Minutes of the 60th Meeting of the Expert Appraisal Committee for River Valley and Hydroelectric Projects constituted under the provisions of EIA notification 2006, held on 7-8th September, 2012 at in New Delhi.

The 60th Meeting of the Expert Appraisal Committee (EAC) for River Valley and Hydropower Projects was held during 7-8th September, 2012 at SCOPE Convention Centre, Opp. Jawahar Lal Nehru Stadium, New Delhi. The meeting was chaired by Dr. B. P. Das, Vice-Chairman on 7.9.2012 and by Shri. Rakesh Nath, Chairman on 8.9.2012. The Chairman welcomed the newly nominated Member-Secretary Shri. B. B. Barman, Director, MOEF in place of Mrs. Sanchita Jindal and introduced to the Committee Members. The Chairman also informed that Dr. T. S. Nayar, Member of the EAC had submitted his resignation from the EAC. The resignation letter was handed over to the Member Secretary for further necessary action and also requested to consider taking-up a suitable member in the EAC. The Committee also placed on record the valuable services rendered by Ms. Sanchita Jindal as Member-Secretary of the Committee. The list of EAC Members and Officials from various projects who attended the meeting is enclosed at Annexure-I

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

1st Day (7.9.2012)

1. Agenda Item No.1: Welcome by Chairman and Confirmation of Minutes of the 59th EAC Meeting held on 20-21st July, 2012.

The Chairman welcomed the members. The minutes of the 59th EAC meeting were confirmed with the following amendment **–**

(i) In agenda item no.2, at page 5 after the first paragraph (ii), the following paragraph is added:

"In view of the above, the EAC (committee) is of the view that to make the study more comprehensive, detailed documentation of flora and fauna covering all the groups should be carried-out including the post monsoon season giving emphasis on endemics and RET species"

2. Consideration of Project proposals for Scoping and Environmental Clearance.

The following project proposals were considered

2.1 Reoli–Dugli Hydroelectric Project (420 MW) in Lahaul-Spiti District of Himachal Pradesh by M/s L&T Himachal Hydropower Ltd. – For ToRs.

The project proponent presented the Reoli–Dugli 420 MW hydroelectric project in Lahaul-Spiti District of Himachal Pradesh. The committee, from the presentation, noted that the project envisages construction of 75 m high concrete gravity dam across river Chenab near the confluence of Darhi nala and Reoli nala with Chenab

river to generate 420 MW hydropower. This project is in between downstream of Seli HEP and upstream of Purthi HEP projects. This is a run-of-the-river scheme. The total land requirement is about 182 ha. Total submergence is 66 ha. A surface powerhouse is proposed just upstream of the confluence of Reoli nala with river Chenab near Reoli village with 4 units of 105 MW each. There is no national park/ wildlife sanctuary/biosphere reserve/historical monuments are present in the project area. Total cost of the project is about Rs. 2604 Crores and will be completed in 7 years.

The committee noted that in the PFR, the clear distance between FRL of downstream project and TWL of upstream project in km shown in the line sketch is misleading. The TWL of Seli HEP being identical with the FRL of Reoli-Dugli HEP and there is no clear river flow stretch between the two. The same comment applies to the Reoli-Dugli and the next D/S Purthi HEP (U/S TWL is 2333.2 m and the D/S FRL is also 2333.2 m) as seen from the line sketch in the Form-1 document. Thus, this gap being about 50 m, is detrimental for the environmental health of the river. It should be sorted out through discussion among the Project proponents of the 3 contiguous projects such that a minimum of 1 km (preferably more) clear river flow stretch is available between the TWL of the upper project and the FRL of the next lower project.

Rainfall data of three stations, Gondla (932 mm), Keylong (494.7 mm) and Koksar (923 mm) in the central part of the basin reveal an average catchment rainfall of 816 mm, but this figure can be considered valid for about 1500 Km^2 of lower basin. The proponent's assumption of rain-fed area as 2251 Km^2 does not seem rational. Average annual runoff of 7490 Mm^3 is arrived by co-relating to discharge data of Udaipur based on CWC's observation. The basin area of 5910 Km^2 at Udaipur is considered as representative for Reoli-Dugli project from hydro-meteorological consideration. The project proponent have carried out the estimation of yield by three methods: i) a catchment area proportion method, ii) a variation of this while utilizing Udaipur and Gulabgarh data (a downstream station) following guidelines suggested by CWC, and iii) a method based on snow melt segregation. However the CWC has approved (June-2012) the hydrologic series for the project from which 10-daily discharge for the period 1976-76 to 2009-10 have been derived and used in power potential studies.

The proponent considered the 90% Dependable year as 1993-94, which ensure a power drawl of 341.5 Cumec with an additional 20% for flushing of silt amounting to a total drawal of 409.8 Cumec through the intake. An examination of the 90% Dependable yield series in monsoon reveal the following:

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Period		In Cumec
June	1-10	317.44
	11-20	490.73
	21-30	477.09
July	1-10	674.65
	11-20	676.84
	21-31	469.88
August	1-10	516.35
	11-20	414.60
	21-31	488.16
September	1-10	370.80
	11-20	256.41
	21-30	208.40

In order to maintain a desirable spill of 30% in the monsoon, 134.04 Cumec flow on an average need to be released, which appears feasible. The proposed withdrawal of 341 Cumec would ensure 30% spill. However, in the later part of September 10 through 30, the spill should be about 60 Cumec, followed by 10 Cumec as environmental release between November to April. In the aquatic ecological study, the promoters are to justify the adequacy of discharge, velocity and depth in the lean season. The promoters categorically assured that at DPR stage, a design drawl not exceeding 341 Cumec would be ensured in the interest of ecological sustainability. Thus a healthy river flow will be maintained over the 13 Km long (HRT 10.775 Km) deprived river stretch.

With regard to non-availability of any free flowing reach, the promoters were asked to examine shifting of the PH by 1 Km upstream at the DPR stage. Further a 7 MW dam toe unit (the promoters suggest 5 MW) that will release about 7 Cumec continuously need to be provided to ensure adequate release both in the monsoon and non-monsoon to take care of diurnal variation. The intermediate catchment contribution between the dam and TW release need to be detailed with neat maps.

The committee after thorough scrutiny & examination of various issues sought the following additional information:

- Form-1 – in Environmental sensitivity column (iii) point no.1 the forests getting submerged or diverted may be protected under Indian Forest Act, 1927. The native species should be “Yes”– accordingly correct the Form-1. In Form-1 under 1.30 the answer should be “Yes” as some area is getting submerged
- EAC categorically asked whether any revision would take place depending upon the water availability. The project proponent has clearly mentioned that they as satisfied with the present proposal and no proposal will be made for capacity enhancement in future and stick to 420 MW only.
- Feasibility of minimum shifting of the powerhouse to upstream be studied
- Gauzing stations should be installed in the project area to find out actual rainfall at the project site
- Giving statement mentioning that “no human habitation in the project area” may be checked

- There appears to be a serious problem of leaving only 148 m free river stretch with 0.8 m elevation difference between TWL of Seli Power House and FRL of Reoli-Dugli reservoir. If considered the free board that is meant for providing a cushion for surges occurring due to winds, the top of Reoli-Dugli barrage shall be higher than the Seli Power House, which is not desirable.
- The free stretch of 148 m with 0.8 m elevation difference equivalent to a slope = 1 in 182.5 may be checked from actual longitudinal section of the river, which needs to be provided. The indicated stretch length of 148 m appears to be on higher side.
- A disaster management plan should consider flood plain mapping for dam break flood scenario considering three dams, viz., Seli, Reoli-Dugli, and Purthi, in series.

The project proponent clarified that a dam tow power house of 10 MW to ensure unhindered environmental flow release has been planned. The Committee, while appreciated this, noted that the documents do not clearly speak for this. Therefore, the project proponent has to indicate the following:

i. The continuous flow in cumecs corresponding to 10 MW capacity,
ii. The release as a percentage of the 4 leanest months average flow in 90% dependable year,
iii. As to whether monsoon season environmental flow release will be 30% of the average flow of the 4 monsoon months with occasional release of a few flood pulses,
iv. As to whether the environmental flow release during the 4 non-lean and non-monsoon months (April, May, October and November) will be between 20% and 30% of the average flow in these months.

Regarding flow release, as mentioned at Items (iii) and (iv) above are to be maintained in view of more than 10 km long HRT entailing a longer length of river diversion. The Committee also observed the following for compliance:

- Merely 148 m free river stretch between two dams is a matter of serious concern for existence of aquatic biodiversity and fisheries.
- Detailed geological survey and structural mapping is essentially required of the geological formation around the proposed reservoir are as well as P/H site. Seismotectonic studies of the region are required to be done at least for a period of one year. The EAC advised to install a local network of seismographs for monitoring of micro-earthquake activities.
- Baseline survey for 3 seasons has to include qualitative and quantitative assessment of periphyton and macro-benthos
- Efforts to be made to explore and document available fish species in the river stretch
- Availability of cold water fish of higher altitude-*Diptychus maculatus* in the river should be ascertained
- In EMP, stocking of brown trout in the river stretch/impoundment and also arcitic char for development of fish hatchery to be explored.

- While carrying out EIA studies special effort may be attached to ascertain the presence of species such as Snow Leopard, Bharal and Ibex particularly during winters.
- Impact of 11 km long HRT would affect the avifauna and riverine birds species. Therefore, effect of tunnelling and diversion of water on them needs to be assessed in detail
- All the standard stipulations in the ToR of EIA notification of 2006 be adhered to
- As a part of aquatic ecological studies, the flow of sediments below the dam occurring during spills as well as from the descending basin will have to be estimated based on standard sedimentation formulate; so that a sediment budget in the riverine reach below the dam, under pre-dam and post-dam condition is prepared. This would be used to assess whether, spilling of sediment lower than the normal condition and due to lower flood spills / pulses will lead to a siltation of deposition in the mouth of lateral channels at their confluence to the main river. Such obstruction leads to blocking of migratory path for which imitative measures may be necessary.

2.2 Request for revision of TORs for revised capacity from 149 MW to 260 MW for Such Khas Hydroelectric Power Project on Chenab River in Chemba District of Himachal Pradesh by M/s L&T Himachal Hydropower Ltd.

The original project envisages construction of 52 m high concrete gravity dam across river Chenab near Pangi village to generate 149 MW hydropower. This is a run-of-the-river scheme. The total land requirement is about 102 ha and that is entirely forest land. Total submergence is 65 ha. An underground powerhouse is proposed on the right bank of the river with 4 units of 37.25 MW each. Total cost of the project is about Rs. 912 Crores and will be completed in 70 months. This project was earlier given TOR on 20.9.2010 for 149 MW.

The project proponent has given a detailed presentation on the revised project for 260 MW. The committee noted that the revised proposal appears to be technically sound and more environmental friendly. The Committee noted that CWC & CEA have cleared the project for a capacity of 260 MW. The present dam site is proposed 850 downstream of the earlier site. This will increase clear riverine stretch and would be closer to 1 km. The salient details now proposed vis-à-vis for the earlier scheme are

	149 MW Scheme	**260 MW Scheme**
Concrete Dam	52 m high	70 m high
FRL	2220 m	2219 m
MDDL	2210 m	2209.3 m
TWL	2210 m	2149 m
Gross Storage	8.5 Mm^3	25.24 Mm^3
HRT	3.5 Km	As Dam Toe, no HRT
Design Drawal	279.49 Cumec	428 Cumec
Land Required	89 ha (Forest)	102.48 ha (Total)
Power House	Underground	Dam Toe (Underground)

The increase in installed capacity is attributed to availability of higher discharge in the river based on approved flow series by CWC in June 2012, where 90% dependable year (1993-94) flow is derived as varying between 400 to 600 Cumec in June-September period, justifying a net power drawl of 428 Cumec. The consistency of the flow series is justified by referring to actual flow data (CWC) at downstream stations in J&K, Gulabgarh (8548 Km^2) and Benzwar (10687 Km^2). It has been noted that the downstream basin of 4000 Km^2 below Sach Khas gets annual rainfall up-to 3000-4000 mm against 1000 mm for basin upstream of Sach Khas and a derivation of yield from Benzwar is not hydrologically sound.

There is no free riverine reach upstream of reservoir tip (RL 2219 m) and downstream of the TWL (RL 2220 m) of Puruthi project. A nominal 200 m is shown in the report. This issue needs critical examination while studying ecological flow. Chenab below Tandi is progressively being obstructed fully by Seli, Reoli-Dugli, Puruthi and Sach Khas projects. Chenab river in this reach has good fish species diversity and their need for sustenance has to be studied by a reputed institute. On the downstream a good 6 Km of free riverine stretch is shown up to the downstream Duggar project.

The committee after thorough scrutiny and examination sought details on the following:

- Continuous discharge corresponding to operation of 7 MW machine and how does that compare in terms of percentage of the average lean season discharge, the average monsoon discharge and average discharges in April, May, October and November in 90% dependable year.
- As the scheme proposes release of entire water to the river in the monsoon, it is beneficial to the eco-system. However in the non-monsoon the 7 MW secondary PH will release about 12 Cumec continuously. During the day, the adequacy of this discharge from aquatic biodiversity consideration need to be substantiated. It is seen from the approved flow series for Sach Khas by CWC for the 90% Dependable Year 1993-94, the non-monsoon flow varies from 50 to 89 Cumec, which has to be given due consideration. A 10 MW secondary station may be a desirable option.

- Form-1 – in Environmental sensitivity column (iii) point no.1 the forests getting submerged or diverted may be protected under Indian Forest Act, 1927. The native species should be “Yes”– accordingly correct the Form-1. In Form-1 under 1.30 the answer should be “Yes” as some area is getting submerged
- Abrupt peaking discharge from dams will be highly destructive for biotic assemblage; spawning and feeding grounds of fishes. Such a continuous diurnal fluctuation would lead to complete extermination of the downstream biota and fisheries. Therefore, appropriate mitigation measures should be devised to mitigate the situation
- As per altitude and substratum conditions, the river stretch may hold some resident and migratory cold water fishes of Schizothoracids group. Hence, intensive efforts must be undertaken to explore and document available fish species in the river.

Experimental fishing with the help of different types of cast and gill nets and traps should be undertaken particularly during summer (lean) months

- Normal TWL has come down by 1 m in the revised proposal. It needs to be clarifed if it may interfere with FRL of the next D/S project. To delineate this, provide longitudinal section of the river.
- Give a comparison of the length of the clear river stretch both U/S and D/S projects, as measured from the corresponding TWL and FRL. The distances indicated in Fig.3 (8.4 Km and 5 Km) in the Form-1 do not give the actual situation in this regard, as the RWL-FRL elevation differences are seem to be very small
- From the fresh list of routine TOR appended at the end of Form-1, it is not clear where and why the revision sought from the TOR approved for 149 MW and now for the revised 260 MW
- EIA and EMP should be carried out afresh keeping in view the drastic changes in the features due to increase in installed capacity of the power house.

2.3 to 2.5 Par Hydropower Project (60 MW); Turu Hydropower Project (66 MW) and Dardu Hydropower Project (60 MW) on Pare River in Papumpare District of Arunachal Pradesh by M/s. KVK-ECI Hydro Energy Pvt. Ltd.- For Reconsideration of ToRs.

These three projects were earlier considered for TORs by the EAC in its 59th meeting held on 20-21st July, 2012. Certain additional information on PFR, Form-1 etc were sought. Because, although about 1 Km free stretch is available between the 2 projects, cumulatively about 37 Km river stretch is getting affected. Therefore, justification in this regard along with information on different streams joining the river in between and resultant water availability in the intervening stretches were needed.

Three hydroelectric projects - Par (60MW), Turu (66MW) and Dardu (60MW) having barrages as head works are sequentially planned as Run-of-the-river schemes on 149 km long Pare River, a tributary to Brahmputra joining the latter at the confluence of Subansiri. The three schemes along with Pare Dam just downstream of Dardu project combined utilize 40.5 Km of the river leaving 109 km as free riveirine reach. The critical reach from the consideration of fish migration of almost 40 km length below Pare Dam up-to confluence with Brahmaputra remain free. In addition, the three Projects with barrage as head-works will pose less hindrance to migration to over 100 km of the river.

Par Hydropower Project (60 MW)

The Par 60 MW hydroelectric project is proposed on the river Pare with 25.5 m high barrage with a HRT 7.75 km long having a diameter 4.5 m diameter. This is a run-of-the-river scheme. A surface powerhouse is proposed on the left bank of river with 2 units of 30 MW each. The total land requirement for the project is about 28.25 ha. Out of which 17 ha is forest land and 11.25 ha is private land. Total submergence will be 8.5 ha. The Catchment area up to project site is 420 Sq. km.

The average annual rainfall of the catchment estimated to be 2863 mm. The water availability has been based on CWC approved 10 daily discharge series at G & D site of Ranganadi HEP Stage-II for 27 years (1978-79 to 2004-05) for downstream Pare Dam Project and the observed data at Hoz G&D Site (CA = 803.35 Sq.km) by catchment area proportion with Pare 10-daily flow series. The catchment area proportion for the transposition of flow series from Pare to Par has been derived to be 0.51 (=420/824) and 0.52 (420/803.35) for Hoz G&D site data to Par HEP. The FRL and TWL of Par is 848 m and 631 m. The lean season environmental flow release will be 1.90 cumec which is 20% of the average flow of 4 leanest months in 90% dependable year. From the longitudinal section of the river, it was noted that there is no upcoming project in upstream of Par HEP and a clear distance between tailrace discharge of Par HEP and reservoir tip of immediate downstream Turu HEP is 1.07 km distance is maintained.

Two muck disposal sites have been identified and both are more than 50 m away from the HFL of the river. The total area for muck disposal allocated as 6.25 ha. in the project.

Turu Hydropower Project (66 MW)

The Turu 66 MW hydroelectric project is proposed across river Pare with 29.5 m high barrage with a HRT 7.95 km long having a diameter 4.5 m diameter. This is a run-of-the-river scheme. A surface powerhouse is proposed on the left bank of river with 2 units of 33 MW each. The total land requirement for the project is about 29.5 ha. Out of which 13.75 ha is forest land and 15.74 ha is private land. Total submergence will be 11.24 ha. The Catchment area up to project site is 560 Sq. km.

The average annual rainfall of the catchment estimated to be 2863 mm. The water availability has been based on CWC approved 10 daily discharge series at G & D site of Ranganadi HEP Stage-II for 27 years (1978-79 to 2004-05) for downstream Pare Dam Project and the observed data at Hoz G&D Site (CA = 803.35 Sq.km) by catchment area proportion with Pare 10-daily flow series. The catchment area proportion for the transposition of flow series from Pare to Turu has been derived to be 0.697 (=560/824) and 0.697 (560/803.35) for Hoz G&D site data to Turu HEP. The FRL and TWL of Par is 612 m and 419 m. The lean season environmental flow release will be 2.53 cumec which is 20% of the average flow of 4 leanest months in 90% dependable year. From the longitudinal section of the river, it was noted that the tailrace discharge of the project to reservoir tip of the immediate downstream project Dardu HEP is 1.50 km distance is maintained.

Dardu Hydropower Project (60 MW)

The Dardu 60 MW hydroelectric project is proposed across river Pare with 29.5 m high barrage with a HRT 8.61 km long having a diameter 4.8 m diameter. This is a run-of-the-river scheme. A surface powerhouse is proposed on the left bank of

river with 2 units of 30 MW each. The total land requirement for the project is about 82.7 ha. Out of which 18 ha is forest land and 64.7 ha is private land. Total submergence will be 64.2ha. The Catchment area up to project site is 710 Sq. km.

The average annual rainfall of the catchment estimated to be 2863 mm. The water availability has been based on CWC approved 10 daily discharge series at G & D site of Ranganadi HEP Stage-II for 27 years (1978-79 to 2004-05) for downstream Pare Dam Project and the observed data at Hoz G&D Site (CA = 803.35 Sq.km) by catchment area proportion with Pare 10-daily flow series. The catchment area proportion for the transposition of flow series from Pare to Dardu has been derived to be 0.862 (=710/824) and 0.884 (710/803.35) for Hoz G&D site data to Dardu HEP. The FRL and TWL of Par is 612 m and 419 m. The lean season environmental flow release will be 3.21 cumec which is 20% of the average flow of 4 leanest months in 90% dependable year. From the longitudinal section of the river, it was noted that the tailrace discharge of the project to reservoir tip of the immediate downstream project Pare HEP is 1.34 km distance is maintained.

The project proponent presented all 3 projects along with details on entire river stretch. The developers have now furnished neat tables and graphs depicting the hydro meteorological features of the basin. The EAC also desired justification for riverine gaps that exceed one km between projects and estimation of rational contribution of intermediate catchment. Observation made by the committee in the 59th meeting were compiled by the project proponent as detailed below.

Pare river drains a basin which receives very high annual precipitation between 2439 mm to 3074 mm. All the four R.G. station are in the catchment which form the basis of dependable hydrological analysis. The rain gage station Leporang (3069mm) adequately, represent Par catchment, The RG station Loptop (2870m) Sagalee (2439mm) and Jampa (3072mm) represent both Toru and Dardu project. The Yield series have been arrived at from the approved yield series by CWC for Pare Dam (for the period of 1978-79 to 2004-05) that intercepts 824 km^2 and from observed discharge data at HOZ G & D site (803 km^2) The consistency of the rainfall by double mass curve method was checked which was found adequate.

The project proponent categorically informed that abstraction approved from Par river for Pare Dam (825Km2) was 75 cumec and the members found this consistent with abstraction of 32.87 cumec for Par (420 Km^2) 41.48 cumec for Turu (560 Km^2) and 54.23cumec for Dardu (710 Km^2).

A critical examination of the yield data in monsoon when compared with the rain fall reveal that the monthly yield from June to September presented in the series for all the 3 projects amount to a runoff of only 40-50% of the rainfall. This is normally 70 to 80% of all Brahmaputra tributaries. It is possible that instantaneous peaks that arise from intense rainfall (a typical situation of 2002) such as 360 mm in 10 days of July 21-31, of which 250 mm occurred in 3 days, 350mm in 4 days of September are

missed in routine twice a day discharge observation. The significance of this is that the barrages planned are bound to spill instantaneous large flood over 6-12 hours stretch in three to four occasions in the monsoon which is not evident in the average 10 daily series. This issue is important as such spills are critical for the channel and aquatic biota by way of supplementing the environmental flow proposed for release. In the Water Environment study of TOR this would need to be specifically covered and quantifying high pulse by exhibiting spills occurring from short duration intense rainfall. The developers have analyzed the contribution of the intermediate catchment properly and the members were satisfied with provision of free riverine reach between Projects.

However, in the interest of sustaining the aquatic ecosystem a critical examination of the flow series was made. Over the basin, monsoon is seen to be active (from the precipitation data provided) between June 10 to September 20 after which the rainfall and yield drastically decrease. The detailed statements provided against '**Hydrology-Monsoon spills**' indicate spills short of 30% to 20 % in four or five years out of thirty years for all the three projects. In rest of the years the spills are much in excess even up to 150 to 170% of the drawl. To ensure adequate environmental flow release which will lead to a spill close to 30% in the monsoon even in the 90% dependable year, the following environmental release is recommended along with the TOR

Name of the Project	**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**
Par	7.0 *	5	2.0	2.5
Turu	9.0 **	6	2.5	4.0
Dardu	12.0 ***	7	3.0	4.5

* May is considered starting of upstream migration of Mahaser

The committee after thorough scrutiny & examination of various issues for all 3 projects and from the foregoing observations and with stipulation of the environmental flow release considers that these three projects meet adequately the aquatic bio-diversity need. The justification of cumulative utilization of 37 km is provided by the project proponent from contribution of intermediate streams joining the river and which has been shown in neat catchment area map now provided in compliance commented by EAC. The committee recommended these three projects for scoping clearance and approved the TOR with the following additional TORs:

- The water availability/water extraction and utilization for the par and downstream ecology study is required to be taken. Cumulative impact of all 3 projects should be studied and along the affected 50 Km length, the effect on aquatic ecology with and without dam should also be studied
- As a result of impounding at the barrages, sediment may lead to silting at the mouth of large lateral channels such as Langban nallah and Nimte nadi to which fish would be migrating for breeding. The sediment inflow and outflow at each barrage site be studied and its general impact on channel morphology evaluated
- Baseline studies – Biological environment (i) include number and basal area of trees of different species in the submergence area (ii) number of quadrats (iii) amphibians
- The area is rich in flora which includes ferns, orchids and a number of Rhododendron species. A detailed study has to be conducted for the project, since number of references have been cited in the PFR related to flora/vegetation studies which include information on endemic and RET species.
- A well designed Fish pass need to be constructed in all the three projects specific to the need of migratory fish
- Geological studies have been done, as required for the project. However, seismic studies are essentially required as the region falls in Seismic zone V.

2.6 Request for Extension of Validity of ToRs for Kangtanshiri 80 MW Hydro Power Project in West Siang District in Arunachal Pradesh by M/s Kangtangshiri Hydro Power Pvt. Ltd.

The project proponent has submitted a request to the Ministry for an extension of 1 year for Kangtangshiri hydroelectric (80 MW) project in Arunachal Pradesh. The Ministry granted Scoping/TOR clearance to this project on 20.10.2010. The validity of 2 year period of the TOR will be over in October, 2012.

The project proponent has mentioned that the 1 year extension will enable them to finalize the DPR, EIA/EMP and thereafter conducting the public hearing. There is no change in the scope of the project. The committee examined the proposal in view of the justification given and recommended the extension of validity of TOR for 1 year for the project and also recommended timely completion of the remaining/ pending works.

The Committee also mentioned that the project proponent critically monitor progress of remaining works, prepare monthly progress report and submit to MoEF. This will help ensuring completion of remaining works in a time bound manner.

2.7 Suntaley Tar Hydroelectric Project (40 MW) in East Sikkim of Sikkim by M/s. Moser Baer Electric Power Ltd - For TORs.

The project proponent made a detailed presentation on Suntaley Tar 40 MW hydroelectric power project in East Sikkim of Sikkim for Scoping/TOR. The committee

noted that this is a Category-B Project. The project falls within 10 km radius of Pangolakha Wildlife Sanctuary, and therefore, the project has been submitted to Ministry for consideration at Central level. The proposed project barrage is about 1.6 km away from the tail water level (TWL) of existing Chuzachen HEP (99 MW), which is an upstream project which is scheduled for commissioning shortly and a clear stretch of 1.0 km is available between the tail water level (TWL) of this project and full reservoir level (FRL) of downstream Bhasmey HEP (51 MW).

The project envisages construction of 17 m high barrage across river Rangpo Chu near village Karo to generate 40 MW hydropower. Total land requirement is about 39.02 ha. Out of which, 13.01 ha is forest land (out of this submergence is 7.80 ha) and 26.01 ha is private land. A surface powerhouse is proposed on the right bank of the river with 3 units of 13.33 MW each. Total cost of the project is about Rs. 300 Crores and will be completed in 3 years.

The project proponent informed that the Rangpo Chu River runs for a length of 51.7 km from its origin to the confluence with Teesta River, out of which 32.5 km is free flowing stretch at present including the proposed diversion for this project. The committee enquired as to why three small units of 13.33 MW have been proposed instead of two bigger units and desired to know how the unit size is fixed. The project proponent mentioned that the practical constraints of transportation and to suit to the operating conditions of type of turbines, three small sized turbines have been designed. The Committee after scrutiny and deliberations, recommended scoping clearance with the following observations/conditions:

- The boundary of West Bengal is within 10 km of study area of the project area. The committee noted that the project components lie entirely in State of Sikkim and thus, public Hearing would not be required to be conducted in the state of West Bengal. However, the sampling of data in the West Bengal area can be taken to the extent possible. Sikkim is rich in biodiversity especially, nocturnal and wet forests. Thus, data collection must be extensive and experienced personnel must be hired for Biodiversity Study. Recommendations pertaining to wildlife/aquatic life in “Teesta Carrying Capacity Study” to be kept in mind while carrying out the study. Keeping in mind the wide range of fish biodiversity, comprehensive study on fishing in the river should be carried out.

- The proposed TOR is to include an item of study on D/S water requirement after diversion of bulk of the water towards the power house. It may be noted that the environmental flow requirement would vary in different seasons. The practice of most of the hydro power developers is to consider 20% of the average flow of four consecutive leanest months (usually December, January, February & March) as the environmental flow release for all the months except for the few monsoon weeks of high rainfall. This practice needs to be reconsidered. D/S release from the dam/barrage during the four monsoon months (June, July, August&September) should be 30% of the average monsoon flow with occasional pulse release of flood flows. The release during the non-monsoon and non-lean months should be between 20 and 30% of the average flow in April, May, October and November.

The monsoon months –September should be considered and 30% average of the monsoon flow should be adopted. During the monsoon at least one full flood is to be provided to rejuvenate the river at the downstream.

- Regarding muck disposal plan, the current norm is to maintain a minimum horizontal distance of 30 m between the outer edge of the muck retaining structure and the river bank at HFL.

- A detailed geological and structural mapping of the dam site is required. The PGA values are very average. It has to be analysed as a site specific parameter for seismic design.

- Aquatic ecology/downstream environmental flow study and basis for release of 1.87 cumecs should be explained along with hydraulic depth and velocity of river flow.

- The river stretch seems rich in biotic parameters, fish diversity and fisheries. Hence, efforts may be made to explore and document all available fish species, their composition and catch, if any. Experimental fishing with the help of different types of cast and gill nets and traps should be undertaken during lean/summer season.

- The river stretch seems to hold migratory mahseer and snow-trout fish species. Therefore, provision of suitable fish ladder/pass should be made to provide safe route to fishes for spawning and feeding purposes.

- The project proponent should develop some stretch of land near barrage as a biodiversity park to conserve, protect and promote the biodiversity of the area especially for butterflies.

2.8 Jerong Hydroelectric Project (90 MW) in West Siang of Arunachal Pradesh by M/s. Jerong Hydro-Electric Power Company Ltd - For TORs.

The project proponent made a detailed presentation on Jerong 90 MW hydroelectric power project in West Siang District of Arunachal Pradesh. The committee noted that the project envisages construction of 85 m high concrete gravity dam across river Siyom near village Karo to generate 90 MW hydropower. The total land requirement is about 108.35 ha. Out of which 95.35 ha is private land and 13 ha is unclassified forest land. Total submergence is about 64 ha. A surface powerhouse is proposed near village Karo with 2 units of 45 MW each. There is no national park/ wildlife sanctuary/biosphere reserve/historical monuments in the project area. Total cost of the project is about Rs. 562.50 Crores and will be completed in 4 years time.

The committee, after thorough scrutiny & examination of various issues for the project mentioned that one of the major problems in hydropower projects is gross interference with the natural and normal river flow regime and the riverine life. In this respect, the project proponent was requested to furnish the following:

i. The total river length interference in continuation including the reservoir length at FRL, the length of de-silting chamber (if any), the HRT, the length of power house complex and the TRT.

- Revisit techno-economic viability of the project as the current norms of release of quantum of environmental flow is not negotiable and the flow release mentioned at Item 29 of Annexure-III of the Form-1 document is, therefore, not acceptable. Minimum Environmental flow release should be 20% of the average of the 4 lean months of 90% dependable year. Environmental flows for the months October-November and April-May should be between 20% - 30% of the average flows of 90% dependable year for corresponding periods. The spill during the monsoon season should be about 30% of Monsoon flow for 90% dependable year.

ii. If the dam height of 85 m is above the river bed or from the deepest foundation level. If above the river bed, what alternative options/sites have been considered to reduce the dam height and hence reduce the reservoir submergence area.

iii. Depict the location of all the HEPs on Siyom River (and please enlarge the font size of all labels). In another 'L' section sketch of the Siyom River, please show the FRL-TWL data of all the HEPs and the clear river flow distance between contiguous HEPs.

After detailed deliberations, the committee recommended Scoping clearance and approved TORs for the preparation of EIA/EMP reports with the following additional TORs:

- Low discharge at the project site is not correct. Therefore, check/verify with Hirong HEP for 10 daily discharge of 90% dependable year to provide environmental flow in this project. A detailed hydrological investigation has to be conducted for this project.
- Power potential studies have to be conducted for this project and Explore the possibility of dam-toe powerhouse for this project
- 1 Km stretch of free of flow of river should have to be maintained in between the Projects
- There is no mention of aquatic biota and fisheries in the PFR. The different components plankton, periphyton, macro-benthos, fish diversity and composition need to be thoroughly studied and documented.
- Efforts must be made to explore and document available fish species. Experimental fishing with the help of different types of cast and gill nets and traps should be undertaken during lean/summer season.

MoEF may consider the above information/clarification, before issuing TOR to the project.

2nd Day (8.9.2012)

2.9 Revalidation of Environmental Clearance for Brutang Major Irrigation Project in Nayagarh District, Orissa by M/s. Water Resources Department, Government of Orissa - For Reconsideration.

This project was earlier considered by the EAC at its 58th meeting held on 1-2nd June, 2012. The committee after examining various issues of the project sought additional information on change in the land use pattern within the 10 Km radius of the project, change in water use pattern from the river, status of requirement of irrigation for the project, any change in scope of the project, progress of the work undertaken in the project, compliance to environmental safeguards, latest 6 monthly report submitted to Regional Office, any violation, adoption of better technologies for environment protection and conservation, conjunctive use of water, bottlenecks in implementation of the conditions which may require mid-course correct etc. The project proponent submitted the requisite information and also presented the same before EAC. The Committee also noted that the project has incurred an expenditure of Rs.127.90 Crores till date. The committee examined the proposal in view of the justification given and recommended the extension of validity of environmental clearance for 5 years for the project with the following additional conditions.

- Since Brutang is a tributary of the river Mahanadi, an abode of a valuable mahseer-*Tor Mosal Maharadicus*, Efforts should be made for conservation and management of the mahseer, along with other EMP provisions for fisheries development in the river and impoundment.
- For R&R provisions, the State Government of Orissa Plan and NRRP, 2007 should be followed and best out the 2 plans should be adopted
- A minimum 20 cumecs/sec should be released as environmental flow for sustenance of aquatic life at the downstream during lean season.

2.10 Teesta-IV 520 MW Hydropower project in North Sikkim District, Sikkim by M/s. NHPC Ltd – For Environmental Clearance (EC)

The project proponent made a detailed presentation on the project. The committee noted that the project envisages construction of a 65 m high concrete gravity dam across Teesta River near Chandy village in North Sikkim District for generation of 520 MW hydropower. This is a run-of-the-river scheme. An underground powerhouse is proposed to be located on the right bank of the river near village Phedang which falls in Dzongu area with 4 units of 130 MW each. The total land requirement is about 324 ha. Out of which 143.49 ha is Government/Forest land (including 31.5 ha river bed + 14.40 ha for underground works) and private land is 180.58 ha. Total submergence is 105.37 ha (68.82 ha Government forest/ land + 36.55 ha private land). A total 256 families comprising of 232 landowners/khadedars and 3 tenants are likely to be affected due to the proposed project. The NHPC R& R Policy will be followed for the project affected persons

The main components of the proposed project are located on the right bank of (Dzongu area) the river and the other establishments (project head-quarters, store, workshop & colony) will be on the left bank to minimize land requirements in the Dzongu area. The Kanchendzonga National Park (KNP) is at an aerial distance of about 6 Km from the dam site & Fambong Lho Wildlife Sanctuary (FLWS) is also within 6 Km from the proposed powerhouse.

The committee after thorough scrutiny, examination and discussions on various issues on the project made the following observations:

1. A map showing all projects u/s and d/s on the Teesta-IV HEP along the Teesta River and their technical details along-with clear-cut L-section of the river depicting all the projects
2. Keeping in view of the recommendations of the Carrying Capacity Study of Teesta Basin, the details of the planning of the Teesta-IV HEP and actions taken/provision made in the EIA/EMP should be presented including mitigative measures
3. Impact of Teesta-IV HEP on Dzongu area (a clear map) where no developmental activities are permitted and the area is not affected should be clarified with proper justification
4. 10-daily discharge for 90% dependable year and details of hydrology should be presented in tables
5. Project area is landslide prone and in view of the recent earthquake in North Sikkim, the committee desired to know the details of site specific study and also mentioned that separate arrangement for seismic monitoring stations should be made in Teesta-IV HEP for seismographic data
6. Location and cross sections of the muck dumping sites and retaining structure and their details to be presented. RCC wall should be provided for retaining at dumping site instead of Plum concrete wall. Stepping should also be provided to stabilize the slopes
7. CAT Plan should be rechecked and justification for 42 Sq. km. to be given

EIA Report

1. **Chapter 2 – Concepts and Methodology: Floristics and Forest Types-**

Inadequate sampling and documentation of plant diversity

- Sampling details are lacking – although there is a map (fig 2.3) showing sampling locations of seven parameters, it does not match with the details in the text? There should have been separate maps for each parameter.
- Sampling site locations given in the map are not clear. Details of the same needs to be properly shown on the map and GPS locations of the same also need to be given.
- Which is the lean season among the three seasons of study? Why winter months were not selected for lean season- give reasons?
- There is no floral/ vegetation documentation in the catchment area, submergence zone, area between dam and Power House and d/s of Power House while these PA areas are very crucial from impact point of view.

- For vegetation study, selection of only two sites that too only in two forest patches is biased and inadequate while 87% of the PA is under forest cover?
- Belt transect is for ecological studies and not biodiversity/ flora documentation & How many transects were taken- (only one?) Not clear from the Report-inadequate sampling

2. Chapter 8 –Forest Types & Floristics:

- There is no separate check list of different groups of plants (Angiosperms, Gymnosperms, Pteridophytes, Bryophytes, Lichens; Bamboos, Canes, Orchids, etc.) at different Project locations giving under families/Groups; Table 8.6 gives only Angiosperms and Gymnosperms (arranged family-wise) of Study area (which study area ???)–why not other groups of plants also? There is a good documentation of Lichens but Bryophytes are neglected!!!
- A good number of endemics and RET (Table 8.7) of the PA has been identified

3. Faunal Species

- Source (primary/secondary) for the faunal list should be given. Status of Otter has not been provided which is actually a schedule-II species. It was sighted at one of the project components.
- Under avifauna, White-rumped Vulture is a schedule-I and IUCN Critically endangered species. Also in the avifaunal listings no summer visitor category has been identified
- The reference books referred for bird field work are outdated and recent ones should have been used.
- **National Park/Biosphere Reserve**- The project is in proximity of Kanchendzonga Naitonal Park and Biosphere Reserve. A good authenticated map clearly showing all the project components including the reservoir should be shown along with the boundary of all the protected areas. Since the project is within 10 km from the boundary of Kanchendzonga NP, NBWL clearance should be taken.

EMP Report

In general a good EMP Report, except the following points which need to be addressed before it could be approved.

1. Chapter 4 Biodiversity Management Plan

(i) Since there are a number of Endemic and RET plant species recorded from the project area, there should have been specific biodiversity management plan for them, for identification of Conservation Areas, Protection, Promoting natural regeneration, Augmented planting, etc. with appropriate budget allocated for each activity with a specific plan.

(ii) Why no details have been provided for the Butterfly Park, for example total area, list of plants to be introduced to attract butterfly. The amount of Rs 3 Crores to Forest Department out of Rs 7 Crores is exorbitant and out of proportion unless the Butterfly Park is closed type (with net),

which comes under the Zoo category and for which permission is needed from Zoos Authority of India.

(iii) Peoples Biodiversity Registers (PBR) – As per the Biological Diversity Act preparation of official PBR is the mandate of State Biodiversity Board and not by individuals. Hence, allocation of Rs. 25 lakhs for PBR is superfluous and should be deleted. Instead prepare a detailed plan to conserve the endemics and RET species.

(iv) 4.4.2.5 Is it Forest Protection or Conservation. All the items listed and funds allocates relates to protection and not conservation!!!

(v) Location of the muck retaining crate wall (EMP Chapter-7) appears to be precarious in most cases, as they are just at the edge of the relatively flatter terrain immediately after which there is a steep down slope

(vi) Study on the effect of tunnel construction on spring flows should be carried-out

(vii) No section was found in the EMP on downstream water environment and environmental flow release. This aspect needs to be explained during presentation through a 10-daily discharge table showing the flow intercepted, flow diverted towards the powerhouse and the spill. The chapter on environmental flow in the EIA document does not give the specific information wanted i.e. the proposed releases (total spill) towards the downstream of the dam in the 4 monsoon months, four lean months and remaining 4 four months (April, May, October and November).

(viii) **Fishery Management Plan**

- The river Teesta is rich in aquatic biota, fish diversity and fisheries, hence serious efforts should be undertaken for conservation and management of the same.
- In most of the studies the Schzothoraichthys fishes are reported from Western Himalayas (J & K and adjoining waters). Availability of the same from Teesta need further verification.
- In a few earlier studies –Puntius dukai is reported as endemic fish to river Teesta, there is no mention about this in the present document, hence availability of P. dukai from the river need be confirmed.
- Availability of Barilius spp. is mentioned in the report, but the fish is not mentioned among 32 species listed in page 10-13 of the EIA report.
- The altitude and substratum of the river seems suitable for some eurythermal species- Labeo dyocheilus, Mastac embelus armatus, Puntius spp. etc.
- Unlike warm water Indian major carps, the coldwater fishes - mahseer and snow-trout need Flow-through Indoor hatchery system with hatching trays, troughs and feeding troughs. Provisions should be made for the same in the EMP.

The project proponent may furnish the above clarification/information for reconsideration of the proposal by the EAC.

2.11 Triveni Madadev Hydroelectric (78 MW) in Mandi and Kangra Districts of Himachal Pradesh by M/s. Himachal Pradesh Power Corporation Ltd.- For Reconsideration for TORs.

The project was earlier considered by the EAC at its meeting held on 10-11th February, 2012. The Committee noted that the proposed project is a run-of-the-river scheme to generate 78 MW of power. The project envisages the construction of a diversion gated barrage of 32 m height on Beas river at Beri village in Dharampur Block in Mandi District and a raised crested weir on Binwa Khad at Babal village in Baijnath Block of Kangra District. A surface powerhouse is proposed at Harsi village in Lamba Gaon. Total land requirement for the project is 482 ha out of which 384 ha is forest land and 98 ha is private land. Total affected villages are 27. The estimated cost for the project is Rs. 538.68 crores.

The L-Section of Beas River was shown. The Committee noted the FRL and TWL of upstream HEPs of Larji and Pandoh which are 20 km upstream of Thana Plaun- are the immediate upstream projects. There is free flowing river stretch of 5 km available between Thana Plaun and Triveni Mahadev and 6.7 km distance between Triveni Mahadev and Dhaulasidh HEP which is the downstream project. The river 'L' section sketch implies adequate free river flow length between Triveni Mahadev and its two contiguous HEPs U/S and D/S and this was found to be satisfactory.

The discharge data for the river is taken from Sujanpur Tihra downstream of the proposed project by Bhakra Beas Management Board (BBMB). The utilizable flow for both the dams is the regulated release (spill) downstream of Pandoh diversion dam and the contribution of intermediate catchment for which 28 years data is available as gauged at Sujanpur on river Beas. However, the data did not match with rain fall data and the Committee was not convinced with the water availability and preliminary data on bio-diversity, aquatic flora fauna etc. It was, therefore decided that complete hydrology with actual rain fall data for justifying availability of water for the project should be provided. Spill from Pandoh Dam may be separated from Sujanpur data and resubmitted.

Annexure VI (iv) of the Compliance Report, gives flow details during the monsoon and the non-monsoon months. The environmental flow release of 30% of the incoming flow is alright. But, environmental flow release of 20% of the average of the 4 lean months even during the non-lean months is less than desired. The proponent may examine if a little capacity reduction of the HEP could be effected for maintaining environmental flow release between 20 and 30% of the average 4-month flow during April, May, October and November..

After detailed deliberations, the committee recommended Scoping clearance and approved TORs for the preparation of EIA/EMP reports with the following additional TORs:

- Baseline survey for 3 seasons also to include qualitative and quantitative assessment of plankton (including both the phytoplankton and zooplankton) and periphyton
- **Muck Disposal Plan**- suitable sites for dumping of excavated material should be identified in consultation with the State Pollution Control Board and Forest Department. All Muck disposal sites should be minimum 30 m horizontally apart and above the HFL of river. Plan for rehabilitation of muck disposal sites should also be given. The L- section/ cross section of muck disposal sites with suitable slope and approach roads to be given. Financial out lay for this may be given separately.
- Minimum Environmental flow release should be 20% of the average of the 4 lean months of 90% dependable year. Environmental flows for the months October-November and April-May should be between 20% - 30% of the average flows of 90% dependable year for corresponding periods. The spill during the monsoon season should be about 30% of Monsoon flow for 90% dependable year.
- A site specific environmental flow study should be carried-out

2.12 Thana–Plaun Hydroelectric (141 MW) Project in District Mandi of Himachal Pradesh by M/s. Himachal Pradesh Power Corporation Ltd.- For Reconsideration of TORs.

The project was earlier considered by the EAC at its meeting held on 10-11th February, 2012. The Committee noted the salient features of the project. However, it was decided that since it is upstream of Triveni Mahadev HEP, it will be considered when the hydrology data substantiated with rain fall data shall be submitted for the entire Basin.

The L-Section of Beas River was shown. The Committee noted the FRL and TWL of upstream HEPs of Larji and Pandoh which are 20 km upstream of Thana Plaun- are the immediate upstream projects. There is free flowing river stretch of 5 km available between Thana Plaun and Triveni Mahadev and 6.7 km distance between Triveni Mahadev and Dhaulasidh HEP which is the downstream project. The river 'L' section sketch implies adequate free river flow length between Triveni Mahadev and its two contiguous HEPs U/S and D/S and this was found to be satisfactory.

Annexure VI (iv) of the Compliance Report, gives flow details during the monsoon and the non-monsoon months. The environmental flow release of 30% of the incoming flow is alright. But, environmental flow release of 20% of the average of the 4 lean months even during the non-lean months is less than desired. The proponent may examine if a little capacity reduction of the HEP could be effected for maintaining environmental flow release between 20 and 30% of the average 4-month flow during April, May, October and November..

After detailed deliberations, the committee recommended Scoping clearance and approved TORs for the preparation of EIA/EMP reports with the following additional TORs:

- Baseline survey for 3 seasons also to include qualitative and quantitative assessment of plankton (including both the phytoplankton and zooplankton) and periphyton
- **Muck Disposal Plan**- suitable sites for dumping of excavated material should be identified in consultation with the State Pollution Control Board and Forest Department. All Muck disposal sites should be minimum 30 m horizontally apart and above the HFL of river. Plan for rehabilitation of muck disposal sites should also be given. The L- section/ cross section of muck disposal sites with suitable slope and approach roads to be given. Financial out lay for this may be given separately.
- Minimum Environmental flow release should be 20% of the average of the 4 lean months of 90% dependable year. Environmental flows for the months October-November and April-May should be between 20% - 30% of the average flows of 90% dependable year for corresponding periods. The spill during the monsoon season should be about 30% of Monsoon flow for 90% dependable year.
- A site specific environmental flow study should be carried-out

2.13 Baglihar Stage-II Hydroelectric (450 MW) Project in District Ramban of Jammu & Kashmir by M/s. J&K State Power Development Corporation Ltd.- For Environmental Clearance.

The project proponent made a detailed presentation on the project. The Committee noted that the project is only an extension of Baglihar Stage –I which has already been commissioned. The Stage-II envisages construction of intake having 2 bays- 1888.80 m long HRT, 79.5 m high surge shaft, 3 nos of steel line pressure shafts each 5.50 m diameter, underground powerhouse having 3 units of 150 MW each, 145 m long TRT and an outlet structure for discharge of water into river Chenab. No additional land required for the project. No R&R issues involved in the project. No National Park/Sanctuary exists within 15 Km radius of the project site.

The Public Hearing was conducted on 14.5.2012. The project proponent mentioned that though R&R issue is not involved in State-II, the grants have already been deposited with District Administration for disbursement of project affected people in Stage-I and compensation in respect of land/houses/other structures submerged due to construction of reservoir of Stage-I has been paid amounting to Rs.30.74 Crores. The project proponent ensured that necessary follow-up action will be taken to complete all activities on time before implementing the Stage-II project. The access to about 4000 population of Rajgarh, Bibrota, Kilaseri & Kunda villages across Chenab river has been provided by providing bridge and approach road. Water supply facility to about 5000 population in village Chanderkot has been augmented.

The project proponent has also clarified that a 10 bedded hospital with trained doctors and paramedical staff are serving the local population besides project staff by providing Medicare & free medicines round the clock.

Catchment area treatment works spread over 5 sub-watersheds & 99 micro watershed encompassing an area of 92,696 ha were taken-up by JKSPDC. Very Severe and severe land erosion areas were taken-up under Phase-I whereas the works are continuing to treat the remaining area as per targets.

A total amount of Rs.5966 lakhs have been allocated for Environmental Management Plan which include a grant of Rs. 2113 lakhs have been earmarked for CSR activities in the project.

The project proponent has also mentioned that the excavation of underground component of State-II project likely to generate 8.86 lakh m^3 of muck. Out of this 4.43 lakh m^3 will be utilized as construction material. The remaining muck will be dumped in 3 designated dumping areas (viz. MD-1, R/B of Nashri Nala; MD-2 & MD-3, behind Chandrakot workshop) having a capacity of 9.6 lakh m^3 with an allocated area of 6.91 ha. It has also been clarified that all 3 dumping sites are horizontally 150 m away from the river bed and retaining structures will be maintained above HFL in all the cases. The Committee categorically mentioned that the slope of the each muck disposal site should not be more than 35%.

The Committee also mentioned that during winter the generation of minimum 100 MW should be maintained round the clock in order to have continuous flow at the downstream of the project. The project proponent has clarified that 100 cumec flow will be available at the downstream. It was also clarified that minimum environmental flow of 13.6 cumecs water will be released at the downstream during the lean season. No substantial negative impact due to water withdrawal and regime will be maintained from plunge pool up-to TRT outfall with additional discharge being supplemented through 3 nallas namely Nachari, Pira and Gajpat Nala.

After detailed deliberations, the committee recommended environmental clearance to the project with the following conditions:

- The fish diversity of the river must be documented following scientific methodology. For production of stocking material of affected mahseer and snow-trout, flow through indoor hatchery system with hatching trays, troughs and feeding troughs should be established at the suitable site
- Environmental flow to be assessed based on the hydrological, hydraulics and ecological indices.
- Regular monitoring of water quality of the river both upstream and downstream to be carried-out

2.14 Request for Revision of Scoping Clearance & TOR for enhanced capacity from 140 MW to 180 MW for Chango-Yangthang Hydroelectric Project in District Kinnaur of Himachal Pradesh by M/s. Malana Power Company Ltd.

The Committee noted that this project earlier given TOR for the 140 MW capacity in 2008. A 23 m height diversion dam is proposed on river Spiti which is

tributary of river Sutlej to generate 140 MW hydropower. An underground powerhouse is proposed on the right bank of the river with 2 units of 70 MW each. Total land requirement is about 80 ha. Out of which 72 ha is barren un-demarked forest waste land. About 40 ha barren un-demarked forest waste land will be submerged. No national park/wildlife sanctuary/defence establishment/ notified eco-sensitive areas/ archaeological monument exists within 10 Km of the project area. No displacement of people is involved due to this project. Total cost of the project is Rs.1000 Crores and will be completed in 5 years.

Now, the project proponent has revised the capacity from 140 MW to 180 MW based on the water availability series of CWC and power potential study by CEA and also the salient features, comparison of old and revised lay out, hydrology, status of current studies and various environmental impacts under the revised proposal.

The project proponent informed the Committee that subsequent to approval of TOR that during detailed survey based on GTS benchmarks, location for Dam proposed in PFR was exceeding the project boundary of Chango Yangthang HEP and large area of private land and a part of NH-22 is submerging. In view of this, Government of Himachal Pradesh reviewed the project levels and confirmed the revised FRL as +El 2934 m in place of +El 2970 m by shifting the dam site D/S and TWL as +El 2795 m in place of +El 2810 m without any change in the location of power house and outfall structure. This has resulted in reduction in the length of HRT from 10.4 Km to 3.85 Km and availability of significant riparian flow U/S of reservoir for about 10 Km and D/S of TWL for about 2 Km. The Committee also noted that CEA has approved the power potential with an enhanced installed capacity of 180 MW considering a design discharge of 150 cumec in the revised scheme as compared to 107.5 cumec in the old scheme.

The Committee observed that although there is an increase in land requirement from 80 ha to 146 ha & the reservoir area from 40 ha. to 53 ha as a result of upward revision of capacity, there is a positive environmental impact in the revised scheme due to reduction in length of the tunnel, minimum effect on private land, increase in riparian flow and substantial reduction in the overall project reach making the scheme compact and with no submergence of National Highway.

After detailed deliberations, the committee observed that the TOR stipulations during 2008 have undergone certain changes particularly with respect to the norms of environmental flow release; muck disposal etc. and hence norms prevalent are to be followed strictly. The Committee agreed with the revised capacity of the project from 140 MW to 180 MW and recommended Scoping clearance for the preparation of EIA/EMP reports with the following additional TORs along with proposed TORs::

- The study area should be: catchment, dam site, area between dam and power house, power house and d/s of PH.
- Baseline Data: Include “Sampling location map for all the parameters” and Land Environment: Include “Contour Map, Drainage Map”

- Biological Environment: (a) Include “RET species – plants and animals as per IUCN, Botanical Survey of India, IUCN Red Data book, Wildlife Protection Act - Schedule species” (b) Include “Frequency, distribution of species, biodiversity richness indices, IVI, etc.”
- The EIA Report should also cover (a) Compensatory Afforestation Plan (b) Biodiversity & Wildlife Management Plan (c) Fisheries Management Plan
- Baseline survey for 3 seasons must also include qualitative and quantitative assessment of plankton (including both the phytoplankton and zooplankton) and periphyton
- **Muck Disposal Plan**- suitable sites for dumping of excavated material should be identified in consultation with the State Pollution Control Board and Forest Department. All Muck disposal sites should be minimum 30 m away from the HFL of river. Plan for rehabilitation of muck disposal sites should also be given. The L- section/ cross section of muck disposal sites and approach roads to be given. Financial out lay for this may be given separately.
- Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
- Minimum Environmental flow release should be 20% of the average of the 4 lean months of 90% dependable year. Environmental flows for the months October-November and April-May should be between 20% - 30% of the average flows of 90% dependable year for corresponding periods. The spill during the monsoon season should be about 30% of Monsoon flow for 90% dependable year.

- A site specific study on minimum environment flow should be carried out.
- The Committee considered the request made by the project proponent that data already collected could be utilized for the preparation of EIA/EMP studies.
- It is in record that in 2004, an artificial lake on the Pareechu stream (a tributary of the Spiti in Tibet) caused floods after a landslide, leading to heavy loss of life in the Sutlej and Spiti valleys. The safety of Chango Yangthang HEP may be in danger if a disaster occurs involving the Pareechu Lake. Therefore necessary safeguard measures are to be provided to prevent such disaster and also a disaster management plan has to be prepared in the event of such occurance.

- **EMP**: to Include “Green Belt Plan, Reservoir Rim Treatment Plan, Wildlife Management Plan"

The meeting ended with vote of thanks to Chair

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List of EAC members and Project Proponents who attended 60th Meeting of Expert Appraisal Committee for River Valley & Hydro Electric Power Projects held on 7th - 8th September, 2012 in New Delhi

A. Members of EAC

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

B. L&T Himachal Hydro Power Ltd

1. Shri P. Kathiravan, AGM , L&THHL
2. Shri D. N. Kalita, DGM, L&T HHL
3. Shri Ratnakar Pandey, Environment Manager
4. Shri B. Bhattacharjee, JGM, L&T HHL
5. Shri D. K. Sharma, GM, L&T HHL
6. Shri C. S. Damle, Director & CEO, L&T HHL
7. Dr. Aman Sharma, WAPCOS

C. KVK ECI Hydro Energy Pvt. Ltd.

1. Shri A. A. N. Kumar, Director
2. Shri Vimal Gary, Director, RSET
3. Ravinder P. S. Bhatia, Director (RSET)
4. Arun Bhaskar, Director (RSET)
5. Janardan Bakshi, (DGM) SNC Lavalin
6. Neha Singh, SNC Lavalin
7. Rajesh Kumar Mahana, SNC Lavalin
8. Nupesh Kumar Patle, KVK-ECI HEPL

D. M/s. Kangtangshiri Hydro Power Pvt. Ltd.

1. Ramesh Chandra, President
2. Praveen Thakur, Consultant
3. Basudev Barman, Engineer
4. Dr. Aman Sharma, WAPCOS

E. Moser Baer Electric Power Ltd.

1. Aksha, AVP
2. Shri S. K. Sharma, AVP
3. Shri Vimal Garg, Consultant
4. Shri R. S. Bhatia, Consultant
5. Shri Arun Bhaskar, Consultant
6. Shri Anubhuti Aggarwal, Sr. Engineer
7. Shri Araya Shah, Assistant Manager
8. Manoj Pathak, Manoj Pathak

F. M/s. Jarong Hydro Electric Power Company Ltd.- For ToRs.

1. Shri M. S. Gusain, President, CFSC
2. Shri S. Datta, Dam CESC
3. Shri P. K. Sanghi, Sr. GM, Lahueyer International India
4. Shri B. C. M. Reddy, Manager
5. Dr. Aman Sharma, Chief Engineer , WAPCOS
6. Mithiliesh Jha, Dy Manager, CESC

G. Water Resources Department, Bhubaneshwar, Odisha.

1. Engineer S. S. Patnaik, Ex- Director
2. Engineer, M. K. Mishra, Ch. Planner WR
3. Engineer R. N. Seroin, Ch. RVN
4. Engineer S. S. Pant, Director and Additional Secretary
5. Engineer K. R. Acharya, Director Planning
6. Engineer P. K. Swan, Executive Engineer

H. M/s NHPC Ltd

1. Shri Atul Kumar, GM (PLG)
2. Shri A. K. Chaudhary, CE (Teesta IV)
3. Shri B. Joshi, GM (D&E) NHPC
4. Shri Vipin Kumar, Chief Control, NHPC
5. Shri J. P. Bhatt, CISMAE, DU
6. Shri R. C. Sharma, Chief (Geology) NHPC
7. Shri M. Arora, Sc 'C' NIH, Roorkee
8. Shri Anish Gouraha, Manager (E)
9. Md. N. Alam, Am (E)
10. Shri Bharti Gupta, DM (C)
11. Anitha Joy, AM (Env)
12. Shri Doije Devora, CISHME, DM
13. Shri D. C. Nautiyal, CISMHE, DM
14. Dr. A. K. Sahav, CIFRI, Barrackpore
15. Dr. S. K. Bajpayee

I. M/s. Himachal Pradesh Power Corporation Ltd.

1. Engineer Ajay Kumar Patyal, General Manager, HPPCL
2. Engineer D. S. Verma, DGM, HPPCL
3. Mr. Sharma, MANLEC Consultant
4. Shri Sanjeev Sharma, ICFRE
5. Dr. A. N. Singh, Additional Director , ICFRE
6. Engineer Kaushik, CE
7. Engineer Vikas Gupta, Sr. Manager
8. Dr. Kewal Kothari, R&R Officer
9. Ms. Luxmi Versain , Geologist HPPCL
10. Shri Prashant Aggarwal, GM (SMEC)
11. Shri D. K. Kaushik, Consultant
12. Shri Ravi Kumar Sahu, Engineer (SMEC)
13. Shri Santosh Sharma, ED

J. M/s J&K State Power Development Corporation.

1. Engineer Zahoor Ahmad Chat, Executive Director
2. Engineer Navjan Mengi, Chief Engineer, BHEP
3. Yamesh Sharma, Principal Consultant, Montec
4. Shri Sanjeev Sharma, E. D. Mantee
5. Shri R. M. Nadeem
6. Dr. Vivek Maragel Sood, Montee

K. M/s Malana Power Company Ltd.

1. Shri V. R. Kapoor, Presedent
2. Shri R. K. Mahajan, Director
3. Shri Sumit Garg, GM
4. Shri B. S. Sethi , Chief Principal
5. Shri Shanlenia Kundan, Principal Engineer
6. Shri Searam, Principal Engineer
7. Dr. Mandal M.P, EIA Consultant
8. Shri Deepak Jain, EIA Consultant
9. Shree Kakohi Sengupta
10. Shri S. P. Bansal, Vice Presedent
11. Shri J. Kundam, AGM