Minutes of the 76th Meeting of the Expert Appraisal Committee for River Valley and Hydroelectric Projects constituted under the provisions of EIA Notification 2006, held on 11th August, 2014 at Indian Council of Forestry Research & Education (ICFRE), Van Vigyan Bhawan, Sector-5, R. K. Puram, New Delhi.

The 76th Meeting of the Expert Appraisal Committee (EAC) for River Valley and Hydropower Projects was held during 11th August, 2014 at Indian Council of Forestry Research & Education (ICFRE), Van Vigyan Bhawan, Sector-5, R. K. Puram, New Delhi. The meeting was chaired by Shri Alok Perti, Chairman. Shri H. S. Kingra, Vice-Chairman, Dr. G. M. Lingaraju, Dr. S. Sathya Kumar, member could not attend the meeting and Dr. K. D. Joshi had informed he is not well and not attend the EAC meeting. The list of EAC Members and officials/consultants associated with various projects and who attended the meeting is at **Appendix**.

The following Agenda items were taken-up in that order for discussions:-

1st Day (3.6.2014)

1. **Agenda Item No.1 :** Welcome by Chairman and Confirmation of Minutes of the 75th EAC Meeting held on 3rd- 4th July, 2014. The Minutes of 75th EAC meeting was confirmed with the following amendment:

Agenda Item No. 2.1 HEO HEP (240 MW) on the Yarjep River, in the West Siang District of Arunachal Pradesh –For Environment Clearance

On page 8 of the minutes (2nd paragraph), it has been mentioned that the public hearing of the Heo HEP has been held on 27th November, 2013. 27th November, may be read as 26th November. In place of vertical francis vertical turbine this may be read as veritical francis turbine on page 2 para 1 and line 9. On page 9, in Row 2, column 2 and Bullet point 1 line 2, 34 hectare including 8 ha of river bed may be read as 34.1 hectare including 8.8 hectare of river bed.

Agenda Item No. 2.2 Tato-1 HEP (186 MW) on the Yarjep River, in the West Siang District of Arunachal Pradesh – For Environment Clearance

On page 19 of the minutes, it has been mentioned that the project contemplates to receive total 130.88 cumec flows. This may be read as 132.88 cumec.

On page 20 of the minutes (last para), it has been mentioned that the project surface land is 50 ha. This may be read as 47.7 Ha.

On page 21 of the minutes, it has been mentioned that the total muck generation with 40% swelling factor works out to 12,19,798 cum. This may be read as 12,91,798 cum (last para).

On page 24 of the minutes, it has been mentioned that the project surface land is 47.1 Ha. This may be read as 47.7 Ha (first paragraph).

On page 24 of the minutes, it has been mentioned that the Government of Arunachal Pradesh has furnished required forest information in June 2013. It may be read as June, 2014.

On page 26, in Row 4, column 2 and Bullet point 1 line 2, 34 hectare including 8 ha of river bed may be read as 34.1 hectare including 8.8 hectare of river bed.

Agenda Item No. 2.3 PAUK HEP (240 MW) on the Yarjep River, in the West Siang District of Arunachal Pradesh – For Environment Clearance

On page 34 of the minutes, the installed capacity of the Pauk HEP has been mentioned as 240 MW in the heading of the agenda item. This may be read as 145 MW. On page 51 under response column, point no 2 para 2: August 2013 may be read as November, 2013. On page 52 , point no (iv) line 2: 2.5 cumec during mon-soon may be read as 2.5 cumec during lean season.

2. **Agenda Item No.2 :** Consideration of Project proposals for Scoping and Environmental Clearance.

The following project proposals were considered:

Agenda Item No. 2.1 Krishna Marathwada Lift Irrigation Project at Osmanabad, Maharashtra by M/s. KMIDC, Government of Maharashtra -For reconsideration of Environmental Clearance (EC).

The project proponent made detailed presentation on various aspects of the project. However, the EAC observed the following:

- The scheme has been formulated with water availability corresponding to 50% dependable year by Maharashtra Government. Whereas, norms followed nationally is corresponding to 75% dependable year. In view of this, Maharashtra Government was asked to submit requisite Government order or approval of appropriate Authority such as Central Water Commission (CWC) in this regard. EAC observed that this is a very crucial parameter of the project and has to be judiciously selected.

- Regarding the issue of violation by way of undertaking construction activity without environmental clearance, reply has been submitted by project proponent only to the Ministry of Environment, Forests & Climate Change (MoEF&CC). The State Environment Department is required to initiate action as per extant OM of MoEF&CC, which was already sent to State Environment Department by the Ministry.

- It was noted that State Environment Department is yet to initiate necessary action against the project proponent. EAC advised MoEF&CC to remind the State Environment Department in this regard for early action.

- Once the project proponent submits requisite information/ clarification on the applicability of dependable year, and State Government initiates necessary actions against the violator, the case may be considered by EAC again.

Agenda Item No. 2.2 Rupin HEP (45 MW) in Shimla District of Himachal Pradesh - For Extension of the Validity of TOR.

Rupin HEP is envisaged as the run-of the river scheme on Rupin and Nargani rivers; Nargani is a tributary of Rupin river, which in turn is a tributary of Tons river. The project falls in Dodra-Kawar Tehsil of Shimla district in Himachal Pradesh. The project site is about 210 Km from Shimla, the state capital.

Rupin HEP is planned with 45 MW installed capacity, which makes it Category 'B' project; however, as the project area falls within 10 km from Inter-state boundary of Himachal Pradesh and Uttarakhand and is also located within 10 km radius of Govind Pashu Vihar Wildlife Sanctuary, the project is treated as category-'A' project.

Therefore, Ministry of Environment & Forests, Government of India accorded Scoping Clearance to the project vide letter No.J-12011/23/2010-IA.Idated 13-9-2010. An extension of one year i.e. up to 13-9-2013 for the validity of this TOR was granted vide letter no.J-12011/23/2010-IA.I dated 11-02-2013.

Project proponent explained that the Public hearing was conducted at the project site on 27-6-2013,within the validity of TOR and updated EIA and EMP reports as per the approved TORs are ready for submission to MoEF&CC. As the project area falls within 10 Km of Govind Pashu Vihar Wildlife Sanctuary, the project requires wildlife clearance from Standing Committee of National Board of Wild Life (NBWL). It was informed that the case of obtaining wildlife clearance from NBWL has been recommended by State and is under consideration at MoEF. The Wildlife Management Plan as recommended by the State Wildlife Board has been processed by the Govid Pashu Vihar Wildlife Sanctuary Authorities. As the four year limit of scoping clearance will expire on September 13, 2014, the project proponent requested the extension of Scoping Clearance till that time to enable them to submit EIA/EMP reports.

The Committee observed that Public Hearing meeting was held within the validity of scoping clearance and asked project proponent that whether they should be able to submit the final reports for appraisal before September 13, 2014. The developer confirmed the same. Keeping in view that reports are ready for appraisal and the requested extension is within the four year period of scoping clearance validity, EAC recommended the extension of Scoping Clearance to Rupin HEP for a period of one year from 13-09-2013 i.e. till 13-09-2014.

Agenda Item No. 2.3 Carrying Capacity & Cumulative Environment Impact Assessment (CC&EIA) for Beas Basin Study- For ToR

The Beas River is among the "five rivers" from which the state of Punjab derives its name. The river originates at Rohtang Pass of the Himalayas in central Himachal Pradesh at a height of 13,050 feet (3978 m) and flows for a length of 290 miles (470 km) before joining the Sutlej River at Harike Pattan; south of Amritsar in the state of Punjab.

The TOR for the Beas Basin Study was discussed during the 76th EAC meeting and the following points emerged:

The study area to be covered is a part of the Beas Basin falling in the state of HP and is proposed to be from its originating point from a cave at the Rohtang Pass to the dam of the Pong Dam Project. The boundary of the study area will be upstream of

dam of the Pong Dam Project to its originating point at Rohtang pass. All Projects irrespective of generation capacity should be taken into account for the study.

A total of 44 projects are envisaged in the study area. However, if smaller projects are planned/ being planned, the same shall also be taken into considerations. The details of the projects in the study area is given in Table 1 to 6 as listed below:

Table-1: Hydropower projects in Beas River

Table-2: Hydropower projects in Beas Basin – commissioned

Table-3: Hydropower projects in Beas Basin – under construction

Table-4: Hydropower projects in Beas Basin under various stages of Environmental Clearance.

Table-5: Hydropower projects in Beas Basin under investigation

Table-6: List of hydropower projects which have been dropped in Beas Basin.

Table 1: Hydropower Projects in Beas Basin

S. No.	HEP Category	No. of projects	Capacity (MW)
1	Commissioned	19	2709.50
2	Under Construction	8	1077.00
3	Under Clearance	12	888.20
4	Under Investigation	6	76.90
5	Foregone	3	354.00
	Grand Total	**48**	**5105.60**

Table 2: Hydropower Projects in Beas Basin - Commissioned

S. No.	Name of the scheme	Installed Capacity (MW)	Agency
1	Malana-I	86.00	Malana Power Company Ltd.
2	Tosh	10.00	Sai Engineering Foundation
3	Patikari	16.00	Patikari Hydro Electric Project Ltd
4	Allain Duhangan	192.00	AD hydro Power Corporation Ltd.
5	Sarbari-II	5.40	DSL Hydrowatt Ltd.
6	Beas Kund	9.00	Kapil Mohan & Associates Hydro Power Pvt. Ltd.
7	Malana-II	100.00	Everest Power Pvt Ltd
8	Neogal	15.00	Om Hydropower Ltd.
9	Uhl-II(Bassi)	66.00	HPSEBL
10	Binwa	6.00	HPSEBL

S. No.	Name of the scheme	Installed Capacity (MW)	Agency
11	Baner	12.00	HPSEBL
12	Gaj	10.50	HPSEBL
13	Khauli	12.00	HPSEBL
14	Larji	126.00	HPSEBL
15	Uhl-I (Shanan)	110.00	PSEB
16	Pong Dam	396.00	PSEB
17	Beas Satluj Link	990.00	BBMB
18	Parbati-III	520.00	NHPCL
19	Ranjeet Sagar Dam (H.P. Share)* Located in Punjab	27.60	
	Total	**2709.50**	

Table 3: Hydropower Projects in Beas Basin – Under Construction

S. No.	Name of the scheme	Installed Capacity (MW)	Agency
1	Baner-II	6.00	Podigy Hydro Power Pvt. Ltd.
2	Fozal	9.00	Fozal Power Pvt Ltd
3	Lambadug	25.00	KU Hydro Power Pvt. Ltd
4	Lower Uhl	13.00	Trident Power Systems Ltd.
5	Baragaon	24.00	Kanchanjunga Hydro Power Ltd.
6	Uhl-III	100.00	HPSEBL
7	Sainj HEP	100.00	HPPCL
8	Parbati-II	800.00	NHPCL
	Total	**1077.00**	

Table 4: Hydropower Projects in Beas Basin – Clearance

S. No.	Name of the scheme	Installed Capacity (MW)	Agency
1	Uhl	14.00	Puri Oil Mills Ltd.
2	Sarsadi-II	9.00	Aroma Colonisers Pvt. Ltd,
3	Palchan Bhang	9.00	Palchan Bhang Power Private Ltd.,
4	Uhl Khad	14.00	Kharnal Hydro Electric Project Pvt Ltd
5	Bhang	9.00	Bhang Hydel Power L.L.P.
6	Balargha	9.00	Sandhya Hydro Power Projects Balargha Pvt. Ltd.,
7	Sharni	9.60	Sharni Hydro Power Pvt. Ltd.
8	Sarsadi	9.60	Himshakthi Power Pvt. Ltd.
9	Nakthan HEP	520.00	HPPCL

S. No.	Name of the scheme	Installed Capacity (MW)	Agency
10	Thana Plaun	141.00	HPPCL
11	Triveni Mahadev	78.00	HPPCL
12	Dhaulasidh	66.00	SJVNL
	Total	**888.20**	

Table 5: Hydropower Projects in Beas Basin –Investigation

S. No.	Name of the scheme	Installed Capacity (MW)	Agency
1	Parbati	12.00	Mahimahesh Power Pvt. Ltd.,
2	Hurla-I	9.40	Hurla Valley Power Pvt. Ltd
3	Kilhi-Bahl	7.50	Puri Oil Mills Ltd.
4	Malana-III	30.00	BMD Pvt Ltd
5	Jobrie	12.00	Green Infra Limited
6	Khauli-II	6.00	HPSEBL
	Total	**76.90**	

Table 6: Hydropower Projects in Beas Basin : Foregone

S. No.	Name of the scheme	Installed Capacity (MW)	Agency
1	Parbati-I	230.00	Nakhtan HEP(520MW) has been proposed against Parbati-I(750 MW).
2	Gara Gossain HEP	25.00	
3	Gharopa HEP	99.00	
	Total	**354.00**	

The details of sampling locations are given in Table-7.

Table-7: Details of sampling locations

S.No.	Name of the Project	Capacity (MW)	Provisional No. of stations *
1	Malana-I	86.00	1
2	Tosh	10.00	1
3	Patikari	16.00	1
4	Allain Duhangan	192.00	2
5	Sarbari-II	5.40	1
6	Beas Kund	9.00	1
7	Malana-II	100.00	2
8	Neogal	15.00	1
9	Uhl-II(Bassi)	66.00	1
10	Binwa	6.00	1

S.No.	Name of the Project	Capacity (MW)	Provisional No. of stations *
11	Baner	12.00	1
12	Gaj	10.50	1
13	Khauli	12.00	1
14	Larji	126.00	2
15	Uhl-I (Shanan)	110.00	1
16	Pong Dam	396.00	2
17	Beas Satluj Link	990.00	3
18	Parbati-III	520.00	3
19	Baner-II	6.00	1
20	Fozal	9.00	1
21	Lambadug	25.00	1
22	Lower Uhl	13.00	1
23	Baragaon	24.00	1
24	Uhl-III	100.00	2
25	Sainj HEP	100.00	2
26	Parbati-II	800.00	3
27	Uhl	14.00	1
28	Sarsadi-II	9.00	1
29	Palchan Bhang	9.00	1
30	Uhl Khad	14.00	1
31	Bhang	9.00	1
32	Balargha	9.00	1
33	Sharni	9.60	1
34	Sarsadi	9.60	1
35	Nakthan HEP	520.00	3
36	Thana Plaun	141.00	2
37	Triveni Mahadev	78.00	1
38	Dhaulasidh	66.00	1
39	Parbati	12.00	1
40	Hurla-I	9.40	1
41	Kilhi-Bahl	7.50	1
42	Malana-III	30.00	1
43	Jobrie	12.00	1
44	Khauli-II	6.00	1
44	**Total**	**4751.6**	**59**

*** to be appropriately decided**

Physico-chemical Aspects

1.1.1. Meteorology

Information on various meteorological aspects is proposed to be collected from India Meteorological Department (IMD) for meteorological stations located within the

basin area or in vicinity to the basin boundary. The information on following aspects should be collected:

Rainfall

- average (monthly, annual)
- maximum (monthly, annual)
- minimum (monthly, annual).

Temperature

- average (monthly)
- maximum and minimum (monthly)

Humidity

- average (monthly)
- maximum and minimum (monthly)

Wind

- wind speed
- wind direction

Water Resources

As a part of the study, the information on following aspects is proposed to be collected:

- Review of drainage characteristics of the basin, including various surface water bodies like rivers and lakes.
- Data collection and review of past studies/reports/data etc.
- Review of existing water sharing agreements for meeting various need-based existing and future demands viz. municipal, irrigation, power generation and industrial.
- Analysis of all past assessment of the water availability and assessing the water availability, as per updated data for the system as a whole and at existing ongoing/proposed project locations at 75% (irrigation requirement), 90% {industrial requirement) and 100% (municipal requirement) dependability on annual/monsoon/non-monsoon and monthly basis.
- Estimation of sediment load at various points in the basin based on available secondary data.
- Identification of perennial sources of water and their designated usages

Water Quality

As a part of the study, the information on following aspects is proposed to be collected:

- Based on the information available with the above referred data source, the information on quantity and mode of disposal of effluent generated by various industries should also be collected and an inventory of the same should be prepared.
- Based on the source of pollution, quantum of waste water generated, mode of treatment, the pollution loading should be ascertained. This should be an input for assessing the Environmental flow for dilution of pollution loading entering in the river.

Water quality monitoring should be done at adequate locations(59 indicative) in the study area. The frequency of monitoring should be once per month for 12 months The various parameters include pH, Dissolved Oxygen (DO), Electrical conductivity (EC), Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Total Alkalinity, Total Hardness, Biochemical Oxygen Demand(BOD), Chemical Oxygen Demand(COD), Nitrates, Chlorides, Sulphates, Phospates, Sodium, Calcium, Magnesium, Potassium, Iron, Manganese, Zinc, Cadmium, Lead, Copper, Mercury, Total Chromium, Total Coliform.

Ecological aspects

Flora

As a part of the secondary data collection, the information as available with the Forest Department, published literatures etc. should be collected. Emphasis should be given to collect information on the following aspects:

- Characterization of forest types in the study area and extent of each forest type.
- Information on general vegetation pattern and floral diversity
- Presence of economically important species viz. non-wood forest producing species, including medicinal plants, timber, fuel wood etc. in the basin area.
- Presence of Rare, Endangered and Threatened floral species as per the categorizion of World Conservation Union or International Union for the Conservation of Nature and Natural Resources (IUCN) and Botanical Survey of India's Red Data list in the basin area.

- Presence of endemic floral species found in the basin area, if any should be assessed as a part of the basin study.
- Location of wild life sanctuaries, national parks, biosphere reserves if any, in the study area

A detailed comprehensive Survey for terrestrial ecology would be conducted for three seasons at 59 locations as per the details given in Table-7. The three seasons to be covered are listed as below:

- Pre-monsoon season
- Monsoon (Rainy) season
- Post-monsoon season

The following aspects should be covered as a part of field studies for terrestrial Ecological Survey: Identification of forest types, density, bio-diversity in the study area.

- Preparation of comprehensive checklist of flora (Angiosperms, Gymnosperms, Lichens, Pteridophytes, Byrophytes, Fungi, Algae etc.) with Botanical and local names.
- Importance Value Index (IVI) of dominant vegetation at various sampling locations.
- Frequency, abundance and density of each species of trees, shrubs and herbs at representative sampling sites should be estimated.
- Identification and listing of plants of genetically, biologically, economical and medicinal importance.
- Major forest produce, if any, and dependence of locals on the same in the forests observed in the study area.

Fauna

The information on following aspects is proposed to be collected from secondary sources as a part of the study:

- Inventory of Birds (resident, migratory), land animals including mammals, reptiles, amphibians, fishes, etc. reported and surveyed in the basin area should be prepared.
- Presence of Rare, Endangered and Threatened faunal species as per the categorization of IUCN Red Data list and as per different schedules of Indian Wildlife Protection Act, 1972 in the basin area.
- Presence of endemic faunal species found in the basin area, if any should be assessed as a part of the Basin Study.
- Existence of barriers and corridors for wild animals, if any in the basin area should be covered as a part of the study.

- Identification of threats to wildlife in the region.
- Presence of National Park, Sanctuary, Biosphere, Reserve Forest etc. in the basin area should be assessed.

Aquatic flora and fauna

The following data should be collected from various secondary sources for river Beas and its tributaries in the basin area:

- presence of major fish species
- inventory of migratory fish species
- migratory routes of various fish species
- presence of major breeding and spawning sites.

As a part of the study monitoring should be conducted at 59 locations to collect data on aquatic ecology & fisheries in the study area. The details of sampling locations to be covered as a part of the study are given in Table-7. The frequency of sampling should be once per month for 12 months. The details of monitoring work are given as below:

- Assessment of biotic resources with special reference to primary productivity, zooplanktons, benthos, macrophytes, macro-invertebrates and fishes in the study area.
- Population densities and diversities of phytoplanktons, zooplanktons, benthos, macrophytes, macro-invertebrates and fishes should be estimated.
- Diversity indices of various ecological groups should also be calculated separately.
- Fish composition
- Migratory route of migratory fishes
- Spawning & breeding grounds of fish species, if any should also be identified.

PREDICTION OF IMPACTS

As a part of the study, cumulative Impact Assessment should be done. The aspects to be covered are listed as below:

- Modification in hydrologic regime due to diversion of water for hydropower generation.
- Depth of water available in river stretches during lean season and its assessment of its adequacy vis-a-vis various fish species.
- Length of river stretches with normal flow due to commissioning of various hydroelectric projects due to diversion of flow for hydropower generation.
- Impacts on discharge in river stretches during monsoon and lean seasons due to diversion of flow for hydropower generation.

- Impacts on water users in terms of water availability and quality
- Impacts on aquatic ecology including riverine fisheries as a result of diversion of flow for hydropower generation.
- Assessment of maintaining minimum releases of water during lean season to sustain riverine ecology, maintain water quality and meet water requirement of downstream users.
- Impact due to loss of forests
- Impact on RET species & impacts on economically important plant species.
- Impacts due to increased human interference
- Impacts due to agricultural practices.
- Study the impact of cascade development and make recommendations on the requirement of free flowing stretch between two projects. Ecological inventory and geomorphology for different stretches of river to be delineated.
- Information on river stretch affected and forest area affected by each project needs to be modified to include additional details of catchment area; total forest area of the sub basin and the area getting affected and total river length, stretch affected and free flowing.
- Undertake environmental flow release assessment for the entire year i.e. covering lean, non-lean non- monsoon and monsoon periods, based on methodology such as BBM and make recommendations for each stretch.
- Hydro Dynamic Study for assessment of Environmental flow release should be linked with the fauna, habitat requirement for assessment of environmental flow releases for entire year.
- Modelling study carried out to assess the impact of peaking discharge should be concluded with recommendations for mitigation of such impacts.
- Sampling sites, forest cover and forest type should be listed and illustrated sub basin wise. Endemic species of fishes in the sub basin may be tabulated.
- Downstream impact study should be done upto the end of the Study Area.
- Impact of sand mining, boulder mining, etc need to be included in the study.
- Impact on overall balance of sediment due to construction of a number of projects needs to be included in the report.
- The main objective of the study is to bring out the impacts of dams being planned on the main river and its tributaries. At the end of the Report there should be a separate Chapter synthesizing the results of each component so that a holistic picture of impacts could be emerged which should lead to Recommendations.
- Impact assessment should also include "Impacts due to construction of approach roads for the HEPs".

- Source of secondary information used in the report/to be used in the report should be revealed and credit given accordingly.
- Detailed maps of each Sub-Basin have to be provided separately for each parameter such as forest cover, forest type, vegetation, location of sampling sites, etc. For each forest type it will be appropriate to give altitudinal range (for some it is given), its location in Beas Sub-Basin in separate maps.
- For betterment of analysis, it may be appropriate to categorize dams as Operational/ Under Construction/ EC, Scoping, Not Allotted yet, this will facilitate decision making on dropping of any dam, if it is required from environmental angle.

OUTCOMES OF THE STUDY

The study should be linked as Carrying Capacity & Cumulative Impact Assessment (CC&CEIA) for Beas sub basin should cover the following aspects:-

- Flow Regime
- Flood Plain including wetlands
- Aquatic ecology
- River Morphology
- Sediment Transportation/erosion and deposition
- Impact on human activities and livelihood

i) Considering the total length of the main river in the basin and the HEPs already existing and planned for future development, how many more HEPs may be allowed to come up. In other words, how much of the total length of the river that may be tunnelled inclusive of the tunnelling requirement of all the projects that have been planned for development so that the integrity of the river is not grossly undermined.

ii) What may be criteria for downstream impact study in terms of length of the river downstream to the tail water discharge point and what may be the parameters of such a study. Currently the norm is 10 km radius area, which is inadequate for major projects.

iii) What criteria the EAC may adopt in restricting the river reach for hydropower development. Alternatively, what should be the clear river length of uninterrupted flow between the reservoir tip at FRL of a downstream project and the tail water discharge point of the immediate upstream project.

iv) What will be the scientific procedure to decide on the minimum lean season flow that must be maintained in the downstream of a dam/barrage and based on such a procedure, what minimum lean season flow must be ensured by the hydropower developer in various reaches of a long river in relation to the aquatic lives and downstream water use.

v) For peaking stations, what extent of diurnal flow variation may be considered safe for the aquatic life. There are examples where the release is drastically reduced during the long time for reservoir filling and the huge discharge flows through the river during the few hours of peak power generation. This is detrimental to the aquatic environment of the downstream stretch of the river.

vi) For muck disposal, what may be minimum distance that must be maintained between the outer boundary of the muck disposal sites and the river bank. If such a site is not available at the indicated distance and long haulage of muck may be involved for safe muck disposal at sites further away, what may be the pros and cons of including the enhanced cost of muck disposal in the project budget. Thus, the study may highlight on the existing norms, cost of haulage per tonne-kilometer, the percentage of the haulage cost of the total project cost and the extent to which the power may be more expensive to generate.

vii) What are the design/feature modification required for existing/ operating plans to make them environmentally & ecologically sustainable.

viii) The status of compliance of Environmental Clearance conditions with respect to sanctioned projects.

The key outcomes of the study should be to**:**

- Provide sustainable and optimal ways of hydropower development of Beas river, keeping in view of the environmental setting of the basin.
- Assess requirement of environmental flow for the entire year i.e. covering lean, non-lean non- monsoon and monsoon periods with actual flow, depth and velocity at different levels.
- Management of impact and mitigation measures.

During the EAC meeting, During the presentation, issues raised by SANDRP, a Delhi based NGO were discussed. Based on the discussions, the following additional TORs were included:

- Inclusion of a real time plan which can be communicated effectively to local communities and outsiders about schedule of water releases, water levels reached, safety, etc. This will have to keep all upstream downstream projects.
- Cumulative Social Impacts including impacts on the local economy to be covered as a part of the study.
- Cumulative impact of mining of various materials required for the projects (sand, clay, boulders, coarse and fine granules, etc.)
- Cumulative impact on hydrological flows, at various points within project, at various points within a day, season, year, over the years and cumulatively across the basin and impacts thereof. This should include impacts on various hydrological elements including springs, tributaries, pools, rapids, riverbed

hydrology and geology, groundwater aquifers, etc. This should include accessing documents as available, to see what the situation before project was/ is and what would be after.

- Changes in sedimentation at various places within project, at various points of time within a day, season, year, over the years and cumulatively across the basin and impacts thereof.
- Cumulative impact on aquatic and terrestrial flora and fauna and basin biodiversity across the basin due to multiple projects.
- Cumulative impact of muck dumping into rivers (the normal practice of project developers) and also of muck dumping done properly, if at all.
- Impact of release of silt free water into the river downstream from the power houses during desilting of reservoirs and impact thereof on the safety of people and structures, biodiversity, livelihoods, compensation for damages, geo morphology, erosion, stability of structures etc, singly and cumulatively.
- Cumulative impact of all the project components (dam, tunnels, blasting, power house, muck dumping, mining, project roads, project township, deforestation, transmission lines, hydro peaking, reservoir operations, etc) for a project and then adding for various projects. Same should also be done for the periods during construction, during operation and decommissioning phases of the projects.
- Cumulative impact of deforestation due to various projects
- Cumulative impact of noncompliance of the environment norms, laws, Environment clearance and Forest clearance conditions and environment management plans.
- An assessment of the what the EIA predicted and what actually happened and draw lessons for more credible and comprehensive impact assessment for future.
- Assessment of what the EMP and Social Management Plan was supposed to achieve, how the environment clearance conditions were to be complied with and what actually happened and what lessons can be drawn for future.
- Plan for fish ladders and fish migration methods to be adopted and the impact of projects singly and cumulatively on native fish and fisheries.
- Assessment of the status of current compliance management system and suggest measures to improve the same.
- The HP government has decided that Tirthan, a tributary of Beas basin will remain no project area.The CIA should look into the need to keep more tributaries as no project zone.
- Similarly the CIA should decide about norms as to above what elevation no projects should be considered..
- The CIA should also recommend what should be the process followed whenever there is a disaster in the basin so that accountability is fixed and lessons learnt.

- The CIA should also look into what kind of regulatory measures are required for small hydro power projects, when today there are none and such projects have huge social and environmental impacts.

SANDRP had listed 12 projects which were not covered in the uploaded drawing. The project proponent confirmed that except 6 MW Bassi Augh HEP, other projects are listed in Tables 2 to 5 and are already included in the Study. It was confirmed by project proponent that Bassi Augh HEP would be included in the Study

Schedule

An Interim Report on the study would be submitted after 6 months for review. The MoEF or its Committee or Expert Appraisal Committee for River Valley and Hydro-power projects, after examining the same would suggest, mid- course corrections, if any. The final draft report would be submitted to MoEF within the stipulated period of the study. The study is proposed to be completed within a time-frame of 24 months

Agenda Item No. 2.4 Sach –Khas HEP (260+7 MW) project in Chamba District of Himachal Pradesh by M/s. L&T Himachal Hydropower Limited- For consideration of Environmental Clearance

The Sach Khas Hydroelectric Project is a run-of the river project with the diversion located between 76°25'30.143" E, 32°57'55.123" N to 76°25'3.8" E, 32°58'7.5" N across the river Chenab. The project envisages construction of a 77 m high concrete gravity dam(From River bed level), about 1100m upstream of the Cheni nala confluence with Chenab and creates a reservoir of live storage capacity of 8.69 MCM between FRL 2219 m and MDDL of 2209.3m. Three power intakes are located in the body of the dam to tap the design discharge from the river for power generation. The water will be conducted through the dam to an underground power house through 300 m long pressure shafts. The power house which is 250m d/s of the dam, comprises 3 generating units of 86.67 MW capacity each coupled with Francis turbines. The power house would be run as a peaking plant. Water from the powerhouse is led back into the river through tail race tunnels. Transformer hall and the pothead yard are proposed as surface structures, with proper arrangements to take care of winter operations.

The substantial part of project catchment is snow fed with elevation greater than 4500 m. The catchment area intercepted upto dam site is 6588 sq.km., of which 3973 sq.km is snow fed. Thus, about 60.31% of total catchment area is snow fed.

To cater to the release of environmental flows during the lean season, when the main power station would operate as a peaking plant, a secondary power intake is also proposed in the body of the dam on the left bank of the river. The water drawn is let into a pressure shaft embedded in the body of the dam and taken to a surface power house at the toe of the dam, which houses 2 unit of 3.5 MW (7 MW). Therefore, the energy is expected to be generated by this secondary station throughout the year, while the main plant would generate energy in the peaking mode. Waters from this power station are let back into the river at the toe of the dam through a tail race tunnel.

Project construction is envisaged to be completed in a span of 6 years' time period (excluding 2 years for infrastructure and pre-construction developmental activities) and is expected to generate energy to the tune of 973 GWh in a 90% dependable year and 1009 GWh in a 50% dependable year and the total cost (including IDC) of the project is Rs. 2845.75 crores.

The total land requirement for the project including for township and roads etc. is about 125.62 Hectare. Further, 118.22 ha is forest land & rest 7.40 ha is private land which shall be taken on lease basis. No cultivable or homestead land is required by the project. The details are given in Table-1.

Table-1: Land requirement for the project

S. No	**Project Component/ Activity**	**Area (ha)**
1	Submergence Area:	
	a) Forest Land	81.88
	b) Non-Forest Land (Private Land)	0.28
Total Area of Submergence		**82.16**
2	Muck Dumping Area	10.53
3	Quarry	3.03
4	Dam & Power House	9.54
5	Project Site Offices/Job Facilities:	5.25
6	Explosive Magazine	0.23
7	Sub-surface (Underground Works) Area	2.44
8.	Approach Roads to explosive magazine, Project facilities & Quarry	5.32
9.	Township & Office (Private land on lease basis)	7.12
TOTAL		**125.62**

Ministry of Environment & Forests (MoEF) had approved the Terms of Reference (ToR) for detailed EIA study vide letter no. J-12011/25/2010-IA-I dated on

22/02/2013. Subsequently, field survey and investigations were conducted at site. The Detailed Project Report (DPR) has been prepared & submitted to Central Electricity Authority for (CEA) examination & concurrence, the same is in an advanced stage of appraisal.

The draft EIA & EMP report was prepared and submitted to Himachal Pradesh State Pollution Control Board (HPSPCB) vide letter L&THHPL/HPPCB/PH/31052013 dated 31st May 2013 for the Public Hearing and the same was conducted under the Chairmanship of Resident Commissioner, Pangi dated on 10/10/2013, as per the provisions of EIA Notification, 2006.

The Sechu Tuan Wildlife Sanctuary is located within the Study Area. The minimum distance of Sechu Tuan Wildlife Sanctuary from the project area (Reservoir lip) is 5.5 km.

The forest land to be acquired is 118.22 ha. Thus, a total of (118.22*2) 236.44 ha of land shall be afforested. The afforestation work is to be done by the Forest Department. In addition, following measures are also proposed:

- Afforestation in degraded areas
- Establishment of Botanical Garden
- Habitat improvement for avi-fauna
- Establishment of botanical garden
- Publicity and Awareness
- Anti-poaching measures

The aggregation of large labour population and technical staff during construction phase is likely to put significant stress on various facets of environment. The project proponents shall make it mandatory for the contractor to make semi-permanent structures for their workers. The water for meeting domestic requirements may be collected from the rivers or streams flowing upstream of the labour camps. The water quality in general is good and can be used after chlorination. One community latrine can be provided per 20 persons. The sewage from the community latrines can be treated in septic tanks prior to disposal.

For solid waste collection, suitable number of masonry storage vats, each of 2 m^3 capacity shall be constructed at appropriate locations in various labour camps. These vats shall be emptied at regular intervals and shall be disposed at identified landfill sites. Suitable solid waste collection and disposal arrangement shall be provided. A suitable landfill site shall be identified and designed to contain municipal waste from various project township, labour colonies, etc.

Project proponents in association with the state government shall make necessary arrangements for distribution of kerosene oil and LPG. These fuel would be supplied at subsidized rates to the local/contract laborers for which provision has been kept in the cost estimate.

The approach roads will be constructed as a part of the proposed project. Steeply sloping banks are liable to landslides, which shall be controlled by provision of suitable drainage. Landslides is proposed to be stabilized by implementing various measures, namely, surface drainage, sub-surface drainage, toe protection and rock bolting.

About 13.15 lakh m^3 of muck shall be generated from various project appurtenances. Considering swelling factor of 45% total quantum of muck to be handled shall be 19.07 lakh m^3. About 5.85 lakh m^3 of muck shall be utilized in various construction activities. The balance (13.22 lakh m^3) of muck shall be disposed at four muck disposal sites with a total area of 10.53 ha. Suitable retaining walls with a provision of 1m of free board shall be constructed to develop terraces so as to support the muck on vertical slope and for optimum space utilization. The muck disposal sites should be reclaimed with vegetation.

Following measures have been recommended for landscaping of quarry sites: are listed as below:

- The top 6-12" of soil will be removed before starting the quarrying activity or any other surface disturbance.
- Top soil will be kept separate and stock piled so that it can be reused after quarrying is over for rehabilitation of sites.
- Garland drains around quarry site shall be constructed to capture the runoff and divert the same to the nearest natural drain.
- Depression and/or craters will be filled by the dumping materials consisting of boulders, rock, gravel and soil from nearby plant/working sites.
- Retaining walls will be constructed at the filled up depressions of quarry sites to provide necessary support particularly where there are moderately steep slopes.
- Concrete guards, shall be constructed to check the soil erosion of the area.
- After the quarrying activities are over, these sites will be splattered with the leftovers of rocks and boulders, which will support growth of mosses and lichens, which will act as ecological pioneers and initiate the process of succession and colonization.
- The depressions/craters filled up with rock aggregates will be covered with top soil.
- Revegetation of the dumping sites shall be done through 'Integrated Biological and Biotechnological Approach'

The beautification of project sites would be carried out by developing flowering beds for plantation ornamental plant and flower garden. The beautification in the colony area would be carried out by development of flowering beds for plantation of ornamental plant, creepers, flower garden and a small park, construction of benches for sitting, resting sheds, walk way and fountain.

It is also recommended to develop greenbelt around the perimeter of various project appurtenances, selected stretches along reservoir periphery, etc. This will be carried out in consultation with the State Forest Department.

A dispensary shall be developed at the project site. It is recommended that the dispensary should be developed during project construction phase itself, so that it can serve the labour population migrating in the area as well as the local population.

A first-aid post shall be provided at each of the major construction sites, so that workers are immediately attended to in case of an injury or accident. This first-aid post will have at least the following facilities:

- First aid box with essential medicines including ORS packets
- First aid appliances-splints and dressing materials
- Stretcher, wheel chair, etc.

The crushers shall be provided with cyclones to control the dust generated while primary crushing the stone aggregates. It shall be mandatory for the contractor involved in crushing activities to install cyclone in the crusher.

The effluent generated from crushers will have high suspended solids. It is proposed to provide settling tanks for treatment of effluent from various crushers.

It is proposed to implement reservoir and supplementary stocking programmes for the project. It is proposed to stock the reservoir and river Chenab upto TWL of upstream project and upto FRL of the downstream project. The fish species namely, rainbow trout, brown trout and snow trout can be stocked. The stocking can be done annually by the Fisheries Department, State Government of Himachal Pradesh. To achieve this objective, facilities to produce seeds of rainbow trout, brown trout and snow trout would be created at suitable sites. The site would be identified in consultation with Fisheries Department.

The summary of Environmental Flows to be released in various seasons is given in Table-2.

Table-2:Summary of Environmental Flows to be released in various seasons

Season	Avg. inflow (m^3/s)	% of Inflow	Avg. EF to be released (m^3/s)	Avg. Actual EF released (m^3/s)
Lean (Dec – Mar)	60.04	20%	12.01	12.01
Non-Monsoon Non-Lean (Oct, Nov – Apr, May)	112.99	20%	22.60	112.99
Monsoon (Jun-Sep)	478.22	30%	143.46	396.54

Silt Yield Index (SYI) method has been used to prioritize sub-watershed in a catchment area for treatment. The area under very high and high erosion categories shall be treated at the project proponent cost. In the catchment of the proposed Sach Khas HEP, there is no area under very high erosion category. Hence, CAT plan has been suggested for high erosion category, as a part of the present EIA study, the expenses of which have to be borne by project proponents. The area under high erosion category has to be treated by the project proponents, which accounts for about 35.41% of the total free draining catchment area.

Table-8: Area under different erosion categories

Category	Area (ha)	Area (Percentage)
Medium	27966	64.59
High	15334	35.41
Total	**43300**	**100**

A CAT Plan comprising of following aspects is proposed:

- Afforestation
- Soil & Water Conservation Works
- PES And Eco-Tourism
- Research Training and Capacity Building
- Infrastructure Development
- Forest Protection
- Wildlife Management
- Monitoring and Evaluation
- Site Specific Working plan

Chapter 2. A special provision of Local Area Development Fund (LADF) has been made under the State Hydro Power Policy to carry out local developmental activities so as to ensure visible additional benefits to the local communities in the

project area as part of the Project cost. Further allocation of this LADF contribution to schemes and purposes needs to be based on predetermined, objective parameters. A budget of 1.5% of the project cost has been earmarked for Local Area Development Fund (LADF).

The following measures have been suggested as a part of the Disaster Management Plan:

- Dam Safety and Maintenance Manual
- Emergency Action Plan (EAP)
- Administration and Procedural Aspects
- Preventive Action
- Communication System
- Notifications
- Evacuations Plans and Evacuation Team
- Public Awareness for Disaster Mitigation
- Management after receding of Flood Water

An Environmental Monitoring Programme for implementation during construction and operation phases of the project has also been suggested.

The advertisements for Public Hearing were issued in following newspaper on 09.09.13

- The Tribune
- Dainik Bhaskar

Himachal Pradesh State Pollution Control Board on 10th October, 2013 at 11 AM organized the 'Environmental Public Hearing' as per Govt, of India Notification No. - SO 1533 dated 14.09.2006 at Ajog Cricket Ground, P.O. Purthi, Tehsil- Pangi, District - Chamba, Himachal Pradesh for the proposed Sach Khas Hydro-electric Project (260+7 MW) of M/S L&T Himachal Hydro-Power Limited under the Chairmanship of Resident Commissioner/Pangi Shri Inder Singh Bhardwaj.

The Key issues raised during Public Hearing are listed in Table-3.

Table-3: Key issues raised during Public Hearing

Issue Raised	Remarks on the Issues Raised
1.5% of total cost of the project has been earmarked for the local development Authority, it is suggested that, if possible, 50% of the said amount may please be transferred to the State Govt. for the construction of Chehani Tunnel.	Resident Commissioner Pangi informed that this 1.5% LADF amount shall be deposited to Govt. of Himachal Pradesh and the funds will be allocated and utilized as per the procedure laid down in LADF notification. The proposal for the utilization of funds can be proposed during

Issue Raised	Remarks on the Issues Raised
	the meetings with LADF members, Project representative said that the construction of Chehani Tunnel is a priority project of the govt. and will play an important role in the development of the region.
About 8,000 trees will be cut off during the construction of project, is it true? H= How much will be the adverse impact on the environment and what are its solutions as a tree takes long time to grow	Counting of the trees by Forest Department is in progress. As of now, we have not received information on the number of trees to be cut for the project from Forest Department. Trees are equally important for us therefore we have planned to retain the green standing trees to the extent possible in submergence area even after marked for cutting.
Employment to local villagers as drivers/ technical persons has been provided and no increment has been given to them since last four years, whether their basic need can be fulfilled with this salary amount? As it is a large organization and if the healthy amount will be paid to these employees their working efficiency will also improve.	H.P. Govt. has enforced the policy of 70% employment to Himachal is not only in Hydro Electric projects but in all kind of industries. The wages to employed person are being given by the company w.e.f. 1st September 2012 as per the minimum wages act notified by the Govt. of Himachal Pradesh for the tribal area.
Training to our boys be provided, then only they get experience otherwise from where they will get experience?	Project Developer is committed to provide training to their engineers & in this regard we send them to their other under construction project sites for three months during winter when there is no work at site.
The funds under LADF are deposited with D.C. Chamba, but if the same will be made available to any concerned department or R.C. Pangi, the people will be benefited directly with ease	R.C. Pangi told that it is a valid point, but when the notification regarding LADF was issued, the Institution of R.C. may not be in their knowledge, but now it is in our knowledge and we will pursue the same with the Govt. Major portion of benefits will be given to three affected Panchayats, some part of it to Pangi Block and some portion to the District. Issue regarding depositing of funds with R.C can be taken up with the Govt.
Regarding the 70% employment to the	The Project representative replied that the

Issue Raised	Remarks on the Issues Raised
Himachali people, we had already given our suggestion in written form to the company, but the company has left everything on LADF and Government. Nothing has been expressed on company behalf	opportunity of employment to the affected panchayat will be given on priority basis. All the employment will be done as per the GoHP employment policy
Cremation ground is coming under submergence in the project, what the provision is proposed by the company for it.	Cremation ground will be constructed, if it gets submerged,
Today most of the people are attached with agriculture and they grow various varieties of crops without any chemical spray on them, if company construct the project, there will be pollution and the crops will get destroyed and the farmers will make a loss, what is the company's action plan in this regard?	The water will be sprinkled on the unpaved roads and Cyclone collector equipped stone crusher will be established to control the fugitive dust emission. If still losses would occur, the assessment will be made by the Agriculture Department/ Horticulture Department and compensation would be given accordingly.

After critically examination of the project proposals, EAC recommended the proposal for Environmental Clearance subject to NBWL Clearance , since, Sechu Tuan Wildlife Sanctuary is located within the Study Area.

EAC observed that promises made during public hearing shall have to be fulfilled by the project proponent.

After critically examination of the project proposals, EAC recommended the proposal for Environmental Clearance with the foregoing conditions.

Agenda Item No. 2.5 Etalin HEP (3097 MW) in Dibang District of Arunachal Pradesh- For amendment in ToR

A detailed presentation was made by the Consultant, viz., RS Envirolink Technologies Pvt. Ltd, Gurgaon before EAC. It was informed that as per Minutes of 64th EAC meeting held during Feb' 2013, EAC while recommending the fresh scoping clearance for 3097 MW capacity for Etalin HEP; had desired the following with respect to minimum environmental flow:

- The CIFRI should conduct the study during monsoon period so as to establish ecological releases during monsoon season also.
- The site-specific study on minimum environmental flow requirement will be conducted by the project proponent. The study should include assessment of

minimum environmental flow requirement for three seasons i.e. lean, non-lean & non-monsoon and monsoon seasons.

However, it was informed by the project proponent that the following stipulations in scoping clearance letter dated 26.04.2013 are not in line with the recommendations of EAC and project proponent requested to delete the same from ToR dated 26.04.2013:

- The cumulative release to the downstream of both Dri and Tangon dam's supplemented release of dam toe powerhouse should be of the order of 25% and should attain 30% within 2 Km from dams (**Bullet No. 4 of Para 4 of TOR letter)**.

Project proponent explained that the following umbrella condition is already there as part of the overall ToR:

- The minimum environmental flow shall be 20% of the flow of four consecutive lean months of 90% dependable year, 30% of the average monsoon flow. The flow for remaining months shall be between 20-30% depending on the site specific requirement. A site specific study shall be carried out by an expert organization **(Bullet No. 9 of Para 6 (B) of Annexure-I of TOR**).

During the meeting, project proponent informed that the Draft EIA/EMP (including SIA and R&R) report is ready. EAC, however, enquired regarding the status of the CIFRI report on the assessment of e-flow. Project proponent informed that CIFRI has completed field sampling and survey for all the seasons and the report is under finalization. It was informed by the project proponent that on receipt of the final report from the CIFRI they will submit Draft EIA /EMP report including the CIFRI report to Arunachal Pradesh State Pollution Control Board (APSPCB) for conducting Public Hearing.

After deliberations, the project proponent was advised to submit the CIFRI report to MOEF to enable EAC to take a view regarding their request for deletion of above stipulations from TOR w.r.t. minimum environmental flow to be maintained. Because, EAC has already called for such a study during its last meeting.

Agenda Item No. 2.6 Kamala HEP (1800 MW) in Lower Subansiri District of Arunachal Pradesh- For amendment of ToR

The Kamala Hydroelectric Project (formerly Subansiri Middle Hydroelectric Project) is proposed for development on Kamla river, a major tributary of river Subansiri. The project is located in Lower Subansiri District of Arunachal Pradesh, just upstream of Tamen village which is about 55 km from Ziro, the District Headquarters.

The proposed scheme envisages a 216 m high concrete gravity dam located about 4 km upstream of Tamen. The crest of the dam is proposed at El. 475 m, which is arrived at by considering a flood cushion of 15 m above the FRL (El 455 m, as approved by MoEF at the time of TOR Clearance) and an appropriate free board. The dam comprises 37 concrete gravity blocks (non-overflow and overflow) and measures 628 m along the crest.

The Minimum Drawdown level (MDDL) of the reservoir is fixed at El 430 m, thus providing live storage of 623.58 MCM for peaking requirement. The total area of submergence at FRL is 2775 ha. The dam would create a reservoir that would extend over a length of around 65 km at FRL (El. 455 m) and 67 km at MWL (El. 470 m) along river Kamala. The gross storages at MWL and FRL are 2365.70 MCM and 1927.62 MCM, respectively.

Four intakes are envisaged, one at the start of each HRT. The intake structure is located on the left bank of Kamla river, just upstream of the dam axis. Four 10m diameter circular headrace tunnels offtake from the intakes and bifurcate into two pressure shafts, each. Tunnel lengths vary from 515m to 815m. Each 5.7m diameter pressure shaft is steel lined and 270m long. 17 The underground powerhouse is proposed to accommodate eight (8) Francis turbine-driven generating units of 216 MW each. The dimensions of the proposed powerhouse are 302m (L) x 23m (W) x 56.5m (H). The rated net head for the units is 154.17m.

The proposal for fresh TOR for the project was appraised in 72nd Meeting of the Expert Appraisal Committee for River Valley and Hydroelectric Projects held in February, 2014. The project was accorded TOR clearance by MoEF vide letter no. &-12011/4/2014-IA-I; dated 05/06/2014.

As per Para 6(B) (under sub head Water Environment & Hydrology-bullet point no.13) of Annexure-1 of the TOR, it was indicated that, "Release of Water from dam-toe powerhouse will not be considered will not be considered as release towards environmental flow as this release will not flow through the diverted stretch between the dam and TRT of dam-toe powerhouse. The aspect may therefore be reviewed and reworked –out by the proponent."

The project proponent submitted a response regarding this clause. The same was discussed during the 76th EAC meeting. The project proponent submitted that the dam-toe power house is planned to be constructed adjacent to the dam body and the release of water from the said power house into the main river shall be just downstream of the main dam. As such, there would not be any dry stretch of the river immediately on the downstream of the dam. A drawing depicting the proposed project layout was also presented during the EAC meeting.

The EAC agreed to the clarification and recommended the exclusion of the above clause for the approved TOR for conducting the CEIA study for the project.

Agenda Item No. 2.7 Shiggaon Lift Irrigation Scheme at Savanur Taluk, Haveri District, Karnataka by M/s. Karnataka Neeravari Nigam Ltd.- For reconsideration of Environment Clearance.

The project proponent made a detailed presentation on the project. The project envisages construction of a diversion weir across Varada river near Halasur village of Savanur Taluka for diversion of 1.5 TMC of water and providing Sprinkler Irrigation facility to 9900 ha of command area in Shiggaon, Savanur and Hangal Taluks of Haveri District benefiting 30 drought affected villages. The project also envisages providing drinking water facility by filling-up of existing 5 minor irrigation (MI) tanks within the command area and construction of 6 bandaras. Filling of existing MI tanks in the command area helps in stabilization and recharge of the groundwater in the region. Total land requirement is about 45 ha. Total cost of the project is about Rs. 238 Crores and proposed to be completed in 36 months.

The area is characterized by low average annual rainfall of 532 mm with wide variation of rainfall both in space and time. The people of the region have no other employment opportunities except agriculture. Hence providing irrigation and thereby increasing agricultural production will provide the much needed relief to the people.

This project was considered by EAC in its meeting held on 1-2nd June, 2012 and committee sought additional information. The project proponent submitted the information & compliance report and also presented the proposal before the EAC in its meeting held on 23-24th September, 2013. The committee noted that overall the proposed project doesn't envisage serious impact on the physical, biological and social environment. No forest land is involved. However, during the discussions, the committee observed that SANDRP has brought to the notice of the EAC that the construction has already been started on the project. Therefore, the committee noted that a violation has occurred in the project and committee mentioned that the extant procedure may be followed in the Ministry to deal with/examine such cases at the first instance. EAC may consider such proposal on the event of such decision to be taken by the MoEF at appropriate level.

The EAC was further informed that such cases are to be dealt in terms with the MoEF OM No. J-11013/41/2006-IA.II (I) dated 12.12.2012 & 27.6.2013. Accordingly,

the MoEF had written letters on 31.12.2013 to the Project Proponent, Government of Karnataka, Department of Environment and Regional Office, MoEF, Bangalore.

As per EAC recommendation, the project proponent was also to submit response to the representation of SANDRP regarding violation, in addition to action by MoEF on violation. The Karnataka Neeravari Nigam Ltd has clarified that violation has occurred in the project which was raised by SANDRP.

Based on MoEF directions, Department of Ecology and Environment, Government of Karnataka issued a show-cause notice to KNNL vide letter dated 25.2.2014 seeking reply, for which reply was submitted by KNNL vide letter dated 19.3.2014. The Committee noted that the process has already been started against the violation occurred in the project and the MoEF's letter to Regional Office, Bangalore to take legal measures. The KNNL replied that there will not be recurrence of violation of the EIA Notification, 2006 and its subsequent amendments thereon in KNNL projects & in conserving the environment and the fact that the company has not carried-out any activity having adverse impact on the environment in the project area.

The compliance report on the Show-cause notice from Karnataka Neeravari Nigam Ltd, Department of Environment, Government of Karnataka and Regional Office, MoEF Bangalore have been received. This was displayed on the Ministry's portal and the same have been placed before the EAC in its meeting 11.8.2014. The EAC was also informed as per the latest MoEF's direction, the IA_I division also issued vide letter dated 30.4.2014 to Regional Office, MoEF, Bangalore on legal measures. The Committee noted that as per MoEF directions, Director (S), Regional Office, MoEF, Bangalore inspected the project site on 4.1.2014 and submitted the detailed report on 18.2.2014 along with different stages of project construction to MoEF, New Delhi. Further, KNNL also submitted the necessary undertaking to MoEF, New Delhi.

The Committee noted that this is a unique project of diverting 1.5 TMC of water by constructing a diversion weir across Varada river and provide 100% sprinkler irrigation with piped conveyance system facility to around 9900 ha of command area in Shiggaon, Savanur and Hangal Taluka of Haveri District. The project aims to benefitting 30 drought affected villages. Initially, it was thought that EC is required as Category-B under EIA Notification, 2006 & application was prepared. Subsequently, upon understanding that the project attracts General Conditions of EIA notification, 2006, in view of the fact Bankapura Peacock Conservation Reserve located within 10 Km from the project site, the proposal has been submitted to Central level. After detailed discussion on the project, the following emerged:

i. The project requires only 45 ha of dry land for the construction of pump house, office, etc and there is no submergence and hence no rehabilitation and resettlement is anticipated. The proposed project helps in substantial socio-economic development and upliftment of the people in the region by providing irrigation facility to the farmers using water saving technique by Sprinkler System.

ii. No forest land is required for the project. The project does not involve R&R issues and only 45 ha of land was acquired by KNNL duly following the land acquisition act 1894 and payment of land compensation to the land losers.

iii. The project proponent has mentioned that considering the importance of the project in drought mitigation and the earnestness of KNNL in conserving the environment and the fact that the company has not carried-out any activity having adverse impact on the environment in the project area

iv. Bankapura Peacock Conservation Reserve is located in the command area of the project. Since, the project envisages sprinkler irrigation system by conveying water to the agricultural lands through HDPE pipes, there is no impact on the "**Bankapura Peacock Conservation reserve**". The project irrigates the adjacent lands of the Reserve which will support the peacocks as well. There are no impacts on the aquatic life/ecology from the scheme as it supports the fishing activities due to the diversion weir construction which provides habitats for the fishes to breed.

v. The total cost of implementation of mitigation measures as per Environmental Management Plan (EMP) is Rs 68.82 Lakhs during the construction phase, Rs 21.82 Lakhs during the first three years of operation phase and Rs 50,000 per annum for the fourth year onwards for maintenance of green belt.

The Committee after due consideration of the relevant documents submitted by the project proponent and clarification furnished in response to its observations have appreciated the efforts made by the project proponent by providing 100% sprinkler irrigation in 9900 ha and underground pipe system to avoid disturbance to Bankapura Peacock Conservation Centre and also mentioned that overall the proposed project doesn't envisage serious impact on the physical, biological and social environment.

The Committee recommended for grant of Environmental Clearance for the project subject to strict compliance to the following additional conditions:

i. The project involves acquisition of 45 Ha of land. land acquisition for the same must be compensated as per the latest government norms which are in force.

ii. Water user association/ Co-operative and involvement of the whole community for disciplined use of available waters should be formed.

iii. The Command Area Development Plan (CADA) as proposed in the EMP report shall be strictly implemented.

iv. There shall be no project activity inside and around the Bankapura Peacock reserve and the project should not lead to adverse impact on the biodiversity of the peacock reserve.
v. Water quality monitoring in the 5 Km stretch in the upstream and downstream of Varada River during construction phase for drinking water quality standards at suitable locations.
vi. Bankapura Peacock reserve is in the command area of the project. It may be checked if any clearance is required from NBWL.
vii. No project work shall be undertaken till the environmental clearance (EC) is granted. Any further violation may lead to termination of environmental clearance.

Agenda Item No. 2.8 Gimliang HEP (74 MW) in Anjaw District of Arunachal Pradesh- For amendment of ToR

Gimliang Hydroelectric Project is located in Anjaw District of Arunachal Pradesh. It envisages utilization of flow of Dav River, a tributary of Lohit River, for generation of electrical power in a run-off-the-river scheme. M/s SKIL has been allotted the project for development on Build-Own-Operate-Transfer (BOOT) basis.

It was informed during the meeting that Memorandum of Agreement was executed between Government of Arunachal Pradesh and M/s SKIL on Feb 26, 2009 to develop Gimliang Hydro Electric Project over Dav River in Anjaw District of Arunachal Pradesh. Scoping clearance was applied earlier for 74 MW installed capacity during May 2013 and matter was discussed in 67th meeting of EAC, where scoping clearance was recommended and MoEF issued a Scoping Clearance letter vide MoEF letter No. J-12011/37/2011-IA-I dated August 16, 2013. It was informed that Hydrology studies and subsequently power potential studies have been approved by CWC and CEA. Based on approved hydrology and power potential, project capacity has been revised to 88.5 MW.

The diversion site is located about 1 km downstream of Goiliang Village and the barrage axis is located at Latitude 28º 08' 25.05" N, Longitude 96º 38' 03.29" E and the deepest river bed level is 934 m and FRL is fixed at 942 m. Surface powerhouse is located at Latitude 28º 05' 1" N, Longitude 96º 33' 42.32" E.

Dav river drains a catchment area of about 371.4 sq.km at the proposed barrage site. The submergence area at FRL is estimated as 1.0445 ha having a gross storage of 0.035 MCM.

The Gimliang HE Project envisages construction of:

- A concrete Barrage 75.5 m long & 20.1 high above river bed level, with 5 nos. of bays with crest level at EL. 934.00 m.
- A Power Intake on the right bank aligned 90^0 to the river flow with invert level at EL. 936.00 m.
- A 3.8 m dia finished D-shaped head race tunnel about 9.537 km long.
- A 8 m dia, 112.3 m high restricted orifice type underground surge shaft with a dome at the top;
- A 2.8 m dia, 1.123 km long steel lined pressure shaft with three 2.0 m dia steel penstocks each of length 41 m will be taking from it for feeding the turbines;
- 68.70 m (l) x 16.5 m (w) x 38 m (h) Surface powerhouse with 3 vertical Francis type units of 29.5 MW each;
- 41.5 m (l) x 65 m (w) Switchyard for housing Generator transformers & equipments

The entire power (88.5 MW) of Gimliang Project is proposed to be evacuated through one 220 kV double circuit line to proposed pooling station at Tezu with line length of approximately 55 km. The project would yield design energy of 338.2 MU in 90% dependable year flows and 481.1 MU in 50% dependable year flows.

Total land requirement for various project activities is about 79.97 ha which all is forest.

It was informed that this is the only planned project on Dav River which originates at 3330 m and flows for 34 Km upto diversion site (elevation: 939 m). River length between barrage and powerhouse site is 10.3 Km (TWL: 575m). Submergence of Upper Demwe spread for 350 m along Dav river. There is a 1.25 km of free flowing stretch between the TWL of Gimliang HEP and the FRL of Upper Demwe.

Project proponents justified increase in capacity on account of the increase in the head available for the project development. There is a change in power house location of the Gimliang HEP; it is now located about 1.5Km downstream of the earlier proposed location. This has been done with a view to utilize the remaining unutilized head of about 50 m in the allotted reach of Dav river. Earlier the powerhouse was an underground structure; now it has been changed to over ground structure due to availability of suitable over ground location. The Tail Race Tunnel has been replaced to Tail Race Channel about 175m long as compared to the 430m long tunnel. The Normal Tail Water Level has been revised to 576m from earlier proposed 625m; thereby, increasing the head by about 50m for power generation. Due to 50m increase in head for power generation the power potential has been revised and approved by the CEA. The Installed capacity of Gimliang HEP is now revised to 88.5

MW as compared to the 74MW, proposed earlier. The length of Head Race tunnel has been increased by about 2400m due to the shifting of power house by about 1.5 Km.

EAC observed from the Comparative statement of salient features that data collection should be proper and adequate to prepare PFR and submit Form-1. For example, although capacity has been increased substantially and dam axis shifted, the submergence of forest are has been kept same. Other similar discrepancies were noticed. The project proponent therefore, asked to submit a revised proposal.

Agenda Item No. 2.9 Raigam HEP (126 MW) in Anjaw District of Arunachal Pradesh- For amendment of ToR

Mr. H K Singh, Associate VP, represented the company along with consultant M/s RS Envirolink Technologies Pvt. Ltd. EAC observed that MoEF directs a director level person to represent the company before EAC. Mr Singh responded that he holds power of attorney to represent the company. EAC allowed to continue the presentation, however, mentioned that in future at least a director level person should be present.

Raigam Hydroelectric Project is located in Anjaw District of Arunachal Pradesh. It envisages utilization of flow of Dalai River, a tributary of Lohit River, for generation of power in a run-off-the-river scheme. M/s SKIL has been allotted the project for development on Build-Own-Operate-Transfer (BOOT) basis.

It was informed during the meeting that Memorandum of Agreement was executed between Government of Arunachal Pradesh and M/s SKIL on Feb 26, 2009 to develop Raigam Hydro Electric Project over Dalai River in Anjaw District of Arunachal Pradesh. Scoping clearance was applied earlier for 126 MW installed capacity during May 2013 and matter was discussed in 67th meeting of EAC, where scoping clearance was recommended. Thereafter, MoEF has written a letter number J-12011/36/2011-IA-I dated 03.07.2013 seeking clarification on installed capacity and project allotment. In the absence of response from State Government, Scoping Clearance letter was not issued. Committee observed that in the absence of response of previous query, project should not be considered in EAC.

Developer submitted that matter was not pursued with the state government as project was being reviewed for change of capacity and requested EAC to consider the project for scoping clearance for enhanced capacity of 195 MW. It was also informed that Hydrology studies and subsequently power potential studies have been approved by CWC and CEA. Based on approved hydrology and power potential, project capacity has been revised to 195 MW.

Developer presented the project location and other features and explained that increase in capacity is due to additional head of about 60 m gained due to shifting of barrage location about 1.2 Km upstream resulting in increase in FRL and powerhouse has been shifted to new location on surface resulting in decrease in tail water level.

The diversion site is located about 2 km upstream of Tee Pani Village and the barrage axis is located at Latitude 28º 10' 42.56" N, Longitude 96º 31' 19.56" E and the deepest river bed level is 710 m and FRL is fixed at 725 m. Surface powerhouse is located at Latitude 28º.5' 46.30" N, Longitude 96º 32' 11.93" E.

Dalai river has a catchment area of about 1703 sq.km at the proposed barrage site. The submergence area at FRL is estimated as 9.6526 ha having a gross storage of 0.531 MCM.

The Raigam HE Project envisages construction of:

- A Barrage 149 m long & 22 m high above deepest foundation level, with 11 nos. of bays with crest level at EL. 710.00 m.
- A Power Intake on the left bank aligned 90^0 to the river flow with invert level at EL.712 m
- 7 m dia finished modified horse shoe-shaped head race tunnel 10.375 km long
- A 22m dia, 77.82 m high restricted orifice type Underground Surge shaft with a dome at the top
- A 5.4m dia, 195 m long steel lined pressure shaft with three 3.20 m dia steel penstocks of length 32.9m/26.92m/45.9m will be taking from it for feeding the turbines;
- 89.6m (l) x 18 m (w) x 40 (h) Surface Powerhouse with three vertical Francis type units of 65 MW each;
- 56.6m (l) x 30 m (w) Switchyard for housing Generator transformers & equipment
- Approx 75 m long tail race channel connected to the river

Total land requirement for various project activities is about 77.62 ha which all is forest. The entire power (195 MW) of Raigam Project is proposed to be evacuated through one 220 kV double circuit line to proposed pooling station at Tezu with line length of approximately 50 km. The project would yield design energy of 761.6 MU in 90% dependable year flows and 1148.6MU in 50% dependable year flows.

It was informed that this is the only planned project on Dalai River which originates at 3866 m and flows for 70 km upto diversion site. River length between barrage and TWL is 13.09 km (TWL: 536.5m). Submergence of Upper Demwe spread for 900m along Dalai river. Free flowing river stretch between the TWL of Raigam HEP (536.5 m) and the FRL of Upper Demwe (EL.525.0m) is about 700 m.

Project proponents justified increase in capacity on account of the increase in the head available for the project development. The Full Reservoir Level has been increased from El.700.0 m to El.725.0 m and the Normal TWL brought down to 538.0 m from 572.0 m; thereby increasing the head by almost 60 m. Accordingly the Power potential for additional head has been revised and the same has been approved by CEA which, thereby, increased the Installed capacity of the project from 126 MW to 195 MW. The Location of barrage axis is the major change in the layout of Head works which has been shifted to about 1.2 Km upstream to the location as proposed earlier. The length of Tunnel is increased to about 2.5 Km due to the upstream shift in barrage axis. The power house has been changed from underground to over ground as there is a spacious terrace near the river bank is available. The Tail Race Tunnel has been replaced to open to atmosphere Tail Race Channel about 75 m long as compared to the 205 m long tunnel. The Normal Tail Water Level has been revised to 538 m as that of 572 m proposed earlier; thereby, increasing the head for power generation. Comparative salient features were projected during the meeting for earlier 126 MW and now revised 195 MW capacity.

Committee made the following observations:

- Submergence area has been shown as 9.65 ha in both earlier and present proposals, whereas due to shift in barrage axis new submergence area needs to be worked out
- Catchment area has been shown as same i.e. 1703 sq km, however there should be a small decrease in catchment area due to shifting of barrage axis about 1.2 Km upstream and this has not been worked out.
- Length of barrage at top has been shown as same in both the proposals ie 149 m; which again is not practical and show that revised workings have not been done
- Land requirement also has not changed; whereas it should have increased due to increase in reach of the project.

In view of above, Committee observed that the capacity of the project has been revised from 126 MW to 195 MW, though power potential and hydrology is approved, still the project planning has not been done. Developer needs to complete the project planning, firm up the salient features and land requirement before the proposal can be considered for scoping clearance. Also earlier queries on the project needs to be answered by the project proponent should be closed before consideration of fresh proposal.

Appendix

List of EAC members and Project Proponents who attended 76th Meeting of Expert Appraisal Committee for River Valley & Hydro Electric Power Projects held on 11th August, 2014 in New Delhi

A. Members of EAC

1.	Shri Alok Perthi	-	Chairman
2.	Dr. Vijay Kumar	-	Member
3.	Dr. P. K. Choudhuri	-	Member
4.	Shri N. N. Rai	-	Member
5.	Shri B. B. Barman	-	Member Secretary & Director, MoEF
6.	Dr. P. V. Subba Rao	-	MoEF

B. Krishna Marathwada Lift Irrigation Project at Osmanabad, Maharashtra by M/s. KMIDC, Government of Maharashtra -For reconsideration of Environmental Clearance (EC).

1.	Shri K. M. Shah	-	Chief Engineer
2.	Shri A. R. Kamble	-	Superintending Engineer
3.	Shri A. D. Kokate	-	Superintending Engineer
4.	Shri L. G. Patil	-	Executive Engineer
5.	Shri V. B. Kotecha	-	Executive engineer
6.	Shri Adhikrao Yewale	-	Project Coordinator
7.	Shri R. S. Patil	-	Project Associate
8.	Shri G. D. Birajdar	-	Deputy Engineer

C. Rupin HEP (45 MW) in Shimla District of Himachal Pradesh - For Extension of the Validity of TOR

1.	Shri Swaraj B. Lalit	-	CEO
2.	Shri Ravinder Bhatia	-	Director

D. Cumulative Environment Impact Assessment (CEIA) for Beas Basin Study- For ToR

1.	Shri Subhash Gupta	-	Chief Coordinator
2.	Shri S. P. Gupta	-	Chief Engineer
3.	Shri D. S. Gupta	-	AGM

E. Sach –Khas HEP (260+7 MW) project in Chamba District of Himachal Pradesh by M/s. L&T Himachal Hydropower Limited- For consideration of Environmental Clearance

1.	Shri B. Bhattacharjee	-	Head- Technical
2.	Shri D. A. Feranades	-	Assistant G. M.
3.	Shri Ratnakar Pandey	-	Manager (Env.)
4.	Shri P. Kathiravan	-	Deputy General Manager
5.	Shri D. N. Kauta	-	Senior DGM

6.	Dr. Aman Sharma	-	General Manager
7.	Shri S. M. Dixit	-	Sr. Engineer (Env)

F. Etalin HEP (3097 MW) in Dibang District of Arunachal Pradesh- For amendment in ToR.

1.	Shri M. M. Madan	-	President (Hydro)
2.	Shri Anil Dhar	-	AVP
3.	Shri Vimal Garg	-	Director
4.	Shri Ravinder Bhatia	-	Director
5.	Shri Gajendra Sharma	-	

F. Kamala HEP (1800 MW) in Lower Subansiri District of Arunachal Pradesh- For amendment of ToR

1.	Shri M. M. Madan	-	President (Hydro)
2.	Shri Anil Dhar	-	AVP
3.	Shri Gajendra Sharma	-	Deputy Manager
4.	Dr. Aman Sharma	-	General Manager

G. Shiggaon Lift Irrigation Scheme at Savanur Taluk, Haveri District, Karnataka by M/s. Karnataka Neeravari Nigam Ltd.- For reconsideration of Environment Clearance.

1.	Shri Ashok Vasanad	-	Chief Engineer
2.	Shri Sharanadia Sulgante	-	Superintending Engineer
3.	Shri S. P. Beedanal	-	Executive Engineer
4.	Shri S. S. Palegar	-	Asst. Executive Engineer
5.	Shri M. S. Bhojastree	-	Assistant Engineer
6.	Shri Shivanand M. Damhal	-	EIA Co-ordinator
7.	Shri Santosh Kumar		

H. Gimliang HEP (74 MW) in Anjaw District of Arunachal Pradesh- For amendment of ToR

1.	Dr. Harish Kumar Singh	-	Asst. Vice Chairman
2.	Shri Charumitra Singh Yadav	-	Dy. Manager
3.	Shri Ravinder Bhatia	-	Director
4.	Shri Vimal Garg	-	Director

I. Raigam HEP (126 MW) in Anjaw District of Arunachal Pradesh- For amendment of ToR

1.	Dr. Harish Kumar Singh	-	Asst. Vice Chairman
2.	Shri Charumitra Singh Yadav	-	Dy. Manager
3.	Shri Ravinder Bhatia	-	Director
4.	Shri Vimal Garg	-	Director

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