for the Districts of Hoshangabad and Harda under Tawa Command were submitted. The irrigation intensity shall be 135%. The total culturable command area is 58,052 ha.

The catchment area of Morand Dam is 1031.99 sq km and that of Ganjal Dam is 413.49 sq km. The total water storage in Morand reservoir will be 271.17 MCM and for Ganjal reservoir it will be 100.1 MCM. The water from Morand right and left bank canal and Ganjal left bank canal shall ultimately be transferred to the combined canal to irrigate command area A&B having irrigable command area of 35,330 ha and 16,875 ha respectively. Total cost of the Project is Rs. 1,400 Crores.

After detailed discussions, the Committee recommended Scoping Clearance for the project and approved draft ToRs for preparation of EIA/EMP reports with the following suggestions-

(i) Plant species for afforestation may be selected from locally available indigenous species, especially from species which will be lost due to the project. Packages of practices for these species may be developed in collaboration with R&D centers if package is not available with the Forest Department.

(ii) Biodiversity Conservation and Wildlife Management Plan for conservation and preservation of endemic, rare and endangered species of flora and fauna may be devised with the help of good R&D centers where expertise is available. The State Wildlife Department may not have experts on flora. Their expertise on fauna of different kinds may also be supplemented with that of specialists from any University Departments or R&D centers, if needed.

(iii) Minimum lean season environmental flow shall be 20% of the flow of four consecutive lean months plus the drinking water needs of d/s people.

(iv) Dam break analysis shall be carried out.

(v) Separate social impact assessment shall be carried out.

3.5 **Dhaulasidh 66 MW Hydroelectric Power Project on River Beas in District Hamirpur and Kangra of Himachal Pradesh by M/s. Satluj Jal Vidlyut Nigam Ltd. – Reconsideration for Environmental Clearance.**

SJVN Ltd. (PP) proposes Dhaulasidh 66 MW Hydroelectric Power Project on river Beas in Hamirpur and Kangra Districts of Himachal Pradesh. The Scoping Clearance was accorded on 20.05.2010. Public Hearing for the project was held on 15th -16th September 2011 and Stage -1 Forest Clearance has been accorded on 6th March 2012. TEC has been given on 25th June 2011. The proposal was considered in 55th meeting of EAC held on 10th -11th February 2012. The Committee had desired certain additional information, which was presented by the PP, after recapitulating the salient features of the project. The following information was presented-

(i) L-section of all existing and proposed small and major hydroelectric projects on river Beas from Pandoh dam to Pong dam with their FRL and TWL was presented. The Committee noted that the project has an FRL and TWL of EL 520m and 472 m. Triveni Mahadev is the U/S project with FRL and TWL of EL 597m and 550m respectively and D/S Pong Dam has FRL and TWL of 433.12m and 338m respectively. There is a clear free flowing stretch of 17 km between Pandoh dam to Thana Palaun and 5 km between Thana Palaun and Triveni Mahadev. The free river stretches between Triveni and Dhaula Sidh and furthers down Pong dam are 6.7 km and 14.40 km respectively.

(ii) Regarding muck disposal, it was noted that there will be two sites with 0.801 $Mm^3$ capacity to accommodate 0.764 $Mm^3$ of muck. Cross-sections of these sites were shown. It was noted that both the sites

are far away from the HFL of river. Design of retaining walls was also seen by the Committee.

(iii) About 252.24 ha of private land shall be acquired in Hamirpur and Kangra Districts, break-up of which was provided.

(iv) Financial assistance to the families losing homestead has been increased from Rs 50,000 to Rs. 100,000/- and total budget for R&R has been increased from Rs. 51.90 Million to Rs. 52.10Million.

(v) Regarding environmental flow, it was submitted that it is a dam toe power house therefore, there is no river stretch getting dry. Environmental flows will be 90.7 cumec in June-September which is 30%, 9.3 cumec in October which is 20%, 6.7 cumec during Nov. to May which is also 20% and 27.6 cumec between April to May which is 24.3% of 90% dependable year flows.

(vi) A fresh terrestrial ecological survey for one season in the month of April 2012 has been conducted. Updated list of Bryophytes, Pteridophytes, Fungi and Lichens was presented. A total of 7 species each of Pteridophytes & Bryophytes, 9 species of Fungi and 3 of Lichens were recorded from the study area. No RET species was recorded.

(vii) Updated list of faunal species reported in the study area was also presented. A total of 11 mammals, 26 birds, 3 amphibians, 7 reptiles and 28 butterflies species have been recorded in the study area. There are no RET species in the area**.**

(viii) Revised inventory of fishes and Fisheries Management Plan was presented and reviewed by the Committee.

(ix) Results of fresh sampling conducted for air, water and soil in April 2012 were presented at additional sites in the study area.

(x) Other information submitted regarding G&D data, sediment load, seismographs, geo-morphological mapping of downstream portion, effect of diurnal flow variation, effect on the downstream etc., the information submitted was discussed and the Committee found it satisfactory.

(xi) A separate chapter on social impacts has also been submitted.

The above mentioned responses were discussed by the Committee. The Committee was satisfied with most of the responses however, felt that some

of the avi-fauna listed in the study area is not found in the study area therefore, need to be updated by an expert in the field. Also that as per the report on the findings of the fresh terrestrial ecological survey conducted in the month of April 2012, Basal area has been calculated for shrubs and herbs, which is scientifically incorrect. The same needs to be modified.

The Committee recommended environment clearance for the project subject to submission of the updated avi-fauna list and revised report on Basal area calculation for the record purpose.

### 3.6 Ratle 850 MW Hydro Power Project on Chenab River in Kishtwar District of Jammu & Kashmir by M/s Ratle Hydro Electric Project Pvt. Ltd. –for Environmental Clearance.

M/s Ratle Hydroelectric Power Project Pvt. Ltd. of GVK Group proposes to build a run-of-the river hydroelectric power project of 850 MW on river Chenab near village Drabshala in Kishtwar District in J&K State. Shri P.M.K. Gandhi and Shri M. M. Madan of GVK provided background and presented the salient features of the project. A video of the entire project area showing the location of the dam site, submergence area, location of project components and downstream reaches was shown.

The Committee noted that the project is located downstream of Dulhasti HEP, 14 km downstream of Hasti power house and 61 km upstream of Baglihar HEP. The FRL and TWL for the project are EL 1029.0 m and EL 924.23 m respectively. The TWL for upstream Dulhasti HEP is EL 1031.50 m and FRL for d/s Baglihar HEP is EL 840 m. The Project proposal was reviewed earlier also by the Committee while considering the Scoping Clearance for enhanced capacity from 690 MW to 850 MW in its 54$^{th}$ meeting held on 26th–27th December, 2011. The estimated cost of the project is Rs. 5353.82 Crores and construction period shall be 60 months.

It is a Dam Toe Project and was accorded Scoping Clearance for 690 MW capacity on 6$^{th}$ December, 2010 which was revised for 850 MW after considering it in 54th meeting of EAC held on 26th – 27th December, 2011. The Public Hearing for the project was conducted on 7th April 2012 at Drabshala in Kishtwar District of J&K. Diversion of forest land has been approved by Govt. of J&K on 27.04.2012. Hydrological Study has been approved by CWC on 8.9.2011 and approval for Power Potential has been accorded by CEA on 10$^{th}$ February, 2012. The approved design flood at Ratle dam site is 13,814 $m^3/s$.

The project envisages construction of a Concrete Gravity Dam of 133 m height from the deepest foundation level. The project is at Latitude 33°10'43" N and Longitude 75°48'26" E with FRL at EL 1029 m. The area of land coming

under submergence is 203 ha. The project envisages having 5 intakes (4 for main units & 1 for additional unit) and 4 penstocks of 6.6 m dia for main units & 1 units of 3 m dia for additional unit. A separate unit of 30 MW shall be provided which will be operated continuously for 24 hours to ensure release of ecological flows, as suggested by the Committee while according Scoping clearance on 27th December 2010. Powerhouse will be underground and there will be 5 turbines (4 nos. of 205 MW each plus 1 no. of 30 MW for additional Unit) and five tailrace tunnels (4 nos. of 8.7 m for main units & 1 no. of 4.7 m for additional unit). Design energy is 3136.77 GWh (2887.11 + 249.66).

Catchment area at Ratle dam site is 14,209 sq. km. Total design discharge is 961.53 $m^3$/sec (for 820 MW is 928.1 $m^3$/sec and for 30 MW unit is 33.43 m3/sec) and design flood is 13,814 $m^3$/sec. Diversion flood will be 243 cumec. Data from Premnagar G&D site from the year 1967-68 to 2009-10 has been used for working out the water availability. Average 10-daily series at Premnagar G&D site for the period from 1967-68 to 2009-10 (43 years) has been transferred to proposed Ratle Dam Site by Catchment area proportion (14209/15490 = 0.917). The Committee had looked into this aspect while considering the Scoping for enhanced capacity.

Total land requirement for the project is 567.22 ha of which 373.29 ha is state land, 55 ha is private land and 138.93 ha is forest land. Diversion of forest land is already approved by State Forest Department. Notifications have been issued under Sec.17 and 9 & 9A for State & private land acquisition and tentative awards have been published.

The project falls in seismic zone IV. Project Proponent has got the site specific responses spectra study done by Department of Earthquake Engineering, IIT Roorkee. The report has been approved by NCSDP.

The minimum environmental flow of 33.43$m^3$/sec, equivalent to discharge required for a 30 MW additional unit, which is about 27% of average lean season from November to February, shall be maintained for lean season.

The baseline data for EIA study was collected for three seasons during 2010-11, covering a 10 km study area delineated all around the project component i.e. from the tip of the reservoir on one side and tail water release point on other. The Committee noted that river is flowing in very deep gorge and therefore, sampling locations for various base line data had to be selected within the narrow band along the river itself. The various sampling locations were depicted on the map. The Committee noted that the ambient air and water quality and noise levels in the project area are well within the prescribed standards.

The forest types based on the Champion and Seth classification are Sub-tropical Adathoda Scrub Forest, Tropical Deciduous Forest, Himalayan Chir Pine Forest, Quercus ballot Forests and Grasslands. Vegetation sampling have been done at five locations which is quite representative of the study area. A total of 102 plant species have been recorded from study area out of which there are 89 species of Angiosperm, one species of Gymnosperms, 3 species of Pteridophytes, 3 species of Lichens and 4 species of Bryophytes, 2 species of fungi. No RET floral 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. Plants used by locals for medicinal use were highlighted.

List of mammalian species was prepared based on the primary data and forest working plan. Only three species were sited during the primary survey viz. Common mongoose, Rhesus macaque and Common palm squirrel and all three fall under low risk category of IUCN. Further, 26 species of birds were recorded from study area through primary surveys but none of them are RET species.

The experimental fishing was carried out using fishing gears like hook and line and cast net method near village Thatri. During the sampling only Snow trouts (*Schizothorax richardsonii*) was recorded from the river. *Salmo trutta fario* (Brown trout) was also recorded from the study area but from the higher reaches of the tributary streams. *Tor putitora* (Golden mahseer) was reported near the Thatri village as per information given by locals.

About 24.4 lacs $m^3$ of muck is expected to be generated out of which about 50% i.e. 12.2 lacs $m^3$ of the muck will be utilized and balance 12.2 lacs $m^3$ with 63% swelling factor (20 lacs $m^3$) shall be disposed at three identified locations which are more than 30 m away from HFL of the river.

About 4.5 km of National Highway will get submerged and will be relocated to higher elevation.

Out of total land requirement of 567.22 ha, 55 ha is private land. 240 families will be affected by the project. Family-wise door-to-door survey was conducted for all project affected families. The Resettlement and Rehabilitation plan for the project affected families has been formulated as per the provisions of NRRP – 2007. A total budget of 19.92 Cr for R & R plan, Rs. 30 Cr for skill development, Rs. 30 Cr for Local Area Development and Rs. 30 Cr for CSR activities has been provided.

The issues raised during the public hearing were discussed at length and it was observed that pubic is in favour of project. Most of the issues pertained to

land compensation, jobs for the locals and facilities for various villages which have been agreed by the Project Proponent.

The following observations made by the Committee were clarified by the Project Proponent:

- Regarding Geological Geotechnical Investigation, it was informed that site specific seismic studies have been carried out by IIT Roorrkee. The PGA values for maximum credible earthquake (MCE) and Design Base Earthquake (DBE) conditions are estimated to be 0.31g and 0.16 g respectively.

- In EIA, Section 6.7: Champion and Seth (1968) classification forest type codes were asked by the Committee which were provided during the presentation.

- It was pointed out that in Table 6.20 Himalayan Griffon is shown as WPA Schedule I species while in Section 6.9.7 it has been stated that none of the faunal species is under Schedule I or II. It was informed by the Consultant that Himalayan Griffon is Schedule IV species as per WPA; due to typographical error it got mentioned as Schedule I species in the Table.

- There is a strong likelihood of occurrence of Leopards in the area which may be rechecked from primary/secondary sources. Consultant responded that this aspect has been thoroughly verified during the field surveys and interaction with locals.

- The number of birds sighted is deficient and it seems that secondary sources have not been consulted for the same. It was informed that since primary sighting has been quite significant therefore need was not been felt to provide secondary level information.

- Committee enquired about the plan for the temple which is getting submerged in the reservoir. It was pointed out by the Project Proponents that the same will be relocated to adjacent higher location.

- On a query about a graveyard getting submerged in reservoir area, it was clarified that there is no issue with locals regarding submergence of graveyard and the same will be relocated at a different place.

After detailed deliberation, environmental clearance was recommended for the Project with the following conditions:

(i) Tie ups should be made with existing city hospitals for disposal of Bio-medical waste in case district hospital at Kishtwar does not have the facility for handling biomedical waste as proposed in the report.

(ii) Muck dumping sites should be handed over to the Forest Department only after restoration including plantations etc.

(iii) LADA activities may be undertaken by GVK Foundation to enhance delivery mechanism from operational point of view.

(iv) Indigenous plant species should be used for implementation of Biodiversity Management Plan and for Compensatory Afforestation. Expertise from R&D centers may be used for propagation techniques. Provision should also be made to include researchers to implement these plans and carrying out plantation.

(v) Auto mechanism/by pass arrangement in dam design shall be made to ensure release of environmental flow water if the 30MW turbine trips or is under maintenance.

**21st July, 2012**

3.7 to 3.9 **Par 60 MW, Turu 66 MW and Dardu 60 MW Hydro Power Projects on Pare River in Papumpare District of Arunachal Pradesh by M/s. KVK ECI Hydro Energy Pvt. Ltd.- For ToRs.**

M/s. KVK ECI Hydro Energy Pvt. Ltd. proposes to build three hydroelectric power projects namely Par, Turu and Dardu on Pare River-a tributary of Brahmaputra River, in Papum Pare District of Arunachal Pradesh. Videography of the project area covering locations of project components, catchment area and downstream area etc. was shown by the Project Proponent. All three projects are run-of-the-river type. The upper most is Par of 60MW after which Turu of 66MW flowed by Dardu of 60 MW.

Project site is accessible by road from Guwahati via Tejpur to Itanagar, the district headquarter for Papum Pare district. All the Projects fall within 10 Km distance of Itanagar Wildlife Area and clearance from National Board for Wild Life (NBWL) shall be taken. The area is rich in flora which includes ferns, orchids and a number of Rhododendron species.

Longitudinal section of the river was seen by the Committee and it was noted that there is no project upstream of Par HEP and a clear distance between tailrace discharge of Par HEP and reservoir tip of immediate downstream Turu HEP is 1.07 km and from tail race discharge of upstream

Turu HEP to the reservoir tip of Dardu HEP is 1.50 km and clear distance between tail race discharge of Dardu HEP and reservoir tip of immediate downstream Pare HEP is 1.34 Km.

The FRL and TWL of Par is 848.0m and 631 m, for Turu 612 m and 419 m and for Dardu it is 400m and 261 m respectively. One kilometre of free riverine stretch has been left between the tail race and tip of the reservoir of two projects. Salient features of these three projects are as follows-

**Par 60MW HEP**

It is a run-of-the-river scheme and will be located in Sagalee village. A Barrage of 25.5 m height and 130m length with a HRT of 7.75 km long having a dia of 4.5 m and a surface powerhouse with two units of 30mw each is proposed. Reservoir area will be 8.5 ha.

The Catchment area up to diversion site is 420 sq km, which is all rain-fed. The average annual rainfall of the catchment has been estimated to be 2863 mm. SPF has been estimated as 3157 $m^3$/sec and 100 year flood as 2441 $m^3$/sec. 10 Daily discharge of 90% dependable year is 69.5 $m^3$/s. The water availability has been assessed based on CWC approved 10 daily discharge series at G & D site of Ranganadi HEP Stage II for 27 years (1978-79 to 2004-05) for downstream Pare Dam Project (Catchment Area: 824 Km2) by catchment area proportion with Pare 10-daily flow series. The catchment area proportion for the transposition of flow series from Pare to Par has been derived to be 0.51 (=420/824).

Total land requirement for the project is 28.25 ha of which 17 ha is forestland and balance 11.25 ha is private land. No family will be displaced but owners of 11.25 ha of private land will be affected.

Lean season environmental flow will be 1.68 cumec which is 20% of the average flow of lean months. Average monsoon release will be about 27.34 cumec (21.22%).

Two muck disposal sites have been identified, both more than 50 m away from the HFL of the river.

**Turu 66 MW HEP**

It is also a run-of-the-river scheme and will be located in Pech – Hoj village, about 66 Km from Itanagar. A Barrage of 29.5 m height and 130m length with a HRT of 7.95 km long having a dia of 4.5 m and a surface powerhouse with two units of 33MW each is proposed. Reservoir area will be 11.24 ha.

Catchment area up to diversion site is 560 sq km of which is all rainfed. The average annual rainfall of the catchment has been estimated to 2863 mm. SPF has been estimated as 3376 $m^3$/sec and 100 year flood as 2599 $m^3$/sec.

For computing water availability, same 10 daily series is used as for Par HEP by catchment area proportion with Pare 10-daily flow series. The catchment area proportion for the transposition of flow series from Pare to Turu has been derived to be 0.679 (=560/824).

Total land requirement for the project is 29.49 ha of which 13.75 ha is forest land and 15.74 ha is private land.

**Dardu 60 MW HEP**

It is a run-of-the-river scheme and will be located near Kigi/Kheel village, which is about 65Km from Itanagar. A Barrage of 29.5 m height and 180 m length with a HRT of 8.61 km long having a dia of 4.8 m and a surface powerhouse with two units of 30 MW each is proposed. Reservoir area will be 64.20 ha.

Catchment area up to diversion site is 710 sq km of which is all rainfed. The average annual rainfall of the catchment has been estimated to 2863 mm. SPF has been estimated as 3672 $m^3$/sec and 100 year flood as 2816 $m^3$/sec. Diversion discharge is 545 Cumec.

Total land requirement for the project is 82.70 ha of which 18 has is forest land and 64.70 ha is private land. No family will be displaced but owners of 64.70 ha of private land will be affected.

For computing water availability, same 10 daily series is used as for Par and Turu HEPs by catchment area proportion with Pare 10-daily flow series. The catchment area proportion for the transposition of flow series from Pare to Dardu has been derived to be 0.862 (=710/824).

Lean season environmental flow will be 2. 84 cumec which is 20% of average flow of lean months. Average monsoon release will be about 46.24 cumec (21.93%).

Two muck disposal sites have been identified, both more than 45 m away from the HFL of the river.

The Committee, after discussing various issues for all the three projects made the following observations:

(i) Copies of the Pre Feasibility Report (PFR) submitted to the EAC were not readable especially the flow data as the font size was very small.

(ii) PFR does not contain adequate information on environmental aspects of the surrounding area. Information for this may be provided from the secondary sources.

(iii) Although, 1 Km of free flowing river stretch is available between the two projects but cumulatively about 37 Km of the river stretch is getting affected. Justification in this regard may be provided. Different streams joining in between and water availability in the intervening stretches needs to be provided.

(iv) In Form-1 at column for Loss of native species or genetic diversity (p. 13) 'No' has been given. The project involves 17 ha of forest land, of which more than 74% is dense forests. Hence, the answer should be 'Yes' as definitely there will be loss of native species and genetic diversity. Revised Form-1 may be submitted.

The projects shall be reconsidered after submission of the above information.

3.10 **Request for Revision of Capacity from 90 MW to 144 MW for Gongri Hydro Electric Project on River Gongri in West Kameng District of Arunachal Pradesh by M/s Dirang Energy Pvt. Ltd.- Reconsideration after Environment Clearance.**

The proposal was earlier considered for capacity revision by the Committee in its 52nd meeting held on 16th - 17th September 2011 and certain additional information was sought. The Project Proponent (PP) presented and clarified the additional information as sought by the Committee as follows-

Regarding details of fixing the installed capacity at 144 MW, it was noted that based on the power potential study carried out taking 90% dependable year (1978-79) from in-flow series of 12 years recommended by CWC. Based on the FRL at 1457.5 m and TWL at 1258.0 m, the capacity works out to be 144 MW on the basis of three hours peaking in 24 hours cycle. CEA had earlier returned the DPR for 90 MW and has now approved the enhanced capacity.

Details of approved hydrology with 10 daily flow series in both the cases were presented. On the suggestion of CWC, the period with effect 1990 onwards was avoided and based on new 90% dependable year, annual yield of 1855 mm has been taken into consideration. The in-flow series has been

approved by CWC. The Committee desired to know whether the hydrological series considered in the 144 MW capacity is same with that considered during the earlier EC for 90 MW capacity. The PP confirmed that it is the same series recommended by CWC. In-flow series for both the capacities were presented.

The Committee reviewed the site specific study for Assessment of Environmental Flow conducted by Asian Consulting Engineers Pvt. Ltd., India. As per the data submitted for in-flow during monsoon, the monsoon flow shall be about 33% of the average monsoon flow. Regarding the lean season environmental flow, the PP confirmed release of 3.2 cumec i.e. 20% of inflow of four consecutive lean months of 90% dependable year, as suggested by the Committee. The environmental flow shall be ensured by providing three unregulated steel pipes in the dam. Regarding Muck Management Plan, it was submitted that the estimated muck generation is 11.19 lakh $m^3$ out of which 3.90 lakh $m^3$ shall be used and 7.29 lakh $m^3$ shall be disposed of in four muck disposal sites having a total capacity of 8 lakh $m^3$. All dumping sites are more than 30 m away from the HFL of the river and the Toe walls for Muck disposal sites will be constructed at least 30m away from the HFL of River. The Committee reviewed the siting of disposal sites and was satisfied with the same. The scheme for Compensatory Afforestation on 65 ha of land in Rurang village with a provision of Rs. 96.27 lakhs has been approved by the MoEF on 11th June, 2012. The Committee suggested that local native species should be used for Compensatory Afforestation. The Committee also advised the PP to use populous' species for the Reservoir Rim Treatment and advised that the same may be ascertained through R&D Centers. Further, the Committee also suggested using expertise from R&D centres for conventional propagation techniques for plantation of *Ulmus lancifolium,* in case the State Forest Department is not in a position to provide planting materials in bulk. The PP informed that they propose to seek consultancy from State Forest Research Institute, Itanagar for both the issues.

Updated EMP with respect to the enhanced installed capacity for monitoring purpose was submitted by the PP which was reviewed by the Committee. The updated budget for implementation of EMP shall be Rs.36.71 Crores. The Committee desired to know the source of 66 plant species mentioned in the EMP. PP clarified that these species were identified during the field visits (primary source) and presented a list of various secondary sources used for verification of these species. The Committee further, desired to know the strategy for maintenance of several programs like afforestation, assisted natural regeneration etc. under the CAT plan beyond the period of implementation i.e. four years. It was clarified by the PP that these programs have been planned for eight years which includes four years of maintenance. Regarding Bird Conservation Plan, the Committee observed that provisions for growing feeder plants, preservation of fungi and insects for birds etc. are not feasible as technical knowhow for such attempts are not available. The PP

proposed to seek consultancy from reputed institute like Wildlife Institute of India, Dehradun for a sound methodology to implement the plan.

The Committee pointed out that there is a provision for Scholarships to two children of each PAF for three years only and desired to know for arrangement in the subsequent years. It was clarified by the PP that this provision is for the construction period only. After commissioning of the project, 1% of the revenue from the power generated from the project will be earmarked towards local area development fund. This fund will be used for various local area development programs including Scholarships to students.

The Committee recommended environmental clearance of the project for the revised installed capacity of 144 MW with the following additional conditions-

(i) The threatened species *Ulmus lancifolium* should be used for afforestation in an area of 20 ha. However, to save genetic diversity among its population, the plantlings for this purpose may be produced by seed germination or any other conventional methods instead of tissue cultured plants (mass multiplication). Expertise from R&D centres like State Forest Research Institute, Itanagar for conventional propagation techniques for its plantation, in case the State Forest Department is not in a position to provide planting materials in bulk should be availed.

(ii) The minimum lean season environmental flow shall be 20% of the inflow of four consecutive lean months of 90% dependable year and the monsoon flow shall be about 33% of the average monsoon flow. The environmental flow shall be ensured by providing three unregulated steel pipes in the dam.

(iii) All muck dumping sites shall be 30 m away from the HFL of the river and the Toe walls for Muck disposal sites will be constructed at least 30m away from the HFL of River.

(iv) Local native species should be used for Compensatory Afforestation and 'populous' species for the Reservoir Rim Treatment with the help of some R&D Center.

(v) The budget for implementation of EMP shall be Rs.36.71 Crores.

(vi) For implementation of Bird Conservation Plan shall be in consultation with some reputed institute like Wildlife Institute of India, Dehradun.

(vii) Minimum 1% of the revenue from the power generated from the project will be earmarked towards local area development fund once the project is commissioned.

(viii) The Bryophytes, Pteridophytes, Gymnopserms and Angiosperms listed in the EIA Report may be segregated under separate heads and the revised list may be submitted to the Ministry for record.

### 3.11 Tsachu-I Lower 69 MW Hydro Power Project on Tsona Chu River in Tawang District of Arunachal Pradesh by M/s Energy Development Ltd.-For ToRs.

M/s Energy Development Company Ltd. (EDCL) proposes a hydropower project of 69 MW on Tsona Chu, a tributary of Tawang River in Tawang District of Arunachal Pradesh. A vediograhpy of the area was seen by the Committee before starting presentation and discussion on the project. The Committee reviewed the project for scoping clearance.

The project is in Tawang Basin, on Tsona Chu which joins Nyukcharang Chu which joins Mago Chu and becomes Tawang river. Catchment area up to diversion site is 1870 sq km of which 636 sq km is snow fed. Average annual rainfall is about 640 mm and Standard Project Flood (SPF) for the project is about 2948 $m^3$/sec.

The project is a tailrace development project where tailrace water of upstream Tsachu I 24 MW HEP along with 4 cumecs of water from Nyukchorang Chu will be used. A small trench weir shall be made on Nyukchorang Chu for diverting water from this river through 1.96 km long tunnel. Water from both these will be brought to a mixing chamber and diverted through a 1.67 km long HRT having 4 m dia to power house on right bank of Nyukchorang Chu. Surge shaft will be open tank type having 10.4 m dia with four penstocks of 330.5 m long and 1750 mm dia. Energy generation is estimated to be 353.87 MU.

Total land requirement for various project components is 19.50 ha which is forest land. There will be no R&R issues as no population will be affected as there is no habitation around the project site. There is only one village in the area.

For water availability data of Murga Bridge, China Bridge and Mago Chu was reviewed by the PP and discharge data of Murga Bridge was finally used. Catchment area proportion (1870/2888 = 0.647) was applied along with rainfall variability. Based on combination of both catchment area and rainfall variability a factor of 0.42 has been used. There is no IMD station in the project catchment. PP has recorded daily flow of the river Tsachu at the

project location for more than one year. The Committee reviewed the data in detail and was satisfied with the water availability for the project.

PP informed that as per the water availability, the capacity works out to be 69 MW instead of 50 MW, for which they will get the MOU with the State Govt. revised before coming for environmental clearance.

The Committee also reviewed the longitudinal profile of the river to ensure that free flowing stretch is maintained between two projects. It was satisfied to note that total river stretch used by Tsachu I 24 MW HEP and Tsachu I Lower (the present project) together is about 5.6 Km. There is no upstream project on Tsona Chhu and on downstream side, Tsachu II of 79 MW is there. The TWL of Taschu I Lower EL 3190m and FRL of Tsachu II is EL 2860m thus having about 3.1 Km free flowing river stretch from the tailrace discharge point of Tsachu I Lower. Below Tsachu II, Nyukchorang Chhu HEP of 96 MW is there which also has a free flowing river stretch of 4.5km.

Literature survey shows that no fish is available in this river stretch which will be confirmed during the EIA study. Lean season environmental flow has been worked out to be 3.09 cumec which is about 21.8% of the lean months average flow. Releases during non-monsoon, non lean moths will be worked out based on the water requirement study in the river stretch.

Committee pointed out that under item 1.30, answer should be YES since 19.495 ha of tropical forest rich in biodiversity will be affected. The PP accepted the error.

After detailed deliberations, the Committee recommended scoping clearance for the project and approved TORs for preparation of EIA/EMP report with the following additional TORs-

(i) Forest classification shall be carried out as per Revised Forest Survey of India Champion & Seth 1968 only and should include Pteridophytes also.

(ii) General vegetation pattern and floral diversity should also include “Pteridophytes”, “bamboos” and “rattans” as the area is rich in these groups of plants. Expertise from R & D centers may be sought for investigating the protected, important, sensitive species, if needed.

(iii) Sampling locations for “Vegetation” and “Water Quality and Aquatic Ecology” should be increased to 10 and should have at least three locations between diversion site and power house site. Also it was agreed to do trails for faunal species during this sampling.

(iv) Considering the high biodiversity of the area, adequate effort may be made to do a proper inventorization of the fauna and possible impacts on them.

(v) Ambient air quality monitoring should be carried out for two seasons instead of one as proposed in the TOR.

(vi) There is no caption mentioned in abbreviation used in PFR for UID (unidentified species), which should be clearly explained in report.

(vii) Seasons to be covered as part of sampling should be Pre-monsoon, Monsoon and Post Monsoon as during winters, the area would be covered by snow and post monsoon sampling would give more information on herbaceous species.

(viii) All five hutments of only village in the Tsachu area which although is not affected due the project but may be adopted as part of CSR activities. Plan to improve their life may be worked out.

(ix) Literature survey shows that no fish is available in this river stretch which will be confirmed during the EIA study.

### 3.12 Tsachu-II Lower 79 MW Hydro Power Project on Nyukcharang Chu in Tawang District of Arunachal Pradesh by M/s. Energy Development Ltd.- For ToRs.

M/s Energy Development Company Ltd. (EDCL) proposes Tsachu-II 79 MW hydropower project on Nyukcharang Chu, a tributary of Tawang River in Tawang District of Arunachal Pradesh. Vediography of the area and presentation on the project was made by the Project Proponent (PP) which was reviewed by the Committee for scoping clearance.

The Committee noted that the project is on Nyukcharang Chu which joins Mago Chu to become Tawang river. Catchment area up to diversion site is 2056 sq km of which 1711 sq km is snow fed. Average annual rainfall is about 673 mm. PMF has been estimated as 3628 $m^3$/sec.

A Barrage of 8.7m height (from the river bed) will be constructed on Nyukcharang Chu. HRT will be of 1 .9 km long with 4 m dia. Surge shaft will be of open tank type of 10.2 m dia . Energy generation will be 421.7 MU.

Total land requirement for various project components is 38.89 ha which forest land is. There will be no R&R issues as no population will be affected as there is no habitation around the project site. There is only one village in the area.

For water availability, status is the same as for Tsachu Lower I. Catchment area proportion (2056/2888 = 0.712) has been applied and a rainfall variability factor of 0.53 has been used.

The PP informed that as per the original allocation, the project capacity is 90 MW but after taking out the environmental flows etc., it works out to be only 79 MW. The Committee appreciated the concern shown for the environment.

Regarding maintaining free flowing stretch between the U/S and D/S HEPs, it was noted that TWL of U/S Tsachu –I Lower is EL 3015m and FRL of this project is EL 2860m and has a free river stretch of 3.1 km and TWL of thi project is 2695 and FRL of D/S Nyukchorang Chhu HEP is 2470 MW having 4.5 km free stretch. River stretch used by Tsachu II is only 2.2 Km. The Committee was satisfied with the configuration.

Literature survey shows that no fish is available in this river stretch which will be confirmed during the EIA study. Lean season environmental flow has been worked out to be 3.90 cumec which is about 21.9% of the lean months average flow. Releases during non-monsoon, non lean moths will be worked out based on the water requirement study in the river stretch.

After detailed deliberations, the Committee recommended Scoping Clearance and approved ToRs for preparation of EIA/EMP reports with the same additional ToRs as for the above mentioned Tsachu I Lower.

### 3.13 Loktak Downstream 66 MW Hydropower Project on Leimatak River in Nungba, Tamenglong District of Manipur by M/s NHPC Ltd. – Reconsideration for Environmental Clearance.

The project proposal was listed for consideration in 53rd EAC meeting held on 11th-12th November 2011 but could not be discussed as the presentation as well as EIA/EMP report quality was poor. It was decided that all maps, graphs and figures shall be replaced with legible prints. Accordingly, NHPC submitted the revised EIA/EMP to the Ministry.

At the outset, the Committee members expressed that they did not receive project documents, hence could not read about the project. M/s NHPC admitted that there was some communication gap hence they had sent just two-three days back by e-mail only those chapters where revision was carried out. The Members expressed that the mail was sent at the last moment and some of the members had already started their journey for the meeting hence could not open the mail. The members desired that project should be deferred for next meeting so that NHPC may send them the hard copies of EIA/EMP and members will be in a position to appraise the project. However, on the

insistence of NHPC, a presentation on the project was taken by the Committee on the condition that decision on the project shall be taken only after the members go through the project related documents. No video of the area was available with NHPC.

Shri Sarkar presented that M/s Loktak Downstream Hydroelectric Corporation Ltd. – a joint venture company of NHPC Ltd. and Government of Manipur proposes a 66 MW hydro power project namely the Loktak Downstream Hydroelectric Project on the river Leimatak- tributary of Irang River, in district Tamenglong of Manipur State. Scoping clearance for the project was accorded on 20.07.2007 and Public Hearing was held on 07.06.2011. In-principle Stage-1 Forest Clearance has been accorded for diversion of 211.57 ha forest land on 03.03.2011. TEC has been accorded on 15.11.2006.

The project is a run- of- river scheme in which the tail race discharge of upstream commissioned Loktak 105MW Power Station, along with the inflow of the River Leimatak shall be use for power generation. Leimatak river is a rain fed river and for most of the year 95% of the discharge of Leimatak River is contributed by the tailrace discharge of Loktak Power Station.

The project envisages utilization of 112 m gross head of Leimatak river by constructing a barrage of 28m height near Tousang khunou village with one HRT of 5.8 km length conveying water to a surface power house having two turbines of 33 MW each located on left bank of Irang river. Leimatak River after flowing for about 14 km joins Ijai river and after about 4 km Ijai River thereafter flows into Irang River. The tail race channel of 71 m will be opening into Irang River. The yearly energy generation during the 90% dependable year with 95% machine availability is 330.24MU.

The design discharge is 65.28 cumec. Catchment area at the Dam site is 554 Sq. Km. and Design flood is 2450 Cumec.

Total land requirement is 211.57 ha land which is of four types viz. wet paddy fields (on river bed), community land, Jhum land and unclassified forest land. No private land is to be acquired for the project; however, 705 families are likely to be affected due to loss of their right over community and unclassified forest land.

Rs. 63.52 Crores will be kept for EMP. The project shall be completed in 78 months.

The revised information presented by the Project Proponent was reviewed by the Members and the following suggestions were made-

(i) Source of information for faunal lists (primary/secondary and source in case of secondary) may be clearly mentioned. The mammal list appears to be largely based on secondary sources. Still some spelling mistakes and mis-classifications are there in the faunal lists which may be corrected. Do not provide sub-specific details in common or scientific names (e.g. Burmese Red-wattled Lapwing should be only Red-wattled Lapwing). No WPA schedules have been given for birds which may be added. A good number of Schedule I mammal and bird species have been reported and specific impacts and mitigation measures may be provided. The list of mammalian and bird species found in the project affected area may be mentioned and specific conservation action for the red-listed species therein may be given.

(ii) No ground Orchids have been enumerated from a State like Manipur. This shows that the floristic account does not provide a correct picture of the flora. Moreover, 412 species belong to 343 genera means there are more monotypic species (one genus with only one species) in the area, which is unusual. This also indicates that the floristic account provided is not adequate.

(iii) In the Executive Summary it is mentioned that a large number of non vascular epiphytes such as Mosses and Lichens were also found covering considerable space on the bark of the trees in the area. No accounts on Lichens and Mosses were provided in the Executive Summary. This may be done in EIA report with Management Plans in EMP if RET species are involved.

(iv) In the Executive Summary it is mentioned that there are 10 animal species coming under Schedule 1. Details of these species are not provided and accordingly the Management Plans advocated by the Proponents for these species (p. 21). Likewise, no management plans have been provided for threatened bird species mentioned on page 22. Proponents may consult respective experts/scientists working in corresponding specialised fields to evolve management plans for these species.

It was decided that since the Committee Members did not have the opportunity to look into the revised information submitted by PP, the project proposal shall be considered once again. Meanwhile, the above suggested information may also be provided.

**4.** Agenda Item No. 4: **Discussion on Environmental Flow for Alaknanda 300 MW Hydro Power Project on River Alaknanda in Chamoli District of Uttarakhand by M/s GMR (Badrinath) Hydro Power Generation Pvt. Ltd**.

GMR once again presented the salient features of the project along with the pictures of the area and project components. The water requirement for various purposes along with the data like hydrological series, cross section of the river, depth and water required etc. was once again reviewed by the Committee and the earlier decision taken by the Committee in its 54th meeting held on 26th - 27th December, 2011 was reiterated with the condition that two flushings shall be carried out every month during the monsoon season. During flushing, the entire flood shall be allowed to go downstream for at least 12 hours.

**5. Any other Item with the permission of Chair.**

The Member Secretary of the Committee expressed that the general ToRs formulated earlier has now been revised by her and needs a review by the EAC for finalization of the same. It was decided that the ToRs shall be e-mailed to all Members for their comments, which can be discussed in the next meeting for finalization.

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Annexure-1

**List of EAC Members and Project Proponents who attended 59th Meeting of Expert Appraisal Committee for River Valley & Hydroelectric Power Projects held on 1st-2nd June, 2012 in New Delhi**

**Members of EAC**

1. Shri Rakesh Nath- Chairman
2. Dr. Dhananjai Mohan
3. Prof. S.K. Mazumdar
4. Dr. (Mrs.) Maitrayee Choudhary
5. Dr. K.D. Joshi
6. Prof. T.S. Nayar
7. Prof. J.K. Sharma
8. Shri G.L. Bansal
9. Dr. Praveen Mathur
10. Ms. Sanchita Jindal, Director, MoEF
11. Dr. P.V. Subba Rao, MoEF

**Inter-Linking of Tambiraparani, Karumeniyar and Nambiyar Rivers, Government of Tamil Nadu**

1. Shri M. Sampath Kumar, Chief Engineer, PWD Water Resources Organisation, Madurai.
2. Shri S.P. Pandian, Superintending Engineer, PWD Water Resources Organisation, Madurai.
3. Shri M.R. Mohan, Deputy Engineer, PWD Water Resources Organisation, Madurai.
4. Er. S. Subhash, Executive Engineer PWD, Madurai.
5. Shri S. Antony Anbarasu, Executive Engineer, PWD, Chennai.
6. Shri A.S. Nagarajan, Assistant Executive Engineer, PWD.
7. Shri J. Murugan Assistant Engineer, PWD.
8. Shri K. Karthikeyan, Associate Engineer, PWD.

**Ghogra Minor Irrigation Project by Government of Madhya Pradesh**

1. Shri R. Julania, IAS, Principal Secretary, D/o WR.
2. Shri M.G. Chowbey, Engineer-in-Charge
3. Shri S.K. Nigam, Senior Engineer
4. Shri Avinash Kulkarni, Executive Engineer
5. Shri Deepak Satpate, Executive Engineer
6. Shri P.K. Tripathi, SOO
7. Shri B.K. Jain, SOO
8. Ms Devyani, Assistant Engineer

**Morand and Ganjal Complex Irrigation Project by Narmada Valley Development Authority, Government of Madhya Pradesh**

1. Shri L.K. Sood, APCCF
2. Shri V.K. Dewada, C.E.I.S. P
3. Shri L.N. Badgotiya, S.E.I.S.P
4. Shri K.N. Tripathi, E.E.ISP
5. Shri R. Krishnamoorty, P.E.- SECON
6. Shri S.S. Surti, EE, SECON
7. Shri V.K. Singh, RM- SECON
8. Shri V.K. Rawat, SDO, Hyderabad
9. Dr. D.Z. Bhatt, Sr. Consultant, SECON
10. Mr. M.K. Sharma, Sr. Consultant, SECON

**Dhaulasidh 66 MW Hydroelectric Power Project M/s. Satluj Jal Vidlyut Nigam Ltd.**

1. Shri S.K. Mahajan, Head of Project
2. Shri Aman Sharma, Chief Engineer, WAPCOS
3. Shri Shiraz Swan, Sr. Engineer (Civil), Shimla
4. Shri Harsh Bhaskar Mehta, Sr. Engineer (Civil), Shimla
5. Shri Awdhesh Prasad, Manager, Shimla
6. Shri Parveen Kumar Sekhri, AGM (Envt.)
7. Shri Ajay Bhushan Dogra, Sr. Manager
8. Shri Vikas Gupta, Sr. Associate, SMEC
9. Shri Ravi Kumar Sahu, Engineer, SMEC

**Ratle 850 MW Hydro Power Project on Chenab River in Kishtwar District of Jammu & Kashmir by M/s GVK.**

1. Shri P.M.K. Gandhi, GVK
2. Shri M.M. Madan, GVK
3. Shri S. Dhawan, GVK
4. Shri Jitender Chaube, GVK
5. Shri Hemant Sharma, GVK
6. Shri Shahu, GVK
7. Shri Rathnakumar Vakkalagadda, Manager GVK
8. Shri S.S. Haider, AFC
9. Shri Vimal Garg, RSET
10. Shri Ravinder P S Bhatia, RSET
11. Dr. Arun Bhaskar

**Par, Turu and Dardu HEPs by M/s. KVK ECI Hydro Energy Pvt. Ltd.**

1. Shri A.A.N. Kumar

2. Mr. Nupesh Patle
3. Ms Nina Singh
4. Shri Ravinder P S Bhatia, RSET
5. Shri Rajesh

**Gongri Hydro Electric Project by M/s Dirang Energy Pvt. Ltd.**

1. Shri M.L. Gupta, DEPL
2. Shri A.P. Agrawal DEPL
3. Shri N.N. Pandey DEPL
4. Shri H.K. Das DEPL
5. Shri B.K. Some DEPL
6. Shri S. Debratt DEPL
7. Shri B.C. Mandal DEPL
8. Shri Sunil Tamrakar DEPL
9. Shri Achyut Khajuria DEPL
10. Dr. Harcharan Singh, EQMS
11. Dr. Suparnaa Mulick, REPL

**Tsachu-I Lower 50 MW and Tsachu –II 90 MW Hydro Power Projects by M/s. Energy Development Ltd.**

1. Shri Sanjay Saraf, EDCL
2. Dr. Andreus Hutarew, EDCL
3. Shri Jan Hutarew, EDCL
4. Shri Ravinder P S Bhatia, RSET
5. Shri Vimal Garg, RSET
6. Shri Arun Bhaskar
7. Shri Patrick Achidi, EDCL
8. Ms Richa Ratia

**Loktak downstream 66 MW HEP by M/s NHPC Ltd.**

1. Shri A.K. Sarkar, Executive Director (Planning)
2. Shri S.K. Chauhan, CEO
3. Shri Y.K. Chaudey, CE (Design)
4. Dr. Shahid Ali Khan, Chief (Env.)
5. Shri K.G. Virmani, Chief (Geology)
6. Shri P.P. Singh, CE (LDHCL)
7. Ms. Bharti Gupta, DM(Hydrology)
8. Dr. Anuradha Bajpayee, AM (Env.)
9. Dr. A.K. Jha, AM (Env.)
10. Dr. D.C. Nautiyal, CISMHE, DU
11. Dr. J.P. Bhatt, CISMHE, DU

12.

**Alaknanda (Badrinath) HEP by GMR**

1. Shri V.K. Sharma
2. Shri G.S. Sharma
3. Ms. O.R. Lalitha
4. Shri Senthur Pandian
5. Shri Tarun Mahajan

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