

**Minutes of the 64<sup>th</sup> Meeting of the Expert Appraisal Committee for River Valley and Hydroelectric Projects constituted under the provisions of EIA Notification 2006, held on 1-2<sup>nd</sup> February, 2013 at SCOPE Complex, New Delhi.**

The 64<sup>th</sup> Meeting of the Expert Appraisal Committee (EAC) for River Valley and Hydropower Projects was held during 1-2<sup>nd</sup> February, 2013 at SCOPE Convention Centre, Opposite Jawaharlal Nehru Stadium, New Delhi. The meeting was chaired by Shri. Rakesh Nath, Chairman. Dr. K. D. Joshi, Member, EAC could not attend the meeting due to pre-occupation. The list of EAC Members and officials associated with various projects who attended the meeting is annexed.

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

**1<sup>st</sup> Day (1.2.2013)**

1. **Agenda Item No.1: Welcome by Chairman and Confirmation of Minutes of the 63<sup>rd</sup> EAC Meeting held on 26-27<sup>th</sup> December, 2012.**

The Chairman welcomed the members. The minutes of the 63<sup>rd</sup> EAC meeting were confirmed with the following amendment:

- (i) **Agenda item no. 2.3 & 2.4:**

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

and

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

The para on minimum environmental flow contained as one of the conditions to be read as under :

“A site specific study may be carried-out for establishing the proper environmental flow release during monsoon, non-monsoon, non-lean and lean months. Release of minimum environmental flow must mimic the pre-dam flow pattern of the river for sustaining the aquatic bio-diversity together with downstream user need and accordingly, water withdrawal for power generation is to be regulated. Minimum environmental flow release would be 20% of average of four months of lean period and 20% to 30% of flows during non-lean and non-monsoon period corresponding to 90% dependable year. The cumulative environmental flow releases including spillage during the monsoon period should be about 30% of the cumulative inflows during the monsoon periods corresponding to 90% dependable year”.

- (ii) **Agenda item no. 2.5:**

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

The para on minimum environmental flow contained as one of the conditions as well as figured at sl.no.4 on page no.11 to be read as under :

“The environmental releases in the Lean season and the Non-monsoon, Non-lean season would be 11.22 cumecs (20% of inflow) and 21.11 cumecs (20% of inflow). Since the monsoon flows of Chenab are very high, 8.75 cumecs is proposed as environmental release in monsoon so that the downstream flow is about 28% of the average inflow during that period instead of the originally proposed 30%. This flow will get supplemented as the intervening catchment area between Reoli Dugli dam site and Power House is 172 sq km which will also yield about 12.5 cumecs in monsoon and contribute to the downstream flow. The largest nallah, Harsar, with about 67 sq km of catchment area is located just 400 m downstream of the dam. The EAC thus, observed that the general norms of about 30% of average flow will be maintained towards environmental release during monsoon period”.

**(iii) Agenda item no. 2.15:**

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

Conditions with regard to Form-1 which found place due to inadvertence to be deleted and the following 3 conditions to remain:

- i. Environmental flow as accepted by MoEF as a part of final Lohit Basin Study shall be ensured by the proponent by appropriate combination, configuration and/or operation of turbines.
- ii. A project specific study on aquatic fauna should be carried out based on the secondary data as available and incorporated in the EIA/EMP report.
- iii. The EAC also recommended extension of validity of TOR for two more years to facilitate completion of remaining studies such as socio-economic studies, studies on aquatic fauna and also to complete revised engineering design & layout for enhancement capacity of 1080 MW.

**1<sup>st</sup> Day (1.2.2013)**

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

The following project proposals were considered

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

The project proponent did not attend the meeting. Therefore, the proposal could not be considered by the Committee.

**2.2. Shirapur Lift irrigation Scheme Project in Solapur District of Maharashtra by M/s. Water resources Department, Government of Maharashtra –for Reconsideration of TOR**

The project was earlier considered in 49<sup>th</sup> meeting of EAC held on 29-30<sup>th</sup> April, 2011.

The EAC sought certain additional information and clarifications including submission of revised Form-1 for reconsideration. Accordingly, the proposal was placed before the 64<sup>th</sup> EAC meeting.

The Chief Engineer of the Project has made a detailed presentation on the project. This is a Lift Irrigation Scheme to lift water from Shirapur KT Weir in 2 stages to provide irrigation facility in 10,000 ha. area in North Solapur Taluka of Solapur District and Tuljapur Taluka of Osmanabad District in Maharashtra. The project is on Bhima river, a tributary of Krishna. The water stored in Ujjani Dam will be fed to Sina River through Bhima Sina Link Tunnel and then stored in KT weirs across the Sina river. The water will be lifted in two stages up to 78.50 m height. The Gross Command Area (GCA) is 20,000 ha; Culturable Command Area is 16,000 ha and Irrigable Command Area is 10,000 ha. The proposed three canals i.e. Link Canal, Right Bank Canal and Left Bank Canal shall be 10.92 km, 21 km, 16.40 km respectively. A Wildlife Sanctuary for Great Indian Bustard is in the command area and the project is within the Wildlife Sanctuary. The total land requirement is about 507.43 ha. Out of this 158.43 ha is forest land and 349 ha is private land. The total project cost is about Rs. 5785.12 Crores.

There is proposal of constructing a number of weirs u/s of the proposed main weir at Shirapur for the purpose of drawing water to meet the demand of their respective command areas. 2 TMC of water is also to be provided to thermal Power Plant. Ujjani reservoir being more than 20 year old has lost considerable storage capacity due to silting. Considering all these factors and also a lot of sugarcane with high water demand are being grown in the area, a water budget may be made to show that the commitments made under Shirapur lift irrigation scheme can be fulfilled.

### **Water Availability:**

Water for the project assessed as 1.73 TMC is proposed to be drawn from Ujjani reservoir across Bhima river by a Ujjain Sina link which, itself is planned to irrigate 23,000 ha with an allocation of 3.15 TC from Ujjani reservoir. This reservoir with Live storage capacity of only 28 TMC has been planned for utilizing 87.78 TMC of water of Bhima river, available as surplus from the upstream catchment of Ujjani dam where the 75% dependable year is assessed as 248 TMC. However anticipated total water use upstream of Ujani dam was stated as 164.80 TMC, leaving 87.78 TMC to flow into Ujjani dam. The EAC observed that the Government of Maharashtra may advance a convincing explanation on this.

The project proponent need to explain the 75% dependable yield for the Shirapur scheme in the overall context of Ujjani dam, which is currently providing irrigation to 1,47,800 ha since 1992. Regarding the adopted cropping practice, the CE explained that almost 90,000 ha is under sugarcane in the flow command which would be consuming around 50-60 TMC against the allocation of 32.16 TMC. If it is true, then 1,00,000 ha of lift schemes planned from Ujjani dam would be suffering from serious shortage once they become operational. The CE also explained that a number of KT weirs have been constructed on Bhima river below Ujjani dam from which water is lifted to provide supplementation to sugarcane grown extensively in the Ujjani flow command of 1,48,000 ha.

A representation from local NGOs stressed that water of Ujjani dam is already over allocated and all the Lift Schemes would fail; because of wide spread unauthorized sugarcane coverage. It was alleged that the reservoir has not been getting filled up for the last 5 years and in the current year it is at Dead Storage Level during January, 2013. The CE explained that the reservoir did attain FRL in the last 5 years with storage up-to 110%.

It was informed that in the current year due to severe drought the inflow was only 30% from upstream and the sugarcane coverage is only 28000 ha. He stated that no sugarcane irrigation will be provided to the Ujani command in the final stage which will automatically lead to stoppage of sugarcane cultivation in the command. This is a crucial issue, which not only impacts the success of Shirapur lift irrigation scheme but also all the other Lift schemes and for the large supply planned for Solapur Thermal Station. The CE clarified that only 2 TMC has been allocated for the thermal plant against 35 TMC as alleged by NGOs.

The overall working table for the Ujani reservoir in a 75% dependable year could not be clearly explained which was a major clarification sought for in the 49<sup>th</sup> EAC meeting. The proponent were asked to submit a clear line diagram showing the Ujani reservoir and all off-taking scheme with water allocation data.

The main lift channel along with a few distribution channels from Sina river passes through wildlife sanctuary with good forest cover and land habitat of the Great Indian Bustard. On a query by the committee, the CE replied that these channels will be constructed using underground pipes so that the over land is not affected. This is as per suggestion of the state Wild Life Board. The Great Indian Bustard (GIB) is a critically endangered bird species now known primarily from India. As per the latest estimates, the number of birds present in the wild is around 250 making it one of the most threatened faunal species in India. The bird is basically a resident of arid and semi arid scrub areas and has historically been known from dry areas of western and peninsular India. Owing to large scale changes in land-use, now a few small populations of the species are often found in a mosaic of dry scrub forests and rain-fed traditional dry zone agriculture. Increase in the irrigation in the habitat is likely to make it unsuitable for Bustard. As per the information provided by the project proponent the area of the GIB Sanctuary at Nanaj, Solapur has been considerably reduced making is 1222 ha now, which too is in many disjunctive patches. Since Bustard is a large bird with large home ranges, it is expected that the bird would be using areas outside the legal limits of the sanctuary for many of its requirements. However since the areas surrounding the sanctuary patches will receive irrigation from the proposed project, their land-use is likely to change from dry rain-fed agriculture to well irrigated agriculture making this agricultural landscape unsuitable for Bustard which may make the 1222 ha Sanctuary unviable for Bustard conservation. The proponent are also to obtain the appropriate clearance from NBWL. The impact on the Wild Life Sanctuary has to be particularly studied for the Avi-Fauna particularly GIB and appropriate mitigation measures formulated.

Thus, the proponents were asked to resubmit their compliance report with supporting facts & figures in English (wherever Marathi has been used) only.

After detailed deliberations, the following suggestions were emerged:

- The documentation and presentation needs improvement
- Certain information during the earlier meeting has not been compiled properly & the clarifications have not been provided
- It needs to be explained as to how the lifted water will be distributed efficiently and equitably among the beneficiaries.
- Details of the crops to be grown under drip irrigation area is to be provided
- A minimum 10% area under drip irrigation is to be developed and maintained by the project and its cost has to be included in the budget.
- Rotational water distribution system and conjunctive water use to be detailed
- The details about the assumed crop productivity in the flow irrigated area and the basis of assumption may be provided.

- The project proponent has to explain as to how the commonly occurring losses of the expensive lifted water such as seepage loss, runoff loss, field application loss and the loss due to non-equitable water distribution shall be tackled in this LIS.
- Detailed time schedule of completing the essential CAD and OFD activities are to be submitted
- The details of the Wildlife Sanctuary for Great Indian Bustard have not been provided. There should be a separate Chapter on the WLS for Great Indian Bustard giving details of population, etc.
- Provide a clear Location map of the Project area and FCC showing the Wildlife Sanctuary and forests and other project attributes. Though no forest land is involved directly, details of the forests coming under the Project Impact Zone need to be given. A copy of the new notification of the GIB sanctuary in English (could be translated from Marathi if not available in English) may be provided.
- The Pre-feasibility report is 15 years old. The updated version of the same is to be submitted

**Proposed TOR:**

The project proponent should follow the standard TOR for irrigation projects.

- (a) Detailed Methodology to be followed for all the parameters to be studied; Sampling locations and intensity ( For example “Number and size of Quadrats”); in tabular form and in a map; instruments/ equipments used for the analysis; , include Contour Map/Slope;
  - (b) Baseline studies to include - Source of secondary information should be cited wherever required and citations included in a Reference List; Valuation of Biodiversity and Ecosystem Services will be studied.
- (ii) *Biological Environment to include –*
- (a) Forest type will be classified as per Champion & Seth’s (1968) classification; number and species of trees in the submergence area and their basal area
  - (b) General vegetation pattern will cover “All group of plants including Pteridophytes, Bryophytes and Lichens”;
  - (e) GPS reading of occurrence of RET plant species will be recorded for conservation and rehabilitation purpose.
  - (f) Under faunal elements include “All groups of animals including Amphibians” will be studied.
- (iii ) *Environmental Management Plan to include –* Compensatory Afforestation Management Plan will cover twice the area of forest land affected due to project activities.

(iv) Environmental Management Plan (EMP) to include “Management Plan for Water Logging and Soil salinity”

The project proponent was thus asked to resubmit the updated PFR and revised Form-I incorporating the above information and reply to the previous observations of EAC made on 29-30<sup>th</sup> April, 2011, for reconsideration of the project.

### **2.3 Revision of capacity Kirthai ( Renamed as Stage-I) HEP from 240 MW to 390 MW in Kishtwar District of Jammu & Kashmir by M/s. J & K Power Development Corporation**

The Executive Director, J&K State Power Development Corporation made detailed presentation of the project. The Kirthai-I HEP project was given scoping clearance on 25.9.2008 for 240 MW capacity. The proposal was to construct a 122 m high concrete gravity dam across Chenab river near Gulabgarh Villages in Kishtwar District of Jammu & Kashmir. An underground powerhouse was proposed with 4 units of 60 MW each. The total land requirement proposed was about 290 ha. Out of which 160 ha is forest land, 80 ha is revenue land and 50 ha is private land. Total submergence is 210 ha (out of which 160 ha is forest land). The total project cost proposed was Rs. 1500 Crores.

Intercepting catchment area 8530 Km<sup>2</sup> in Chenab basin, the Kirtahi HEP was originally planned as a 240 MW scheme by utilizing a drawl discharge of 256 m<sup>3</sup>/sec. A dam toe power house with two short inlet tunnels of length i.e. 225.93 m and 185 m and 6 m dia each feeding the powerhouse were planned. These parameters were based on the DPR (flow series 1973 to 1990) framed by CWC and scoping clearance with the above project features was accorded by MoEF on 25-09-2008.

The J&K State Power development Corporation has now submitted a revised proposal for capacity enhancement from 240 MW to 390 MW.

A relook of the flow series beyond 1990 up-to 2009-10 was undertaken by JKSPDC. It was informed that a fresh long term flow series was approved by CWC on 30.12.2011. As the monsoon flow in the 90% Dependable Year 2000-01 for the revised approved series ranged from 395 to 859 m<sup>3</sup>/sec, a design discharge of 385 m<sup>3</sup>/sec in the monsoon was approved by CEA on 18.7.2012 in place of earlier 256 m<sup>3</sup>/sec. The revised installed capacity is thus 390 MW (4 units of 95 MW + one 10 MW dam toe) with an underground powerhouse. No change of design features such as FRL, TWL, reservoir submergence, live storage, land area is envisaged and the location of the dam is also unchanged. The details of the earlier and revised project parameters are given below:

<b>S.No</b>	<b>Name of the Parameter</b>	<b>Original Proposal</b>	<b>Revised Proposal</b>
1	Capacity	240 MW	390 MW
2	Dam height	122 m	122 m
3	Dam height from deepest foundation	160 m	165 m
4	Land requirement	290 ha	290 ha
5	Forest land	160 ha	160 ha
6	Submergence area	210 ha	210 ha
7	Head Race Tunnel	2 ( 6 m diameter)	1 ( 10.5 m diameter)
8	Design discharge	256 cumec	385.50 cumec
9	Muck generation	10.93 lakh m <sup>3</sup>	12.18 lakh m <sup>3</sup>
10	Powerhouse	Underground	Underground
11	Units	4 x 60 MW	4 x 95 MW + 10 MW
11	Total cost	Rs. 1257.78 Crores	3126.59 Crores

The spillway design flood has been changed from 7400 cumec to 9140 cumec and accordingly to accommodate increased discharge, spillway has been redesigned. The diameter of diversion channel is increased from 10 m to 13 m to allow increased discharge. There is also no change in FRL of 1895 m as intimated earlier. An auxiliary powerhouse of 10 MW is proposed with a design discharge of 9.5 cumec on the right bank of the river.

After detailed deliberations, the following emerged:

- The comparative statement of salient features (240 and 390 MW) comprises two differing units (ha-m/year and mm/year). Uniform units may be followed for appropriate comparison and understanding
- Since the design features of both the projects are practically the same, the higher power output is due to higher water withdrawal for power generation. The JKSPDC is to provide 10-daily discharge table (for the 90% dependable year) under the subheads: (i) Flow intercepted at the dam, (ii) Flow diverted towards the power house and (iii) Flow spilling immediately downstream to the dam, for each of the two installed capacities (240 MW and 390 MW).
- This is to be clarified as to how does the 9.5 m<sup>3</sup>/s discharge through the 10 MW dam-toe powerhouses will meet the required ecological flows.
- Since, the HRT and the TRT lengths together are only a few hundred meter, it may be explained, if the dam-toe powerhouse has been conceived keeping environmental flow in mind or for a higher power generation.
- Details are to be submitted for estimated PMF of 9140 cumec.
- This may be explained as to how the diurnal storage is reduced from 13.99 to 13 MCM with the same FRL & MDDL.
- Dimensioned and labeled sketches of the muck disposal sites, including the retaining structure and its distance from the river at HFL have to be provided.

The committee noted that also for increased capacity of 390 MW, there is no requirement for additional land and no R&R work is involved. It was also noted that the TOR for this project was given during 2008 and since then several new issues have been included in the standard TOR, such as 30% water release during monsoon, minimum distance between TWL and FRL of upstream and downstream projects, muck disposal plans etc. Thus, the committee could not agree for making use of earlier EIA studies which has been already prepared for 240 MW also for 390 MW. It was also noted that the project proponent has already conducted public hearing for 240 MW which is not in line with EIA Notification, 2006. The Committee stressed that a fresh public hearing needs to be conducted after preparing EIA/EMP for 390 MW. The present proposal may be considered for fresh for 390 MW with following additional TOR:

- Environmental Evaluation: details of the environmental evaluation should be given and details of forest land/flora and fauna have to be presented in the EIA report
- Detailed site specific seismological study be carried out and geo-morphological mapping should also be done for the project area
- Power potential study with respect to 10 daily discharge in 90% dependable should be carried-out
- A site specific study may be carried-out for establishing the proper environmental flow release during monsoon, non-monsoon and lean months. Release of minimum environmental flow must mimic the pre-dam flow pattern of the river for sustaining the aquatic bio-diversity together with downstream user need and accordingly, water withdrawal for power generation is to be regulated. Minimum environmental flow release would be 20% of average of four months of lean period and 20-30% of flows

during non-lean and non-monsoon period corresponding to 90% dependable year. The cumulative environmental flow releases including spillage during the monsoon period should be about 30% of the cumulative inflow during the monsoon periods corresponding to 90% dependable year.

After detailed examination and scrutiny, the committee agreed for the revised capacity of 390 MW of the project and recommended scoping clearance for the project subject to submission of the above information/clarification. After, receiving the information, the Ministry may take a view for issuance of TOR for the project.

#### **2.4 Kirthai Stage-II HEP (990 MW) in Kishtwar District of Jammu & Kashmir by M/s. J & K Power Development Corporation – For Reconsideration of TOR**

The Executive Director, J&K State Power Development Corporation has made a detailed presentation on the project. This is a run-of-the-river hydro power project of 990 MW at the downstream of Kirthai Stage-I HEP. The project is under the purview of Indus Water Treaty 1960.

The project was earlier considered in 53<sup>rd</sup> meeting of EAC held on 29-30<sup>th</sup> March, 2012. Based on the observation of the EAC, the project proponent has submitted a revised Form-1 and PFR to the Ministry with downward revision of the capacity from 990 MW to 930 MW proposed on Chenab river in Kishtwar District of Jammu & Kashmir. The JKSPDC informed that due to the downward revision in the capacity of Kirthai Stage-II HEP, there will be no submergence of Paddar Valley. The FRL of Kirthai Stage-II HEP (930 MW) project is 1764 m and TWL is 1527.5 m and immediate upstream project Kirthai HEP (390 MW) project having FRL of 1895 m and TWL is 1784 m. The Kirthai State-II project is located about 5.5 Km downstream of Kirthai HEP thereby adequate free riverine stretch is available.

It was informed that the flow series have been approved by CWC on 1.9.2011. The approved flow series show that the monsoon flow in 90% dependable year ranges from 673.7 cumec to 1038.8 cumec which justifies a design discharge of 512 cumec with bifurcation of 413.47 cumec for 840 MW (6 x 140 MW) main underground powerhouse and 99.17 cumec for 90 MW dam toe powerhouse. Thus, the 20% release in lean season flow ranging from 50 to 70 cumec is adequate to meet the downstream release as environmental flow.

It is proposed to construct 121 m high concrete gravity dam from the river bed (165 m from the deepest foundation level) across Chenab river to generate 930 MW of hydropower. The HRT will be of 4.28 km long and 11.25 m dia with a design discharge of 485 cumec. The reservoir area will be about 1.473 sq. km with gross storage of 51.26 M cum at FRL. Out of the total catchment area of 29,050 sq. km. for Chenab Basin within India, 21,206 sq. km. lies in Jammu Region. The catchment area of the project is 9987 Sq. Km. Total land requirement is about 416.25 ha, out of which 227.25 ha is forest land, 149 ha is private land and 40 ha is government land. Total submergence is 331 ha (out of which 155 ha is forest land). About 15 families will be fully affected due to this project. The estimated cost of the project is Rs. 6087.48 Crores.

After detailed deliberations, the following emerged:

- The estimated PMF shown as 8140 cumec, whereas, the peak flood hydrograph shows 7440 cumec. This needs to be explained/reconciled
- Dimensions and labeled sketches of the muck disposal sites, including the retaining structure and its distance from the river bed at HFL have to be provided

After detailed deliberations, the Committee expressed its satisfaction over reduction in capacity from 990 MW to 930 MW as with this, land requirements and submergence area have come down, thereby saving Peddar valley. The committee thus agreed to the downward revision of the capacity of project to 930 MW subject to the following conditions:

- Keeping in view the proximity of protected forest land, the Environmental Sensitivity is to properly assessed and reflected in the EIA
- The EIA/EMP should also include the following points:
  - (i) Enumeration of all plant species belonging to all groups, especially trees – number of trees of each species and their volume in the submergence area;\_(ii) Studies on Economic valuation and Ecosystem Services will be carried out on the forest lost\_(iii) EMP: For Compensatory afforestation tree species affected in the forest will be utilized for planting.
- Land cover and land-use pattern should be given with False Colour Composition (FCC)
- Flora of the Project Area: “29 taxa of flowering plants” appears to very low. Details about Gymnosperms, Pteridophytes, shrubs and herbs are to be presented in the EIA report.
- The sampling locations are to be given.
- Sampling locations for floral/faunal studies appeared to be inadequate. Champion & Seth (1968) should be followed for forest types
- **Environmental Evaluation:** details of the environmental evaluation should be given and details of forest land/flora and fauna have to be presented in the EIA report
- Proposed Engineering and Biological measures: Use **Coir mats - geotextiles** on slopes to prevent soil erosion and for raising plantations.
- A study on environmental flow release needs to be included. Draw a separate column giving environmental flow, spill flow, turbine flow and flow through the dam-toe powerhouse. Check the total release d/s dam as per the prescribed norms. In any case release of minimum environmental flow must mimic the pre-dam flow pattern of the river for sustaining the aquatic bio-diversity together with downstream user need and accordingly, water withdrawal for power generation is to be regulated. Minimum environmental flow release would be 20% of average of four lean months of lean period and 20-30% of flows during non-lean and non-monsoon period corresponding to 90% dependable year. The cumulative environmental flow releases including spillage during the monsoon period should be about 30% of the cumulative inflow during the monsoon periods corresponding to 90% dependable year.
- The estimated PMF shown as 8140 cumec, whereas, the peak flood hydrograph shows 7440 cumce. This needs to be explained/reconciled

## **2.5 Revision of capacity Sawalkote HEP from 1200 MW to 1875 MW in Ramban District of Jammu & Kashmir by M/s. J & K Power Development Corporation**

The project documents were not received by the committee members and as such the proposal could not be considered.

## **2.6 Teesta-IV HEP (520 MW) Project in North Sikkim District, Sikkim by M/s NHPC Ltd - for Reconsideration of Environmental Clearance.**

The proposal was earlier considered by the Expert Appraisal Committee (EAC) for River Valley & Hydroelectric projects in its meetings held on 7-8<sup>th</sup> September, 2012 and 23-24<sup>th</sup> November, 2012. On both these occasions, the EAC sought additional information/clarifications.

Teesta-IV HEP with an Installed capacity of 520 MW is planned across river Teesta, with a basin area of 3910 Km<sup>2</sup> and envisages a 65 m high dam with power drawl 406.4 m<sup>3</sup>/sec through two HRTs 6.58 & 6.47 kms respectively.

The general concern regarding possibility of landslides studied in the carrying capacity study of Teesta river, project lying in MCT zone, Dzonghu area being impacted on the right side were clarified along with the flora and fauna issues during the 24<sup>th</sup> November. The decision to lower FRL from El 768 m to El 755 m to avoid submergence of Mela ground of Dzonghu community was considered absolutely essential.

A major concern however remained regarding the ecological flow release by spillage over the dam in the monsoon and in the lean season with 406 m<sup>3</sup>/sec withdrawal. The 10-daily flow series for the 90% Dependable year 1994-95 showed discharge in the range of 316.54 to 431.2 m<sup>3</sup>/sec during monsoon and an abstraction of 406 m<sup>3</sup>/sec if decided would lead to practically drying of the river over 7 Km of deprived reach spanning the HRT domain. This was of the major concern.

The environmental release of 10 m<sup>3</sup>/sec; that was proposed as adequate throughout the year on 24<sup>th</sup> November, 2012 though recommended by CIFRI for the lean season was considered highly inadequate particularly for the monsoon season.

Actual depth, velocity related to discharge up-to 20 m<sup>3</sup>/sec (release from the dam) was required to be examined, to establish adequacy for fish migration. NHPC however agreed for a minimum release of 20 m<sup>3</sup>/sec in the monsoon as environmental flow.

During the discussions held in November, 2012, the issue of environmental flow to be maintained at the downstream was prominent. The EAC carried out a critical review of the flow in the river, the issue of deprivation of the natural flow regime, river stretch below Teesta-IV dam going dry as has been represented by voluminous emails.

The NHPC Ltd was asked to adequately and convincingly address and explain the issue.

The NHPC made a detailed presentation on the project and replied to queries raised by the EAC during earlier meetings. The committee asked the NHPC Ltd to elaborate further the following two issues in detail:

- (i) Environmental flow releases during non-monsoon & non-lean months, lean months and monsoon months
- (ii) Estimated flow contributed by tributaries joining the river between the dam and the TRT discharge point – separate line sketches : one for lean season average, one for monsoon season average and one for other 4 months

The NHPC emphasized that ToR awarded by MoEF in 2009 required a study to be conducted through NIH, Roorkee and CIFRI, Barrackpore for estimation of environmental flow. The NHPC has accordingly got the study carried out. It was informed that NIH study concluded that 5 cumec environmental flow is adequate to satisfy the condition of **Class-C** river (assuming present condition of river in **Class- C**, because u/s projects are under construction). However, the NHPC agreed for higher release of 10 cumec recommended by CIFRI for sustenance of ecological integrity in the stretch between dam site and TRT. Accordingly, power potential study has been revised entailing some generation loss.

The NHPC, however, worked out and presented an alternative scenario of releasing 20 cumec as environmental flow during monsoon months as indicated by EAC, for sustenance of aquatic lives. Based on the available hydrological data, the project proponent mentioned that adequate water is available in the stretch between dam and TRT during monsoon for sustenance of Ecological integrity which is over and above the recommended release by two reputed Institutes. In this regard, the following were explained:

- Total catchment area between Teesta-IV and Teesta-V Dam is 397 sq. km and the intermediate catchment between Teesta-IV dam and TRT is 108.4 Sq.km. This intermediate catchment has been used for assessing the discharge of intermediate tributaries.
- The hourly gauge and daily discharge data is available at Teesta-IV Gauge and Discharge site & hourly gauges at Teesta-IV have been converted to hourly discharges by using rating curves.
- Hourly discharge data is available at Teesta-V dam site.
- The daily discharge of Teesta-IV has been subtracted from daily discharges of Teesta-V during monsoon period to assess the intermediate catchment contribution.
- The discharges so computed are reduced by catchment area proportion to calculate contribution of respective tributary of intermediate catchment.

It was thus shown that the maximum discharge on daily basis through intermediate tributaries from the downstream during monsoon goes up-to 206 cumec. There are about 175 days when the discharge is more than 50 cumec and 28 days when discharge is more than 100 cumec in 4 years of monsoon season.

The project proponent further substantiated their claim based on the flood hydrograph methodology as under:

- Few flood events were taken-up for further analysis from the daily discharge available during monsoon period
- The distance between two Dams is 13 km, the travel time between Teesta-IV and Teesta-V is about 1 hour and as such after applying a lag of 1hour, the discharges at two sites were subtracted on hourly basis.
- The discharge so computed was then reduced by catchment area proportion to respective tributaries of intermediate catchment.

- The discharge thus computed gives flood hydrograph on hourly basis.

It was demonstrated by NHPC that the discharges on hourly basis go as high as more than 300 cumec. During flood events, for many hours the discharges remain more than 100 cumec, which will keep on replenishing the main course of the river. These spurts of high peak occurring during monsoon period will not allow the sediment to settle at the confluence of these tributaries with Main River. In addition to above, it is also proposed to release 10 cumec during lean season and 20 cumec during monsoon period from the inflow being received at Teesta-IV Dam site on the downstream, which will further rejuvenate the river on a continuous basis.

The project proponent also demonstrated with the help of mathematical modelling that by releasing 20 cumecs from Teesta-IV dam during monsoon months and 10 cumecs during remaining months, the depth of water column achieved at different distance is adequate for the sustenance of ecology in the d/s. It was also explained that the water availability in the d/s stretch is further augmented by sluicing and flushing operation. For small reservoirs like Teesta-V and Teesta-IV, it is mandatory to carry out one drawdown flushing in each month of monsoon period.

The Committee expressed satisfaction with the explanations and calculations made on environmental flow and observed that 20 cumec release as environmental flow during monsoon months (June-September) and 10 cumec release as environmental flow during remaining months would be adequate to sustain the aquatic lives and carry silts.

The Committee further discussed the various representations received from Civil Society Organizations expressing concern against the project quoting the recommendations of Carrying Capacity Study recommendations, Public Hearing Report and site inspection report submitted by MoEF Regional CCF, Shillong for diversion of forest land for the project. The project proponent, in response, submitted the following:

1. The recommendations of Carrying Capacity Report have already been discussed in detail in previous meetings of EAC and a detailed action taken / proposed to be taken in r/o recommendations regarding Teesta –IV have been submitted to EAC. The NHPC will follow the recommendations relevant to the project.
2. The project proponent further mentioned that none of the recommendations of Carrying Capacity Study prohibits construction of Teesta-IV Project.
3. Public Hearing was held on the Namprikdang Mela Ground which is heart of Dzongu area and it was conducted peacefully and successfully. The attendees were agreed for the project.
4. As regards the observation of the Regional CCF, it was indicated that the issue was discussed during the FAC meeting held on 22.1.2013 for diversion of the forest land.

The EAC while expressing satisfaction over the response, asked for point-wise written reply to be submitted to MoEF by NHPC as was explained during the meeting.

The EAC, after the presentation of NHPC, their response on various issues and further deliberations, observed the following:

- The NHPC made a detailed analysis of the daily flow scenario in the 90% DY. This revealed that the flow in the river exceeded 400 m<sup>3</sup>/sec rising up-to 500 m<sup>3</sup>/sec at least six times for spells of 2 to 3 days between June 1 and July 16 and thereafter twice in August. Further spills varying from 50 to 150 m<sup>3</sup>/sec was evident over 30 days in the monsoon, which was not deciphered from the daily data. For the 80% DY spill occurred over 75 days in spells of 10 to 25 days with the highest spill of 900 m<sup>3</sup>/sec. The situation in 70%, 60% and 50% year, the scenario revealed daily spill of not less than 100 m<sup>3</sup>/sec in the entire monsoon period. In essence the flow below Teesta-IV dam would have low flows, high flows, flood pulses, mimicking the pre-dam situation over 80-85% of the years.
- Further contribution of the downstream tributaries (397 Km<sup>2</sup>) was arrived at by reference to actual flow data of 2010 and 2011 of Teesta-IV site (now gauged) and Teesta-V under operation, which revealed that the contribution was of the order of 20 to 310 m<sup>3</sup>/sec in the months of June, July, August 2010 and July, August 2011. This happens because the area receives 3000 mm of rain mostly in the monsoon. The proponent substantiated availability of abundant flow downstream of Teesta-IV, in the monsoon minimum of 50 to 1000 m<sup>3</sup>/sec and each flood event resulted in spill of 100 to 300 m<sup>3</sup>/sec which occurs at least 5 to 6 times in the monsoon. In addition the flushing discharge likely once in every month will leave a large spike flow of 200 to 500 m<sup>3</sup>/sec as was inferred from actual flushing data of Teesta-V. The augmentation by tributaries, flushing and significant spills at the dam would ensure sustainable riverine health and aquatic ecosystem.
- With regard to assessment of realistic depth and velocity in the river section from the dam to TRT, NHPC showed that based on actual gauging data (Sankalang G & D site) the manning coefficient 'n' was derived for range of discharge from 50 m<sup>3</sup>/sec to 600 m<sup>3</sup>/sec. The 'n' value worked out to be in the range of 0.1 to 0.13 for discharge upto 200 m<sup>3</sup>/sec whereas 'n' ranged from 0.14 to 0.19 for discharge range of 100 to 50 m<sup>3</sup>/sec. NHPC adopted a value of 0.15 (on the conservative side) for the environmental release of 10 and 20 m<sup>3</sup>/sec from the dam and the estimated depth was around 1.01 to 2.3 m for 10 m<sup>3</sup>/sec during lean season and 1.5 to 3.23 m for 20 m<sup>3</sup>/sec release during monsoon season supplemented by the intermediate streams contribution. This was considered satisfactory by the EAC for sustaining aquatic biodiversity.
- As a check on the consistency of abstraction quantum from the river, NHPC indicated the following pattern.

	<b>CA in Km<sup>2</sup></b>	<b>Design Drawal in m<sup>3</sup>/sec</b>
Teesta-III	2764	212
Teesta-IV	3910	406
Teesta-V	4307	292
Teesta-VI	4502	531

The abstraction of 400 m<sup>3</sup>/sec at Teesta-IV was therefore considered rational which also shows significant spill in the monsoon and adequate release (minimum 20 m<sup>3</sup>/sec) in the monsoon.

The committee also considered the conditions pertaining to minimum environmental flow issued to the NHPC during issue of ToR. After further deliberations, the EAC recommended issue of EC with the following additional conditions:

- (i) A separate provision under R&R Plan for bearing full expenses including tuition fees of at least two students of the project affected family (PAF) is selected on merit in a Government Engineering/Medical college. The maximum scholarship shall be limited to 2 students every year for five years. An additional provision of Rs. 25 lakhs have to be added in the R&R Plan.
- (ii) In the Community & Social Development Plan – the water supply connection should be made available in each house in project affected area based on their requirement.
- (iii) Enhance the budget of community toilets from Rs. 15 lakhs to Rs. 30 lakhs for nearby villages to ensure that 8 sets of good quality community toilets are constructed and maintained.
- (iv) Solid Waste Management Plan - the committee desired that in addition to the solid waste management of the project colony, the proponent should also contribute towards the solid waste management in the project affected area. An additional grant of Rs. 25 lakhs to be provided to the local civic authorities to be used for waste management.
- (v) Fuel & Energy Conservation Measures should have provision for installation of solar street lights in project affected area with an additional grant of Rs. 20 lakhs in the plan.
- (vi) Point-wise written reply to be submitted to MoEF by NHPC as was explained during the meeting in response to various representations and reports, copies of which were handed over during the meeting.

**2.7 Papu HEP (90 MW) Project in East Kameng District of Arunachal Pradesh by M/s. Papu Hydropower Projects Ltd - For consideration of TOR.**

The project documents were not received by the committee members and as such the proposal could not be considered.

**2.8 Ralong HEP (120 MW) Project in North Sikkim District, Sikkim by M/s Velankani Renewable Energy Pvt. Ltd - for reconsideration of TOR.**

**2.9 Chakungchu HEP (90 MW) Project in North Sikkim District, Sikkim by M/s Velankani Renewable Energy Pvt. Ltd - for reconsideration of TOR.**

The project proponent requested the committee to postpone to the next EAC meeting due to health ground. Therefore, the Committee has not considered these proposals. However, the information provided in earlier presentation regarding presence of protected areas (sanctuaries and national parks) within 15 km from project components seems to be incorrect. The proponent is required to provide a map duly authenticated by the forest department showing the Wildlife Sanctuary/National Park boundaries and the project components indicating the distance between them.

## **2.10 Rolep HEP (72 MW) Project in East Sikkim District, Sikkim by M/s Velankani Energy Pvt. Ltd - for consideration of TOR.**

The environmental clearance to Rolep HEP (72 MW) in Sikkim was accorded on 25.2.2004. The project was to be developed by a private company, named Rolep Hydroelectric Power Company Ltd. During 2005 the project authority had informed that they want to increase the installed capacity of Rolep project from 36 MW to 54 MW. They were requested vide the MOEF's letter dated 30.6.2005, to send their proposal through State Government for increasing the capacity. No response was received from the project authority.

As no construction work was started even after five years, the EC was cancelled in March 2009, as per provision of EIA Notification 1994 (*the environmental Clearance was valid for five years for commencement of the work*).

The proposed site for the present proposal for generation of 72 MW hydropower is same as mentioned earlier. The location of the earlier project's dam site was at Latitude – 27-17'-00" N, and Longitude – 88-44'-00"E. The present dam site's Latitude – 27-17'-4.6" N, and Longitude – 88-43'-15.4" E. Four (4) hectares of forest area was to be submerged for construction of 42.5 m concrete gravity dam for earlier proposal. Now for proposed project 10.71 ha forest is likely to be submerged for construction of 45 m concrete gravity dam. However pondage area is indicated against column No.1.21 as 0.5486 ha.

The present project is located on Rangpo River (tributary of Teesta River) near Rolep village in East Sikkim District of Sikkim. It is proposed to construct a 45 m high concrete gravity dam across Rangpo River to generate 72 MW of hydropower. Total land requirement is about 35.37 ha. Out of which 10.17 ha is forest land and 25.3 ha is private land. Total submergence is about 3.85 ha. The catchment area of the project is 195.33 Sq.km. A surface powerhouse is proposed with 3 units of 24 MW each. The total cost of the project is 630 Crores and will be completed in 40 months.

A detailed presentation was made by the project proponent. The following emerged:

- Neora valley National Park in West Bengal is 15 km away, as stated under Environmental sensitivity (III). However boundary of West Bengal is indicated 18 km. In a scaled map the distance of the National Park from project site should be shown. The protected areas of Sikkim (Pangolakha and Kyongnosla WLS) which are 5-6 km from the project components have been completely overlooked. It is suggested that a map duly authenticated by the forest department showing the Sanctuary/National Park boundaries and the project components indicating the distance between them may be provided.
- The distance between TWL of Rolep HEP and FRL of downstream project Chuzachen HEP is about 500 m. A minimum distance of 1 km should be maintained between 2 projects in order to have free flow of river.
- Only 1-season EIA data has been proposed instead of the standard 3-season EIA data.
- The reason for a drastic difference between the 5-year average values and the values in the year 2000 is not clear. The proponent is to clarify as to which data may apply to the Rolep HEP in view of the design discharge of 25.6 m<sup>3</sup>/s (Page 7).
- It is also to be clarified if there are other HEPs on the Rolep stream and on Rangpo chu that may have a cumulative effect on the river flow.

## **FORM 1:**

### *(I) Basic Information*

- Land Use/Land Cover - details of Private land as to whether it is Agriculture or Forest land and give FCC of the Project area in support of land cover are to be provided.
- 1.30: It should be “YES” as forest will be affected. Include - Creation of reservoir of 26.5 ha due to submergence will be a new land use. This is to be verified.
- (iii) A Location Map of Rolep HEP to be given.

## **PFER:**

- (i) Details of Reservoir area and length are to be given
- (ii) Detailed Location Map showing Forests – Protected area/WL Sanctuary/ National Park, etc are to be given
- (iii) Terrestrial Ecology: Biotic Environment- Vegetation Cover – Powerhouse Site, Dam Site: The description given is not proper and without any scientific details. Proper scientific names of trees/ plants are to be given without any spelling mistakes in the names of Ferns.

## **Proposed TOR:**

- Standard TOR for hydropower projects should be followed and the proposed TOR should also include the following:
  - (i) *Study Area:*
    - (a) Include “Catchment, Submergence area, HRT area between d/s of Dam and Powerhouse, tributaries and d/s of PH”.
    - (c) Detailed Methodology to be followed for all the parameters to be studied; Sampling locations and intensity (for example - Number and size of Quadrats) in tabular form and in a map; instruments/ equipments used for the analysis; include Contour Map/Slope Map, Relief Map, Drainage Map etc.
    - (d) Aquatic Environment: provide details of physic-chemical properties to be studied.
    - (e) Baseline studies: Include- Source of secondary information will be cited wherever required and citations included in a Reference List; Valuation of Biodiversity and Ecosystem Services will be studied.
  - (ii) *Biological Environment:* Include –
    - (a) Forest type will be classified as per Champion & Seth’s (1968) classification; number and species of trees in the submergence area and their basal area
    - (b) General vegetation pattern will also include “Pteridophytes, Bryophytes and Lichens”, “Canes, Bamboos spp., Wild Banana, Orchids”;
    - (c) GPS reading of occurrence of RET species will be recorded for conservation and rehabilitation purpose.
    - (f) Under faunal elements ”Amphibians” should also be studied.

- (iii) *Environmental Management Plan*: Include – Compensatory Afforestation Management Plan should cover twice the area of forest land affected due to project activities.

**General:**

- The project documents are not prepared properly. The committee mentioned that the documents should have been prepared in an ordinary A4 size bond paper instead of this costly paper with all the details of the project components in order to get a clear picture of the project. The committee requested the project proponent taking the above comments into consideration, the form-1 and the project details are to be revised and submitted to Ministry for consideration during the next EAC meeting.
- The committee has also noted that a legal issue has been brought to the notice of EAC about allotment of these 3 projects in Sikkim to M/s Velankani Energy Pvt. Ltd. The project proponent should ascertain that these projects have been allocated to them by Government of Sikkim. The Committee also observed that the Ministry may also write to Government of Sikkim for clarification on these projects about the allottee and status.
- The project may be reconsidered based on the above.

**2.11 Revision of capacity from 4000 MW to 3097 MW for Etalin HEP in Dibang Valley District of Arunachal Pradesh by M/s. Etalin Hydro Power Company Ltd – For reconsideration.**

This project was earlier considered by the EAC in its meeting held on 26-27<sup>th</sup> December, 2012. The following observations and comments were to be addressed by the project proponent:

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

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

The scoping clearance was accorded to Etalin HEP project on 30.11.2009 for 4000 MW capacity. The project proponent submitted that draft EIA/EMP report has already been prepared after completing data collection for all 3 seasons as per TOR prescribed by MOEF.

Etalin (3097 MW) is a mega project planned with gravity dams on two limbs across Dri (Dibang) arm and Tangon arms of Dibang river. The original project of IC 4096 MW comprising of 2500 MW (10 x 250 MW) utilizing a drawal of 720 m<sup>3</sup>/sec on Dri limbs and 1500 MW (6 x 250 MW) utilizing a drawal of 426 m<sup>3</sup>/sec on Tangon limb was granted scoping clearance in October, 2009. This planning was based on earlier PFR prepared by NHPC.

The project is located in Dibang Valley District of Arunachal Pradesh and envisages diversion of two rivers - Dri / Dibang (called Dri limb) and Tangon (called Tangon limb). The dam site of the Dibang limb of the project is located across Dri River near Yuron village about 22 km from Etalin. The Tangon limb consists of construction of dam about 800 m downstream of Anon Pani confluence with Tangon river. The installed capacity for the scheme proposed on Dri limb is 1861.6MW, comprising of a small hydro scheme of 19.6 MW at the toe of the dam on Dri river and six (6) units of 307 MW each in the common underground powerhouse near Etalin village.

The installed capacity for the scheme proposed on Tangon limb is 1235.4 MW, including a small hydro scheme of 7.4MW envisaged at the toe of the dam on Tangon river and four (4) units of 307 MW each in the common underground powerhouse. The total installed capacity of the project is consequently 3097 MW. The headrace tunnel on Dri limb has length of 10.722 Km while HRT along Tangon limb is 13.045 km long.

In order to utilize the aquatic releases, requirement of two additional Dam Toe Powerhouses (1x19.60 MW at Dri diversion and 1x 7.40 MW at Tangon diversion) were proposed. Detailed Project Report (DPR) was formulated & submitted to CEA with installed capacity of 3097 MW and same has been concurred by CEA vide letter dated 17.7.2012. DPR of the project has been concurred by CEA on 31.1.2013.

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

It was pointed out that in Dri Limb, dam axis is shifted 300 m downstream and on Tangon Limb dam axis is shifted 2200 m upstream based on detailed geological investigation and mapping. By moving the dam axis 2.2 km upstream in case of Tangon, two major tributaries Kun Pani and Anon Pani with total catchment area of more than 210 sq km will join river within 1.3 Km downstream of diversion. There is no change in influence area (study area for EIA study), since there is no change in FRL and TWL on either side i.e. Tangon River and Dri River.

Therefore, the developer, from geological and site suitability conditions, decided to move the dam site on Dri limb to 300 m downstream with no change in catchment area. Dam site on Tangon site is shifted 2200 m upstream, thereby reducing the intercepted area to 2573 Km<sup>2</sup> from original 2782 Km<sup>2</sup>. The developers accordingly updated the flow series which received CWC clearance on 27.07.2011. Based on CWC approved series and flow in the 90% DY (2001-02), the withdrawal from the Dri limb was set at 480 m<sup>3</sup>/sec and for the Tangon limb at 320 m<sup>3</sup>/sec. Accordingly CEA approved revised IC of 3097 MW on 17.7.2012.

During December 27, 2012 revised scoping proposal for the IC of 3097 MW was presented to the EAC. The EAC observed that the 10-daily series data for the Dri and Tangon limbs exhibited actual flow in the monsoon significantly below the proposed withdrawal.

For Tangon limb the monsoon flow was in the range 229 to 300 Cumecc (except for 20 days in June) against proposed drawal of 320 Cumecc. Similarly for the Dri Limb except for 10 days (August 21-31) the flow is well below the design drawal of 480 Cumecc.

The CWC approved series for Dri as well as Tangon limbs were highlighted and it was informed that as specified in TOR to conduct a separate study by an independent reputed agency. The purpose of the study is to come out with a minimum environmental flow that should be required to be released during lean season to sustain the aquatic life. The study is being undertaken by CIFRI and they have already collected field data including detailed site specific survey during the months of May and November 2012. As per their preliminary recommendations ecological flows during lean season have been considered as 30.64 cumec and 19.52 cumec in case of Dri and Tangon rivers respectively; which is 20% of average of four leanest months of 90% dependable year.

The developer proposal of small release at the two Dam toe power houses (19.00 MW at Dri and 7.40 MW at Tangon) was inadequate to compensate for 18 Km and 25 Km deprived riverine reach in both rivers. From adequacy of environmental flow consideration it was suggested to justify the spills in the monsoon and releases in the non-monsoon.

Regarding committee's query on releases during monsoon months and other months, Dri and Tangon river 10 daily flow data for 50%, 87.5% and 90% dependable year was shown and it was pointed out that monsoon flows in the year next to 90% dependable year i.e. year with 87.5% dependability, are approximately double for most of 10 daily figures, whereas in lean season the trend is reversed. Flow contributions from intermediate catchments were also highlighted for both limbs which show significant contributions from intercepting catchment especially in case of Tangon.

The proponent submitted that they will plan for adequate environmental release that will be suggested by a reputed institute. This was not considered rational by the EAC and the developer were advised to resubmit complete hydrology enclosing CWC approved flow series and plan afresh for desirable power drawl leaving around 30% of the monsoon flow toward environmental flows.

The daily observed flow data is available at both diversion sites on Dri and Tangon rivers for about two years from March 2011 to December 2012, the same has been used to study the spills available in the rivers during monsoon months. Profiles of daily observed flows for entire 2 year period vis-a-vis drawls in both river limbs were shown clearly depicting several peaks especially during monsoon months. 10 daily flow profiles for both limbs for year 2001-02 (90% dependable year), year 2006-07 (87.5% dependable year; next to 90% dependable year), year 2000-01 (50% dependable year) and observed flows from January 2011 to December 2012 were presented, which clearly highlights that 90% dependable year had substantially lower monsoon flows. The Committee asked the developer to submit the observed data.

The Committee enquired about the impacts on river morphology and adequacy of channel's capacity due to tail race releases from power house into Tangon river at confluence especially since discharges from tail race for both power houses are coming together into one river. It was clarified that releases from Dri limb power house will be 480 cumec which will be additional but Tangon limb channel experiences flood of the order of 1500 cumec also, hence it has sufficient carrying capacity to pass the tailrace releases without any significant impact on river morphology.

The Committee asked regarding checking observed flows with the observed rainfall data during the period. It was also enquired about observed rainfall data at dam sites and power house sites so as to substantiate adequate flow contributions from the intercepting catchment. The project proponent has pointed out that the observed rainfall at diversion sites

is of the order of 3000 mm while at power house site is of the order of 5000 mm. The Committee asked to submit the observed rainfall data as well. Committee expressed satisfaction regarding establishment of adequacy of flows with the help of flow data that adequate flows are available throughout the year including monsoon months for ecological and downstream use releases. However, committee asked for a further detailed assessment of the release requirement during monsoon months and recommended extension of scope of study being conducted by CIFRI to cover monsoon months as well.

Thus, the scheme was re-examined by the EAC on February 3 for scoping. The developers analysed and presented the daily observed flow scenario at the two dam sites for monsoon season of 2011 and 2012. It revealed that the 10-daily averaging of flow did not exhibit the steep rise of discharge spike that corresponds to intense rainfall of 50-100 mm or more in a day. The small spills or no spill shown in 10-daily data of the 90% year would have a number of spikes going upto 50% excess of the design drawal at periodic intervals, which would automatically spill into the river.

For the two consecutive monsoon seasons of 2011 and 2012 both for the Dri and Tangon limbs simulation shows that, the reservoirs would spill daily from 31<sup>st</sup> March to end of October except for 10 days out of 120 days. In 2012, the highest flood spill would have been of the order of 2500 m<sup>3</sup>/sec for Dri limb 1500 m<sup>3</sup>/sec for the Tangon limb. The developers also showed that for the year 2006-07, which corresponds to 87.5% dependability, the flow increases by 30% to 100% over the 90% year in most of the 10-daily spells both for Dri and Tangon limbs, thereby establishing that significant spills would occur almost 88% of the time with the pattern of drawal planned for the 3097 MW scheme. This the developer attributed to the unusually dry condition in the basin in 2001-02. The rivers below the dam would experience low flow, medium flows and flood pulses with the 3097 MW hydro schemes in operation, which is a very desirable feature of sustaining the aquatic ecosystem.

The other issue of contribution of the intermediate streams was explained in detail. For the Dri limb, two major streams of CA 39.70 Km<sup>2</sup> and 27.20 Km<sup>2</sup> join just within 2.40 Km below the dam and for Tangon limb two major streams with CA of 62.06 Km<sup>2</sup> and 148.90 Km<sup>2</sup> join just within 1.30 Km below the dam. With rainfall around 1500 mm to 2000 mm in the area, significant contribution would supplement release from the dam. In summary on the basis of analysis of daily flow, the cumulative release to the downstream of both Dri and Tangon dam's supplemented release of dam toe powerhouse would be of the order of 25% and would attain 30% within 2 Km from the dams.

After further detailed deliberation, the Committee recommended the scoping clearance for 3097 MW capacity for Etalin HEP, with the following conditions:

- Issuance of fresh TOR for revised capacity of 3097 MW valid for 2 years
- Since influence area remains same, same set of field data can be utilized for environmental baseline status.
- The CIFRI should conduct the study during monsoon period so as to establish ecological releases during monsoon season also.
- The site-specific study on minimum environmental flow requirement will be conducted by the project proponent. The study should include assessment of minimum environmental flow requirement for three seasons i.e. lean, non-lean & non-monsoon and monsoon seasons.

- Public hearing to be conducted after completing EIA study as per prescribed new TOR.
- Daily observed flow data at site along with observed rainfall data to be submitted in hard copy as well soft copy format.

### **3. Other items pertaining to extension of the validity of TOR**

The following projects were taken-up for consideration:

#### **3.1 Lurhi HEP (775 MW) in Shimla, Kullu and Mandi Districts of Himachal Pradesh by M/s. Satluj Jal Vidyut Nigam Ltd–for Environmental Clearance.**

This project was considered by EAC on 23-24<sup>th</sup> November, 2012. After detailed deliberations, the Committee recommended the environmental clearance for the project with the following conditions :

1. The river holds coldwater mahsheer and snow-trout fishes, which need Flow-through Indoor hatchery system with hatching trays, troughs and feeding troughs. Therefore the Fishery Management Plan need be revised with provision of Flow-through Indoor hatchery system.
2. A site specific study may be carried-out for establishing the proper environmental flow release during monsoon, non-monsoon and lean months corresponding to the 90% dependable year. Release of minimum environmental flow must mimic the pre-dam flow pattern of the river for sustaining the aquatic bio-diversity together with downstream user need and accordingly, water withdrawal for power generation is to be regulated. A minimum environmental flow of 25% of average of four lean season months shall be released. During monsoon period, average release should 30% of the monsoon flow including spillage, during monsoon period and release during non-monsoon and non-lean period should be 20-30% of average flow corresponding to 90% dependable year.
3. A downstream study preferably by CIFRI and WII may be carried-out in a holistic manner to determine the minimum flow required to maintain the ecological integrity of the river taking into account water requirement for various other downstream use.

The project proponent submitted a letter in response to conditions to MOEF mentioning that condition no.2, the HP government already awarded the study to ICFRE for cumulative Impact assessment of Satluj Basin including Lurhi HEP. Based on this the design discharge has been reduced to 380 cumec instead of 480 cumec as originally mentioned. Therefore, the capacity of the project has been reduced to 600 MW and requesting the Ministry to issue EC for 600 MW capacity

The Committee desired to know the revised position/status of environmental flow due to proposed change in capacity and whether it will cause any significant impact due to revised and realignment of HRT for example impact on muck disposal and its planning, before taking a final view.

#### **3.2 Kundah Pumped Storage HEP (4 x 125 MW) in Nilgiri District of Tamil Nadu–Extension of the validity of Environmental Clearance.**

The MOEF granted Environmental Clearance to this project on 8.5.2007 as per EIA Notification, 2006 with a validity of period for 5 years from the date of issue of clearance for commencement of construction work. The validity expired on 7.5.2012.

The Tamil Nadu Electricity Board has requested the Ministry to extend the validity of the EC for 5 more years. The Committee mentioned that Ministry may obtain details of action taken within last 5 years i.e. physical and financial progress made if any, compliance of EC conditions etc for further consideration by the EAC. After the response has been received from the TNEB, the case may be placed before the EAC.

### **3.3 Purthi HEP (300 MW) in Lahaul & Spiti and Chamba Districts of Himachal Pradesh by M/s. Purthi Hydro Power Pvt. Ltd–for TOR.**

This project was considered by EAC on 23-24<sup>th</sup> November, 2012. After detailed deliberations, the Committee did not recommend scoping clearance for the project in the present form.

The project proponent has mentioned that in the 62<sup>nd</sup> EAC meeting, while considering the project for scoping clearance, the committee observed following points:

- The Committee while considering the other projects on Chenab was not told about this project at any point of time. Thus, Purthi HEP has been introduced by Govt. of Himachal Pradesh as an afterthought and extension of Reoli Dugli HEP. The Committee regretted this communication gap. Because, the guidelines of the EAC for maintain free flow of stretch between two projects have been violated as a result of introduction of the project along with its distinct engineering features.
- The proposed tunnelling as a result of depriving release of TRT water of Reoli-Dugli back into Chenab, will virtually dry-up and deprive the river flow in 23.32 km long continuous river stretch. This, if accepted, may invite wide spread resentment among the public and various stakeholders as it may substantially damage the ecological health and integrity of Chenab river.
- The Committee further noted that the TWL of Purthi HEP is matching with the FRL of the downstream project Sach-Khas, which was already approved by Government of Himachal Pradesh, and thereby leaving no free flow stretch, which is unacceptable from environmental point of view.
- The Committee concluded that the project proponent and Govt. of Himachal Pradesh may review and revise the proposal in the light of the above observations for reconsideration.

The project proponent has mentioned that the project in the present format has been allotted to them by Government of Himachal Pradesh and therefore the MoEF may seek clarification from GoHP instead of project proponent & GOHP may review & revise the proposal.

The Committee observed that the Ministry may write to Government of Himachal Pradesh endorsing a copy of the minutes of the EAC meeting. However, the EAC reiterated to its earlier decision that the project is not acceptable in the present form for scoping clearance.

### **3.4 Reoli-Dugli HEP in Lahaul & Spiti District of Himachal Pradesh by M/s. L&T Himachal Hydropower Ltd–for TOR.**

The EAC was informed that the project proponent had brought to the notice of MOEF about an inconsistency in recording the actual capacity of the project. Because, as per minutes of 63<sup>rd</sup> EAC meeting, while in the main agenda number 2.5, the capacity has been mentioned as 410 MW + 10 MW; in the body of the minutes this is recorded as 4 units of 105 MW each + 10 MW dam toe powerhouse. Therefore, the correct capacity figure should be 420 MW + 10 MW instead of 410 MW + 10 MW.. It was also informed that the documents submitted by the project proponent also support the higher capacity figure of 430 MW. The lower capacity of 420 MW therefore, found place due to oversight

The EAC agreed to the explanation, noted the capacity of 430 MW and recommended that MOEF may affect correction appropriately.

The meeting ended with a vote of thanks to the chair.

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## Annexure

**List of EAC members and Project Proponents who attended 64<sup>th</sup> Meeting of Expert Appraisal Committee for River Valley & Hydro Electric Power Projects held on 1-2<sup>nd</sup> February , 2013 at SCOPE Complex, New Delhi**

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

1.	Shri Rakesh Nath	Chairman
2.	Dr. B. P. Das	Vice-Chairman
3.	Dr. Arun Kumar	Member
4.	Dr. S. Bhowmik	Member
5.	Dr. (Mrs.) Maitrayee Choudhury	Member
6.	Dr. S. K. Mishra	Member
7.	Dr. S. K. Mazumder	Member
8.	Dr. Praveen Mathur	Member
9.	Dr. Dhananjai Mohan	Member
10.	Dr. A. K. Bhattacharya	Member
11.	Dr. J. K. Sharma	Member
12.	Sh. G. L. Bansal	Member
13.	Shri. B. B. Barman	Director, MoEF & Member-Secretary
14.	Dr. P. V. Subba Rao	MoEF

**B. Shirapur Lift irrigation Scheme Project in Solapur District of Maharashtra by M/s. Water Resources Department, Government of Maharashtra- for Reconsideration of ToR.**

1.	Shri C. A. Birajdar	-	Chief Engineer
2.	Shri B. S. Birajdar	-	Executive Engineer
3.	Dr. C. P. Vibhuti	-	Representative

**C. Revision of Capacity of Kirthai HEP from 240 MW to 390 MW in Kishtwar District of Jammu & Kashmir by M/s. J&K Power Development Corporation.**

**D. Kirthai-II HEP (990 MW) in Kishtwar District of Jammu & Kashmir by M/s. J&K Power Development Corporation- for Reconsideration of TOR.**

**E. Revision of Capacity of Sawalkote HEP from 1200 MW to 1856 MW in Ramban District of Jammu & Kashmir by M/s. J&K Power Development Corporation.**

1.	Shri Zahoor Ahmad Chat	-	Executive Director
2.	Shri Ashok Kumar Koul	-	Chief Engineer
3.	Shri Ravinder Nath Bhat	-	Chief Engineer
4.	Shri Vijay Nagri	-	Ex Engineer
5.	Shri Dilip Ambardar	-	Asst. Executive Engineer
6.	Shri Kalim Ahmad	-	Manager
7.	Dr. M. A. Khalid	-	CEO, Biodiversity
8.	Shri S. K. Jain	-	Director- Technical

**F. Papu HEP (90 MW) Project in East Kameng District of Arunachal Pradesh by M/s. Papu Hydropower Projects Ltd. – for Consideration TOR.**

1.	Shri M. S. Gusain	-	President
2.	Shri N. D. Arora	-	Vice- President
3.	Shri Arun Bhaskar	-	Director, RSET
4.	Shri Ravinder P. S. Bhatia	-	Director, RSET

**G. Teesta-IV 520 MW Hydro Power Project in North Sikkim District by M/s. NHPC Ltd. –Reconsideration for Environmental Clearance.**

1. Ms. Bharti Gupta	-	Deputy Manager ( C)
2. Shri Anitha Joy	-	Assistant Manager
3. Shri Vipin Kumar	-	Chief (Env.)
4. Dr. S. K. Bajpayee	-	Deputy Manager
5. Shri Balraj Joshi	-	General Manager
6. Shri Rajiv Baboota	-	Chief Engineer
7. Shri M. G. Gokhle	-	Chief Engineer
8. Shri Anish Gouraha	-	Manager
9. Md. Navshad Alam	-	Deputy Manager
10. Dr. Dorje Dawa	-	Scientist
11. Dr. Dinesh Chandra	-	Scientist
12. Ms. Sudha Tiwari	-	Research Fellow

**H. Ralong HEP (120 MW) Project in North Sikkim District by M/s. Velankani Renewable Energy Pvt. Ltd. – For Reconsideration for TOR.**

**I. Chakungchu HEP (90 MW) Project in North Sikkim District by M/s. Velankani Renewable Energy Pvt. Ltd.- For Reconsideration for TOR.**

**J. Rolep HEP (72 MW) Project in East Sikkim District by M/s Velankani Renewable Energy Pvt. Ltd.- For TOR.**

1. Shri V. N. Rathnakar	-	Director
2. Shri Abhaye Mahajan	-	Consultant
3. Shri V. Lakshamana	-	Technical Advisor
4. Shri S. V. Sridhar	-	Technical Advisor
5. Shri Rajib Ranjan Das	-	Manager
6. Shri Suparnaa Malik	-	Consultant

**K. Revision of Capacity from 4000 MW to 3097 MW for Etalin HEP in Dibang Valley District of Arunchal Pradesh by M/s. Etalin Hydro Power Company**

1. Shri Mr. Jayant Kawale	-	Managing Director
2. Shri Satish C. Sharma	-	President & CEO
3. Shri Ravinder Bhatia	-	Director
4. Shri Vimal Garg	-	Director
5. Dr. J. K. Soni	-	Vice- President
6. Shri Ranjan Anand	-	Additional General Manager
7. Shri Rajiv Sawaran	-	Deputy General Manager
8. Shri Vinod Chilkoti	-	Manager
9. Shri Subhash Chand	-	Additional Vice President
10. Shri Sovik Khamrui	-	Manager
11. Shri Santosh Kumar	-	Additional Manager
12. Shri Manish Singh	-	Deputy Manager
13. Shri Sudeep Dabas	-	Sr. Manager

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