Minutes of the 85th Meeting of the Expert Appraisal Committee for River Valley and Hydroelectric Projects held on 20-21st July, 2015 at Brahmaputra Meeting Hall, 1st Floor, Vayu Wing, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi110003

The 85th Meeting of the Expert Appraisal Committee (EAC) for River Valley and Hydroelectric Projects was held during 20-21st July, 2015 at Brahamaputra Meeting Hall, 1st Floor, Vayu Wing, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi110003. The meeting was chaired by Shri Alok Perti, Chairman. Shri. P. K. Choudhury and Dr. A. Lingaraju, Members could not attend the meeting. The list of EAC Members and officials/consultants associated with various projects and who attended the meeting is at **Appendix**.

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

1st Day (20.07.2015)

1. **Agenda Item No.1**: Welcome by Chairman and confirmation of Minutes of the 83rd EAC held on 23-24th April, 2015 & 84th EAC held on 3-4th June, 2015. The minutes these EAC meetings were confirmed as was circulated. Thereafter, following agenda items were taken-up:

Agenda item No.2.1 Sawalkote HEP (1856 MW) in Ramban District of Jammu & Kashmir by M/s J&K State Power Development Corporation – For Extension of Validity of TOR

The project proponent made a detailed presentation on the project. The project envisages construction of a 193 m high concrete gravity roller compacted dam (from the deepest foundation of the river bed) across river Chenab to generate 1856 MW of hydropower. This is a run-of-the-river scheme. Total land requirement is about 1099 ha, out of which 600 ha is forest land. Total submergence area is about 900 ha. (Of which 160 ha is cultivable land, uncultivable land – 140 ha + forest land is 600 ha). An underground powerhouse is proposed on the left bank of river. The first stage would be an aggregate capacity of 1406 MW (6 units of 225 MW each + 56 MW). The second stage of the project is envisaged for an installation capacity of 450 MW. A total of 629 families comprising of 4400 individuals are likely to be affected due to this project. No national park/sanctuary/biosphere reserve/historical monument exists within 10 Km radius of the project area

Scoping/TOR clearance was granted on 12.6.2013 with a validity of two years i.e. till June 11, 2015. EIA/EMP reports were prepared as per the approved TOR and submitted to J&K Pollution Control Board in April 2015 for initiation of public consultation process. J&KPCB announced 15.6.2015 as the date of public hearing and issued a press notification on 15.5.2015. The public hearing date was after the expiry of scoping clearance, therefore, J&KPCB was requested to cancel the public

hearing meeting and announce the new date only after extension of validity of scoping clearance is issued by MoEF&CC.

It was explained that the land & property survey has already been completed; DPR is under advance stage of approval & preparation of EIA/EMP reports have been completed. Immediately on receipt of extension of the validity of scoping clearance, J&KPCB will be requested for conduct of public hearing. Thereafter, update the report and submit the final report to MoEF&CC for appraisal.

Keeping in view of the project progress and no significant change in any of the project parameters, EAC recommended extending the validity of Scoping Clearance for 1 year i.e. from 12.6.2015 to 12.6.2016 to complete all the remaining works within the extended period of validity of TOR.

Agenda item No.2.2 Shutkari Kulan HEP (84 MW) in Ganderbal District of Jammu & Kashmir by M/s J&K State Power Development Corporation – For reconsideration of TOR

The project proponent made a detailed presentation on the project. The project envisages construction of a barrage across river Sindh near Shutkari Village in Ganderbal District of Jammu & Kashmir to generate 84 MW of hydropower. This is a run-of-the-river scheme. Total land requirement is about 65.5 ha. Total submergence area is about 22.5 ha. A surface powerhouse is proposed on the left bank of river near Kulan village with 2 units of 42 MW capacity each. The barrage is close to Baltal Thajwas Wildlife Sanctuary and Overu-Aru Wildlife Sanctuary is about 7 Km radius of the project area. Total cost of the project is about Rs. 714 Crores and proposed to be completed in 70 months.

The scoping/TOR clearance for the project was granted on 26.9.2014. At the time of scoping clearance it was discussed that project is in proximity to Baltal Thaijwas Wildlife sanctuary; however the components are outside the boundary.

The project proponent informed that during detailed topography survey and mapping of reservoir, it was revealed that submergence was encroaching left bank of the Wildlife Sanctuary. A joint survey of the project location was conducted by the SPICCPL and the Wildlife Department to demarcate the boundary of the Baltal Thaijwas Wildlife sanctuary vis-à-vis project land requirement. To avoid submergence spreading into protected area, project layout was revised to avoid any encroachment by project into the protected area.

The revised layout proposal has a barrage at Sonamarg, Trench weir and intake near Shutkari village (about 4 Km downstream along the river) and a right bank powerhouse at Kulan Village. The Head Race tunnel is on the right bank of Sindh Nallah in the present proposal. The present proposal does not involve Wildlife land and it is confirmed from the Wildlife Department.

Due to change of layout, a revision of scoping clearance was requested. After detailed deliberation, EAC made the following observations:

- There has been a major change in the project layout; this would also change the study area of EIA study and therefore, a fresh TOR need to be issued in such cases.
- Sindh river is an abode of snow trout possibility of 7-8 species of *Schizothorax is* bright. Therefore, the developer should conduct a proper study and prepare sufficient safeguard measures to ensure their protection.
- Hangul is a critically endangered species as per IUCN and is endemic to J&K. Dachigam National Park and surrounding areas are home to remaining population of Hangul. Hangul conservation project is also underway, to protect and increase the population of Hangul. It is therefore, important for EAC to know the status of Hangul presence in the project area before the project can be further discussed and considered for scoping clearance.

EAC recommended that the project proponent should first consult State Wildlife Department and review the work done on Hangul conservation including areas required to be protected for this purpose. The project proponent should bring adequate and authentic information on this, before the project is discussed for the extension of the validity or revised/fresh scoping clearance. The MoEF & CC will take a view for placing the case before EAC based on response in this regard.

Agenda Item No. 2.3 Kwar HEP (560 MW) in Kishtwar District of Jammu & Kashmir by M/s. Chenab Valley Power Projects Pvt. Ltd. – For reconsideration of TOR

The project proponent made a detailed presentation on Kwar HEP Project. Kwar HEP is proposed on river Chenab near village Padyarna in District Kishtwar of Jammu & Kashmir State. The project envisages construction of a 109 m high concrete gravity dam across river Chenab near village Padyarna with four intakes, four pressure shafts, an underground powerhouse of 4 units of 140 MW each. The catchment area up-to diversion site (dam) is 10325 Sq. km. The total cost of project is about Rs. 4375.50 Crores.

The scoping/TOR clearance for Kwar HEP (520 MW) was granted by MoEF & CC on 17.03.2010 in favour of NHPC. The TOR has been transferred to Chenab Valley Power Projects Pvt. Ltd. a Joint Venture Company (NHPC, JKSPDC and PTC) has been formed to harness the vast hydro potential of river Chenab by development of Pakal Dul, Kiru and Kwar HE Projects.

The EIA studies have been undertaken as per the approved Terms of Reference (TOR). Based on water availability series during preparation of DPR, installed capacity of the project has increased from 520 MW to 560 MW; for which DPR was prepared and submitted to CEA. Draft EIA and EMP reports prepared were

of 560 MW and reports along with Executive Summary, were submitted to J&K State Pollution Control Board (SPCB) by CVPP in August 2013. Public Hearing was conducted by J&K SPCB on 28.10.2013. Final EIA&EMP reports along with proceedings of public hearing have been submitted to MoEF & CC for consideration of Environmental Clearance for the project.

This project was considered by EAC in its 74th meeting held on 5-6 May, 2014 at Van Vigyan Bhavan, New Delhi. The EAC observed that Scoping Clearance was accorded on 17.3.2010 and was valid till 16.03.2014. Public Hearing and submission of final report for appraisal was done within the validity of scoping clearance. Installed Capacity of project was enhanced from 520 MW (at the time of Scoping Clearance) to 560 MW for which draft EIAEMP reports were prepared, Public Hearing conducted and final report submitted to MoEF for appraisal. Revised scoping clearance for change in installed capacity was not obtained.

Regarding the environment flow, it was informed that as this is a dam-toe project and about 2.6 Km of river stretch will be affected from the edge of plunge pool to tail water discharge point. A provision of 9.5 cumec of environment flow, which is about 12% of lean season average discharge, has been made in the DPR to be continuously released throughout the year. EAC observed that as the upstream project is also with CVPP, they need to explore the option of reducing the FRL of Kwar HEP to ensure about 1 Km of free flow river stretch between these two projects. Further the provision of environment flow is not adequate and developer needs to undertake a study to assess the adequacy of the environment flow requirement for the affected stretch of about 2.6 Km

EAC concluded (5-6th May, 2014) with the following observations:

- The final approved capacity of the project is 560 MW, for which Public Hearing is conducted and final EIA/EMP reports prepared and submitted to MoEF within the validity of scoping clearance. As such, a fresh Public hearing may not be needed in this case. However, project proponent shall submit if there has been any variation in project parameter such as dam height, submergence area etc. as capacity has been enhanced to 560 MW.

- Free flow river stretch of about 1 Km should be maintained between FRL and TWL of downstream and upstream projects and Environment flow should be decided based on scientific study, keeping in view the requirement throughout the year. Till such time, release 20%, 25% and 30% norms during lean, non-lean & non-monsoon& monsoon seasons corresponding to 90% DY to be followed by the Developer. The Ministry, may however, take an appropriate view on the environmental flow as the project/ river comes under Indus water treaty.

- Provision of free flow stretch and environment flow requirement may lead to change of installed capacity and revision of EIAEMP report. This needs to be explained accordingly.

- A fresh TOR will be issued to complete the above work and prepare the EIA/EMP report for the final approved installed capacity within the validity of scoping

clearance. As the data collected is just about 3 years old at the time of consideration of project by EAC; same baseline data may be used for updating EIAEMP study.

- The project proponent shall apply for a fresh scoping clearance for revised capacity of 560 MW accordingly.

Project proponent made a detailed presentation on the project configurations, levels and free flow river stretch. It was mentioned that using longitudinal profile of Chenab river for this stretch, that upstream of Kiru, more than 1 Km free flow of river stretch is available with Kirthai-II HEP; downstream of Kiru HEP i.e. between FRL of Kwar and TWL of Kiru, a 325 m of free flow of river stretch is available and downstream of Kwar i.e. between TWL of Kwar and FRL of Dulhasti, a 350 m of free flow river stretch is available. Dulhasti (390 MW) is an operational project of NHPC; whereas Kiru and Kwar are under investigation since 2006. The scoping clearance for Kwar was issued in 2010 and at that time, neither free flow stretch nor environment flow provisions were stipulated. Both these Kiru and Kwar projects are located on main river Chenab and are governed by the provisions of the Indus Water Treaty (IWT) 1960.

The matter regarding non-planning and development of Kiru and Kwar projects as a single storage project with adequate free flow stretch was further deliberated. Project proponent submitted that provisions of treaty do not permit creation of storage works downstream of *Naunut*. Accordingly, cascade development of projects namely Dulhasti, Kwar & Kiru Projects were planned by CEA/CWC as run-of-the-river plants. The location of the dams and power house has been finalized after detailed geological investigations and establishment of geotechnical conditions at site. In order to increase this free flow stretch to about one km, the FRL of the Kwar project shall have to be reduced resulting in considerable decrease in reservoir capacity. The Chenab river is known to carry heavy sediment load with average sediment load at proposed Kwar dam site is estimated as around 23 MCM, which is extremely high and it could be extremely difficult to manage the sediment if reservoir capacity is further reduced. The recent award of International Court of Arbitration (*on Kishenganga Project*) does not allow drawdown flushing in all the future run-of-the- river projects on western rivers covered under IWT.

The committee took a note of the fact that these projects have limitations under IWT and also that scoping clearance was issued in 2010 without any stipulation on free flow stretch. DPR has already been completed and any change of levels at this stage may not be practical. Keeping this in view, EAC recommended that project should be considered at the present levels and suggested that developer should submit a detailed letter to ministry explaining applications/provisions of IWT.

Project proponent also presented E-flow release requirement based on a scientific study. The study is based on hydrodynamic modelling on Mike-11 to meet the habitat requirement for survival of aquatic life. Baseline data collected during EIA study was used for assessment of aquatic habitat – snow trout (***Schizothorax***

***richardsonii*)** was considered as predominant fish species and WII data was used to establish its habitat.

CWC approved flow series was presented for 90% dependable year (1996-97) to show that peak flow period is June to September with an average of 741 cumec and thereafter flow reduces substantially and remain low for remaining period. Lean season is considered from December to March with an average flow of 82 cumec during this period in 90% dependable year. Intermediate catchment was also mapped where smaller streams are meeting at various distances between edge of plunge pool and TRT outfall point.

Modelling results show that 10% of average lean season discharge (8.24 cumec) gives a depth of 82 cm and adequate velocity with flow width. E- flow of 9.5 cumec has been taken in the DPR while finalizing the power potential studies, which is considered adequate by the study. For the peak flow period (June-September), 10% release (74.09cumec) gives 1.93m of flow depth, 1.95 m/s of velocity and 30.54 m of flow width, which is more than 50% of natural river width without any flow diversion. Intermediate catchment will augment additional 1.68 cumec of water during this period. Daily data analysis for 90% dependable year flow was presented; which showed that entire period has adequate spills and flood peaks are distributed throughout the four-month period. It was further presented that by maintaining a minimum release of 74.09 cumec (10% of average peak period discharge in 90% DY), 26% of inflows will be released. All other years, more than 30% of inflow will be available.

For remaining four months, a flow release of 16.79 cumec, which is 10% of average flow during this period in 90% dependable year, is recommended by the study which gives a water depth of 1.07 m and flow width of 22.98 m as against the flow width of 32.77 cumec under natural conditions without any diversion.

EAC reviewed the methodology and findings and accepted the e-flow provisions for peak season and other months, however, for lean period EAC recommended that 20% of the average flow in 90% dependable year should be considered as the minimum flow for lean season.

Project proponent during deliberations requested that lean season flow be also adopted as per the outcome of scientific studies and also submitted that increase of minimum flow during lean season from 9.5 cumec to 16.49 cumec may impact installed capacity as they may not be able to meet CEA's requirement of 3 hour peaking in lean season and that environment flow requirement has been established based on the scientific study and requested the EAC to take an appropriate view as the project/ river is covered under Indus Water Treaty (IWT).

EAC also noted that in compliance the recommendation of 74th EAC meeting, project proponent has submitted the application for consideration of modification in TOR for 540 MW capacity. After detailed deliberation, EAC recommended the following for Kwar HEP:

i. As the final capacity approved by CEA is 540 MW, TOR for 540 MW will be issued for updating EIA/EMP report. As recommended earlier, same baseline data may be used for updating EIA/EMP study. As such, a fresh Public hearing may not be needed in this case.

ii. Keeping in view that project has got scoping clearance in 2010 without any stipulation of free flow stretch/environment flow and project's limitation under IWT, project can proceed with same parameters and available free flow stretch; However environment flow provisions as recommended needs to be implemented.

iii. Environment flow provisions should be in line with the findings of the detailed scientific study for peak flow period and other months, however, for lean flow period 20% of average lean season flow should be released. Therefore, final environment flow provisions to be made in the project are 16.49 cumec for lean flow period (December–March), 74.09 cumec for peak flow period (June-September) and 16.79 cumec for remaining four months (Oct, November, April & May). Ministry may however, take an appropriate view on lean season environmental flow as the river comes under IWT.

iv. In case, some changes are envisaged in the installed capacity due to above recommended environmental flow provision for lean flow period, project proponent shall have to intimate the ministry about the change in Installed capacity, if any, however, the terms of reference for conducting EIA studies shall remain the same for the capacity, so updated.

Agenda Item No. 2.4 Kiru HEP (660 MW) in Kishtwar District of Jammu & Kashmir by M/s. Chenab Valley Power Projects Pvt. Ltd. – For reconsideration of TOR

The project proponent made a detailed presentation on Kiru HEP Project. Kiru HEP is proposed on river Chenab near village Kiru in District Kishtwar of Jammu & Kashmir State. The project envisages construction of a 123 m high concrete gravity dam across river Chenab near village Padyarna with four intakes, four pressure shafts, an underground powerhouse of 4 units of 165 MW each. The catchment area up-to diversion site (dam) is 10225 Sq. km. The total cost of project is about Rs. 4375.50 Crores.

The scoping/TOR clearance for Kiru HEP (600 MW) was granted by MoEF & CC on 9.9.2008 in favour of NHPC. The TOR has been transferred to Chenab Valley Power Projects Pvt. Ltd. a Joint Venture Company (NHPC, JKSPDC and PTC) has been formed to harness the vast hydro potential of river Chenab by development of Pakal Dul, Kiru and Kwar HE Projects.

The EIA studies have been undertaken as per the approved Terms of Reference (TOR). Based on water availability series during preparation of DPR, installed capacity of the project has increased from 600 MW to 660 MW for which DPR was prepared and submitted to CEA. Draft EIA and EMP reports prepared were of 560 MW and reports along with Executive Summary, were submitted to J&K State

Pollution Control Board (SPCB) by CVPP in August 2013. Public Hearing was conducted by J&K SPCB on 30.10.2013. Final EIA&EMP reports along with proceedings of public hearing have been submitted to MoEF & CC for consideration of Environmental Clearance for the project.

This project was considered by EAC in its 74th meeting held on 5-6 May, 2014 at Van Vigyan Bhavan, New Delhi. The EAC observed that Scoping Clearance was accorded on 9.9.2008 and was valid till 8.9.2012. Neither CVPP nor NHPC has approached MoEF & CC for fresh scoping on completion of 4 year scoping period. Further, capacity of the project was enhanced from 600 MW (at the time of Scoping/TOR clearance) to 660 MW for which draft EIA EMP reports were prepared, Public Hearing was conducted and final report submitted to MoEF for appraisal. Revised scoping clearance for change in installed capacity was also not obtained.

Developer has informed that during the past 1 year, worked on finalization of installed capacity, so that there is no further change in scoping clearance. Numerical Model Studies for reservoir sedimentation and flood mitigation as per CWC directions have been carried-out and also obtained approval of various design parameters. Capacity has been optimized as 624 MW and there is no change in dam type, dam length, FRL as was considered in EIA study. Minor changes as a result of optimization of various structures have been done based upon the updated & approved data and TOR application has been submitted for 624 MW capacity.

Regarding the e-flow, it was informed that as this is a dam toe project and about 500 m of river stretch will be affected from the edge of plunge pool to tail water discharge point. A provision of 9 cumec of environment flow, which is about 12% of lean season average discharge, has been made in the DPR to be continuously released throughout the year. EAC observed that as the downstream project is also with CVPP, they need to explore the option of reducing the FRL of downstream project to ensure about 1 Km of free flow river stretch between these two projects. Further the provision of environment flow is not adequate and developer needs to undertake a study to assess the adequacy of the environment flow requirement even if the affected stretch is about 500 m only.

EAC during 5-6th May, 2014 concluded with the following observations:

- As the final capacity approved by CWC is 624 MW, a fresh TOR for 624 MW will be issued. As the data collected is just about 3 years old at the time of consideration of project by EAC; same baseline data may be used for updating EIA/EMP study. However, consultant should update the data at least with one season field data collection.
- On updating the data and preparation of revised EIA/EMP study for 624 MW capacity, a fresh Public Hearing needs to be conducted for updated report and within the validity of scoping clearance. It was also noted that Public Hearing was conducted in 2013, after the expiry of ToR validity period.

- Free flow river stretch of about 1 Km should be maintained between FRL and TWL of downstream and upstream projects. For this, project parameters may have to be altered/ modified.
- Environmental flow release would be 20% of average of four months of lean period and 25% of flows during non-lean/non-monsoon period corresponding to 90% Dependable year. The cumulative flow releases including spillage during monsoon period should be about 30% of the cumulative inflows during the monsoon period corresponding to 90% dependable year. Environment flow should be decided based on scientific study, keeping in view the requirement throughout the year and final capacity decided based on the environment flow provisions. Option of a dam toe turbine can also be explored. The Ministry, may however, take an appropriate view on the environmental flow as the project/ river comes under Indus water treaty.
- The transfer of Scoping/TOR clearance from M/s. NHPC Ltd to M/s. Chenab Valley Power Projects (P) Ltd should be submitted to MoEF and necessary permission/NOC for the same may be obtained, if required.
- An Index sheet to be added in the EIA report showing compliance of all ToR conditions indicating pages (numbers) where compliance are available.
- It may be required to apply for a fresh ToR by the Developer as ToR validity has expired.

Project proponent made a detailed presentation on the project configurations, levels and free flow river stretch. It was mentioned that using longitudinal profile of Chenab river for this stretch, that upstream of Kiru, more than 1 Km free flow of river stretch is available with Kirthai-II HEP; downstream of Kiru HEP i.e. between FRL of Kwar and TWL of Kiru, a 325 m of free flow of river stretch is available and downstream of Kwar i.e. between TWL of Kwar and FRL of Dulhasti, a 350 m of free flow river stretch is available. Dulhasti (390 MW) is an operational project of NHPC; whereas Kiru and Kwar are under investigation since 2006. The scoping clearance for Kwar was issued in 2010 and at that time, neither free flow stretch nor environment flow provisions were stipulated. Both these Kiru and Kwar projects are located on main river Chenab and are governed by the provisions of the Indus Water Treaty (IWT) 1960.

The matter regarding non-planning and development of Kiru and Kwar projects as a single storage project with adequate free flow stretch was further deliberated. Project proponent submitted that provisions of treaty do not permit creation of storage works downstream of *Naunut*. Accordingly, cascade development of projects namely Dulhasti, Kwar & Kiru Projects were planned by CEA/CWC as run-of-the-river plants. The location of the dams and power house has been finalized after detailed geological investigations and establishment of geotechnical conditions at site. In order to increase this free flow stretch to about one km, the FRL of the Kwar project shall have to be reduced resulting in considerable decrease in reservoir capacity. The Chenab river is known to carry heavy sediment load with average sediment load at proposed Kwar dam site is estimated as around 23 MCM, which is extremely high and it could

be extremely difficult to manage the sediment if reservoir capacity is further reduced. The recent award of International Court of Arbitration (*on Kishenganga Project*) does not allow drawdown flushing in all the future run-of-the- river projects on western rivers covered under IWT.

EAC took a note of the fact that these projects have limitations under IWT and also that scoping clearance was issued in 2008 without any stipulation on free flow stretch. DPR has already been completed and any change of levels at this stage may not be practical. Keeping this in view, EAC recommended that project should be considered at the present levels and suggested that developer should submit a detailed letter to ministry explaining applications/provisions of IWT.

Modelling results show that 10% of average lean season discharge (8.16 cumec) gives a depth of 86 cm and adequate velocity and flow width. E- flow of 9 cumec has been taken in the DPR while finalizing the power potential studies, which is considered adequate by the study. For the peak flow period (June-September), 10% release (73.37 cumec) gives 1.93 m of flow depth, 2.89 m/s of velocity and 24.05 m of flow width, which is about 50% of natural river width without any flow diversion. Bela Nala will augment additional 7.18 cumec of water during this period. Daily data analysis for 90% dependable year flow was presented; which showed that entire period has adequate spills and flood peaks are distributed through-out the 4 month period. It was further presented that by maintaining a minimum release of 73.37 cumec (10% of average peak period discharge in 90% DY), 24.5% of inflows will be released and it becomes 25.5% when contribution of Bela Nala is added. All other years, more than 30% of inflow will be available.

For remaining four months, a flow release of 16.62 cumec, which is 10% of average flow during this period in 90% dependable year, is recommended by the study which gives a water depth of 1.13 m and flow width of 16.05 m as against the flow width of 27.75 cumec under natural conditions without any diversion.

EAC reviewed the methodology and findings and accepted the e-flow provisions for peak season and other months, however, for lean period EAC recommended that 20% of the average flow in 90% dependable year should be considered as the minimum flow for lean season.

Project proponent during deliberations requested that lean season flow be also adopted as per the outcome of scientific studies and also submitted that increase of minimum flow during lean season from 9 cumec to 16.33 cumec may impact installed capacity as they may not be able to meet CEA's requirement of 3 hour peaking in lean season and that environment flow requirement has been established based on the scientific study and requested the EAC to take an appropriate view as the project/ river is covered under Indus Water Treaty (IWT).

EAC also noted that in compliance the recommendation of 74th EAC meeting, project proponent has submitted the application for consideration of modification in

TOR for 624 MW capacity. After detailed deliberation, EAC recommended the following for Kiru HEP:

i. As the final capacity approved by CEA is 624 MW, TOR for 624 MW will be issued for updating EIA/EMP report. As recommended earlier, same baseline data may be used for updating EIA/EMP study. However, project proponent should update the data at least with one season field data collection. As such, a fresh Public hearing may be needed in this case for revised capacity of 624 MW.

ii. Keeping in view that project has got scoping clearance in 2008 without any stipulation of free flow stretch/environment flow and project's limitation under IWT, project can proceed with same parameters and available free flow stretch; However environment flow provisions as recommended needs to be implemented.

iii. Environment flow provisions should be in line with the findings of the detailed scientific study for peak flow period and other months, however, for lean season 20% of average lean season flow should be released. Therefore, final environment flow provisions to be made in the project are 16.33 cumec for lean flow period (December – March), 73.37 cumec for peak flow period (June-September) and 16.62 cumec for remaining four months (Oct, November, April and May). Ministry, may however, take an appropriate view on lean season environmental flow as the river comes under IWT.

iv. In case, some changes are envisaged in the installed capacity due to above recommended environmental flow provision for lean flow period, project proponent shall have to intimate the ministry about the change in Installed capacity, if any, however, the terms of reference for conducting EIA studies shall remain the same for the capacity, so updated.

Agenda item No.2.5 Ashti Lift Irrigation Scheme-III in Beed District of Maharashtra by M/s. Godavari Marathwada Irrigation Development – for consideration of TOR

The project proponent made a detailed presentation on the project. The project is proposed to utilize 23.66 TMC of water from available Krishna sub-basin to provide irrigation facility in 87,188 ha of area in Osmanabad District of Maharashtra. The project is proposed in 2 parts viz. Lift Irrigation Scheme-I (LIS-I) and Lift Irrigation Scheme-II (LIS-II). Administrative approval for the scheme is given by Government of Maharashtra vide letter no.2004/1413(385/04) dated 23.8.2007 for 2382.50 crores for 19 TMC of surplus water for 87,188 ha in Osmanabad District. The project is subsequently, revised and approved by Government of Maharashtra vide letter dated 27.8.2009 amounting to 4845.05 crores for utilization of 23.66 TMC of water and the project was planned for 114731 ha in Osmanabad and Beed Districts by 3 lift irrigation schemes.

The Lift Irrigation Scheme - LIS-I and LIS-II as Krishna Marathwada Lift Irrigation Scheme has been granted environmental clearance vide letter no. J-12011/58/2008-IA-I dated 24.6.2015.

The instant scheme is Ashti LIS-III proposing to utilizing 5.68 TMC of water from Ujani reservoir in 5 stages for providing irrigation facility to 27,543 ha in drought prone area in Beed District of Maharashtra. The gross command area is 52,662 ha, culturable command area is 35,647 ha and irrigable command area is 27543 ha. The project envisages construction of 39.50 m high and 1410 m long earthen dam on river Mehekari. Total land requirement is about 1749.2 ha. There is no national park/ wildlife sanctuary/biosphere reserve/ historical monuments in the project area. Total estimated cost of the project is about Rs. 1046 Crores.

During the discussions, the Committee observed that the construction works has already been started on the project. The project proponent mentioned that as the project was originally approved by the Government of Maharashtra as LIS-III of the Krishna Marathwada Project, the construction works started. The works were stopped long back. This project was separated as LIS-III and hence separate application has been submitted by Government of Maharashtra for scoping clearance as a separate project.

The committee noted that a violation has occurred in the project and EAC mentioned that the extant procedure may be followed in the Ministry to deal with/examine such cases at the first instance. EAC was further informed that such cases are to be dealt in terms with the MoEF OM No. J-11013/41/2006-IA.II (I) dated 12.12.2012 & 27.6.2013 in conjunction with orders of National Green Tribunal recently in this regard.

The EAC, therefore mentioned that the case for scoping/TOR clearance for this project cannot be considered at this stage. The Ministry may inform the project proponent accordingly.

Agenda item No.2.6 Chintalapudi Lift Irrigation Scheme in West Godavari District of Andhra Pradesh by M/s. Water Resources Department, Government of Andhra Pradesh – for consideration of TOR

The project proponent did not attend the meeting. Therefore, the project was not considered by the committee.

Agenda Item No. 2.7 Repair the existing ghat road from Mullai Periyar Dam to Vallakkadavu approach road and pathway to Baby Dam in Idduki District of Kerala by Water Resources Department, Government of Tamil Nadu

The project proponent made a detailed presentation on the project with focus on road development for access to dam site. The EAC observed that the project proponent proposed to make a 4.5 km long concrete road and strengthen the existing ghat road in the Mullaperiyar Dam site which is entirely runs through forest area. The committee mentioned that neither the project area nor the road project is covered

under the Mullaperiyar Dam project. In addition, as per the EIA notification, 2006 there exists a seperate EAC for construction of road projects and FAC for forest clearance. The project proponent was advised to approach Forest Clearance Division/ Infrastructure Sector of the Ministry in this regard.

Agenda Item No. 2.8 Luhri HEP (612 MW) Project in Shimla, Kullu & Mandi Districts, Himachal Pradesh by M/s. Satluj Jal Vidyut Nigam Ltd – For consideration of amendment in Environment Clearance for change in generation capacity from 612 MW to 219 MW

The project proponent made detailed presentation on the project and proposed to seek amendment in the Environment Clearance accorded to 612 MW Luhri project to revised scheme of 219 MW Luhri project Stage-I.

The project envisages construction of 86 m high concrete gravity dam across the river Satluj to generate 612 MW of hydropower. This is a run-of-the river scheme. The total land requirement is about 380.3175 ha. Out of this, 271.1577 ha (181.5369 ha is forest land above ground + 89.6208 ha is notional land underground components of the project) is forest land and 109.1598 ha is private land. The total submergence area is 153.05 ha. The total catchment area of the project is 797 Sq.km. An underground powerhouse is proposed near Marola Village with 3 units of 196 MW each & a dam-toe powerhouse of 24 MW to meet environmental flow requirement at downstream of the project. A total of 468 Project affected families comprising of 2337 land owners from 24 villages belonging to 6 tehsils of 3 districts are likely to be affected due to this project. Out of this a total of 37 families will be displaced. The total estimated cost of the project is about 7137.02 Crores and will be completed in 8 years.

The environmental clearance for this project was granted on 19.8.2013 for 612 MW capacity.

The project proponent informed that the original project of 612 MW Luhri HEP project had to be re-designed to address the technical issues raised by Central Water Commission regarding design of Surge Shaft. In addition, Government of Himachal Pradesh had also desired to explore the possibility of executing Luhri project as a multi-staged project to address numerous representations from local inhabitants and other stakeholders regarding 38 Km long head race tunnel (HRT) proposal in the original project. The project proponent submitted that keeping in view these issues, the project has been re-designed & 38 Km long HRT has been completely eliminated. The redesigned scheme envisages construction of two powerhouses of 200 MW and 19 MW each at the toe of the dam proposed at Nirath within the same reservoir levels which have been earlier appraised by the Ministry.

After detailed deliberations on the matter, the committee was of the opinion that any change in the design and layout in the original scheme would require fresh scoping and appraisal of the project. The revised scheme for amendment in in environmental clearance from 612 MW to 219 MW has completely changed the scope

of the original scheme proposed earlier. Therefore, the committee desired that a fresh application seeking scoping clearance may be submitted by SJVN Ltd for conducting fresh EIA/EMP study for the revised scheme.

Agenda item No. 2.7 Athirapally HEP (163 MW) Project in Thrissur District of Kerala by M/s. Kerala State Electricity Board – for reconsideration of environmental clearance notice

The Ministry granted environmental clearance (EC) to this project on 18.7.2007. Afterwards, the Ministry received several representations on this project primarily regarding threat to the habitation of Primitive Kadar Tribes and likely endangerment of the Biodiversity in the region. The Ministry issued a **show-cause** notice under Section-5 of EP Act, 1986 to Athirapally HEP (2 x 80 MW + 2 x 1.5 MW) project on **4.1.2010** to explain the position satisfactorily or else face revoking of the clearance and closure of the project.

The reply receivd from KSEB was considered by the Expert Appraisal Committee (EAC). While KSEB was to furnish additional clarifications, the MoEF &CC referred this project to the Western Ghats Ecology Expert Panel (WGEEP) under the chairmanship of Prof. Gadgil on 27.7.2010 in view of issues relating to ecological sensitivity & bio-diversity of the area. The WGEEP report, submitted to MoEF &CC on 30.8.2011, did not recommend the execution of this project. MoEF &CC had subsequently constituted a High Level Working Group (HLWG) under the chairmanship of Dr. K. Kasturirangan, Member, Planning Commission on 17.8.2012 for taking a view on the way forward to implement the WGEEP report. The HLWG submitted its report to MoEF & CC on 15.4.2013. In the HLWG report, following has been mentioned with respect to Athirappally HEP:

" ***HLWG is of the view that while the importance of the proposed Athirappilly hydropower project for meeting the peaking power requirements of the State cannot be disputed, there is still uncertainty about ecological flow available in the reverine stretch, which has a dam at a short distance upstream of the proposed project. It recommends that given the increased variability due to unpredictable monsoon, the project must be revaluated in terms of the generation of energy and whether the plant load factor expected in the project makes it viable against the loss of local populations of some species. Based on this revaluation and collection of data on ecological flow, the Government of Kerala, could take forward the proposal, if it so desires with the Ministry of Environment and Forests"***

The KSEB was therefore, requested by the Ministry (on 9.1.2014) to conduct a study and submit a report taking into account the recommendations of HLWG report.

The KSEB submitted its response and also presented before the EAC in its meeting held on 11-12th December, 2014. The EAC accepted the clarifications with respect to the aspects of biodiversity associated with the implementation of the project. However, EAC sought a water availability study through CWC to be sure about the adequacy of the installed capacity of the HEP.

Flow availability data vis-a-vis adequacy of installed capacity of HEP together with assessment of adequate e-flow release have been received from KSEB & CWC and the same was presented before the EAC during 20-21st July, 2015 for consideration.

Project proponent explained that during rainy season, there will be flow from the downstream catchment of Athirappilly dam for maintaining the beauty of falls. There will be flow from major streams such as Charpa, Itiany & other small streams from either bank. In addition to the water available from the catchment area and the streams, spill from the Athirappilly reservoir will also contribute to the flow for Vazhachal and Athirappilly falls. During dry season, if the entire quantity of water is diverted to the main powerhouse, there will not be any water in a stretch of river between the dam and the confluence of the river with Kannankuzhy stream (where the tail race joins the river). In order to avoid the formation of this dry stretch, it was initially proposed to release 6.23 m^3/s of water during the months April & May and 7.65 m^3/s of water during September-March from the Athirappilly reservoir for 24 hours in a day. This minimum release is corresponding to the daytime generation at the existing Poringalkuthu power station. From the generation pattern of Poringalkuthu powerhouse for the past years, it was observed that during summer, during off peak hours, the powerhouse operates mostly at a minimum generation of 8 MW. The discharge corresponding to this generation is minimum of 6.23 m^3/s. In other words the rate of flow during day times is the one corresponding to the generation of 8 MW. So in order not to create any adverse impact on the waterfalls due to the implementation of Athirappilly project, it was proposed to release water at the same rate from the Athirappilly dam-toe powerhouse. The dam toe powerhouse will be operated 24 hours from January to May i.e. 65% of the flow pass over the falls. Thus 35% of the flow is diverted to the main power house and that too only during 7 pm to 11 pm. Based on the recommendations of the committee of experts who had visited the site, MoE&F had stipulated that the flow has to be maintained @ 7.65 m^3/s 24 hours/365 days, which in fact would be slightly higher than the present flow during summer months. It was pointed out by KSEBL officials that the figure of 7.65m^3/sec is not an arbitrary figure, but the figure arrived on long-term data analysis. The project is designed in such a way that during the summer months the operation of the main powerhouse is suited to a manner of the operation of the upstream Poringalkuthu so as not to create undue fluctuations. Thus the flow in the river is maintained as such.

It was also brought to the attention of EAC regarding the judgment of the Hon' High Court of Kerala dated 29.5.2015 wherein it was directed among others; that the contentions of the petitioners are left open to be decided at the appropriate stage. EAC was of the opinion that it is bound to consider the directions of the Hon' Court. Therefore EAC requested the officials of KSEB to summarise the contentions of the petitioners raised in both the petitions. The EAC also noted that the contentions raised in various representations before the Ministry with respect to the project are of similar nature and in line with the issues considered in the EAC meeting held on 16.05.2007

& 17.7.2010. The EAC members also deliberated on the issues in detail among others viz.

(a) Concern: Loss of forestland

The project is likely to submerge 28.4 ha of natural forest. 15 RET (Rare, Endangered & Threatened) species are in the submergible area as well as in the Catchment Area. ***Salacia bedduomei*** (ponkorandi-local name) is in the submergible area and has wider distribution in Southern Western Ghats. It was informed by scientist from TBGRI that they have standardized protocol for the species and produced 5000 species for re-introduction and supplied to public for cultivation. Therefore, there is no threat to any of the RET species. Scientific institutions like TBGRI has sufficient experiences in rescue & restoration of RET species successfully and scientific advice will be sought as and when required, like wise there are no faunal elements strictly endemic to project

(**b) Concern: Loss of beauty of waterfalls**.

It was informed that the existence of Vazhachal- Athirappilly waterfalls at present is not part of the natural flow regime of Chalakudy river. As an average 8 MW tail race from Poringalkuthu power house releases during off peak hours maintain the waterfalls at present. This will be maintained all days even if the proposed Athirappilly project is commissioned through the proposed dam-toe power house. The dam toe powerhouse will be operated 24 hours from January to December. The flow will be maintained as per the MoEF&CC recommendations i.e. 7.65 m3/s over Athirappilly falls. Thus the concern regarding the beauty of waterfalls due to the proposed project is mainly during periods from January-May.

(c) Concern : Majority of water is diverted to main power house

The average flow available at present during February-May is approximately 1.1 MCM per day. The stipulation fixed by MoEF& CC is 7.65m3/sec for maintaining the beauty of waterfalls. This flow rate will be maintained by KSEB through the dam-toe power house round the clock for maintaining the beauty of falls as at present. This flow rate of 7.65m3/sec corresponds to 0.66 MCM per day. In other words during summer as an average 66% of the water flows over the falls. Thus only 34% of the water is diverted to the proposed main power house and that too after 7 pm.

(d) Concern: Reduction in water in Chalakudy River which in turn will affect the irrigation requirement, drinking water requirement

The Central Water Commission has endorsed the water availability of the project for the fourth time again 2/2015. The Chief Engineer (Hydrology), CWC had earlier informed the EAC of MoEF&CC that the average flow available for the project and water planning of the project are not in conflict with each other. At present the tail water discharges from Poringalkuthu powerhouse reaching Thumboormuzhi Irrigation project cater to the above needs. By implementing the proposed project, the same quantity of water is only let down through the dam-toe powerhouse and the main

powerhouse at Kannakuzhy for generation of electricity. There is no change in quantity of water reaching the irrigation weir.

(e) Concern: The installed capacity of the project is very high

The head available for the Poringalkuthu powerhouse & Athirappilly powerhouse for generation is nearly equal (gross 180 m & 160 m respectively). The capacity of Poringalkuthu station is only 48 MW. The apprehension is, under more or less same head how it is possible to generate 160 MW power from Athirappilly. As submitted earlier, an annual flow of about 1055 MCM of water is estimated at Athirappilly scheme based on the actual measurement from G&D station maintained by CWC in Chalakudy river. Of the available inflow into Poringalkuthu, about 50% will be surplus from the reservoir and the balance water will be utilized for generation. The generation from Poringalkuthu powerhouse is about 690 MCM of water. The generation from Athirappilly powerhouse will be 1055 MCM. The spill Poringalkuthu reservoir will occur generally in the months June, July, August and October depending up on the rainfall. In other words such huge quantity of water is released in a shorter period; definitely the rate of flow during spill will be very high. It is observed from the records that discharge is in the rate of 40-45 MCM per day has occurred during the pervious years. The spill from the Poringalkuthu reservoir in certain days has even exceeded the capacity of the Poringal reservoir 30.3 MCM. Also there is high variation in the rate of flow during spill. The maximum possible daily utilization of Poringalkuthu power house is about 3.3 MCM. Since the provision for storage in Athirappilly reservoir is minimal nearly 1/6th of Poringalkuthu reservoir, if we are not choosing an higher installation for Athirappilly power house, most of the spill from Poringalkuthu reservoir will be spilled from Athirappilly reservoir also without utilization due to meager storage capacity and thereby minimizing the submergence. In other words the project has been designed as a Run of the River Scheme. For utilizing the spill to the possible extent and considering the cost aspects an installed capacity of 160 MW is chosen for the Athirappilly. The conclusion was that one cannot linearly compare the installed capacities of Athirappilly and Poringalkuthu powerhouses without considering the possibility of utilizing the spill from Poringalkuthu reservoir in the Athirappilly power house.

(f) Concern: Displacement of Tribals

No families are there in the submergence area of Athirappilly reservoir. There are 22 (previously 18) tribal families living in the upstream of the submergence area. Ministry has already stipulated that no tribals are to be displaced while implementing the project.

(**g) Concern: Installed Capacity of the proposed project is high compared to existing upstream projects**

Athirappilly Hydro Electric Project is envisaged mainly as run of the river scheme. A run of the river scheme requires only negligible storage. The storage of proposed Athirappilly project is 8.4 MCM. The existing Sholayar Hydro Electric Project and Poringalkuthu Hydro Electric Project are seasonal storage schemes with considerable submergence area. The Sholayar Hydro Electric Project (54 MW) has a submergence area of 8 Sq.km with a storage of more than 150 MCM. Hence regulated discharge is possible from this storage, which results in lower installed capacity. However in the case of proposed Athirappilly Hydro Electric Project the submergence area is only 1 Sq.km and storage of just 8.4 MCM much less than 10% of Sholayar Hydro Electric Project. Hence EAC rejected the challenge on the same.

(h) Concern: Energy Generation from the proposed project is less compared to existing scheme

As per availability of water assessed by concerned agencies, has lead to higher installed capacity so as to utilize the optimum water available. At Poingalkuthu the Installed capacity is 48 MW generating more than 233 Mu. Thus it was clarified that the water available for power generation for the proposed Athirappilly Hydro Electric Project involves tail race releases after generation equivalent to 233 Mu of power (generated at Poringalkuthu) + energy equivalent to the spill of water from Poringalkuthu . Hence at Athirappilly KSEBL can generate more than 233 Mu (Poringalkuthu generation plus spill plus inflow from its own catchment). Further the energy arrived by statutory authorities is the minimum energy that can be generated in the worst scenario. EAC members accepted the view in consultation with member representing CWC.

(i) Concern: Generation from the proposed project is mainly during monsoon period.

Poringalkuthu Hydro Electric Project generates 80% of annual generation during season from June-January. Only 20 % of the energy is generated from the " storage" form Poringalkuthu project during the months of February-May even though Poringalkuthu has a storage of 30.3 MCM. With 1/6th live storage capacity compared to Poringalkuthu, the proposed Athirappilly project like wise generation pattern is can only be undertaken during monsoon. During months of February to May, the proposed project follows only the generation pattern at Poringalkuthu and that too considering the water releases for maintaining the water falls. Hence it was concluded that the views of KSEB be accepted

(j) Concern: Water availability data has been fabricated and Central Water Commission has upheld the contentions of the petitioner

The Central Water Commission (CWC) had considered the hydrology data in 2010 from 1970 -2002 based on the representation filed by the petitioner and accorded requisite clearance with a copy to the petitioners stating the facts therein. The water availability was assessed therein as 1056 MCM. The Central Electricity

Authority (CEA) has arrived at 233 Mu as Design Energy. CWC has again re-considered the water availability for the project based on the hydrology data in 2015 from 2002-2013 and accorded necessary clearance. The water availability assessed therein was 1055 MCM based on the request of MoEF&CC. There is no variability in the inflow pattern at Athirappilly from 1970-2002 & 2002-2013. EAC accepted the above clarifications as CWC is the statutory agency to clear the water availability of a hydro electric project in the country.

(**k) Concern: Discussion not held with concerned authorities.**

It was clarified by KSEB that adequate discussions has been held with all concerned departments.

(l) Concern: The EIA report is fraud

It was informed that the allegation that EIA report prepared by WAPCOS has been evaluated by e-law based on the request of Adv. Sahasharanam. The criteria for evaluation of an EIA report have been published by Ministry of Environment & Forest (EIA MANUAL- published in January 2001). It has only been cited by KSEB that the impact on elephant population has not been considered in the report is the only concern raised therein. However this aspect has been studied by experts deputed by MoEF&CC and report submitted to MoEF&CC.

(m) Concern: Six dams in the river

It was informed that before the implementation of Sholayar and Poringalkuthu Hydro Electric Projects of KSEB, summer flow in Chalakudy river was very lean. The summer flow available today in Chalakudy river is only due to the regulated release from the storage reservoirs of KSEB during summer days. It was submitted that reservoirs never decrease the water availability of the basin. Reservoirs only store a certain quantity of water when there is surplus water and meet the requirements when the natural flow in the river is minimal. It was informed that KSEBL had compared the storage capacity of the reservoirs upstream of the Chalakudy River Diversion Scheme within Kerala State with the annual yield, the storage of KSEBL Reservoirs is only approximately 180MCM, which is 10% of the annual yield. Further the benefits derived by the people of Kerala and Tamil Nadu from the dams cannot be ignored. Further it should be appreciated regarding the fact of the case that the existing schemes are maintaining the summer flows catering to the needs of the downstream users when others areas are getting dried up once the monsoon recedes. EAC accepted the views of KSEBL after discussions and clarifications provided by KSEB

(n) Concern: Report has been fabricated. 45 days has only been taken to furnish the report of downstream impacts

It was submitted that guidance for assessment of representativeness and reliability of baseline environmental attributes has been published by MoEF&CC. It specifies the frequency and network of sampling which is generally one sampling per

season. It is worthwhile to mention that regarding the aspect of network of sampling points it has been stated that “Considering probable impact, sampling points and number of samples to be decided on personal judgment….”.

(o) Whether the implementation of the project will affect the uniqueness of the ecosystem/Richness in endemic species of the area, whether the implementation of the project will affect the very high conservation value of Vazhachal which is as high 75%, whether it is possible to mitigate the eco-system loss/damages caused by the implementation of the proposed project, whether the implementation of the project will result to loss of bio-diversity, whether the methods followed for bio-diversity studies carried out for the proposed project were totally wrong and unacceptable, whether in the proposed project area shows the tree density in the project area 608/ha and that of shrubs between 6000-16000/ha, whether the proposed project will have any impact on cane turtle and endemic and endangered species which was first reported from here, whether the two species of plants namely lagenandranairii and new species reported only from Athirappilly area and jymnemakhandalense in Kerala which was reported only from Athirappilly will be affected due to the implementation of the proposed project, whether all the four species of horn bills found in Kerala are present in the Athirappilly-Vazhachal area will be affected due to the implementation of the project, whether 12 out 16 species (75%) of the endemic species of birds seen in the Western Ghats are present in the Athirappilly- Vazhachal area will be affected due to the implementation of the project, whether the proposed project will have any impact on the lion tailed macaque, whether any serious attempts have been made so far to document the lower forms of life in the promising eco-systems while carrying out the studies by KSEBL, whether the EIA study unequivocally shows that the project area is an abode of habitat specialists of all taxa studied, whether the implementation of the project will affect the ecology of the river system even though the water flows of 6.23 cumecs throughout the day/throughout the year may help to maintain the waterfalls, whether the project area is an important bird area

It was informed that Dr. A.G. Pandurangan, Head, Plant Systematics & Evolutionary Science Division, TBGRI has been working in the Western Ghats for the past 30 years and associated with KSEB in the preparation of EIA reports for various projects would explain the aspects related to Bio-Diversity. The scientist from TBGRI brought to the attention of EAC that MoEF&CC had granted forest clearance for diversion of 138.60 ha of which 13.20 ha of forest land which is required for temporary use shall be returned back to State Forest Department as soon as the work is over after restoring it to its original status. The project so approved involves construction of a reservoir extending over an area of 104.40 ha of land. The break-up of this submergence area consists of 28.4 ha is Natural forest, 36.8 ha of Plantation and 39.2 ha River Bed. The forest area at 4 M below FRL is about 81.00 ha and Clearance of natural forest & plantations required is only about an extent of 41.80 ha. This is a very small extent when compared to the installed capacity and generation potential of the project. It was also stated that there is no appreciable bio-diversity or any endangered eco-system available except riparian forest in the project affected area. 104.4 ha of

submergence area is a portion of Vazhachal forest tract which is an abode of many species of flora and fauna, few such species are among the Rare, Endangered and Threatened (RET) species. Studies undertaken by KSEB had convincingly proved that there is absolutely no species, exclusively confined to this submergence area. RET species identified have wider distribution all over the Western Ghats. Therefore submergence of such a small area will not have any adverse impact on the ecosystem of Vazhachal forest tract. The bio-diversity values pointed out by various institutions such as NBFGR, French Institute of Pondicherry, Bird Life International, Wild Life Trust etc have been brought out in the EIA reports prepared by TBGRI and WAPCOS engaged by KSEB.

It was pointed out that all available published reports with respect to the project area has been examined in detail. The published reports of KFRI made available with respect to the project area have been scrutinized and the reply furnished to MoE&F. The list of species available in the Vazhachal forest Division submitted by the Chief Conservator of Forests. MoEF&CC mentioned that the replies furnished by TBGRI & KSEB have been received. It was also pointed out by KSEB that MoEF&CC had published the list of critically endangered, endangered and vulnerable species in Kerala. On close scrutiny of the same, it can be seen that only one species which is classified as vulnerable is available in the submergible area of the project. 15 RET (Rare Endangered Threatened) Species in the submergible as well as in Catchment Area has been identified by studies conducted by KSEB. It was pointed out that only Phaeanthus malabaricus Bedd is in the submergible area and has wider distribution in Southern Western Ghats. Scientific institutions have standardized protocol for the species for re-introduction. Therefore there is no threat to any of the RET species. Scientific institutions has sufficient experiences in rescue and restoration of RET species successfully and therefore scientific advice will be sought as and when required by KSEB. Likewise there are no faunal elements strictly endemic to project. Well renowned scientists Dr. R. Sukumar and Dr. P. Kannan have opined that the proposed project will not cause any hindrance to the movement of elephant. Sri V.K. Sinha, IFS, then Chief Conservator of Forests (WL) and Chief WildLife Warden has also opined that the proposed project shall not cause any problem to the elephant population. The reports were subsequently examined by the committee. It was also submitted that KSEBL has built in to the project a constant monitoring mechanism by eminent scientific Institutions for 10 years from the date of implementation right from construction to operation. This is also a condition stipulated in the environmental clearance letter. Therefore bio-diversity conservation and ecosystem resilience can be maintained without compromising the welfare of the state.

It was submitted that along the banks of every river (43 rivers) there would be different types of vegetations. In Kerala the species seen along the banks of the river are tropical in nature. Hence it was submitted that such vegetation, which grow along the banks of the river, will have certain unique characteristics. Natural riparian vegetation would be visible along more than 70 Km of its left and right banks especially in the lower elevations of the Chalakudy river which has a total length of

approx 130 Km. The proposed reservoir would affect only 2.5 km of the length of the river. Hence it was submitted that such submergence over a small extent of area would not destroy the entire riparian vegetation. It was also pointed out that such riparian vegetation would develop subsequently along the FRL of the proposed reservoir. The EIA report clearly states that the endemic species of the Western Ghats located in the project area are not strictly endemic to Chalakudy river or the project area. EAC members informed that a scientist from KFRI has made available copies of reports of bio-diversity studies undertaken by scientist in the area. The Director of KFRI based on the request from KSEB with respect to a press report on the high conservation value reported by KFRI on Vazhachal Forest Division where the proposed project is to be housed. It was brought to the attention of the committee that KFRI had prepared a conservation plan to the Vazhachal Forest Division of Kerala Forest Department as per the request of the Principal Chief Conservator of Forests. The conservation plan is now under consideration of the State Forest Department and the same is not a report which has till date not been published. It was also stated before the committee that the bio-diversity value of the entire Vazhachal division extending from 300-1000 m MSL is not disputed. What is important is that the project area at 300 m MSL creates very low negative impact and adequate mitigative measures have been proposed while implementing the project. It was submitted that the Catchment Area is having a fairly good bio-diversity and it is not going to be affected. Riparian vegetation is seen only along the fringes of the river and that too for a width of few meters. Thereafter on either side of the river it is moist deciduous forest and manmade plantations. However enough representative samples of the same eco-system are available both in the upstream and downstream of the proposed project which are not going to be affected and that there is no alteration of flow and quantum of water in the river. With reference to the aspect of fisheries by EAC members, the committee was drawn to the attention of the reports by Ajith Kumar (1999), the report of “Three new species of fishes of the genera from Chalakudy River, Kerala India “by Rohan Pethiyagoda and Maurice Kottelat. In case of any migratory fishes in the downstream the existing Athirappilly waterfall acts as a barrier. In the normal course migrating fish, can jump only a couple of meters. The Athirappilly waterfalls register a drop in elevation by 45 m; and hence no upward migration of fishes is possible beyond the falls. However the presence of any migratory fish species is not observed in the project area.

It was pointed out that the Bird Life International has identified Vazhachal, Sholayar area as an important bird area in various reports. It was clarified by KSEB that the area selected (identified) is upstream of the project area where the proposed project has no impact. The proposed bird area also houses two important hydro power reservoirs namely Sholayar and Poringalkuthu for the last 40 years and IBA has not made any adverse remarks on the existence of such water bodies. 12 of the 16 endemic species of birds seen in the Western Ghats are present throughout the Western Ghats and thus available in Athirappilly also which forms part of the Western Ghats. All the four species of Horn Bills are available throughout the southern Western Ghats and thus available in Athirappilly also.

Regarding the documentation of lower forms of life, it was stated that the report prepared by scientists from KFRI in this regard has been sourced and supplemented by KSEBL. Regarding Lion Tailed Macaque it was clarified that the same is found in Silent Valley, Nagaholai, Anamalai, Srivilputhur,Periyar Tiger Reserve,Sabarimala forests etc. There is no resident population of the species in the area. With respect to Cane Turtle, it was emphatically clarified that Cane Turtle was first described (reported) from Parambikulam Wild Life Sanctuary and never been reported outside this habitat.

Regarding Horn Bills, it was clarified that all the four species area available through the Western Ghats and thus available in Athirappilly also.

Regarding Legenandra nairi it was clarified that TBGRI has located the species from Pooyamkutty river basin as an alternative habitat to this species. Gymnema Khandalense was not encountered and in the absence of any voucher specimen, the claim cannot be substantiated and hence cannot be commented upon.

The estimate of tree density is highly exaggerated. The project area especially submergible area never contain tree density to the tune of 608/ha. The project area is already highly disturbed and is impossible to contain shrubs between 6000-16000/ha as claimed

KSEB mentioned that concerns raised and all environmental issues were duly considered examined by Expert Appraisal Committees and thereafter site visits by experts deputed by MoEF &CC thoroughly considered before granting environmental clearance to the project.

The committee observed that all issues have been specifically addressed by experts of EAC, CWC & CEA from time to time. No fresh issues have been brought to the attention of EAC or the Ministry with any convincing data. EAC also concluded that the forest clearance issued by MoE&F is subject to the obtaining requisite Environmental Clearance and hence valid from the date of issuance of the same.

After detailed deliberations, EAC observed that it is evident that there is no endemic species specifically of project area and there is any species for which mitigation methods are not available. The damage due to submergence of flora and fauna of the area is mitigable. Moreover, the various committees had looked into these aspects during the appraisal of the project as well as at the time of site visit and had suggested some environmental measures which have been incorporated by sacrificing the power. In view of this, the Committee felt that there is no enough data and reason to go against the recommendations of EAC for environmental clearance for the Project based on which MoEF & CC had accorded Environmental Clearance in 2007 and also decided to reiterate EAC's earlier recommendation of 17.7.2010 & 12.12.2015. After critically examining all the issues based on the reports, facts and discussions and deliberations held among the EAC members, the committee considered that the clarifications provided were satisfactory.

The EAC decided to recommend for withdrawal of "**show- cause**" notice issued by the Ministry to KSEB with respect to Athirapally project in 2010. The committee also suggested that there should be strict monitoring of the environmental conditions by KSEB in consultation with State Forest Department. And Regional Office of MoEF & CC shall also conduct strict monitoring to ensure compliance of various conditions.

Agenda item No. 2.10 Jeera Irrigation Project in Odisha by M/s. Water Resources Department, Government of Odisha – For reconsideration of Environmental Clearance

The project proponent made a detailed presentation on the project. This is a medium irrigation project with a culturable command area (CCA) of 4800 ha. The project on completion will provide irrigation to 4320 ha of land in Khariff season and 1520 ha in Rabi season thereby improving the socio-economic condition of the people of the area. Government of Odisha submitted to Central Level stating that Chhattisgarh is within 10 Km of the proposed project area. Therefore, the project was considered by EAC at that time as per EIA Notification, 2006 (General Conditions apply).

This project was considered in the 70th EAC meeting for River Valley & HEP held on 10-11th December, 2013 at MoEF&CC, New Delhi. While considering the project, the EAC noted that the validity of the TOR for the project has expired and public hearing was held after expiry of the Validity of TOR. Therefore, EAC advised Water Resources Department, Government of Odisha to submit application seeking extension of the validity of TOR so as to enable reconsideration of the proposal by the EAC. Due to non-submission of the information, the Ministry have closed the file in February, 2015.

The EAC observed that Government of Odisha submitted compliance report instead of asking for validation of TOR. The EAC noted that under the extant rules validity of TOR can still be extended and therefore requested them to immediately first apply for seeking extension of the validity of TOR and thereafter they may revise the EIA/EMP and compliance report and submit to Ministry for consideration in the next EAC meeting . The Odisha Government informed they would submit the application on this day itself.

3. **Any other item with permission of Chair**

Agenda item No. 3.1 Tawang River Basin Study in Arunachal Pradesh by NEHU

Prof. S.K. Barik of NEHU, Shillong & Prof. S. Dutta of IIT, Guwahati presented the report on Tawang river basin study which was commissioned by Government of Arunachal Pradesh through NEHU. Government of Arunachal Pradesh was asked by the Ministry of Environment and Forests to get this study conducted while considering the Forest clearance for Tawang-I & Tawang-II projects of NHPC. A total of 13 HEPs with total capacity of about 2809.10 MW has been planned in Tawang River Basin

(TRB) in Arunachal Pradesh including three projects of over 500 MW capacity; seven projects of less than 100 MW capacity, one project of less than 50 MW capacity, and two micro-hydels. The study was conducted with the following objectives: (i) Impact assessment for individual 13 projects, (ii) Cumulative Impact Assessment for all the projects on Tawang River Basin, (iii) Determining Ecological Flow necessary to maintain structure and function of ecosystems in Tawang River Basin, (iv) Assessing carrying capacity of Tawang River Basin, (v) Developing a sustainable development plan for Tawang River Basin, and (vi) Prepare a Landscape Level Biodiversity Management Plan for Tawang River Basin.

The approach and methods followed for each component of the study were presented in detail, which are summarized below:

Impact assessment for individual projects

Since base-line primary data for the basin was almost non-existent, baseline primary data on all aspects of environment were collected over a period of 12 months. The primary environmental data collected include vegetation, flora and fauna, disaster vulnerability, LULC, hydrology and hydraulics, ambient air and river water quality, noise level, socio-economic and cultural data from affected and influenced villages. The possible impacts on different environmental components common to all the projects and project-specific impacts were identified and mitigation measures were suggested.

Cumulative Impact Assessment

Standardized Cumulative Impact Assessment (SCIA) index for each project was developed using quantitative and qualitative values obtained from primary data collected in respect of 33 identified aspects/indicators covering i) Ecosystem Structure, Function and Services, ii) Biodiversity, iii) Disaster Vulnerability, iv) Hydrology, v) Cultural aspects and livelihood, and vi) Dependency of population on natural resources. These 6 Valued Environmental and Social Components (VECs) were selected after thorough discussion among the experts and knowledgeable people in the project area. The index was used to assess the relative contribution of the individual project to the cumulative impacts at basin level.

Environmental flow assessment

E-flow assessment for TRB was done following building block method taking holistic assessment approach. It comprised the following steps: (1) using a stakeholder consultation process to identify the building blocks, (2) determination of threshold limits for different indicators under each building block using the primary data and modeling for threshold limit, (3) assessing a modified flow regime that will meet those thresholds, (4) using flow–dependent indicators and non-consumptive human requirements, as well as water quality metrics, water depth, velocity, river width, and substrate types were identified that would provide the required habitat and ecosystem conditions. Such hydraulic requirements were then converted into flow

characteristics, and (5) critical components known as building blocks of the flow regime that govern environmental conditions were identified. The Building Blocks are: (i) ecosystem structure, function, and services, (ii) river biodiversity, (iii) river hydraulics, (iv) cultural requirements, and (v) livelihood requirements. Based on these processes, the e-flow was recommended. The e-flow requirement for each project site was assessed after extracting the average value of calculated flow depth, velocity, top width for each season through hydrodynamic modeling using HEC-RAS model. The reduced water flow as recommended should not reduce the water quality beyond the tolerable limit of any aquatic flora and fauna, for the consumption of wildlife, and for agricultural use. Besides, the recommended reduced flow should be able to maintain the critical ecosystem structure, function and services.

Carrying capacity assessment of river basin

Following indicators were used for determining carrying capacity of TRB: 1) upper elevation limit based on vegetation characteristics, snow-line, para-glacial deposits and location of the glaciers, (2) human population influx, (3) prescribed e-flow based on availability of water at different points, (4) minimum acceptable free-flow length between the two successive projects, and total river length free from any projects, (5) forest/ vegetation loss, and (6) SCIA i.e. combined socio-environmental index. The 'K' value or the upper asymptote was determined for each of the indicators. Using SCIA K value, and upper elevation limit, projects were allowed or rejected for implementation. To maintain population within the limit of acceptable carrying capacity limit i.e. 15% more than the current population as decided through consultation process with several stakeholders, the allowed projects were recommended for implementation in two phases i.e. 0-5 and 5-10 years.

Development Plan

Following four strategic components were formulated for development of TRB:

i) Institutional system: constitution of an autonomous body viz., Tawang River Basin Development Authority (TRBDA) by the state government, which would be entrusted with the responsibility of coordination with the existing government departments and power developers, planning and implementation of programmes, undertake regular monitoring of activities etc.

ii) Socio-economic and infrastructure development system: the component would focus on identified community development activities in different sectors with articulation of new need-based plans/grants and schemes, and also implement the programme in prioritized villages based on socio-economic index of each influenced and affected village,

iii) Protection of environment: planning and implementing forest and biodiversity management activities with close collaboration with the concerned state government departments, undertaking and facilitating conservation actions through communities and traditional village level institutions, and

iv) Disaster Management System: this would include activities to mitigate the impacts of extreme or unplanned/unforeseen events particularly affecting the

public safety and risking the property. This would also include man–made disasters that can occur either related to or due to hydropower structure, and also unexpected natural phenomena related to glacier lake outburst flood or climate change-related disasters.

Landscape Level Biodiversity Management Plan

Ecosystem based approach (EBA) was considered as the strategy for developing the landscape level biodiversity management plan for TRB. Therefore, constituent ecosystems were identified for each landscape element and ecosystems were used as unit of planning for developing landscape level biodiversity management plan. The conservation measures at species, ecosystem and landscape levels were identified based on the primary data collected during the study.

The Committee noted the following recommendations made by the study:

- The river basin would have at least 66% of its total geographical area under forest cover. Only 519.54 ha forest area will be diverted for construction of different project components.
- At least 40% of the contiguous main river length would be free-flowing i.e., free from any projects. A minimum distance of 1 km free-flowing river length between the two successive projects will be maintained. The total free-flowing river length would be maintained at 50% of the total main river length.
- TRB has a total population of 49,977. The influx of population at any given point of time should not exceed 15% of the original local population. Thus, the total population of TRB should not cross 57,474 at any given point of time.
- Minimum level of water flow at different project sites as recommended by the study as e-flow should be maintained in the river round the year. This is required to maintain the river ecosystem structure, function and services, including flora and fauna in the river, and the riverine and the adjacent terrestrial ecosystem structure and function. The seasonal flow dynamics of the river would be maintained, although at a much lower scale. The recommended seasonal e-flow requirements for different HEPs are:

Sl. No.	Name of HEP	Recommended environmental flow in discharge (cumecs)			Recommended environmental flow in percentage of 90% dependable flow		
		Lean	Monsoon	Non–Monsoon	Lean	Monsoon	Non–Monsoon
1	Tawang–II	10	26	13	25	18	20
2	Tawang–I	7.6	20	10	27	18	20
3	Rho	7.6	20	10	27	18	20
4	Nykcharong chu	6	13	10	30	30	27
5	Mago chu	5	10	8	70	20	53
6	New Melling	3	10	7	50	20	50
7	Tsa chu–I	5	10	6	25	25	17

8	Tsa chu–I Lower	5	10	6	25	25	17
9	Thingbu chu	1	2	1	100	30	100
10	Tsa chu–II	5	10	6	25	25	15
11	Nyamjang chu						

- The developer of Nyamjang chu joined the study late. The sites could be visited only for one season i.e. pre-monsoon season. In absence of the data for three seasons, it was not possible to conclude and recommend on all the aspects of the project. Based on the available literature, WWF's direct observation and expert opinion, the expert team felt that the protection of the wintering habitat of the threatened black-necked crane could be a major deciding factor for Nyamjang Chu project. However, during the present study the team could not directly observe or camera-trap the bird, as winter season was already over by the time the developer joined the study. Therefore, e-flow for Nyamjang Chu project could not be recommended. It is recommended that a national level institution having adequate expertise on black-necked crane such as WII, BNHS or SACON should be involved to recommend the e-flow for Nyamjang Chu project vis-a-vis the habitat protection of black-necked crane.
- All the existing forest/scrub areas should be managed and no more forests should be diverted for other uses. The biodiversity present will be conserved in totality and not a single element of biodiversity should be lost.
- The air, water, and noise quality would be maintained well-below the permissible limit as notified by CPCB.
- Given the sensitivity and ecological fragility of the ecosystems above 3,200 m elevation in the Eastern Himalaya, no power projects would be undertaken beyond this elevation.
- Religious places or the stretches directly related to the sacred belief of the people will not be disturbed. No lateral flow or the adjoining ecosystems contributing to the lateral flow in the downstream region of the barrages would be disturbed.
- There will be a 1-km wide green corridor on the both sides of the river in the entire stretch of Tawang river beginning from the first barrage in the upstream region bordering China upto Bhutan border in the downstream area. All the well-vegetated forest areas are connected through wildlife corridors for their smooth migration. A sanctuary of 40 ha area will be established in Tsachu project area to mitigate high altitude impact.
- Establishment of well-designed HEPs i.e., design discharge based on actual water availability in a realistic manner, and allowing minimum level of e-flow for the downstream river stretch for the sustenance of the river ecosystem. This would also ensure the continued dependency of people and wildlife on the river in the downstream area.

- Substantial contribution by the power developers towards socio-economic development of the river basin, particularly for those people whose lands would be acquired. The development and biodiversity conservation prescriptions made in the report should be undertaken by the respective developers falling within the 10 km radius of the respective projects. This would result in significant increase in employment opportunities and livelihood diversification.
- Improved quality of life through need-based intervention in education, health, road network, sanitation, and water supply should be ensured.
- Soil erosion and other hazards including future uncertainties due to climate change, earthquake and GLoF must be taken care of.
- In order to keep the developmental activities within the carrying capacity of the basin, it is recommended that the projects falling within the carrying capacity limit may be taken up in two time phases: **Phase–I (0–5 years):** Nykcharong chu, Tawang–I, Tawang–II, Nyamjang chu, Jaswantgarh Stage–I and Paikangrong chu and **Phase–II (5–10 years):** Rho, Mago chu, New Melling, Tsachu-I Lower & Tsachu-II.

Observations of the committee:

- The members appreciated the approach taken in the study and requested to provide each of them a hard and soft copy of the report for perusal.
- Considering the threatened status of black-necked crane, the committee noted the importance to protect the species as well as its wintering habitats which fall within the Nyamjang Chu project area (barrage site).
- The committee also observed that the study report will be further examined on receipt from the Government of Arunachal Pradesh along with their comments if any.

The meeting ended with thanks to Chair

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Annexure

List of EAC Members and Project Proponents who attended 85th Meeting of Expert Appraisal Committee for River Valley & Hydro Electric Power Projects held on 20-21st July, 2015 in New Delhi

Members of EAC

1.	Shri Alok Perti	-	Chairman
2.	Shri H. S. Kingra	-	Vice Chairman
3.	Shri Vinay Kumar	-	Member
4.	Shri N.N. Rai	-	Member
5.	Dr. K. D. Joshi	-	Member
6.	Dr. Vijay Kumar	-	Member
7.	Dr. S. Sathyakumar	-	Member
8.	Shri B. B. Barman	-	Member Secretary
5.	Dr. P.V. Subba Rao	-	MoEF & CC

Agenda No. 2.1 and 2.2

1.	Sh. Vishal Srivastava	-	DGM
2.	Dr Vijay Kulkarni	-	SP Infra
3.	Sh. Gautam V Kumtakar	-	AGD, SP Infra
4.	Dr. Arun Bhaskar	-	RS Enviro Technologies
5.	Sh. Ravinder Bhatia	-	RS Enviro Technologies
6.	Sh. Vimal Garg	-	RS Enviro Technologies
7.	Sh. I. K. Chugh	-	Feedbak Infra
8.	Sh. Mohemmad Hussain	-	DSM, JKSPDC Sawalkote
9.	Sh. Vijay Nagri	-	AEE, JKSPDC Sawalkote
10.	Er. Mohd. Haniflone	-	CE, JKSPDC, Sawalkote
11.	Sh. Hamid Mahmood	-	CE
12.	Ms. Meenakshi Raina	-	AM, JKSPDC

Agenda No. 2.3 and 2.4

1.	Sh. B. R. Saraf	-	MD, CVPP Ltd
2.	Sh. Rajeev Sachdeva	-	GM, CVPP Ltd
3.	Sh. R. S. Bhadwar	-	HOP, CVPP Ltd
4.	Sh. Ravi Sharma	-	AM (Env), CVPP Ltd
5.	Sh. Akash Seth	-	AM (Env), CVPP Ltd
6.	Sh. Narendra Kumar	-	GM (Design), NHPC
7.	Sh. Rajeev Baboota	-	CE (hydrology), NHPC
8.	Sh. Deepak Kumar	-	Manager, NHPC
9.	Prof. A. K. Raina	-	Consultant, Jammu University
10.	Dr. Arun Bhaskar	-	RS Enviro Technologies
11.	Sh. Ravinder Bhatia	-	RS Enviro Technologies
12.	Sh. Vimal Garg	-	RS Enviro Technologies

Agenda No. 2.5

1.	Sh. R. K. Niturkar	-	Chief Engineer, GMIDC
2.	Sh. A. R. Kumble	-	Suptt. Engineer, GMIDC
3.	Sh. D. V. Musale	-	Executive Engineer, GMIDC
4.	Sh. S.G. Kakade	-	GMIDC
5.	Sh. A. B. Khedkar	-	Dy. Engineer, GMIDC
6.	Ms. Rupa Roshan	-	GMIDC

Agenda No. 2.6

Absent

Agenda No. 2.7

1.	Sh. C. Rajes	-	Spl. CE, PWD/WRD/GoTN
2.	Sh. R. Mathavan	-	EE, PWD/WRD/GoTN
3.	Sh. R. Vilva Nathan	-	Liaison Officer, TN House

Agenda No. 2.8

1.	Sh. Depak Nakhesi	-	GM
2.	Sh. O. P. Gupta	-	Addl. GM
3.	Sh. K. L. Aumta	-	Addl. GM
4.	Sh. Rajiv Aggarwal	-	Deputy GM
5.	Sh. Arvind Mahajan	-	Addl. GM
6.	Sh. Milind Sangliani	-	Senior Engineer
7.	Sh. Shiraz Swan	-	Senior Engineer
8.	Sh. Ramaraj Verma	-	Senior Officer
9.	Sh. Sumit Awasthi	-	Senior Engineer
10.	Sh. Ramesh Chopra	-	DGM

Agenda No. 2.9

1.	Sh. Sivasankar	-	CMD
2.	Sh. T. V. Sultra	-	Executive Engineer
3.	Sh. Ramesh	-	Asst. Executive Engineer
4.	Sh. P. Mohan	-	Executive Engineer
5.	Dr. Pandurangan	-	Scientist-F

Agenda No. 2.10

1.	Sh. T. D. Sahoo	-	E&C
2.	Sh. Ashutosh Dash	-	Deputy Director
3.	Sh. Niranjan Panda	-	SE
4.	Bibhudatta Panda	-	EE
5.	Madan Mohan Sethy	-	AEE

Agenda No. 3.1

1.	Prof. S. K. Barik	-	NEHU, Shillong
2.	Prof. S. Dutta	-	IIT, Guwahati

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