Minutes of the 77th Meeting of the Expert Appraisal Committee for River Valley and Hydroelectric Projects constituted under the provisions of EIA Notification 2006, held on 16th – 17th September, 2014 at Brahmaputra Meeting Hall, 1st Floor, Vayu Wing, , Indira Paryavaran Bhawan, Jor Bagh, Aliganj, New Delhi110003

The 77th Meeting of the Expert Appraisal Committee (EAC) for River Valley and Hydropower Projects was held during 16th – 17th September, 2014 at Brahmaputra Meeting Hall, 1st Floor, Vayu Wing, Indira Paryavaran Bhawan, Jor Bagh, Aliganj, New Delhi110003. The meeting was chaired by Shri Alok Perti, Chairman. Shri H. S. Kingra, Vice-Chairman could 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 (16.09.2014)

1. **Agenda Item No.1 :** Welcome by Chairman and Confirmation of Minutes of the 76th EAC Meeting held on 11th August, 2014. The Minutes of 76th EAC meeting was confirmed. Thereafter, following agenda items weer taken up:

Agenda Item No. 2.1 Dibang Multipurpose Project (3000 MW) in Arunachal Pradesh by NHPC –For reconsideration of Environment Clearance.

The Dibang Multipurpose Project is proposed on River Dibang in Arunachal Pradesh. The project has been conceived with dual objectives i.e. flood moderation and power generation. The project involves two Districts of Arunachal Pradesh viz. Lower Dibang Valley and Dibang Valley Districts. All the project components are located in Lower Dibang Valley District while reservoir will fall in both the Districts. Underground Power house has been proposed on right bank, 250 m downstream of the dam axis.

Concurrence of CEA was obtained on 23.1.2008. PIB Clearance was obtained on 28.1.2008. During earlier presentation NHPC explained the following:

1) Project was accorded Site Clearance Stage-I & Stage II in January 2004 and December 2004, respectively as per EIA Notification, 1994. Accordingly,

the EIA study was undertaken and EIA & EMP reports prepared. Further, NHPC submitted the application along with EIA & EMP reports to Arunachal Pradesh State Pollution Control Board (APSPCB) for initiating Public Hearing in February 2007. Public hearing for Lower Dibang Valley District only was held on 29.01.2008, after its postponement for several times, and the same for another district i.e. Dibang Valley District, could not be conducted due adverse law and order conditions.

2) Environmental clearance proposal was submitted by NHPC along with EIA & EMP reports and public hearing report of One District (i.e. Lower Dibang Valley District) to MoEF on 26.12.2008 for accord of environmental clearance. Subsequently, MoEF vide letter dated 30.1.2009, intimated that extension of time for submission of project proposal under EIA Notification, 1994 has expired on 13.09.2008. Hence, the proposal for Environmental Clearance need ED to be submitted as per the provision of revised EIA Notification, 2006. Accordingly, NHPC submitted proposal to MoEF on 27.5.2009 for approval of TOR as per EIA Notification 2006. MoEF accorded clearance for pre-construction activities and approved the TOR for EIA study on 17.8.2009. The EIA & EMP reports, prepared earlier, were revised by NHPC as per the approved TOR and submitted to Arunachal Pradesh State Pollution Control Board (APSPCB) for initiating the fresh public hearing process in both the districts (i.e. Lower Dibang Valley and Dibang Valley) on 26.8.2010 and also submitted the above documents to MoEF on 3.9.2010 for initiating the process of public consultation. APSPCB tried to conduct the public hearings in October 2011, but the same was again postponed due to adverse law and order condition.

3) NHPC, then pursued the matter with State Government, MoP and MoEF for conducting the public hearings through APSPCB. Finally, APSPCB successfully conducted the public hearings for Lower Dibang Valley on 11.3.2013 at Roing and for Dibang Valley District on 13.3.2013 at New Anaya. In both meetings, large number of people participated. EIA & EMP reports incorporating the concerns raised by PAFs and local people during public hearings and public consultations, along with proceedings of public hearings were submitted to MoEF on 27.5.2013 for consideration and accord of environmental clearance.

4) The project was earlier considered in the 68th EAC meeting held in 23rd September 2013 and EAC has raised certain queries / clarifications related to flora & fauna, fish species, protection of cultural identity of tribal community, reassessment of environmental flow, revision of cost of various EMPs including

R&R plan which has provision of rights and privileges for loss of customary rights over forest land, etc. To address the issues, an additional study including field survey was undertaken. Reply to the observations of EAC along with Environmental Management Plan with revised cost estimates was submitted to MoEF for consideration of environmental clearance.

5) The project was again discussed by EAC in its 73rd meeting on 26.03.2014 where in the response of project proponents to the issues raised in earlier EAC meeting was duly discussed. A study was undertaken to work out depth of river water on account of release of Environmental Flows in the diverted portion of about 1.2 km i.e. between dam and TRTs of Power House. Three alternate environmental flow i.e. 15 cumecs, 20 cumecs and 25 cumecs have been considered with four scenarios viz., no contribution of Ashupani & no backflow, contribution of Ashupani & backflow, contribution of Ashupani but no contribution from backflow, and contribution of backflow but no contribution from Ashupani. The study has shown that with the release of discharge of 15 cumecs from dam, a sufficient depth of water is available downstream of plunge pool of dam with no contribution of Ashu Pani and no contribution from backflow. Thus, the depth available in the stretch between plunge pool of dam and TRT outlet, by releasing the environmental flow of 15 cumecs from dam, is appropriate and meet the depth required by fish population. Moreover, at least one turbine out of 12 turbines shall be operated 24 hours in full / part load throughout the year, which will provide the sufficient discharge downstream of TRT outlet with adequate depth and velocity of water. EAC has agreed for release of 15 cumecs of water from dam and operation of at least one unit in full / part for 24 hours throughout the year as cited above. After the discussions. EAC has desired following additional information viz., revision of cost of private land in line with "The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation & Resettlement Act, 2013"; impact of peaking operation of Dibang Project on Dibru-Saikhowa National Park; and reply to the representations received by MoEF..

6) Reply to the observations was submitted by NHPC to the Ministry for consideration.

7) Subsequently, the project was again considered in the 74th EAC meeting on 6th May 2014, where in the response of project proponent to the issues raised in earlier EAC meetings were discussed. After the discussions, the information/clarification/compliance on following issues were further sought by EAC:

- Impact/benefit of flood moderation component of Dibang Multipurpose Project be accessed through a study.
- Top width, depth and velocity of flow in the 1.2 km stretch between dam and TRT outlet corresponding to 15 cumecs flow.
- Top width, depth and velocity of the flow in the lean season during peaking scenario between TRT outlet and confluence of Dibang river with Lohit river.
- Cumulative impact of peaking operation of Lower Siang HEP, Dibang Multipurpose Project and Lower Demwe HEP on Dibru-Saikhowa National Park to be assessed through modelling.

8) The project proponent has submitted the responses as below, which were considered by the EAC:

i. The Impact of flood moderation due to Dibang Multipurpose Project has been assessed through HEC-RAS 4.1 model. In Dibang Basin, flood moderation is proposed in the event of occurrence of a 100 year return period flood wave preceded and succeeded by a 25 year flood wave at dam site. Release from the reservoir has been restricted to 3000 cumec, which was considered by Brahmaputra Board as the safe carrying capacity of the downstream channel reach. Storage of the order of 1260 MCM is kept for flood moderation which has not been changed.

A flood routing study was carried out for 1 in 100 year return period flood (12756 cumec), 1 in 25 year return period flood (9750 cumec) and 3000 cumec discharge to assess the impact of flood moderation d/s of dam. HEC-RAS 4.1 software was used for modeling. An average 45% of reduction in top width/area is envisaged due to flood moderation as shown in Table-1. This is a significant positive impact of flood moderation in the downstream area.

Table 1- Top width (m) variation for different discharge values

Location d/s of dam	1 in 100 year Flood = 12756 cumec	Release = 3000 cumec	% Reduction in Top Width
10000	403	224	44
11000	549	371	32
12000	1024	531	48
13000	1108	848	23
14000	3137	1029	67
15000	2843	1052	63
16000	2142	1483	31
17000	2243	1521	32
18000	2237	1763	21
19000	2515	1606	36

Location d/s of dam	1 in 100 year Flood = 12756 cumec	Release = 3000 cumec	% Reduction in Top Width
20000	3920	3366	14
21000	2773	2362	15
22000	2641	1972	25
23000	1934	908	53
24000	1778	492	72
25000	1085	602	45
26000	1610	436	73
27000	3349	930	72
28000	2526	941	63
29000	2422	1117	54
30000	2342	1285	45
31000	3646	1319	64
32000	2567	1692	34
33000	2962	1312	56
34000	3262	1981	39
35000	3814	1630	57
36000	4748	3345	30
37000	5678	4539	20
38000	4736	2621	45
39000	1388	737	47
40000	1558	1025	34
41000	1640	1119	32
42000	4616	2974	36
43000	3629	2174	40
44000	4593	2627	43
45000	1916	1042	46
46000	2147	1359	37
47000	5411	2220	59
48000	5876	1538	74
49000	5037	1715	66
50000	5022	1488	70
51000	4127	1711	59
52000	2802	1684	40
53000	3673	2354	36
54000	4512	3534	22
55000	3331	995	70
56000	3949	2174	45
57000	11276	5094	55
58000	10652	5709	46
59000	12388	9062	27
60000	4949	2889	42
		Average reduction in Top width = 45%	

ii. A study using HEC-RAS 4.1 was conducted to assess the top-flow width, depth and velocity of flow in the 1.2 km stretch between dam and TRT outlet corresponding to 15 cumec flow. The findings of the study are given in Table-2

Table-2: Dibang Multipurpose Project (Depth, Velocity & Topwidth for 15 cumec discharge)

Location (Distance in m from d/s end of plunge pool)	Location (Distance in m from dam axis)	Bed Level (m)	With Machine Discharge			Without Machine Discharge		
			Velocity (m/s)	Depth (m)	Top Width (m)	Velocity (m/s)	Depth (m)	Top Width (m)
0	700	287.02	0.62	1.33	34.20	0.62	1.33	34.20
100	800	286.88	1.69	1.10	16.15	1.69	1.10	16.15
200	900	286.14	1.08	1.38	20.06	1.08	1.38	20.06
300	1000	285.96	1.07	1.23	22.74	1.07	1.23	22.74
400	1100	285.53	1.99	0.79	19.24	1.99	0.79	19.24
500	1200	284.90	0.65	1.05	40.79	0.65	1.05	40.78
600	1300	284.76	1.39	0.81	25.22	1.38	0.81	25.34
700	1400	284.12	0.69	1.20	40.09	0.76	1.14	38.18
800	1500	284.00	0.52	1.25	30.39	0.56	1.18	29.93
900	1600	283.92	0.40	1.30	57.80	0.45	1.21	56.25
1000	1700	283.59	0.56	1.57	37.77	0.65	1.45	35.04
1100	1800	283.68	0.78	1.36	34.73	1.23	1.10	26.39
1200	1900	283.55	0.31	1.46	63.05	0.80	0.86	45.64
Average			**0.90**	**1.22**	**34.02**	**0.99**	**1.13**	**31.53**

It was found that velocity ranged from 0.31 to 1.69 m/s. The depth of flow ranged from 0.79 to 1.57 m. The top width ranged from 16.15 to 63.05 m.

iii. A study using HEC-RAS 4.1 was conducted to assess the top-flow width, depth and velocity of flow in the stretch between TRT outlet and confluence of Dibang river with Lohit river. Based on the above study, it can be concluded that there will be a marginal fluctuation in W.L. of the order of 0.17 m at upstream of confluence (about 60 km downstream of Dam Axis) due to peaking operation of Dibang Project, which is almost negligible considering the size and morphology of the river. . Velocity is of the order of 0.77 to 1.07 m/s in post project scenario whereas in pre project scenario it around 0.93 m/s at upstream of confluence. It can be safely said that velocity/flow fluctuation is insignificant due to peaking operation at Dibang Multipurpose Project.

iv. A detailed study using MIKE 11 was conducted to assess the Cumulative impact of peaking operation of Lower Siang HEP, Dibang Multipurpose Project and Lower Demwe HEP on Dibru-Saikhowa National Park (DSNP).

Two scenarios were simulated:

- The river network before 1998.
- The river network after 2003 (present case) following change of course of Lohit River

Flow Scenario before 1998

- Before 1998, Lohit River used to meet with Dibang River and then combined flow of Lohit and Dibang River used to meet with Siang River before DSNP.
- From 1998 to 2003, transition of flow path occurred in Lohit River and flow path of Lohit changed.

Flow Scenario after 2003 (present case)

- From 2003, Dibang river directly meets with Siang River on northern boundary and before DSNP while Lohit River flows along southern boundary of DSNP.
- After passing along southern boundary of DSNP, flow of Lohit River meets with combined flow of Siang and Dibang River i.e. Brahmaputra River.

For each scenario five different cases were simulated:

- When only Demwe Lower is constructed and is doing peaking for 3 hours in a day while Dibang and Siang are flowing in their natural regimes.
- When only Lower Siang is constructed and is doing peaking for 3 hours in a day while Lohit and Dibang are flowing in their natural regimes.
- When only Dibang is constructed and is doing peaking for 3 hours in a day while Lohit and Siang are flowing in their natural regimes.
- All three projects are constructed and are peaking for 3 hours.
- No Project scenario.

Pre 1998 scenario – When Lohit was flowing along the Northern Boundary of Dibru-Saikowa Park

For Manning's n=0.033, the maximum water level due to non-monsoon peaking will vary from 112.87 m (at section III) to 117.54 m (at Section I). The maximum water level at no project condition varies from 112.69 m (at Section I) to 116.88 m (at Section I). Therefore, the maximum variation in water level will be 0.18 m (at Section III) to 0.66 m (at Section I).

Similarly, for Manning's n=0.04, the maximum water level due to non-monsoon peaking will vary from 113.02 m (at section III) to 117.86 m (at Section I). The maximum water level at no project condition varies from 112.92 m (at Section I) to 117.39 m (at Section I). Therefore, the maximum variation in water level will be 0.10 m (at Section III) to 0.47 m (at Section I).

Further, for Manning's n=0.05, the maximum water level due to non-monsoon peaking will vary from 113.20 m (at section III) to 118.26 m (at Section I). The maximum water level at no project condition varies from 113.17 m (at Section I) to 118.02 m (at Section I). Therefore, the maximum variation in water level will be 0.03 m (at Section III) to 0.24 m (at Section I).

The results for Manning's n value of 0.033, 0.04 and 0.05 are given in Tables-3 to 5.

Table-3: Pre 1998 scenario – When Lohit was flowing along the Northern Boundary of Dibru-Saikowa Park for (for Manning's n=0.033)

	Cross section No.	Min Elevation of Dibru-Saikowa Park (m)	Max Water Level due to Non monsoon peaking (m)	Max Water Level at no project condition (m)	Max variation in water level (m)
All 3 Projects, Demwe Lower, Dibang and Lower Siang	I	125.700	117.538	116.880	0.658
	II	117.300	115.364	115.015	0.349
	III	115.500	112.873	112.689	0.184

Table-4: Pre 1998 scenario – When Lohit was flowing along the Northern Boundary of Dibru-Saikowa Park for (for Manning's n=0.04)

	Cross section No.	Min Elevation of Dibru-Saikowa Park (m)	Max Water Level due to Non monsoon peaking (m)	Max Water Level at no project condition (m)	Max variation in water level (m)
All 3 Projects, Demwe Lower, Dibang and Lower Siang	I	125.700	117.857	117.388	0.469
	II	117.300	115.552	115.341	0.211
	III	115.500	113.015	112.920	0.095

Table-5: Pre 1998 scenario – When Lohit was flowing along the Northern Boundary of Dibru-Saikowa Park for (for Manning's n=0.05)

	Cross section No.	Min Elevation of Dibru-Saikowa Park (m)	Max Water Level due to Non monsoon peaking (m)	Max Water Level at no project condition (m)	Max variation in water level (m)
All 3 Projects, Demwe Lower, Dibang and Lower Siang	I	125.700	118.259	118.020	0.239
	II	117.300	115.819	115.714	0.105
	III	115.500	113.196	113.169	0.027

Present scenario i.e. post 2003 – When Lohit has changed its course to Southern Boundary of DSNP

For Manning's n=0.033, the maximum water level due to non-monsoon peaking will vary from 112.64 m (at section III) to 117.07 m (at Section I). The maximum water level at no project condition varies from 112.52 m (at Section I) to 116.27 m (at Section I). Therefore, the maximum variation in water level will be 0.12 m (at Section III) to 0.80 m (at Section I).

Similarly, for Manning's n=0.04, the maximum water level due to non-monsoon peaking will vary from 112.78 m (at section III) to 117.26 m (at Section I). The maximum water level at no project condition varies from 112.74 m (at Section I) to 116.69 m (at Section I). Therefore, the maximum variation in water level will be 0.04 m (at Section III) to 0.57 m (at Section I).

Further, for Manning's n=0.05, the maximum water level due to non-monsoon peaking will vary from 112.97 m (at section III) to 117.54 m (at Section I). The maximum water level at no project condition varies from 113.02 m (at Section I) to 117.29 m (at Section I). Therefore, the maximum variation in water level will be -0.05 m (at Section III) to 0.25 m (at Section I).

The results for Manning's n value of 0.033, 0.04 and 0.05 are given in Tables-6 to 8 respectively.

Table-6: Present Scenario Post 2003 – When Lohit has changed to Southern Boundary of Dibru-Saikowa (for manning's n=0.033)

	Cross section No.	Min Elevation of Dibru-Saikowa Park (m)	Max Water Level due to Non monsoon peaking (m)	Max Water Level at no project condition (m)	Max variation in water level (m)
All 3 Projects, Demwe Lower, Dibang and Lower Siang	I	125.700	117.070	116.266	0.804
	II	117.300	114.480	114.11	0.370
	III	115.500	112.637	112.518	0.119

Table-7: Present Scenario Post 2003 – When Lohit has changed to Southern Boundary of Dibru-Saikowa (for Manning's n=0.04)

	Cross section No.	Min Elevation of Dibru-Saikowa Park (m)	Max Water Level due to Non monsoon peaking (m)	Max Water Level at no project condition (m)	Max variation in water level (m)
All 3 Projects, Demwe Lower, Dibang and Lower Siang	I	125.700	117.26	116.690	0.570
	II	117.300	114.59	114.350	0.240
	III	115.500	112.78	112.74	0.035

Table-8: Present Scenario Post 2003 – When Lohit has changed to Southern Boundary of Dibru-Saikowa (for Manning's n=0.05)

	Cross section No.	Min Elevation of Dibru-Saikowa Park (m)	Max Water Level due to Non monsoon peaking (m)	Max Water Level at no project condition (m)	Max variation in water level (m)
All 3 Projects, Demwe Lower, Dibang and Lower Siang	I	125.700	117.54	117.289	0.251
	II	117.300	114.77	114.68	0.090
	III	115.500	112.97	113.02	-0.047

It is clear from Tables 3 to 8 that the variation is within 1 m when all projects will be operating simultaneously. Fluctuated water level is thus, well below the minimum elevation of Dibru-Saikowa Park for all cases.

After critically examining the proposal and considering the response to various issues raised in the earlier EAC meetings, the project was recommended by EAC for accord of Environmental Clearance to Dibang Multipurpose Project. However, EAC suggested that 20 cumec flow may be released towards e-flow in the 1.2 km diverted stretch as 15 cumec gives just sufficient quantity. EAC noted that beyond this 1.2 km, adequate flow will be available from TRT which will be minimum in the order of 85 cumec at 80% rated discharge of one turbine.

Agenda Item No. 2.2 TSACHU-I HEP (43 MW) on the river Tsona Chu in Tawang District of Arunachal Pradesh – For ToR

The project proponent has withdrawn the proposal subsequently. Will be taken you on receipt of fresh proposal.

Agenda Item No. 2.3 Talong Londa HEP (225 MW) in Arunachal Pradesh by M/s. GMR Pvt. Ltd. -For Environment Clearance.

A team of Officers from GMR and their Consultants made a detailed technical presentation on the proposal and the following emerged:

The Talong – Londa Hydro Power Project is being developed by GMR Energy limited for which Memorandum of Agreement (MoA) was signed with the Government of Arunachal Pradesh on 27th January 2007. Project is being implemented under an SPV naming GMR Londa Hydro Power Private Limited (GLHPPL). Terms of Reference (ToR) for Talong HEP was accorded by Ministry of Environment & Forests, Government of India on 23rd March 2007; at that time project capacity was 160 MW. During the period of survey and investigation, installed capacity was revised to 225 MW for which MoEF accorded revised TOR on 10th Aug 2010. This was subsequently revalidated on December 2012 and December 2013. Validity of TOR expired on 9th August 2014. Public Hearing was conducted on 28th July 2014 and updated EIA, EMP and SIA after Public Hearing was submitted for appraisal to MoEF on 7th Aug 2014.

The Techno Economic Clearance (TEC) was accorded by CEA on 16th Aug 2013. Application for Diversion of forest land was submitted with State Forest Department on 4th Nov 2010 and revised proposal was submitted on 10th Feb 2014 as per the advice of state forest department. The proposal is under examination by the State forest department.

The proposed Talong Londa Hydroelectric project is envisaged as run of the river scheme situated in East Kameng district of Arunachal Pradesh. Catchment area upto the dam site is 2814 sq. Km, out of which only 91 sq. Km is snow fed. Average annual yield is 2228 mm and 16891 cumec has been worked out as design flood value. The project comprises concrete dam with a maximum height of 108.50 m above deepest foundation level across river Kameng near village Pachi/Londa. The water conductor system consists of 94 m long and 5.2 m diameter three parallel penstocks along the dam surface to feed the three units 75 MW of Vertical Francis turbines in surface power house of 225 MW installed capacity. The power house is located on left bank-toe of the dam. The length of the dam would be 253 m at its top which includes an overflow section of 117 m length and 138 m long non-over flow sections with FRL at EL. 488.0 m and MDDL at EL.486.80 m. The crest elevation of under sluice spillway has been kept at EL. 443.0m and the crest elevation of overflow spillway has been kept at EL. 484.0 m. The energy dissipation device has been planned through flip bucket which has been designed to pass 16891 cumecs of flood discharge.

Basin development plan and longitudinal profile of Kameng river was presented and it was observed by the EAC that immediate upstream project is Marjingla HEP with 490m of TWL and Talong Londa HEP with 488m of FRL which leaves 500m of free flowing river stretch. Reservoir of Talong Londa HEP spreads for a length of 12.8 Km along Kameng river and also along Pachuk river with total submergence area of 350 ha. On the downstream side, confluence of Pachi river is a distance of 950m and Kameng dam, which is immediate downstream project is about 15 Km away.

As part of EIA study, for the purpose of baseline data collection, a 10 Km distance was marked from all the project components and primary surveys were conducted at selected locations with the study area as per TOR requirement. First phase of field surveys were carried out in 2006-2007 covering three seasons i.e. Pre-monsoon, Monsoon and Winter (Lean)seasons. Later on after the receipt of revised Tor for 225 MW capacity in 2010, the baseline data was updated in the years 2010-2011. The environmental baseline data was collected for flora, fauna, forest types and ecological parameters as well as sociological aspects. In addition, surveys and studies were also conducted for understanding aquatic ecology and fish diversity of Kameng river.

Baseline data was explained and discussed in detail and for all the physical parameters viz. ambient air quality, sound levels, water and soil quality, etc. Environment quality is found to be undisturbed and pristine. Land use map has been prepared based on satellite data show that 77.14% of the study are is dense forest and 19.54% is open forest. Administratively, the forest area is under the jurisdiction of Seppa Forest Division and the legal status of forests is Unclassified

State Forest (USF). The forests types recorded from study area as per Champion and Seth's (1968) comes under Sub Group – 2B Northern Tropical Semi Evergreen.

Survey for terrestrial ecology was undertaken at six sampling locations to prepare inventory of plant species in the study area from plant groups like angiosperms, gymnosperms, pteridophytes, bryophytes and lichens. Nested quadrat sampling method was used for the study of community structure of the vegetation.The data was quantitatively analyzed for abundance, density and frequency. Total plant species recorded are 228 out of which 185 are angiosperms, 19 pteridophytes, 8 fungi, 7 lichens and algae each and 2 bryophytes. The area is largely affected by shifting cultivation and the tree density was not as high as compared to other sub-tropical forest vegetation. *Ficus*spp*., Ailanthus grandis, Canariumstrictus, Terminaliamyriocarpa, Ulmuslanceifolia* were the important trees in the study area*Vanda* sp*., Dendrobium*sp*., Coelogyne*sp*., Eria*sp*.,* etc. are the orchids; *Lycopodiumselago, Aspleniumnidus*and *Microsorum* are a few epiphytic ferns recorded from study area.The shrub layer was represented by *Micromelum, Phlogacanthus, Maesa, Ficussquamata*and about 30 economically important plant species were also recorded from the study area.

Faunal diversity was studied on the basis of Primary surveys and secondary sources. As per the Seppa Forest Division, 20 species of mammal and 111 species of bird are reported from the area. However, during the field surveys in the study area, 5 species of mammals, 20 species of birds, 39 species of butterflies and insects and 1 species of reptiles were recorded. There is no national Park or sanctuary in the project area within 10 km radius/ distance. However, Pakke Tiger Reserve is the nearest protected area, located about 29 km downstream from the proposed dam site.

EAC observed that primary survey could not capture many of the species reported from the area and as the forest is dense in that region, there is a possibility of wildlife in the region which has not been recorded in the report and hence impact has not been studied adequately. Trails for the primary sampling for faunal diversity has been done at six locations coinciding with the vegetation sampling locations and covered during the day time; there is a possibility that many of the nocturnal animals in the area may have gone un-noticed. Therefore, for wildlife study in such dense forest areas, camera traps should be considered; to be installed at various sampling locations representing all habitat types and elevation zones in the project area for 2-3 weeks in October and November 2014 to capture the wildlife presence in the area.

The data of fish species collected from Fisheries Department, GoAP and secondary sources such as literature. Fishing was also done as part of primary sampling and about 50 castings each in the upstream and downstream of the dam

site were done in different sections of the river. A total of 73 fishes have been listed from the Kameng basin from which only 16 species were observed during primary survey. Mahaseer is the dominant species in the study area followed by *Acrossocheilus sp*., *Labeo*, *Chaguniuschagunio, Salmostomabacaila* and *Schizothoraxsp.*

Impact assessment has been done based on baseline data and project features for both construction and operational phase of the project. Environment flow study has been conducted and environment management plan prepared component wise with estimated cost. For environment flow assessment, initial 950m stretch upto the confluence of Pachi river was considered critical and 7 cross sections were taken in this stretch. Hydraulic modeling was carried out to simulate depth, velocity and river width under different reduced flow scenarios. 90% Dependable year discharge data was used and modeling study was carried out for 10%, 15%, 20% 25%, 30%, 50% and 100% release scenario. EAC observed that even under 10% release scenario i.e. for a discharge of 5.275 cumec, depth available varies from 82 cm to 1.36 m at different cross sections considered and an average depth of 1.02 m is available. However, EAC recommended that in lean season a minimum of 20% of the average discharge available in four leanest months should be taken as minimum environment flow. Developer suggested that they have studied the provision of dam body turbine so that in lean season, environment flow can be released through a small turbine of approximate 5 MW capacity. EAC observed that this would change the total installed capacity of the project and would require approved from CEA. Therefore, such proposal can be considered only after CEA's approval of revised installed capacity. For other 8 months, one turbine will be running at all the time making flow available immediate downstream of the dam.

Various components of the EMP were discussed along with the budgetary provisions. EAC found that budget for fisheries development was not adequate and need to be revised from 65 lakhs to at least one crore. Muck disposal site should be at least 30 m from the HFL of the river at all the locations and instead of gabion structure, concrete wall should be constructed as retaining structure. On R&R plan, EAC observed that annuity policy proposed for 20 years should be budgeted and total cost revised as per price index with 2014 as the base year.

EAC noted the Public Hearing Issues and Responses as under:

S. No.	Issues Raised by the Project affected members	Clarification by the project proponent
1	Identification/ survey of exact land owners and displaced families	Agreed
2	Land /property compensation rates to be fixed in due consultations with land owners under the banner of TLHEPAPC (PAF community)	The land rates and compensation will be fixed as per the LARR Act 2013 or as per the prevailing State Government law(s) as may be applicable.
3	Compensation to be paid in single installment within a year after assessment	As per the LARR Act 2013 or as per the prevailing relevant State Government Law(s).
4	Clarity over forest and private land. No land belongs to forest	Issue will be resolved as per the guidelines of Forest Department and Revenue Department.
5	Forest compensation not to be paid to the forest department and shall be paid to the Project Affected Families (PAFs).	The compensation will be paid as per decision of GoAP.
6	GoAP to make provision of 2% as a free power to local area development rather than State policy of 1%	Adhere to the MoA conditions.
7	Project Proponent to contribute Rs. 5 lakh annually to project affected village for festivals	During project construction and operation, possible contribution shall be made to the project affected villages.
8	Job reservations for project affected people	As per the State Government Policies.
9	Award of contract work to PAFs/ affected villages	Preference shall be given to the PAFs/affected villagers for award of miscellaneous contracts duly considering the capability of such contractors.
10	Senior Secondary school to be established with boarding facility	As per the formalized R&R package, required school shall be established based on the feasibility.
11	Hospital with 50 beds in project affected area	As per the formalized R&R package, Primary health centre shall be established.
12	Provision of insurance to local community in case of death/ accident due to project related activity	As per the State Government policy.
13	Motorable road construction from Dam site to Liya village	•Project Proponent agreed to carryout feasibility study based on the need.

S. No.	Issues Raised by the Project affected members	Clarification by the project proponent
		•If the village connectivity is adversely affected on account of the project, required alternate arrangements shall be made for establishing the connectivity.
14	Construction of Community Hall with 200 Seating capacity with kitchen facility.	Based on the need, required community hall shall be established during project execution phase.
15	Concrete embankments on both banks of Kameng river and in landslide prone area.	The land slide prone zones will be identified and proper slope stabilisation measures will be implemented. The Reservoir Rim Treatment Plan is proposed in EMP Report.
16	Proper management of migrant labours during construction to avoid antisocial activity	All the adequate measures as per prevailing labour law will be taken to avoid such antisocial activity by migratory labours.
17	R&R Policy to be properly implemented in transparent manner as per LARR Act, 2013	Will be implemented as per approved R&R plan.
18	Provision of Solar lighting to all households of project affected villages immediately prior to the construction of project.	Rural electrification shall be implemented as per the approved R&R plan.
19	Review the cost structure of R&R Plan and Economic Development Package	The R&R and Economic Development package is based on the LARR Act, 2013 and prevailing State Government policy.
20	Permanent colony and office to be established in Project affected area	Permanent project colony shall be located in the vicinity of project affected area duly considering the project operational requirement and feasibility in consultation with project affected community.
21	Immediate constitution of R&R and land acquisition Committee with representative of PAFs representatives	R&R implementation committee shall be constituted as per the prevailing State & Central Government policies.
22	TLHEPAPC to be made a nodal agency for implementing CSR programs in the area	The CSR activity will be implemented through GMRVF. The CSR Plan will duly consider the local project affected needs in the area of health, education and livelihood promotion. It will be formalised in due consultation with project affected villages and people.
23	Downstream impact of TLHEP	Downstream impacts are carefully studied as a part of EIA and suitable management plan has been already formalised in the

S. No.	Issues Raised by the Project affected members	Clarification by the project proponent
		EMP Report.
24	Impact on Fishes and Management Plan	Required studies were carried out and suitable management plan are in place for implementation
25	Construction of Prayer Centre	Suitable replacement shall be carried out at appropriate stage.
26	Compensation for crops and Plants	The compensation for trees and crops will be finalized by District Administration in consultation with project affected families.
27	Impact of Air and water quality	Environment Management Plan duly addresses these issues and the air and water quality shall be maintained as per the prescribed environmental law.
28	Reasons of delay in project	Project Proponent explained that there were extensive investigation and studies involved for preparation of DPR&EIA/EMP and also approval of DPR from CEA also took about 2 to 3 years. Besides the above, there were many salutatory clearances & approvals required for setting-up such project.
29	Impact on water quality in downstream of dam	Environment Management Plan duly addresses these issues. Water quality shall be maintained as per the prescribed Environmental law.
30	Assessment of PAFs from Meora village	In SIA survey, PAFs of Meora village were considered as a Hamlet in the village provinces of Rikhung & Tallo. However, compensation package shall be implemented as per the approved R&R plan.
31	Compensatory Afforestation	Implementation of Compensatory Afforestation is carried by the Forest Department as per the State Government policies.
32	Safety measures in downstream of Dam.	A comprehensive disaster management plan shall be developed and implemented. A Dam is designed considering required factor of safety.

EAC also studied the proceedings of Public Hearing meeting and developers response to each issue raised by public during the meeting. Summary of proceedings and response are annexed herewith.

EAC after further deliberations concluded the meeting with the following observations/comments:

- Longitudinal connectivity has to be explored and provided for ensuring non-disruptive biota movement & sediment transportation in the river. This is to be suitably incorporated in the civil design of the Dam or alternative measures for conservation, development and management of aquatic fauna should be suitably incorporated in case structural measures are found to be techno-economically infeasible.
- Environment flow release in lean season should be minimum 20% of the average flow of four leanest months corresponding to 90% dependable year based on CWC approved series. For remaining 8 months; one turbine should be running all the time to ensure environment flow release in the river. Project proponent said that they would propose a dam-body dam of adequate capacity for this purpose and come back to the EAC.
- For environment flow release during lean season through a dam body turbine, the matter will be discussed after CEA's approval to the proposal is obtained as this would involve change in installed capacity.
- Budget for Fisheries development to be increased to at least to one crore INR.
- R&R Plan should consider budget for annuity policy for a period of 20 years to be proportionately increased with the price index with 2014 as the base year.
- Muck disposal site should be at least 30m away from the high flood line of the river at all locations. Retaining wall of adequate height is to be proposed for retaining muck with proper slope. A reclamation plan may also be submitted.
- Camera traps to be installed at various locations representing the different habitat types and elevation categories of the study area for a period of about 3 weeks each in October and November and results of faunal inventory submitted. GPS locations of camera trapping sites and the efforts made (no. of camera trapping nights/ sampling site) to be provided.
- Lean season e-flow & other season e-flow to be worked out both in terms of percentage and absolute quantum based on site specific study. EAC will take a final view on this.
- Impact of mining of quarry if any has to be assessed and submitted.
- On receipt of the further study and modified proposal, the same will be re-considered.

Agenda Item No. 2.4 **Shongtong-Karcham HEP (450 MW) project in Distt Kinnaur of HP by M/s. Himachal Pradesh Power Corporation Limited - For consideration Environment Clearance.**

Project Proponent requested to place this agenda the proposal in the next EAC meeting.

Agenda Item No. 2.5 **Turu HEP Papum pare, District of Arunachal Pradesh by Mytrah Energy (India) Limited, Arunachal Pradesh- For ToR**

Turu Hydroelectric Project is located in Papum Pare District of Arunachal Pradesh. It envisages utilization of flow of Pare River, a tributary of Brahmaputra River, for generation of electrical power in a run of the river scheme. It is located in between latitude of 27°13'5.6" N and 27°13'7.86" N and between longitude of 93°35'55.2" E and 93°40'39.12" E. Barrage site of the project is located at latitude of 27°13'5.6" N & longitude of 93°35'55.2" E.

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It was explained that the Memorandum of Agreement (MoA) was signed with Government of Arunachal Pradesh on 26th Dec 2007. Scoping Clearance for Turu HEP (66 MW) was accorded by Ministry of Environment & Forests, Government of India vide letter No. J-12011/19/2012-IA-I dated October 18, 2012. At the time of scoping clearance, environment flow release provisions in different seasons were discussed in the Expert Appraisal Committee (EAC) meetings. During the DPR preparation, flow release provisions as per EAC recommendations were considered and power potential studies were revised for the remaining available water for power generation. This has resulted in reduction in installed capacity from 66 MW to 60 MW. Therefore, it was requested to revise the Scoping Clearance for 60 MW installed capacity and to extend the validity of the TOR by another year i.e. till October 18, 2015.

The Developer also discussed that during earlier scoping clearance detailed discussion was held for the provision of the environment flow. Pare River originates at 2860 m and total catchment area of only 560 sq. Km up to diversion location is rain-fed, making the lean period much longer. Keeping in view the distinct discharge pattern, EAC recommended the following specific quantity as the environment flow.

Monsoon release June 10 to September 10 in Cumec	End of monsoon release for September 10-30 in Cumec	Lean season October to April in Cumec	Release in May* Pre-monsoon in Cumec
9	6	2.5	4

The Developer requested that for the purpose of DPR preparation, the EAC recommended values have been adopted and during the process of EIA study, as per the TOR requirement, a site specific study would also be conducted. Findings of the site specify study or the EAC recommended values, whichever is higher, will be adopted as the final environment flow release values. EAC observed that the matter would be discussed in detail during final appraisal once the findings of the site specific study will be available.

EAC concluded that as there is no change in any of the critical parameters of the project i.e. location, FRL, TWL and submergence etc. and capacity reduction is only due to the provision of environment flow, the scoping clearance may be revalidated for the revised capacity of 60 MW and extension of one year may be granted to complete Public Hearing and submit the final EIA/EMP reports for appraisal.

Agenda Item No. 2.6 Par HEP Papum pare, District of Arunachal Pradesh by Mytrah Energy (India) Limited, Arunachal Pradesh- For ToR

Par Hydroelectric Project is located in Papum PareDistrict of Arunachal Pradesh. It envisages utilization of flow of Pare River, a tributary of Brahmaputra River, for generation of electrical power in run of the river scheme. It is located in between latitude of 27°14'33" N and 27°13'11" N and between longitude of 93°30'43" E and 93°34'41" E. Barrage site of the project is located at latitude of 27°14'33" N & longitude of 93°30'43" E.

It was informed that the Memorandum of Agreement (MoA) was signed with Government of Arunachal Pradesh on 26th Dec 2007. Scoping Clearance for Par HEP (60 MW) was accorded by Ministry of Environment & Forests, Government of India vide letter No. J-12011/18/2012-IA-I dated October 17, 2012. At the scoping clearance stage, environment flow release provisions in different seasons were discussed in the Expert Appraisal Committee (EAC) meetings held during July and September 2012 and also mentioned in the scoping clearance letter. During the

DPR preparation, flow release provisions were considered as per EAC recommendations and power potential studies were revised for the remaining available water for power generation. This has resulted in decrease in installed capacity from 60 MW to 52 MW. Therefore, it was requested to revise the Scoping Clearance for 52 MW installed capacity and to extend the validity of the TOR by another year i.e. till October 17, 2015.

The Developer also explained that during earlier scoping clearance detailed discussion was held for the provision of the environment flow. Pare River originates at 2860 m and total catchment area of only 420 sq. Km up to diversion location is rain-fed, making the lean period much longer. Keeping in view the distinct discharge pattern, EAC recommended the following specific quantities as the environment flow:

Monsoon release June 10 to September 10 in Cumec	End of monsoon release for September 10-30 in Cumec	Lean season October to April in Cumec	Release in May* Pre-monsoon in Cumec
7	5	2	2.5

The Developer requested that for the purpose finalizing the DPR the EAC recommended values have been adopted and during the process of EIA study, as per the TOR requirement, a site specific study will also be conducted. Findings of the site specify study or the EAC recommended values, whichever is higher, will be adopted as the final environment flow release values. EAC accepted the request and observed that matter would be discussed in detail during final appraisal once the findings of the site specific study will be available.

EAC concluded that as there is no change in any of the critical parameters of the project i.e. location, FRL, TWL, submergence etc. and capacity reduction is only due to the provision of environment flow, the scoping clearance should be revalidated for the revised capacity of 52 MW and extension of one year may be granted to complete Public Hearing and submit the final EIA/ EMP reports for appraisal.

Agenda Item No. 2.7 Kundaliya Major Irrigation Project on River Kalisindh in Rajgarh and Shajapur District of Madhya Pradesh by Water Resources

Department, Bhopal, Government of Madhya Pradesh- For reconsideration of Environmental Clearance.

The Kundalia project is a major multipurpose project proposed on river Kalisindh along with diversion of water from its tributary i.e. river Lakhundar by MPWRD which is also a left bank tributary of river Kalisindh. The proposed Kundalia dam site is located in Balaheda village of Zirapur tehsil of Rajgarh district in Madhya Pradesh. Its latitudes and longitudes are 23055'41" N and 76°18' 15" E respectively. The project envisages providing irrigation downstream of the proposed Kundalia dam on left and right flank of Kalisindh river 'in approximately 58040 ha of CCA.

The irrigation will be provided by a composite canal system over an area of 19000 ha in Kharif season and 54,500 in Rabi season. About 1500 ha will be irrigated under perennial crops. The proposed Kundalia dam is the last dam to be constructed on river Kalisindh in the state of Madhya Pradesh and its reservoir will have suitable absorption of incoming floods which will greatly help in reducing the magnitude of flood devastation on downstream of dam.

The project envisages construction of 3100 m long dam of which 2875 m of earthen portion and 275m of masonry portion. The Gross and Live Storage Capacities of the project are 582.75 MCM and 495.20 MCM respectively. Yield corresponding to 75% Dependable Year (DY) for Kundaliya dam site is worked out as 679.128 MCM for the gross catchment area of 3850 sq.km and for Lakhundar Diversion Barrage it is worked out as 201.63 MCM for the gross catchment area of 1075 sq.km. To meet out the requirement at Kundalia dam site, 105 MCM of water is proposed to be diverted from Lakhundar sub-basin to Kundalia dam site through proposed lakhundar diversion barrage.

The land required for various project components is of about 8155 ha. About 5001 ha of private land and 2474 ha of Revenue land is to be acquired. The quantum of forest land to be acquired is 680 ha. It was informed by the project proponent that Ministry of Environment & Forests and Climate Change, Government of India has accorded Stage-I Forest Clearance (FC) vide their letter dated 21st August 2014.

The dam will also meet the domestic (potable) and industrial water supply demand to the adjoining towns situated on the periphery of reservoir and just downstream of dam in Madhya Pradesh. About 18 Mm^3 of water is earmarked for

drinking purposes and 84 Mm^3 has been earmarked for industrial use. Besides, other fringe benefits of ground water recharge, flood control, pisciculture and tourism will be achieved. Construction of Kundalia dam is also essential for reducing the effect of likely flood damage in Kalisindh sub basin to a great extent.

The project will store water in the months of August to October to meet the irrigation water requirements from October to February and in the months of July and September. The river carries flow only during monsoon season. It is proposed to release 30 cumec of flows in monsoon season in both Kalisindh and Lakhunder rivers as Environmental Flows to meet the downstream water requirements and sustenance of aquatic ecology.

During the 71^{5t} EAC meeting held on January 20-21, 2014, the project proponents gave a detailed response to the issues raised by SANDRP. EAC after a lot of deliberations, asked the project proponent to provide the additional information, which were discussed during the instant EAC meeting.

The Water Resources Department, Government of Madhya Pradesh has submitted a Letter from CWC (Letter no.MP/90/2011-PA (C)/216-18, dated 02-05-2014) regarding their approval on according Environmental Clearance for Kundalia Major Multi-purpose project as a standalone project.

A Letter from Secretary Water Resources Department, Government of Madhya Pradesh, (Memo No.237/PA/Secy./Camp/ 2014, dated 24/06/2014) has also been received stating that Madhya Pradesh government is committed to make Kundalia Major Multipurpose project an integral part of P-K-C Link project, as and when it materializes. In the said letter, Government of Madhya Pradesh also gives a commitment that it has no objection if any change is required by the competent technical authority for the purpose of making Kundalia Major Multipurpose project an integral part of P-KC Link project.

It was informed that, a total of 50 villages are coming under submergence, of which 28 villages are in District Rajgarh (Tehsils Zeerapur and Sarangpur) and 22 villages in newly formed district (as on 15.08.2013) Agar (tehsil Nalkheda). Earlier Agar was a Tehsil of Shajapur District. No village is, however, coming under full submergence. All the villages will be partially submerged. Out of 50 villages, abadi in 15 villages (08 villages in District Rajgarh and 07 villages in District Agar) will come under submergence. In the remaining 35 villages (20 villages in district Rajgarh and 15 villages in district Agar) only land will come under submergence

The private land measuring 4592.0 ha coming under submergence is owned by 2861 Khatedars. Of these, 508 Khatedars are Scheduled Caste and 55 Khatedars are Scheduled Tribes owning 637 ha and 80 ha land respectively. Most of this land is fallow or poor in fertility and depends upon monsoon. The fallow government land was allotted about a decade ago to the present khatedars. A total of 4278 families will be affected from the project. The number of Project Affected Families (PAFs) will increase to 5281when each adult, destitute and widow, etc is considered an independent family in terms of the "Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013". 363 families are losing their agriculture land as well as homesteads, 1417 families are losing homesteads and/or shops and 2498 are losing only agriculture land. A total of (363+2498) 2861 PAFs are dependent on agriculture for their livelihood, 1417 are dependent on activities other than agriculture. 451 families are not dependent on village based income.

A total of 1780 PAFs will lose their homesteads. The PAFs have 435 permanent pucca houses, 1212- semi pucca houses and 225 temporary structures.

As suggested in the 71^{5t} EAC meeting, project proponent presented the R&R Plan for PAFs of Kundalia Major Multipurpose project, as per the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013.

The project proponent presented the Dam Break analysis which has been done using HEC-RAS model. The Design flood for the Kundalia Major Multipurpose Project is adopted as per the criteria laid down in IS 11223-1985. The gross storage of the dam is 582.7 Mcum and its hydraulic head (Difference between FRL and Nalla Bed Level) is 39.50 m. After the breach, immediately below the dam, the maximum flow will occur immediately after the start of breach. The critical condition assessed for the dam break study is when the reservoir is at Full Reservoir Level (FRL) and design flood hydrograph is impinged. Thus, in the present study, keeping the initial reservoir level at MWL El. 401.5 m the reservoir routing has been carried out by impinging the design flood hydrograph and keeping all the spillway gates fully open. The results along with Disaster Management Plan were explained and discussed during the EAC meeting.

Considering the response and explanations to various issues raised in the earlier EAC meetings, the project was recommended for granting Environmental Clearance subject to the following additional conditions:

- All promises made in public hearing to be religiously fulfilled by the Government of MP

- E-flow is to be released as per extant norms i.e. 20% during lean season, 25% during non-lean & non-monsoon season and 30% during monsoon season
- Longitudinal connectivity ensuring hydraulic compatibility at bed level is to be provided to ensure non-disruptive biota movement and sediment transportation. For this necessary feature may be incorporated in design of Dam.
- E-flow release should be unregulated and the system is to be equipped with censor/suitable devise for facilitating real time monitoring.

Agenda Item No. 2.8 Nyamjang Chu HEP (780 MW) Project in District: Tawang, Arunachal Pradesh by M/s. NJC Hydro Power Ltd- For re-examine of e-flow

Project proponent requested to place the proposal in the next EAC meeting.

Agenda Item No. 2.9 Chhatru HEP(108 MW) in Lahual & Spiti District Himachal Pradesh by M/s. DCM Sriram infrastructure Ltd. – For re-consideration of Environment Clearance.

The Chattru Hydroelectric Project is envisioned as a run-of the river project on River Chandra, and is located near Chhatru, Tehsil keylong, District Lahaul and Spiti of Himachal Pradesh, to generate 126 MW (3X42MW) hydropower.

The project is located close to Chattru, about 100 km from Manali. The project diversion site is about 5.5 km upstream of the Chattru bridge and the power house is located around 5 km downstream of it. The project is proposed to be constructed on river Chandra, a tributary of Chenab, one of the major rivers of Northern India. The river originates from the snow covered slopes of Great Himalayan Pir-Panjal ranges in Lahaul Spiti district and flows in a steep gradient with a series of loops and bends.

The Chandra River originates from Bara Lachala and its flow is further augmented by Chandra Tal. The Chandra River joins the river Bhaga at Tandi and flows as Chandra-Bhaga River in Himachal Pradesh, which is known as Chenab in the state of J&K. The catchment has snow covered peaks at height ranging from + 4800 m to 6517 m elevation.

The catchment for the proposed project covers an area of 1583 sq.km. The discharge data from 1973-74 to 2007-08 at Ghoushal station (Central Water Commission discharge and silt observatory) across Chandra river has been suitably co-related to arrive at reliable discharge and flood frequency values for planning the project.

Following flood values has been used to plan and design the structures:

Table 1: Flood values

Flood type	**Flood Peak (m^3/s) based on Hydro-Meteorological approach**
SPF	2272
100 Year	1400
50 Year	1230

The project diversion comprises a low height weir on river Chandra i.e. 6M high above river bed level. The project envisages installation of 126 MW capacity (i.e. 3X42 mw) of hydropower. Project construction and commissioning is envisaged to be completed in a span of 8 years time period and will enable energy generation of 521.40 GWH corresponding to 90% dependable year of flows. The salient features of the project are given below:

Table: Salient features of the Project

State	**Himachal Pradesh**
District	Lahaul-Spiti
River	Chandra river
Weir site	About 5.5 km u/s of Chhatru
Powerhouse site	About 5 km d/s of Chhatru on right Bank of Chandra river
Type of powerhouse	Underground
Installed capacity	126 MW (3X42)
Catchment area	1583 sq km
River bed level	3446 m
Poor level/Full reservoir level (FRL) in river	3452 m
H.R.T. length and size	10.480 km and 5.00 m dia
Tail water level	3242.10 m

The project shall be operated purely as a RoR scheme without any diurnal storage for peaking to maintain continuous flow in water conductor system.

Table: Power generation

Power generation	
90 % dependable year	2001-2002
50 % dependable year	2006-2007
Energy generation in a 90% Dep. year	521.0 MU
Energy generation in a 50% Dep. year	634.9 MU
Construction period	9.25 years (including initial 3 years pre-construction period)
Cost	
Cost (without IDC and financing cost) as reflected in DPR submitted to CEA at March, 2014 price level	Rs. 1013.00 cr.
Cost (including IDC and financing cost) as reflected in DPR submitted to CEA at March, 2014 price level	Rs. 1420.00 cr.

The total land to be acquired for the project is 56.2ha, which is entirely forest land. Thus, a total of 113 ha of land shall be afforested as per norms. The afforestation work is to be done by the State Forest Department.

Ministry of Environment & Forests (MoEF) had approved the Terms of Reference (ToR) for detailed EIA study vide letter no. J-12011/14/2008-IA dated on 20/06/2008. 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) and Public Hearing for the same was conducted under the Chairmanship of Sub-Divisional Magistrate (Civil), Keylong dated on dated 24th Oct 2011, as per the provisions of EIA Notification, 2006.

The construction of the project may involve diversified activities and require a large number of laborers. The change in population density through immigrants/influx may cause new health problems in this region. Hence public health delivery system has been planned to be executed. This would involve site selected for habitation through proper planning which will not be in the path of natural drainage. A thorough medical screening of the laborers will be conducted for all the laborers coming from outside. Regular health check-ups will be held at the construction sites for the laborers and staff in order to assess general health

conditions and communicable diseases. It is proposed to develop a small dispensary with 2 doctors and 2 paramedics and one visiting expert close to the project site which would serve the labour population immigrating in the area during construction phase.

Details of Para-medical staff for dispensary

Para-medical staff	Number
Auxilliary Nurse	2
Male Multipurpose Health worker	2
Attendants	3
Driver	2

For solid waste management from labour camps, during construction phase, about 800 laborers and 200 technical staff is likely to congregate. The solid waste likely to be generated from labour camps shall be of the order of 4.5 MT/month. Adequate facilities for collection, conveyance and disposal of solid waste shall be developed. The solid waste will be disposed at the designated landfill sites or incinerated as found suitable.

Mandatory arrangements shall be made for the contractor to provide adequate facilities at the labour camp which include:

- Construction of block of two large rooms for accommodating 30-40 workers.
- During cold weather, a proper heating system shall be provided including hot water supply; Provision of water supply:
- Drinking water will be collected from the river from the rivers or strams flowing upstream of the labour camps and stored in tanks. Water quality shall be properly disinfected by chlorination. At peak construction phase, about 1000 Labour and technical staff would be staying in the labour camps. Considering water requirements as 135 lpcd, the total water requirement works out to 0.135 mld. One community latrine will be provided per 20 % with septic tanks. The sewage from the community latrines will be discharged in septic tanks. The project staff colony (to be used for operation phase) will be provided with an STP. The treated effluent shall be disposed off in nearest water body.

The project proponent in association with state government of Himachal Pradesh shall make necessary arrangements for distribution of kerosene oil and LPG. The total cost required for provision of fuel works out to be Rs. 42.38 million.

The approach roads will be constructed as a part of the access to the construction site. Road construction will generate muck due to the stripping/ blasting of the rocks. The stripped material would be collected (to the maximum extent) and dumped in the designated muck disposal area, which will have retaining wall to prevent the muck flow down into the river. After disposal operation is complete at the dumpsite, the dump yard shall be stabilized by terracing and overlain with geo-textile and seeded with suitable grass species.

About 12.275 lac m^3 quantity of muck is expected to be generated as a result of excavation activity at diversion site tunneling operations, construction of roads, and other developmental activities etc. Muck is proposed to be disposed at designated sites, where a capacity of 16.01 lac m^3 is available. The total area earmarked for muck disposal is 10.541 ha. All measures would be adopted to ensure that the dumping of muck does not cause injury or inconvenience to the people or the property around the area. It is estimated to use about 14572 m^3 of utilizable excavated muck in construction of coffer dams, 27300 cubic meter in embankment construction and 5810 cubic meter in construction of guide bunds. However after this utilization considerable quantity of muck would be available which is likely to contain material suitable for other developmental activities and private use. Other developmental agencies like PWD, I&PH and private users would be allowed to lift the remaining material which is unsuitable for use in the project construction free of cost.

For the project a huge natural stone-quarry (detached rock) is available about 2.9 Km upstream of weir site. However, appropriate slope stabilization measures shall be implemented to prevent the possibility of soil erosion and landslides in the quarry sites. Coarse aggregate will primarily be obtained by crushing the excavated muck from project component sites and screen deposits about 2.9 km upstream of weir axis. It will also be quarried from RBM in shoals along Chandra River from the proposed storage reservoir area. Since river bed mining sites are replenished annually during high flow season, these sites do not require any treatment. Normally these sites are left untreated after excavation of the construction material. The pit so created impedes the natural drainage and increases the potential for soil deposition leading to filling up of dug out areas.

The cumulative impact of the above may increase turbidity levels. Good dredging practice can however, minimize turbidity. It has also been observed that slope collapse is the major factor in increasing the turbidity levels. If the depth of

cut is too high, there is slope collapse, which releases a sediment cloud, which goes outside the suction radius of dredged head.

The working areas of weir site, power house complex colony area have been selected for beautification of the project area after construction is over. There would be sufficient open space in power house complex and colony area. Forested area in the power house complex would provide aesthetic view and add to natural scenic beauty. 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 away and fountain. A provision of Rs. 1.10 million has been earmarked for landscaping and beautification of the area.

During operation phase the quality of land is not likely to deteriorate as the implementation of landscape and restoration work, and catchment area treatment works shall improve the land cover. Moreover, many of the redundant areas having no further usage will be brought under plantation. The plantations would be carried out at area of 0.5 ha. This work would be completed in two years and shall be carried out by State Forest Department.

A CAT Plan comprising of following aspects is proposed:

- Contour trenching/ Afforestation
- Pasture improvement
- NFTFP (Non Timber Forest Products) regeneration
- Wildlife Management
- Gully control
- Dry Rubble stone masonry (DRSM) check dams
- Eco-Tourism
- Research and development
- Monitoring of silt load
- DRSM Avalanche deflection
- Bench terracing
- NFTFP Regeneration/ Medicinal Plants cultivation

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 24.09.11

- Indian Express
- Dainik Bhaskar

Himachal Pradesh State Pollution Control Board on 24th October, 2011 at 11 AM organized the 'Environmental Public Hearing' as per Govt, of India Notification No. - SO 1533 dated 14.09.2006 at PWD Rest House Compound at Koksar, Tehsil Lahaul, Distt. Lahaul and Spiti,

, Himachal Pradesh for the proposed Chattru Hydroelectric Project 126 MW (3X42MW) M/S

DCM Shriram under the Chairmanship of Sub-Divisional Magistrate (Civil), Keylong

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**
Whether there will be any adverse impact on the nearby glaciers, since the project is proposed in snow bound region?	Most of the components of the project shall be underground, barring the weir/diversion arrangement which will be on surface. Hence, the most of the construction work shall be carried out underground. Chota Shigri glaciers which is located about 20 km from the power house site, does not seem to be impacted by project activity.
There is no arrangement for winter sports here. What co-operation shall the project management extend for this?	In addition to this Hydro-electric Project, many other HEPS' are also to be established in this region. The Project management is committed to abide by any policy to be evolved collectively in this context.
Whether fishes shall be adversely impacted due to the project?	No fish species has been found in the project area. It has also been verified from the concerned department.
Local people should be given priority for employment and contracts. Mutual cordial relationship should be	Representative of M/S DCM Shriram Infrastructure Ltd informed that in keeping with policy of H.P. State Government, recruitment not less than 70% of the total

Issue Raised	Remarks on the Issues Raised
maintained between the project personnel and the local residents	employees shall be from bona fide Himachalis as per qualifications and the local residents shall be given priority in this matter. Besides direct recruitment, the local residents, during construction of project shall get opportunity for indirect recruitment in work activities like sprinkling of water on roads, work at muck sites and engagement of light vehicles etc. The project management is committed to ensure mutual cordial relationship between company personnel and local residents
In this area many medicinal herb species like "Sarala", "Pama" and "Sushpa" are found. These species should not be used as fuel wood by the labourers engaged for the project, as herbs and shrubs play important role in arresting soil erosion	The management made it clear that arrangement for boarding and lodging and food for the employees and work–force shall be made by the company. The company shall make available the LPG and Kerosene oil for this purpose. Thus, the possibilities for cutting and harming of such shrubs are not there
Whether quarrying and crushing operations shall adversely impact the environment	The Project management assured that standard mitigation measures shall be complied with for control of pollution from quarrying and operation of stone crushers. Besides this, the Executive Engineer State Pollution control Board clarified that the consent for establishing stone crushers shall be accorded as per approved policy and the installation of all equipments for control of air-pollution, shall be deployed and periodically monitored
Due to adverse climate conditions, it is not feasible to carry out afforestation within catchment area under the CAT plan. Therefore, the afforestation may be undertaken in other areas of Khoskar Gram Panchayat.	Project management clarified that the implementation of the CAT plan shall be done by the Forest Department. DFO, Kaylong, stated that afforestation shall be done with the participation of the local people. Various medicinal plant /herb species shall be planted in the area besides such species which control the soil erosion.
One Percent of the cost of the project should be used for the local	The development of the local area shall be implemented as per State Government

Issue Raised	Remarks on the Issues Raised
development.	Policy under which a provision of 1.5% of final cost of the project shall be earmarked under LADC for local area development..
One Percent of the annual units generated should be given free to the local people.	Project management clarified that in this matter, the Policy of the Government shall be complied with
In this area there is no medical facility. Therefore, the village Panchayat intends to provide land and Project management should establish a Hospital on it and provide relevant staff	Project management stated that if the village Panchayat make available the land, the Project hospital shall be established on that land at Khoksar and free medical facility shall be given to the local residents. Medical camps of specialists shall also be organized from time to time.
What precautionary measures have been proposed by the project management for safety against loss due to possible avalanche at Weir/diversion site?	After detailed investigations, it has been found that there is no possibility of any avalanche movement on weir /diversion site, which is why the site has been selected
One percent of the annual units generated should be given free of cost to local people.	The issue has been clarified vide S. No 3(iii)
The selection of land for the project should not be done in an hapazard manner	The selection of land has been done in accordance with the government policies and after complete investigation. Besides this the DFO, Kaylong, clarified that the selection of the land for the project has been made on the recommendations of the Joint Inspection Committee, constituted by the Forest Department
There should not be any adverse impact on Chota Shigri glacier by the project.	The issue has been discussed at s. no. 1(i)
What steps shall be undertaken to control the pollution?	For control of air pollution, the water shall be sprinkled on road on regular basis. At stone crusher the state-of-the-art air pollution control equipments shall be established. Sewage treatment plant shall be installed to control water pollution

Issue Raised	Remarks on the Issues Raised
Whether, the road from Khoskar to Chattru, under construction on the right bank of the Chandra will be interrupted due to construction of the project	There shall be no interruption on construction of the road. No objection certificate from the concerned department has been received.
The Project area being snow –bound people shall get employment only for four months. How the project management consider to compensate the workers for balance eight months	Project management made it clear that for the persons recruited for the project, the employment shall be for the full year and not for four months as apprehended. This arrangement shall continue as it is, till completion of the project.
What shall be the contribution of the company for encouragement of sports	Project management clarified that it does not have the knowledge about sport interests of local people. However, project management will come forward to promote sports activities in consultation with the Panchayat
What steps shall be taken by the project management for welfare of destitute and widows	Project management made it clear that the necessary measures for their welfare shall be undertaken in consultation with Mahila Mandal and the Panchyat.
The tipper –truck of our union should only be deployed for works related to the project construction.	The Project management made it clear that the work shall be implemented through various contractors, who shall be owning their own trucks and tippers. Notwithstanding this, in order to create cordial relationships between the contractors and the local tippers-truck union, the management shall incorporate conditions to that effect into the agreement so that local union and Panchayat gets appropriate participation.

The Project was considered by the Expert Appraisal Committee (EAC) of MoEF for Environment Clearance in its 57th meeting held on 27-28th April, 2012 for an installed capacity of 120 MW. The project submittals were accepted by the EAC except for some observations on bio- diversity.

EAC observations for additional data on bio-diversity of the project area were conveyed by the MoEF to the proponent vide letter no J-12011/15/08-IA-I dated 2nd July, 2012.

Compliance to above observations along with revised EIA/EMP Report was submitted by the proponent to MoEF vide letter no : DS Infra/Chh/Environment/SPL-ENV-I dated 02.05.2013.

Further comments of the member EAC on submission made on 02.05.2013 were conveyed by MoEF to the proponent vide letter no: J-12011/14/2008-IA-I dated 18th June, 2013 which were replied by the proponent vide letter no: DS Infra/Chh/Environment/SPL-I dated 28.10.2013 (Revised Chapter on Biological Environment is contained at page-118 in EIA Report).

The project was listed by MoEF for re-consideration by EAC in its 70th meeting which was scheduled for 10th – 11th December, 2013. The proponent, however, requested MoEF for postponing consideration of the project by EAC as CEA decision on operation philosophy of the Project as a pure RoR scheme was under deliberation.

After CEA approval on operation philosophy of the project as a pure RoR scheme, the proponent again requested the MoEF on 02.05.2014 for considering the Project for clearance. Accordingly, the Project was listed for re-consideration of Environment Clearance in the 77th meeting of the EAC

During the deliberations, the EAC took note of compliance by the proponent to observations on bio-diversity as contained in the revised Chapter 6 in EIA

The EAC also deliberated in detail changed operational philosophy for the Project as concurred by CEA. The proponent brought out following highlights:

- During scrutiny of the DPR by CEA/CWC for techno-economic viability, certain dominating facts about peak arctic winter months in the Project area called for a review of the operation philosophy (post commissioning) of the Project as super cooled water conditions, frazil ice and permafrost conditions in the project area could jeopardize sustained operation of the Project.

- Post such a review, CEA/CWC have agreed with a change in operation philosophy of the Project to ward off the adverse effect of super cooled water conditions, frazil ice and permafrost conditions. Now, Chhatru power plant shall be operated purely as a ROR scheme without any diurnal storage for peaking (Project description based on changed operation philosophy is contained at page-28 under Section-2.2 in EIA Report). The change in operation philosophy has resulted in following major environmental gain:

- *Since there will be no diurnal storage for peaking and since one machine will continuously in operation during the winter period, entire diverted river flow will flow back in to the river downstream of Tail Race Tunnel at all times.*

- *Also, capacity of the Project has increased from 120 MW to 126 MW due to less variation in water levels in absence of storage provision and without any change in the Project domain or governing water levels and the size of engineering structures.*

After critically examination of the project proposals and discussing adequately the bio-diversity issues as raised earlier, EAC recommended the proposal for Environmental Clearance subject to the following additional stipulations:

- E-flow release should be at least 20% during summer, as rest of the time freezing has been reported.
- Promises made during public hearing to be religiously fulfilled.
- Need for Longitudinal connectivity to be explored and if need be this is to be provided.

Agenda Item No. 2.10 Siang Upper Hydro Power Project , Stage-II District Upper Siang, Arunachal Pradesh- For ToR

The Brahmaputra Board had envisaged one large dam on river Siang in 1983, with a view to exploiting hydro potential and to derive benefits of flood moderation. Brahmaputra Board had prepared Detailed Project Report (DPR) after conducting detailed survey and investigations works of Siang Dam Project (20,000 MW) comprising of 269 m high dam near village Rotung about 47 km upstream of Pasighat. The project could not be taken up for execution because of objections from Arunachal Pradesh Government on account of large submergence of its land

including some major towns like Along and Yingkiong, etc.

Later, during 1995 Brahmaputra Board in consultation with Central Water Commission proposed cascade development over Siang river in order to minimise the extent of submergence. Three schemes were identified in the Siang basin. The broad features of these schemes of Siang river basin were as under:

S.	Name of the	Location	Dam Height (m)	Installed Capacity (MW)
1	Siang Upper HEP	Pugging	257	11000
2	Siang Middle HEP	Mega	154	700
3	Siang Lower HEP	Rotung	65	1700
	Total			**13400**

Subsequently, the work of survey and field investigations of Siang Basin as a whole was given to NHPC. Based on Survey and investigations by NHPC, it was pointed out that the reservoir of Siang Upper Project extends beyond the Indian Territory with the dam of height 257^{m} as proposed in the master plan by Brahmaputra Board. Further, the Siang Upper project would have also led to submergence of Tutting town in Arunachal Pradesh.

The work of survey, investigation and preparation of PFR for Siang Upper HE Project has been allocated by Govt. of Arunachal Pradesh to NT PC Limited vide letter dated 16.2.2009. During the meeting held in the office of Secretary (Power), Gol, New Delhi, on 19.05.2009, Hon'ble Chief Minister of Arunachal Pradesh indicated that for harnessing the hydropower potential of Siang Upper Basin be considered through cascade/ a series of two or three projects minimizing submergence. Further, submergence of Yingkiong and Tutting town be avoided. With this background, Siang Upper Project on river Siang in Arunachal Pradesh is envisaged to be developed in two stages. Siang Upper Stage-I HEP and Siang Upper Stage-II HEP. The dam site of Siang Upper Stage - II HEP is located near village Uggeng in Upper Siang District of Arunachal Pradesh. The dam site is about 6 km upstream of Geku and about 20 km from Dite Deme. The distance of dam site from Pasighat is about 84 km by road. From Dite Deme, there is a BRO road on the right bank, which passes very close to the site and the site is thus approachable by metalled roads on both banks. The nearest meter gauge rail head is North Lakhimpur and Broad Gauge Railhead is at Nagaon. The nearest Airport is at North Lakhimpur (Lilabari).

The Siang Upper HEP Stage-II project comprises of the following components:

- A 140 m high Concrete Gravity Dam from river bed level
- Two level spillway.
- Upper spillway comprising of 7 nos. of Radial Gate with opening size of 16m x 20m and crest elevation at EL 300.0 m.
- Lower Sluice spillway comprising of 7 nos. vertical list gates with opening size 6m x 8m and crest elevation at EL. 258.0m.
- 6 nos. 12.5 m Horse Shoe shaped Diversion Tunnel and length 1000 m (Max) 12 nos. Horse Shoe shaped Head Race Tunnel of 9.0 m diameter and 2050 m long (Max)
- 15 nos. 6.8 m diameter Penstock
- Dam Toe surface Power House having installation of 3 units (Unit-I: 3*250MW, Unit-II: 6*250 MW, Unit-III: 6*250) with a total installed capacity of 3750 MW. 2 nos. Underground Power House cavern having installation of 6 units each.
- Independent Tail Race Tunnel of 9.0 m diameter Horse Shoe section for each machine to feed the water back into the river.
- Necessary infrastructure e.g. approaches roads, buildings, etc.

The reservoir area at FRL 340 m is 3939 ha. After critically examining the Proposal in the 73rd EAC meeting, additional information was sought. The key issues raised were:

- The PFR submitted to MOEF is almost 5 years old, and NEEPCO was asked to submit a revised PFR along with revised Form-I
- EAC observed that there is no riverine free stretch between Siang Upper HEP Stage-I, Siang Upper HEP Stage-II and Siang Lower HEP. The project proponent was asked to maintain a reasonably longer clear/ free stretch between the Siang Upper HEP Stage-Ion the upstream side and Siang Lower HEP on the downstream side.
- MOEF norms for release of Environmental Flows, i.e., 30% in monsoon season, 20% in lean season and 25% in non-monsoon -non lean season to be followed in power potential exercise.

NEEPCO has submitted the revised PFR alongwith Revised Form-I.

The comparison of the old and the revised layout is given as below:

Parameter	**Old layout**	**New Layout**
Dam		
Type	Concrete Gravity	Concrete Gravity
FRL	340 m	335 m
MDDL	320 m	320 m

Parameter	Old layout	New Layout
Submergence Area	3939 ha	3892 ha
Gross storage	2016 MCM	1850 MCM
Live Storage	750 MCM	580 MCM
HRT		
Shape	Horse Shoe	Horse shoe
Diameter	9 m	9 m (Finished dia)
Number	12 nos.	12 nos.
Length	2050 m	2050 m
Design discharge	300 cumec	304.47 cumec
Power House		
Type	PH-1=Surface, PH-2 & PH-3= Underground	PH-1=Surface, PH-2 & PH-3= Underground
Capacity	PH-1=3X250 MW, PH-2=6x250 MW, PH-3=6x250 MW	PH-1=3X250 MW, PH-2=6x250 MW, PH-3=6x250 MW
MIV Cavern size	10 x 250 x 20 m	10X250X20 m
Rated head	94.33 m	PH-1=97.25 m PH-2 & PH-3=93 m
Design discharge	300 cumec	304.47 cumec 873.49 cumec for PH-I 3653.65 cumec for PH-2&3
Design Energy (GWh) at 95% availability	17977	16938

The FRL of Siang Upper HPP, Stage-II is lowered to El. 335 m from EL. 340 m. Thus, riverine free stretch of about 2.25 km is maintained between TWL of Siang Upper HPP, Stage-I and FRL of Siang Upper HPP, Stage-II. Further, TWL of Siang Upper HPP, Stage-II is fixed at El. 235 m & thus riverine free stretch of about 2.0 km is maintained between T.W.L of Siang Upper HPP, Stage-II and FRL (EL. 230 m) of Siang Lower HEP.

The Power Potential Studies has been carried out accordingly to satisfy MOEF norms for release of Environmental Flows. 3 nos. of turbines are proposed immediately at the toe of the dam as surface power station, about 22% required environmental flow will be released through these three turbines throughout the year. The remaining component of environmental flows shall be released through spillway on a continuous basis.

During the EAC meeting, it was conveyed that in PFR, it is mentioned that the project would help in flood moderation. Considering the flood peaks in Siang Basin, live storage capacity of 580 MCM is too low for providing any

substantial flood moderation. This aspect be relooked as a part of DPR preparation.

In addition to standard TOR for North-Eastern projects, following additional TORs have also been proposed:

- Disaster vulnerability of the area on various aspects like landslides, earthquakes and floods to be studied and assessed.

- Impacts due to peaking power Operations with special reference to downstream areas and communities to be studied impact assessed.

- Impacts of Tunneling and Blasting to be assessed and safeguard measures suggested.

- Impacts of Mining of materials for the project to be assessed.

- Impacts of Backwater Effects of the reservoir in flood season to be assessed.

- A table of 10 daily water discharges in 90% dependable year showing the intercepted discharge at the dam, the environmental and other flow releases downstream of the dam and spills shall be included in the EIA report

- Observed flow at G&D site, rainfall data and intermediate catchment mapping along with its contribution shall be included in the EIA report
- Bio-diversity study to be conducted by a suitable institute as per OM of MoEF dated 28.05.2013

- Realistic assessment of requirement of labour during the construction phase of the project shall be done and local labour shall be preferred. Mixing with local tribal community to be minimised and if need be, labour colony may be set up away from such inhabitants to avoid adverse impact on ethnic community.

- With regard to clearance for HEPs being located within 10 km of National Park and Sanctuary, instructions contained vide OM No. J-11013/41/2006-IA(I) Part dated 20.08.2014 will apply.

- Longitudinal connectivity through proposed dam is to be provided for ensuring non-disruptive biota movement and sediment transportation.

- Release of environment flow should be made in such a manner that real time monitoring is possible.

- Bio-diversity study is to be conducted through an institute published in the website of the Ministry.

- A site specific study to be conducted for assessing e-flow requirement and submitted.

Based on the above, EAC recommended the proposal for TOR clearance.

Agenda Item No. 2.10 Tidong-II HEP (60 MW) project in Kinnaur District of Himachal Pradesh by M/s Tidong Hydro Power Ltd. – For Scoping Clearance/reconsideration of ToR.

The project was considered in 71st Meeting of EAC and the ToR for the project was recommended subject to submission of point-wise reply to the representation given by NGO namely; Dhara and research and action group.

The following major concern expressed by the NGO and response of the proponent was deliberated by EAC:

1. Flood and calamity proneness of the area:

   The NGO has raised concern that the project area is prone to flood and natural calamity. The project proponent has submitted response by explaining that all such natural hazards is part of any eco-systems and all such aspects shall be fully deliberated and considered in the Environmental assessment and all safeguards shall be incorporated in project design. EAC deliberated on the issue and considered that stakeholders will have an opportunity to review the safeguard arrangements in the project design during public hearing and same concerned shall be reviewed as raised during appraisal stage.

2. Local opposition with regard deforestation and forest rights:

   The proponent has clarified that the project is located at high altitude and cold deserts scenario area and is on a barren forest land with very scarce vegetation and no-high trees. In any case they have committed to incorporate biodiversity management plan in the EIA study which EAC agreed too.

3. Cumulative impact assessment:

   The project proponent informed that cumulative impact assessment is phenomena of Basin specific studies. Himachal Government has already initiated Satluj river basin studies. The related applicable findings would be incorporated in the project EMP.

After detailed deliberations, the EAC concluded that he terms of reference may be granted to the project proponent subject to the following additional conditions:

- Disaster vulnerability of the area on various aspects like landslides, earthquakes and floods to be studied and assessed.

- Impacts due to peaking power Operations with special reference to downstream areas and communities to be studied impact assessed.

- Impacts of Tunneling and Blasting to be assessed and safeguard measures suggested.

- Impacts of Mining of materials for the project to be assessed.

- Impacts of Backwater Effects of the reservoir in flood season to be assessed.

- A table of 10 daily water discharges in 90% dependable year showing the intercepted discharge at the dam, the environmental and other flow releases downstream of the dam and spills shall be included in the EIA report

- Observed flow at G&D site, rainfall data and intermediate catchment

mapping along with its contribution shall be included in the EIA report

- Bio-diversity study to be conducted by a suitable institute as per OM of MoEF dated 28.05.2013

- Realistic assessment of requirement of labour during the construction phase of the project shall be done and local labour shall be preferred. Mixing with local tribal community to be minimised and if need be, labour colony may be set up away from such inhabitants to avoid adverse impact on ethnic community.

- With regard to clearance for HEPs being located within 10 km of National Park and Sanctuary, instructions contained vide OM No. J-11013/41/2006-IA(I) Part dated 20.08.2014 will apply.

- Longitudinal connectivity through proposed dam is to be provided for ensuring non-disruptive biota movement and sediment transportation.

- Release of environment flow should be made in such a manner that real time monitoring is possible.

- Bio-diversity study is to be conducted through an institute published in the website of the Ministry.

- A site specific study to be conducted for assessing e-flow requirement and submitted.

Agenda Item No. 2.10 Bhagya Lift Irrigation, Madhya Karnataka- For ToR.

The proponent did not attend the meeting.

The meeting ended with vote of thanks to Chair

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Appendix

List of EAC members and Project Proponents who attended 77th Meeting of Expert Appraisal Committee for River Valley & Hydro Electric Power Projects held on 16th -17th September, 2014 in New Delhi

A. Members of EAC

1.	Shri Alok Perthi	-	Chairman
2.	Shri Vinay Kumar	-	Member
3.	Shri N. N. Rai	-	Member
4.	Shri S. Sathyakumar	-	Member
5.	Dr. K. D. Joshi	-	Member
6.	Dr. G. M. Lingaraju	-	Member
7.	Shri B. B. Barman	-	Member Secretary & Director, MoEF
8.	Dr. P. V. Subba Rao	-	MoEF

B. Dibang Multipurpose Project (3000 MW) in Arunachal Pradesh by NHPC – For reconsideration of Environment Clearance.

1.	Dr. Shahid Ali Khan	-	Chief (Environment)
2.	Mrs. Manjusha Mishra	-	Manager
3.	Shri V. K. Maini	-	General Manager
4.	Shri A. K. Sarkar	-	Executive Director (Planning)
5.	Shri Rahul Shrivastava	-	Environment Officer
6.	Dr. Aman Sharma	-	General Manager
7.	Dr. Ajay Kumar Jha	-	Assistant Manager
8.	Shri Y. K. Chaubey	-	Chief Engineer
9.	Shri Rajeev Baboota	-	Chief Engineer
10.	Shri I. D. Dayal	-	Executive Director (Design)

C. TSACHU-I HEP (43 MW) on the river Tsona Chu in Tawang District of Arunachal Pradesh – For ToR

Not discussed as PP was not present

D. Talong Londa HEP (225 MW) in Arunachal Pradesh by M/s. GMR Pvt. Ltd. -For Environment Clearance.

1.	Shri O. R. Lalitha	-	Principal Associate
2.	Shri G. S. Sharma	-	Vice- President
3.	Shri P. Senthurpandian	-	General Manager

4.	Shri Rajbir Singh	-	Head CA
5.	Shri Vivek Sadevra	-	Manager
6.	Shri Pravir Deshmukh	-	Assistant Manager
7.	Shri Ravinder Bhatia	-	Director
8.	Shri Rahul Deshmukh	-	SIA Expert

E. Shongtong-Karcham HEP (450 MW) project in Distt Kinnaur of HP by M/s. Himachal Pradesh Power Corporation Limited - For consideration Environment Clearance

1.	Shri D. S. Verma	-	AGM
2.	Shri Rakesh Sood	-	CES
3.	Shri Rahul Sharma	-	AE

F. Turu HEP Papum pare, District of Arunachal Pradesh by Mytrah Energy (India) Limited, Arunachal Pradesh- For ToR

G. Par HEP Papum pare, District of Arunachal Pradesh by Mytrah Energy (India) Limited , Arunachal Pradesh- For ToR

1.	Shri Deepak Jain	-	Sr. Manager
2.	Shri Janardan Baruah	-	DGM
3.	Shri Rajesh Kumar Mahana	-	Hydro Expert
4.	Shri Nupesh Patle	-	Assistant Manager
5.	Shri Kunal	-	Director
6.	Shri Subhash Karri	-	Sr. Manager
7.	Shri Ravinder Bhatia	-	Director

F. Kundaliya Major Irrigation Project on River Kalisindh in Rajgarh and Shajapur District of Madhya Pradesh by Water Resources Department , Bhopal, Government of Madhya Pradesh- For reconsideration of Environmental Clearance.

1.	Shri R. S. Julaniya	-	Principal Secretary
2.	Shri M. S. Dhakad	-	Commissioner
3.	Shri M. G. Choubey	-	Engineer-in-Chief
4.	Dr. Aman Sharma	-	General Manager
5.	Shri S. K. Nigam	-	Superintending Engineer
6.	Shri Anil Singh	-	Executive Engineer
7.	Sushil Parmar	-	SDO
8.	Dr. S. K. Tyagi	-	Chief (Ecology)
9.	Shri Amit Sharma	-	Engineer

H. Nyamjang Chu HEP (780 MW) Project in District: Tawang, Arunachal Pradesh by M/s. NJC Hydro Power Ltd- For re-examine of e-flow

Was not discussed as PP was not present

I. Chhatru HEP(108 MW) in Lahual & Spiti District Himachal Pradesh by M/s. DCM Sriram infrastructure Ltd. – For re-consideration of Environment Clearance

1.	Shri Ajit Kumar Awasthi	-	CEO
2.	Shri Manoj Kumar	-	General Manager
3.	Dr. N. J. Singh	-	Director
4.	Shri Prem Das	-	Dy. Business Head
5.	Shri K. S. Raghav	-	Sr. Consultant
6.	Shri S. K. Jain	-	Director & Coordinator
7.	Dr. Sunil Bhatt	-	FAE & Sr. Specialist
8.	Ms. Subhashree Adhikari	-	AFAE
9.	Shri Sunil Batta	-	Vice President
10.	Shri Atul Handa	-	Head I&I

J. Siang Upper Hydro Power Project , Stage-II District Upper Siang, Arunachal Pradesh- For ToR

1.	Shri Tulshi Baruah	-	Executive Director
2.	Shri Dayashankar Rai	-	General Manager
3.	Shri Jawahar Chaudhuri	-	General Manager
4.	Shri N. K. Meo	-	General Manager
5.	Shri Kamalendu Deb	-	Sr. Manager
6.	Shri C. R. John Zeliang	-	Sr. Manager
7.	Shri Ramanan	-	Technical –Head
8.	Shri Rahul Tripathi	-	Head- Project
9.	Shri Sanjeev Bajpai	-	Director
10.	Dr. Aman Sharma	-	General Manager
11.	Dr. S. K. Tyagi	-	Chief (Ecology)

K. Tidong –II (60 MW) HEP, Kinnaur District, Himachal Pradesh – For Consideration of Final Report.

1.	Dr. Vinay Kumar Pandey	-	Sr. Geologist
2.	Shri Vinod Kumar	-	Director
3.	Shri S. K. Jain	-	Managing Director
4.	Dr. Sunil Bhatt	-	Spe. EIA
5.	Ms. Subhashree Adhikari	-	Dy. Specialist)

L. Bhagya Lift Irrigation, Madhya Karnataka- For ToR.

The proponent did not attend the meeting.

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