

Minutes of the 81st Meeting of the Expert Appraisal Committee for River Valley and Hydroelectric Projects constituted under the provisions of EIA Notification 2006, held on 27th – 28th January, 2015 at Teesta Meeting Hall, 1st Floor, Vayu Wing, , Indira Paryavaran Bhawan, Jor Bagh, Aliganj, New Delhi 110003

The 81st Meeting of the Expert Appraisal Committee (EAC) for River Valley and Hydropower Projects was held during 27th -28th January, 2015 at Teesta Meeting Hall, 1st Floor, Vayu Wing, Indira Paryavaran Bhawan, Jor Bagh, Aliganj, New Delhi 110003. The meeting was chaired by Shri Alok Perti, Chairman. Shri K. D. Joshi, Dr. S. Sathya Kumar and Dr. G. M. Lingarau, Members could not attend the EAC meeting. The list of EAC Members and officials/consultants associated with various projects and who attended the meeting is at **Appendix**.

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

1st Day (27.01.2015)

1. **Agenda Item No.1** : Welcome by Chairman and Confirmation of Minutes of the 80th EAC Meeting held on 11th-12th December, 2014. The Minutes of 80th EAC meeting was confirmed as was circulated. Thereafter, following agenda items were taken up:

Agenda Item No. 2.1 Chuzachen Hydroelectric Project in East Sikkim by M/s. Gati Infrastructure Pvt. Ltd- Consideration of Environmental Clearance for capacity enhancement from 99 MW to 110 MW.

Chuzachen HEP is located in East Sikkim District of Sikkim. The HEP Project was commissioned on 18th May, 2013 and is under operation. This was discussed during 75th EAC meeting held in July 2014 and also in 79th meeting of EAC held during November 2014 for environment clearance for enhanced of 110 MW from 99 MW capacity.

EAC has made the following observations during the discussion on this project in its 79th meeting:

- The violation case is being separately handled by Ministry and a case has been already registered against the Developer by the Sikkim Government.
- On technical side, there are no significant additional impacts due to alteration of various physical parameters such as dimensions of the dam, HRT etc.

However, the significant change is in the capacity being raised from 99 MW to 110 MW and consequently doubling the project cost

- The Developer, however, shall have to follow the latest norms of environment flow @ 20% in lean season, 20-25% in non-lean & non-monsoon and 30% during monsoon season. The higher capacity is strictly subject to fulfilling these e-flow criteria.
- There is a need to have a document covering the detailed project information, revised impacts and status of implementation of original environment management plan already sanctioned. On receipt of such a document along with a comparison of various components of original EMP with the higher capacity HEP. MoEF & CC may consider placing the same before the EAC, if the Ministry feels it appropriate to do so.

The Developer has now responded to these observations and presented the matter before the EAC as under.

Observation

The violation case is being separately handled by Ministry and a case has been already registered against the Developer by the Sikkim Government.

Response

Developer informed that based on EAC recommendation, State government has initiated legal action under section 15 and 19 of EP Act, 1986 and filed a complaint in Court of Civil Judge cum Judicial Magistrate East, Gangtok Sikkim under case code 218400012872014. The case has been registered under registration No. 81/2014 dated 5/11/2014 and directed proponent to operate only up to 99 MW till the environment clearance for revised capacity is obtained from the MoEF for 110 MW installed capacity. EAC reviewed the copy of petition filed by state government and observed that violation matter is sub judice and court will take appropriate decision.

Observation

On technical side, there are no significant additional impacts on various physical parameters such as dimensions of the dam, HRT etc. However, the significant change is in the capacity being raised from 99 MW to 110 MW and consequently doubling the project cost

Response

Although, the matter was discussed in previous EAC meeting held during November 2014, EAC again reviewed comparative salient features and noted that there is no significant change in the dimensions of the project component, which can cause significant changes in the environmental impacts. These changes are mainly on account of detailed engineering exercise during the construction phase of the project and are not entirely due to change of capacity from 99 MW to 110 MW. Additional muck generation/change of land use could be a potential impact due to construction of project components of higher dimensions, however, in this case for various reasons including presence of hard rock found in sub-terrain and in some components the change in dimensions are negative, as a result net quantity of muck generated was slightly lower than estimated.

EAC also noted that no additional land was sought and acquired due to increase in capacity; forest land estimated at the EIA stage was approved for diversion in 2006 and additional land was diverted in 2008 for construction of approach roads; which were expected to be provided by the State Government and therefore this was not considered at DPR stage. Therefore, at present no forest clearance is pending.

Observation

The Developer shall have to follow the latest norms of environment flow @ 20% in lean season, 20-25% in non-lean & non-monsoon and 30% during monsoon season. The higher capacity is strictly subject to fulfilling these e-flow criteria.

Response

Developer confirmed and agreed that the latest environment flow release requirement will be met with on approval of enhanced capacity. Necessary arrangement to release e-flow will be made along with facility of automatic monitoring.

Observation

There is a need to have a document covering the detailed project information, revised impacts and status of implementation of original

environment management plan already sanctioned. On receipt of such a document along with a comparison of various components of original EMP with the higher capacity HEP. MoEF & CC may consider placing the same before the EAC, if the Ministry feels it appropriate to do so.

Response

A detailed document giving the background, comparison of salient features, likely impacts and environment management plan has already been submitted by developer. EAC discussed the original EMP along with its budgeted cost and status of implementation of various components of EAC along with actual expenditure. Developer presented that estimated budget for original EMP was Rs. 462.81 lakhs at EIA stage. However, actual expenditure booked under this head is Rs. 4584.55 lakhs. EAC observed that all the components of EMP have already been implemented except that for Fisheries Development, where budgeted amount is yet to be provided to the department based on their proposal. Substantial increase in cost under EMP head is due to increased cost under management of geo-hazards, land acquisition and compensation, social welfare, crop compensation, etc.

After detailed deliberations, EAC concluded the following:

- The violation case is being separately handled by the court and a case has been already registered against the Developer by the Sikkim Government.
- From the environment point of view, there are no significant additional impacts of increase in capacity from 99 MW to 110 MW. Increase of 3.1 cumec of design discharge in monsoon will not affect the river adversely as minimum required environment flow as per prevalent norms will be followed by the Developer.
- Arrangement for release of revised e-flow is to be put in place along with automatic monitoring mechanism.
- After reviewing the document submitted by the developer and detailed discussion, EAC concluded that since the revised project does not have significant changes in the environmental impact compared to the original proposal the project is recommended for environment clearance for increased capacity of 110 MW. However, the EAC is of the opinion that this case should not be treated as a precedence for according environmental clearances in

cases where the project is revised and work has been initiated on the revised project without obtaining environment clearance for the revised project and that the Ministry should formulate appropriate guidelines for dealing with such cases and till such guidelines are not notified the ministry is requested not to place such cases before the EAC for examination. MoEF&CC may take appropriate action on the violation part.

Agenda Item No. 2.2 Kynshi Stage-I (270MW) Hydroelectric Project in West Khasi Hill District of Meghalaya by Athena Kynshi Power Pvt. Ltd. (AKPPL)- Consideration of extension of validity of ToR/Scoping Approval.

Kynshi Stage-I (270MW) Hydroelectric Project is proposed in West Khasi Hill District of Meghalaya.

The Scoping clearance for Kynshi Stage-I HEP for an installed capacity of 300 MW was accorded by MOEF vide letter dated 13th January, 2011 with a validity period of two years i.e. till 12th January, 2013. With the expiry of two years and on request of the developer, MOEF vide letter dated 19th August, 2013 had granted extension of TORs validity for a period of one year i.e. till 12th January, 2014 along with approval of reduced installed capacity of 270 MW. Thereafter, considering the pendency of finalization of the project layout plan and design parameters, MoEF vide letter dated 29th April, 2014 granted further extension for ToR validity till 12th January, 2015.

EAC noted that in last four years of scoping approval, developer could not complete EIA, EMP studies. Developer explained that the Detailed Project Report (DPR) of Kynshi I Hydro Electric Project took substantial time due to inadvertent delay in the approval of change of scheme from Storage to Run of the River (ROR) and accordingly, reduction in Installed Capacity (IC) and elevation levels. After approval of ROR scheme, IC and elevation levels, DPR was submitted for the purpose of concurrence to CEA and the acceptance meeting was held on 14th March, 2013. Since then, the DPR has been vetted by various directorates of CEA and CWC and accorded respective clearances. Developer informed that, the meeting of CEA for concurrence of DPR is scheduled to be held in the last week of January, 2015.

Regarding, EIA/EMP Studies, developer explained that three season baseline data for all the parameters have been collected except socio-economic

studies which shall be taken up after the concurrence of CEA to the Project parameters, including its layout.

For undertaking socio-economic surveys of affected families, finalization of the EIA/EMP Reports and thereafter, holding of Public Hearing, developer requested one year extension in scoping approval & TOR validity.

EAC enquired about the provision stipulated in respect to the environmental flow release, Developer informed that MOEF vide Scoping approval letter dated 13th January, 2011 has already stipulated that provision for minimum flow shall be evaluated for the aquatic ecology of the project area with respect to the flow and velocity considerations. Comparative analysis of minimum release to be carried for various cases of 10%, 15% and 20% of the average lean season flow of 90% dependable year for four consecutive leanest months along with the detail of flow contributions of the intermediate tributaries.

However, EAC directed that an environmental flow of 20% corresponding to average lean season of 90% dependable year for four consecutive leanest months shall be maintained.

Keeping in view the pending activities, EAC recommended further one year extension of scoping approval till 12th January, 2016 for Kynshi Stage I HEP subject to its being in conformity with necessary OM issued by the Ministry in this regard. No further extension shall be considered for the project.

Agenda Item No. 2.3 Kemeng Hydroelectric Project (600 MW)– Arunachal Pradesh–Consideration of report of CICFRI regarding Fish pass.

The project proponent, represented by the Executive Director (D&E), NEEPCO and his team made detailed presentation on the project and their proposal regarding the fish passes in Bichom Dam and Tenga Dam of the 600 MW Kameng Hydro Electric Project. A brief description of the project along with the fish pass is summarized hereunder.

The Kameng H.E. Project in Arunachal Pradesh is a run-of-the river scheme and consists of two dams namely Bichom Dam (69M height) and Tenga Dam (24.50M height) for diverting the water of Bichom River(tributary of the Kameng) and Tenga River (tributary of the Bichom) for generating 600 MW of

power, under a gross head of about 536 m. The diverted water will be carried to the power house, located on the right bank of the Kameng River through a 14.5 KM long head race tunnel and about 3.60 KM long partially underground and partially surface penstock. The power house will be equipped with 4 units of 150 MW each.

Kameng HE Project (600 MW) is in advance stage of construction and the expenditure incurred as on 31.12.2014 is reported to be Rs.3,500 Cr and scheduled for commissioning in March 2017.

The preparation of the comprehensive Environmental Management Plan (EPM) for the Project was assigned by NEEPCO to M/S Agriculture Finance Corporation Limited (AFC), in 1999. The Environmental Clearance (EC) to the Project was accorded vide letter of MoEF&CC dated 29.3.2001.

The work of Design of fish pass facilities for Bichom and Tenga Dam of Kameng Hydro Electric Project was awarded to CIFRI in September 2004 as per the stipulations of EC letter which was accorded in 2001. CIFRI designed fish ladders for Bichom Dam and suggested hatcheries for Tenga Dam.

The report of CIFRI was reviewed by M/S SMEC (Design consultant of the project) and opined that fish ladders for high dams world-wide have failed to meet objectives of successfully passing fish to upstream of dam structures/greater than 20m height.

NEEPCO brought the above matter to the notice of EAC with following proposal for their consideration:

NEEPCO's proposals are as below.

- 1) **Tenga Dam:** Under the revised design parameters, the water from Tenga River will not be drawn for power generation during monsoon season because of high silt content. The spillway crest has been removed and instead flat spillway bottom has been created at the river bed level so that River will flow as a natural stream without any obstruction. Therefore, NEEPCO feels that the fish pass/hatcheries/farms are not necessary for Tenga dam. CIFRI has also agreed to the proposal.

- 2) **Bichom Dam:** Bichom Dam is 69M high Concrete Dam and since there has been adequate evidences of ineffectiveness of Fish Ladder in high dam for fish to migrate upstream, fish hatcheries/farms is proposed instead of fish ladder for Bichom Dam.

In the EAC meeting, the project proponent was also represented by the officials of M/s CIFRI, Kolkata and M/s SMEC and gave their views on the trending of the fish passes in high dam. The matter was deliberated in the EAC meeting at length and the official of M/s CIFRI, Kolkata opined that the alternative in Bichom dam could be Fish Hatcheries/Farms. It was a general consensus amongst the members that for high dam exceeding the height of 35-40 m, the success of fish ladder is a matter of apprehension. Therefore, for Bichom Dam, which is 69 M high, fish hatcheries/farms for migratory fishes may be a rational approach for sustainability of fisheries in the upstream of Bichom Dam. In regard to Tenga Dam, the water of Tenga River will be allowed to flow through major part of the season especially during monsoon in the region, allowing free movement of fishes through the dam, the need for fish pass or hatchery is not necessary since the bottom of the spillway is at the river bed level.

NEEPCO was advised to submit plan & estimate of hatchery for rehabilitation of migratory fishes in the upstream through CIFRI and submit to EAC. However, NEEPCO was also advised to suggest quantum and means of releasing e-flow also with fish ladder. This will be again discussed when NEEPCO comes with a revised/ modified plain in this regard.

Agenda Item No. 2.4 Reoli-Dugli Hydroelectric Project (420+9.2 MW) located in Lahaul & Spiti District of Himachal Pradesh-Consideration of extension of Validity of ToR/Scoping Approval

The project proponent presented the case for extension of the validity of TOR for 1 year. The TOR clearance for this project was accorded on 12.3.2013 and 2 year validity period will be completed on 12.3.2015.

The Reoli- Dugli HEP 430 MW (420 MW + 10 MW) Project is proposed across river Chenab in Lahaul & Spiti District of Himachal Pradesh. The project

envisages construction of a 75 m high concrete gravity dam across river Chenab between the confluence of Darhi nala and Reoli nala with Chenab river to generate 430 MW of hydropower. This is a run-of-the-river scheme. The total land requirement is about 182 ha. which is forest land. Total submergence area is about 66 ha. The catchment area of the project is 6588 Sq.km. An underground powerhouse is proposed on the right bank of the river with 4 units of 105 MW each. To release of environmental flows during the lean season, a powerhouse at toe of the dam with 10 MW is also proposed. Total cost of the project is about Rs. 2604 Crores and will be completed in 7 years.

The project proponent mentioned that the three seasons base line data has been collected. The preparation of draft EIA&EMP report is in final stage of completion. However, the proponent may not be able to submit the EIA & EMP report along with the public consultation, before expiry of the present ToR, due to limited accessibility, working time and extreme weather conditions at the site. Hence, the project proponent requested the extension of validity of TOR for 1year to complete all the formalities.

The project proponent has also mentioned that an underground powerhouse is proposed on the right bank of river near Reoli village with 4 units of 105 MW each & a secondary surface powerhouse with 2 units of 4.6 MW each at the toe of the dam to cater the release of environmental flow during lean season when the main power station would operate as a peaking plant. Total cost of the project is about Rs. 2909.42 Crores (February, 2014 price level) and proposed to be completed in 9.5 years (including 1.16 years of infrastructural works).

The committee noted that the request made by the proponent appeared to be genuine and reasonable. A one year extension of validity for 1 year with effect from 12.3.2015 for the project was recommended in order to complete to public hearing and timely submission of EIA/EMP reports of Reoli-Dugli HEP (420 MW + 9.2 MW) project.

Agenda Item No. 2.5 Final Reports on Cumulative Impact & Carrying Capacity Study of Subansiri Sub-basin including Down Stream Impacts-consideration thereof.

A detailed presentation on “Cumulative Impact & Carrying Capacity Study of Subansiri Sub-basin including Downstream Impacts” was made by the Consultant, on behalf of Central Water Commission (CWC). EAC, River Valley and Hydroelectric Projects was briefed about the background of the study. Central Water Commission (CWC), Ministry of Water Resources, River Development and Ganga Rejuvenation has undertaken the task of Cumulative impact and carrying capacity study of Subansiri sub-basin including downstream impacts of hydropower development in Subansiri basin. The work was awarded to Consortium of IRGSSA and EQMS by CWC in December 2011. Revised Interim report was presented before Expert Appraisal Committee (EAC)- River Valley and Hydroelectric Projects, for seeking mid course corrections during its 68th meeting held on August 24, 2013. Final report was approved by TAC, CWC and required number of copies submitted in December 2014. CWC submitted the final report to MoEFCC and the presentation to EAC is to seek final acceptance and implementation of its recommendations. The Consultant submitted the following:

1.0 The key recommendations based on ToR of the study are:

- Sustainable and optimal ways of hydropower development of Subansiri river, keeping in view of the environmental setting of the basin.
- Requirement of environmental flow during lean season with actual flow, depth and velocity at different levels.
- Downstream impacts on Assam due to hydropower development in Subansiri basin in Arunachal Pradesh.

2.0 A detailed presentation was made covering various chapters of the study like Basin Characteristics, , planned hydro power development in the basin, methodology adopted for the study, terrestrial ecology, protected areas, aquatic ecology, fish and environmental flows for lean, monsoon and non-lean & non-monsoon and all these issues were discussed at length. It was submitted by the Consultant that data on information on HEPs (less than 25 MW) in Subansiri Basin were not available and therefore not used in the study.

Major points covered in the presentation are:

3.0 It was shown that River Subansiri (Singit) rises from the Kangig glacier range in Tibet at an elevation of 7090 m (23260 ft) above mean sea level. Total length of River Subansiri upto confluence with Brahmaputra (25 kms downstream

of Jorhat), Assam is 326 km. The total catchment area up to the confluence with the Brahmaputra is about 37,000 sq. km. out of which 14,000 sq. km. is in Tibet (40%) and the rest (60%) lies in India (21,800 sq. km. in Arunachal Pradesh and 1,200 sq. km. in Assam). Major tributaries of Subansiri are River Kamla and Kurung

4.0 For the study 19 hydropower projects have been marked and sampling was conducted at 32 sites to collect data on different environmental parameters.

The sampling locations were shown on maps and the sampling methodology was discussed for each parameter and in detail. The EAC members were appraised about the area and the basin terrain through number of photographs covering the entire basin also. The GIS based thematic maps prepared on forest cover, land use/ land cover, and other aspects were shown and explained for the Subansiri basin.

5.0 The richness of Subansiri basin in terms of biodiversity was shown in terms of taxonomic diversity i.e. number of plant and animal species, RET species, species endemic to Subansiri Basin. Similarly detailed coverage on Aquatic ecology was also depicted through slides like water quality of Subansiri river and its major tributaries and richness of fish diversity in the river. All the parameters physic-chemical and biological indicators highlighted the good water quality and biodiversity richness of Subansiri river and its tributaries. In addition the location of various hydro projects vis-à-vis Protected Areas was also shown.

6.0 In the Environmental Flows section, it was shown how the entire exercise was undertaken and the environmental flows for each project were arrived at. It was demonstrated that these studies were undertaken for Lean season, monsoon and non-lean-non-monsoon months.

7.0 The downstream impact assessment concluded following:

- The peaking will have insignificant impact beyond 40 km. downstream of Subansiri Lower Project in the river reach during the non-monsoon period when the average natural condition discharge in Subansiri river is of the order of about 500-600 cumec.
- The non-monsoon peaking release from the projects in Subansiri basin will cause the fluctuations in discharge and water level up to first 40 km

downstream of Subansiri lower HE Project. In this reach of river the daily fluctuation in water level may be about 1.5 m to 2 m.

- For the Subansiri river from 40 km downstream of Subansiri lower HE project and up to the Subansiri Brahmaputra confluence the daily fluctuation in water level will progressively decrease to 1 or 2 cm near the Subansiri Brahmaputra confluence

8.0 The Final report recommended following:

The distance between FRL and TWL of Oju and Niare is 0.88 km and Niare (with proposed installed capacity of 800 MW) and Naba (with proposed installed capacity of 1000 MW) is 0.64 km. Since the distance between these projects is less than 1 km, it is recommended that detailed surveys and investigations should be carried out to ascertain the distance between FRL and TWL of Niare and Naba. It is recommended that the distance between FRL and TWL should be made in accordance with MoEFCC guideline of maintaining the distance of at least 1 km.

Environment flow computation for Tammu indicates 55% flow in pre and post monsoon season and 60% release in monsoon. Tammu project is recommended to be dropped as it does not meet specific flow release recommendation. It is recommended that after dropping Tammu HEP, river reach should be kept free and not allotted by altering its features, locations, name, etc. On free stretch, tributaries no further hydropower projects, should be planned/allotted, even if they are small (less than 25 MW) and do not fall under the purview of EIA notification. Further, no HEPs should be planned in Subansiri basin in main stem of Subansiri river including its tributaries.

For Lower Subansiri HEP, one unit of turbine should run continuously to ensure at least about 240 cumec release from Subansiri Lower HEP so that a constant source of aquatic flow discharge to maintain the critical water flow to the tune of 240 Cumec is available at all the time on continuous basis to provide protection to aquatic habitat and conservation of aquatic biodiversity including dolphin.

9.0 Based on the presentation, discussion and deliberations, EAC concluded with the following recommendations:

- (i) 19 Hydro Electric Power (HEP) Projects have been considered in the basin study details of which have been provided by the CEA/CWC. Capacities of these HEPs are above 50 MW. The HEPs of capacity 25 MW and below have not been considered in the Cumulative Impacts Assessment and Carrying Capacity Study. The consultants informed that despite best efforts of the consultants, the State Government did not provide requisite data on such HEPs. Total number of such HEPs there, latitude & longitude are not available. Therefore, these HEPs could not be considered in the study rendering the exercise incomplete.
- (ii) The committee noted that the study is therefore, incomplete. Committee also noted that reliable data have not been obtained and considered in the study as it was mentioned that consultant could gather roughly that there are about 7 HEPs of below 25 MW capacity from sources.
- (iii) It was also noted that Consultants is required to collect updated data/information. For example; Oju HEP, which was granted ToR for 1870 MW has been mentioned as HEP of 1000 MW. Consultants was, therefore, advised to update all such data and incorporate in the study.
- (iv) Committee noted that the study did not mention about the predominant aquatic species available at various locations of the river(s) to justify quantum of environmental flow assessed by them. This is to be done in details and the assessed e-flow has to be justified accordingly. Referencing may be done with established literature such as Report of WII etc in this regard to conclude adequacy of the quantum of e-flow.
- (v) The study has recommended to wake up all the 18 projects (except only one) which were considered. This is to be reviewed again thoroughly considering extent of loss of bio-diversity; both aquatic and terrestrial due to coming of so many HEPs. Availability of spawning, breeding and growth area for fish etc to be considered and accordingly some areas and stretches may have to be kept out of bounds for HEP development. Attempts to be made to suggest optional number, size and location of HEPs those can be sustainably taken up in the basin. A balance between HEP and environmental preservation is to be struck.
- (vi) The consultants have to review necessity and submit detailed reports on 3 storage projects proposed in the basin which are likely to cause loss of substantial bio-diversity and forest cover etc. Status of Lower Subansiri project should also figure in this regard.

- (vii) MoEF&CC may write to Arunachal Pradesh Government to provide details of HEPs of below 25 MW capacity in a time bound manner so that the consultants may complete the study in its entirety by factoring them also in the study.
- (viii) A tabular statement showing reasons for recommending or dropping or modification of design of a HEP is to be provided to make them environmentally suitable.
- (ix) Study did not suggest design modification of proposed HEPs to be better suited to the environmental need. This is to be reviewed and recommendations may be made accordingly.
- (x) A sub-committee of EAC shall make a site visit in the basin and hold discussions with various stakeholders as early as possible for first hand idea before EAC takes a final decision on the study Report.

Agenda Item No. 2.6 P. V. Narsimha Rao Kanthanpally Sujala Sravanthi Project in Warrangal District by Government of Telangana –Consideration of extension of Validity of ToR/Scoping Approval.

The project proponent presented the case for extension of the validity of TOR for 2 years. The TOR clearance for this project was accorded on 16.4.2012 and 2 year validity period completed on 16.4.2014.

The P.V. Narasimha Rao Kanthanapally Sujala Sravanthi Project in Warangal District of Andhra Pradesh by M/s. Irrigation & CAD Department, Government of Andhra Pradesh. The Scoping/TOR clearance was granted on 16.4.2012 and the 2 year validity period ended on 16.4.2014. The project accorded TOR, when the Andhra Pradesh State was not bifurcated. Now the state is bifurcated into Telangana State and Andhra Pradesh State. Now, the present project is in bifurcated Telangana State.

The project envisages construction of 28.2 m high barrage across Godavari River near Kanthanapally village in Warangal District of Telangana to divert 1415.85 MCM of water to stabilize the command area under Sriram Sagar Project (SRSP) Stage-I & II. The water is lifted from the barrage in 3 stages of Kakatiya Canal of SRSP. An area of 3.04 lakh ha under SRSP will get water for irrigation by supplementation.

The project proponent mentioned that the data analysis and report writing for EIA/EMP study was completed for all the aspects except the Catchment Area Treatment, the Plan for Conjunctive use of Ground and Surface Water, and the R & R Plan for Project Affected Families. This was delayed due the indefinite strike by State Government employees both in Telangana and Seemandhra, subsequent initiation of measures for bifurcation of the state Andhra Pradesh by Government of India and 2014 General Elections, hence extension requested to complete all activities and submission of final EIA/EMP report including public hearing.

The proposal was earlier considered by EAC in its meeting held on 13-14th November, 2014. The committee pointed-out that compliant was received regarding Tendering of the barrage work, whereas the EC is still to be granted. The EAC sought a clarification through verification of the facts regarding delay in submitting request for extension of ToR.

The Chief Engineer in his letter dated 28.11.2014, submitted that –

- Delay in submitting the request for extension of validity of TOR in August, 2014 is due to the strike by State Government employees and pre-occupation works in State re-organization. The strike by the State Government employees on announcement of formation of new State i.e. Telangana State on 1.8.2013 by then UPA Government. Since then the day to day works in the Government sector were badly delayed and it was extended till formation of new Governments in both the states in June, 2014 after the General Elections.
- The barrage work was tendered by the then Government of Andhra Pradesh to pacify the Telangana agitation, since the project is located in Telangana and at present only pre-construction activities such as drilling of bore holes, detailed geological investigations and FRL & MWL surveys are being taken up as permitted by the MoEF at the time of approval of TOR.

The committee noted that the request made by the proponent appeared to be genuine and reasonable. Two years extension of validity of TOR with effect from 17.4.2014 to 16.4.2016 for the P.V. Narasimha Rao Kanthanapally Sujala Sravanthi Project in Warangal District of Telangana was accordingly recommended in order to complete to public hearing and timely submission of EIA/EMP reports to the Ministry.

**Agenda Item No. 2.7 Shirapur Lift Irrigation Scheme Project Solapur
by Executive Engineer, Shirapur Lift Irrigation**

Project, Solapur-Consideration of ToR/Scoping Clearance

The project proponent and consultant made a detailed presentation on the project. The project proponent informed that the Shirapur Lift Irrigation was administratively approved by MKVDC, Pune vide Marathi Ir.No. Shirapur/296/(146/96), PB-2 Dt.10/10/1996 for Rs.9056.63 Lakhs. Rates adopted for the AAPR were as per sanctioned DSR in the year 1995-96 & prevailing market rates for the items which were not included in the schedule of rates. As per revised project report 2010-11 the total cost of the scheme comes Rs.24779.95 Lakhs.

This is a Category-B project. The Great Indian Bustard Sanctuary lies in the buffer zone of Shirapur LIS scheme. Therefore, the project was submitted to Central Level. The EAC considered the project as Category-A project. The project proponent informed the EAC that application for obtaining NOC from Wild life Sanctuary has been submitted and State Wild Life Board which has recommended the proposal and sent to NBWL, New Delhi.

The 13.6 TMC of water of Bhima project is proposed to be utilized through various lift irrigation schemes. Shirapur Lift Irrigation scheme is one of those proposed scheme with water utilization of 1.73 TMC.

The **Bhima Sina Link Tunnel** - Bhima storage (Ujjani) & Sina river is connected by a Bhima-Sina link tunnel canal of 26.5 km length from Ujjani lake to provide irrigation benefits in Sina valley. In Sina valley there are two schemes to be served through Bhima-Sina link tunnel which are (a) Bhima-Sina Lift Irrigation Scheme - by series of KT weirs for both banks of river Sina and (b) Shirapur Lift Irrigation Scheme - to serve the area in North Solapur & Mohol taluka. This tunnel will provide required quantum of water from Ujjani Lake to Sina River starting from village Kandar through Shirapur KT weir and ending at K.T. weir at Kave a Sina river. This will provide assured and adequate water supply (1.73 TMC) to the scheme.

The project is proposed to give irrigation benefits to 10000 ha of area in North Solapur, Mohol taluka of Solapur District and Tuljapur taluka of Osmanabad District by lifting water from Shirapur KT weir. The Shirapur KT weir

is fed by Bhima Sina link. It is proposed to lift water from river Sina @ Shirapur KT weir near village Shirapur in 2 stages. This include first lift of water with 4.03 km long rising main from RL 1430' (436 m) to 1589' (484.5 m) having static head of 159.08' (48.5m). From delivery chamber of 9.63 km in length is proposed. At the end of main canal i.e. @ 9.63 km stage-II lift is proposed near village Mothewadu. The Stage II includes lifting water by 2.55 km long rising main from RL 1565' (477.1 m) to 1650' (503 m) having a static head of 84.95' (25.9 m). After second lift, the left bank canal (LBC) of 16.4 Km and right bank canal (RBC) of 21 Km is proposed to be constructed. It is proposed to provide irrigation facility to 10,000 ha area benefitting 20 villages from North Solapur and Tuljapur of Osmanabad District. The gross command area (GCA) is 20,000 ha.

The project proponent also submitted reply to the questions raised by NGO regarding serious violation by commencement of work before obtaining environment clearance (EC). The project proponent mentioned the following:

- (i) The project was sanctioned by Government of Maharashtra in 1994 and the administrative approval was given in 1996 and the work commenced in 1998 only. As per EIA notification 1994 the new projects having investment more than Rs.100 Crores and large irrigation project requires environmental clearance and hence no violation committed in the project.
- (ii) They have collected base line data for 3 seasons i.e. March-May 2014, July-September 2014 & October- December 2014 and EIA is almost ready for submission to State Pollution Control Board for Public Hearing.

The Committee after critically examining all environmental issues, recommended clearance for pre-construction activities and approved the standard TOR with the following additional TOR:

- (i) In order to conserve Great Indian Bustard Wildlife Sanctuary proper mitigation measures should be incorporated in EIA/EMP.
- (ii) As far as wildlife clearance is concerned, conditions as stipulated in this Ministry's OM No.J-11013/41/2006-IA-II(I) (Part) dated 20.8.2014 is also to be complied with, in case it is applicable.
- (iii) There is no construction of any dam/barrage in the project, except to lift water from the existing Shirapur KT weir and the river is not perennial. However, norms for release of environmental flow should be followed during the monsoon season.

Agenda Item No. 2.8 Kalai- II HEP (1200 MW) Project in Anjaw District, Arunachal Pradesh By M/s. Kalai Power Pvt. LTD. For consideration of Environment Clearance (EC).

Kalai Power Pvt. Ltd. For consideration of Environment Clearance (EC) for Kalai-II HEP.

The Kalai-II H.E. Project envisages Run of the River with pondage scheme on the Lohit river, a left bank tributary of Brahmaputra river with a view to utilize flows of Lohit river over large head available for hydro power generation. The Lohit river, a tributary of Brahmaputra River, rises at an EL 6190m above MSL from the snow clad peaks in Eastern Tibet and enters India through Kibithoo area of the district.

The Kalai-II HE Project envisages utilization of across head of about 125m for power generation with an installed capacity of 1200MW. The catchment area upto the proposed dam site including Tibet region is estimated to be about 15,654sq.km. The full reservoir level (FRL) is at EL904.80m. The project involves construction of a concrete gravity dam, upstream & downstream coffer dam, diversion tunnel, in take tunnel, pressure Shafts, underground Powerhouse complex, surge chamber and Tail Race Tunnel etc. The construction period for the project shall be 87 months.

The total optimized land requirement for the project including underground structures is 1100 ha. The entire and to be acquired for the project is considered as forest land. On certain portions of land, community/private settlements are private/community properties. For such categories of land, compensation on account of forest land acquisition will be paid.

Based on the approved 10 daily flow series for the 90% dependable year, Environmental Flows for Kalai-II HEP are given in Table-1.

Table-1: Environmental Flows for Kalai-II HEP

| Season | Av. Seasonal Inflow (cumec) | Environmental Flows (cumec) |
|------------------|------------------------------------|------------------------------------|
| May to September | 794 | 238 (30%) |

| | | | |
|----------|---|-----|----------|
| October | | 567 | 142(25%) |
| November | – | 278 | 56(20%) |
| March | | | |
| April | | 335 | 84(25%) |

The Kalai-II HEP power station is proposed to comprise of 6 units of 190 MW each and 1 unit of 60MW. One unit each of 60MW and 190MW i.e. 250MW is envisaged to utilize the mandatory environmental releases. The plant shall be run so as to meet the requirement of the environmental flows in to the river just downstream of the dam.

The total amount to be spent for implementation of Environmental Management Plan (EMP) is Rs.355.66crore. The details are given in Table-2.

Table-2: Cost for Implementing Environmental Management Plan

| S. No. | Item | Cost (Rs.lakh) |
|---------------|--|---|
| 1. | Compensatory Afforestation, and Bio-diversity conservation | 5416.75 |
| 2. | Catchment Area Treatment | 3195.39 |
| 3. | Fisheries Management | 516.80 |
| 4. | Public health delivery system | 678.12 |
| 5. | Environmental Management in labour camp | 1044.33 |
| 6. | Muck management | 1470.28 |
| 7. | Restoration and Land scaping of construction sites | 325.00 |
| 8. | Environmental management in road construction | 520.00 |
| 9. | Greenbelt development | 97.50 |
| 10. | Air Pollution Control | 400.40 |
| 11. | Water pollution control | 200.00 |
| 12. | Energy Conservation measures | 100.00 |
| 13. | Fire Protection Plan | 40.00 |
| 14. | Land slide Treatment Plan | 2839.19 |
| 15. | Disaster Management Plan | 2622.80 |
| 16. | Resettlement and Rehabilitation Plan | 9606.36 |
| 17. | Local Area Development Plan | 6052.00 |
| 18. | Plan to preserve cultural identity of the locals | 185.56 |
| 19. | Monitoring and Evaluation Aspects for R&R aspects | 60.00 |
| 20. | Environmental Monitoring during construction | 194.73 |
| 21. | Purchase of meteorological instruments | 0.70 |
| 22. | Purchase of noise meter | 0.10 |
| | Total | 35,566.01 Say Rs.355.66crore |

The project was discussed in 79th EAC meeting held during November, 2014. Based on detailed deliberations during the meeting, EAC asked the project proponents to provide information on various aspects. The detailed response of from the project proponent was discussed during the EAC meeting and are described in the following paragraphs,

Comment No.1- Possibility of Longitudinal Connectivity

It was desired that longitudinal connectivity be studied to provide un-obstructed connectivity. To meet the objective, the option of providing an Open Channel was studied

OPEN CHANNEL

The option of an open channel was studied from u/s of reservoir lip to downstream of diversion structure and to meet the environmental flow requirements for the purpose of providing longitudinal connectivity with unobstructed flow. This connectivity can be theoretically achieved when the intake of the channel is located immediately up stream of the reservoir lip and traversing along the hill slope at a level higher than the FRL, crossing the dam axis again above the FRL.

Channel upstream of Dam Axis

The study has been carried out to arrive at the size, slope, length etc. of the open channel to meet the flow requirements. The flow velocity in the channel, keeping in view the self cleansing criteria, has been kept at a minimum of 1m/s (for 56 Cumecs) which increases to 1.8m/s (for max. 238 Cumecs). The corresponding slope of the channel works out to 1:8077 and the size of channel works out to 30m x 5m.

The project area starts from EL 904.80m which is the lip of the reservoir at FRL and is downstream of the tail race outlet of Kalai-I HEP. The length of the Kalai-II reservoir at FRL along the river Lohit is 15Km. The channel would cross the Kalai-II dam body at an elevation above dam top i.e. EL 908m. Thus with a slope of 1:8077, the channel is to be located at river water level EL 914.4m (Invert EL 910m). For passing maximum discharge of 238 Cumecs through the channel, water level in the channel works out to be EL 914.4m. As per the topographical survey, EL 914.4m exists at ~1.2Km upstream of lip of reservoir of Kalai-II HEP. The channel would therefore be encroaching into the domain of the upstream Kalai-I project.

Channel downstream of Dam Axis

The concrete lined channel beyond dam body would commence at EL 908m and has to terminate at EL 779.80m, near tail race outlet where it would meet the original river course. The average slope of this portion of the channel from dam to the tail race outlet (1.15 Km long) would be about 1:8.7.

With this slope, the exit velocity of the flow would be greater than 33m/s., which is extremely high and not permissible / sustainable in a free flowing concrete lined channel.

From the above it is inferred that

- The size of channel to be excavated is 30m (W) x 5m (H), which would require additional acquisition of land of about 350 Ha. The large width of excavation along the hill slope would result in destabilization of the existing slopes necessitating extensive slope stabilization measures and substantial tree felling which would be require substantial additional expenditure (> Rs. 1000 Crores) and environmental degradation.
- The intake and about 1.2 km of the channel would be located much beyond the project limits and interfering with the upstream project.
- The slope of channel in the portion downstream of dam is 1:8.7 and shall have extremely high exit flow velocities ranging from ~33m/s to ~56m/s which are not permissible in a free flowing concrete lined channel.
- This option would be detrimental to river system due to following reasons:
 - The original river stretch from channel intake till the channel exit at the tail race outlet would be deprived of the flow passing through the channel.
 - The velocity of water in the channel at the exit would be very high, resulting in damaging the ecosystem.
 - Excavation of channel would increase the vulnerability of the river banks to increased landslides along the alignment.

In view of the above, longitudinal connectivity from the u/s of reservoir up to the tail race outlet cannot not be met with and as such the open channel option is not found feasible.

Comment No.2- Possibility of Un-gated and Un-interrupted Flow

The minimum environmental flow requirement as envisaged is 56 Cumecs (non-monsoon) and the maximum environmental flow is 238 Cumecs (monsoon). To meet the downstream environmental flow requirement the following two options were hypothetically studied:

- Un-gated pipe in dam body above river bed level (Option-1)
- Opening slit from top to a bottom of dam with crest level close to the river bed (Option-2)
- Open Un-gated Ogee Overflow Spillway (Option-3)

Option-1: UN-GATED PIPE IN DAM BODY NEAR RIVER BED LEVEL

In the option-1, study has been carried out by placing an ungated steel pipe at three different elevations (i.e. El 800m, El 820m and El 850m) and its discharging capacity meeting Environmental flow requirements is checked. The pipes are located at higher elevations from the river bed level to avoid the high silt intrusion in the pipe with FRL being El. 904.8m and MDDL El. 900m.

In the study, the reservoir level has been varied between MDDL to FRL and variation in different parameters such as pipe diameter, pipe length, flow velocity, throw distance etc were evaluated and compared and are given in Tables-3 and 4.

Table-3: Calculation of non-monsoon discharge (56 Cumecs)

| FRL (m) | MDDL (m) | Res. level (m) | Reqd discharge (Cumec) | Pipe Dia (m) | Pipe Inlet C/L, (m) | Pipe Outlet C/L level, (m) | Pipe Length, (m) | Actual Exit Velocity (m/sec) | Throw dist X (m) | Remarks |
|---------|----------|----------------|------------------------|--------------|---------------------|----------------------------|------------------|------------------------------|------------------|---------------|
| 904.8 | 900 | 900 | 56 | 1.69 | 850 | 850 | 51 | 24.92 | 95.46 | Pipe in Block |
| 904.8 | 900 | 904.8 | 56 | 1.655 | 850 | 850 | 51 | 26.04 | 99.76 | Pipe in Block |
| 904.8 | 900 | 900 | 56 | 1.592 | 820 | 820 | 106 | 28.16 | 82.40 | Pipe in Pier |
| 904.8 | 900 | 904.8 | 56 | 1.57 | 820 | 820 | 106 | 28.85 | 84.43 | Pipe in Pier |
| 904.8 | 900 | 900 | 56 | 1.505 | 800 | 800 | 99 | 31.48 | 66.67 | Pipe in Block |
| 904.8 | 900 | 904.8 | 56 | 1.49 | 800 | 800 | 99 | 32.19 | 68.18 | Pipe in Block |

Table-4: Calculation of monsoon discharge (238 Cumecs)

| FRL (m) | MDD L (m) | Res. level (m) | Reqd discharge (Cumec) | Pipe Dia (m) | Pipe Inlet C/L, (m) | Pipe Outlet C/L level, (m) | Pipe Length, (m) | Actual Exit Velocity (m/sec) | Throw dist X (m) | Remarks |
|---------|-----------|----------------|------------------------|--------------|---------------------|----------------------------|------------------|------------------------------|------------------|---------------|
| 904.8 | 900 | 900 | 238 | 3.38 | 850 | 850 | 51 | 26.51 | 101.58 | Pipe in Block |
| 904.8 | 900 | 904.8 | 238 | 3.310 | 850 | 850 | 51 | 27.75 | 106.32 | Pipe in Block |
| 904.8 | 900 | 900 | 238 | 3.103 | 820 | 820 | 106 | 31.49 | 92.15 | Pipe in Pier |
| 904.8 | 900 | 904.8 | 238 | 3.06 | 820 | 820 | 106 | 32.36 | 94.68 | Pipe in Pier |
| 904.8 | 900 | 900 | 238 | 2.930 | 800 | 800 | 99 | 35.15 | 74.44 | Pipe in Block |
| 904.8 | 900 | 904.8 | 238 | 2.90 | 800 | 800 | 99 | 35.97 | 76.18 | Pipe in Block |

Evaluation of the results in Tables-3 and 4 show that pipe diameter required to pass monsoon e-flow discharge of 238 Cumecs is nearly double of the pipe diameter required to pass non-monsoon EFlow discharge of 56 Cumecs. The impact of variation in reservoir level i.e. MDDL to FRL on the discharging capacity of the pipe is negligible.

In view of large variation in pipe diameter, it was not found possible to pass varying discharges (56 Cumecs to 238 Cumecs) through a single un-gated pipe of any diameter.

However, the un-gated / gated pipe in dam body near river bed level would carry the following impacts / concerns:

High intensity of erosion in pipe: Reference Tables-3 and 4, the exit velocities from pipe range from 25m/s to 36m/s which are extremely high. High velocity and presence of sediments in the water would intensity erosion in pipe resulting in shorter life of pipe.

Safety concerns to the dam block: When water is discharged through the pipe, water jet will hit the river TWL downstream of dam. Due to high velocity, water jet will erode river bed material and damage the downstream face of dam; thereby causing safety concerns to the dam block.

Since the requirement of uninterrupted flow is of permanent nature, this option is impracticable in view of low life of steel pipe due to corrosion/erosion concerns besides concerns on dam safety.

Option-2: SLIT FROM TOP TO A BOTTOM CREST LEVEL NEAR THE RIVER BED LEVEL

Option-2 of opening a slit from top to a bottom crest level near the river bed level has been studied and sensitivity analysis for the following 3 slit crest levels has been carried out:

- Slit at 2m above river bed level i.e. EL. 780m
- Slit at 22m above river bed level i.e. El. 800m
- Slit at El 850m i.e. 72m above river bed level.

In the study, the slit has been assumed as broad-crested weir and the width of the slit is calculated for allowing a particular amount of discharge to pass through it. The results of hydraulic design of broad crested weir for discharge of 56 cumec and 238 cumec are given in Tables-5 and 6 respectively.

Table 5:Results of the hydraulic design of broad crested weir for 56 cumecs discharge

| FRL (m) | MDDL (m) | Res. level (m) | Discharge through Slit Cumec | Slit Width, L, mm | Slit Crest El, m | Crest Length, (m) | Actual Exit Velocity (m/sec) | Minimum Throw dist, X_{min} (m) | Maximum Throw dist, X_{max} (m) |
|----------------|-----------------|-----------------------|-------------------------------------|--------------------------|-------------------------|--------------------------|-------------------------------------|--|--|
| 904.8 | 900 | 900 | 56 | 24.99 | 780 | 122 | 28.01 | 17.89 | 139.71 |
| 904.8 | 900 | 904.8 | 59.4 | 24.99 | 780 | 122 | 28.57 | 18.24 | 145.26 |
| 904.8 | 900 | 900 | 56 | 32.84 | 800 | 99 | 25.57 | 54.16 | 127.54 |
| 904.8 | 900 | 904.8 | 60 | 32.84 | 800 | 99 | 26.18 | 55.44 | 133.11 |
| 904.8 | 900 | 900 | 56 | 92.90 | 850 | 51 | 18.08 | 69.28 | 90.18 |
| 904.8 | 900 | 904.8 | 64.25 | 92.90 | 850 | 51 | 18.93 | 72.53 | 96.25 |

Table 6: Results of the hydraulic design of broad crested weir for 238 cumecs discharge

| FRL (m) | MDD L (m) | Res. level (m) | Discharge through Slit Cumec | Slit Width, L_s mm | Slit Crest El, m | Crest Length, (m) | Actual Exit Velocity (m/sec) | Minimum Throw dist, X_{min} (m) | Maximum Throw dist, X_{max} (m) |
|----------------|------------------|-----------------------|-------------------------------------|--|-------------------------|--------------------------|-------------------------------------|---|---|
| 904.8 | 900 | 900 | 224.4 | 100.12 | 780 | 122 | 28.01 | 17.89 | 139.71 |
| 904.8 | 900 | 904.8 | 238 | 100.12 | 780 | 122 | 28.57 | 18.24 | 145.26 |
| 904.8 | 900 | 900 | 221.8 | 130.11 | 800 | 99 | 25.57 | 54.16 | 127.54 |
| 904.8 | 900 | 904.8 | 238 | 130.11 | 800 | 99 | 26.18 | 55.44 | 133.11 |
| 904.8 | 900 | 900 | 207.4 | 344.10 | 850 | 51 | 18.08 | 69.28 | 90.18 |
| 904.8 | 900 | 904.8 | 238 | 344.10 | 850 | 51 | 18.93 | 72.53 | 96.25 |

From the Tables-5 & 6 following conclusions can be made:

- Slit width requirement varies from approx. 24mm to 93mm for 56 Cumecs and 100mm to 344mm for 238 Cumecs.
- Single opening size cannot meet the variation in discharge from 56 Cumecs to 238 Cumecs for the variation of reservoir level from MDDL to FRL.

Considering the sizing of the slit for uninterrupted flow and the velocities developed along the flow path, the following problem would be encountered:

- The high velocity at the slit crest would lead to concrete erosion and with time would impair the stability of the dam body, a potentially hazardous situation leading ultimately to its failure.
- The high velocity at the exit near the river bed level would aid the erosion of the river bed and the banks, an undesirable condition affecting the stability of the dam toe and the river slopes.
- With time, the river bed elevation would rise due to deposition of coarser particles upstream of the dam. This would lead to the blockage of the slits below the spillway crest level.
- The high velocities at the exit would be detrimental for the ecosystem, since it disturbs higher river strata benthos ultimately the food chain of

the ecology, disturbs the fish fauna during spawning and breeding and migration and effects water temperature

Thus, this alternative is also not found feasible.

Option-3: OPEN UN-GATED OGEE OVERFLOW SPILLWAY

In the option-3, an un-gated overflow spillway is considered. Since ogee spillway is already provided through block number 5 (five) and 12 (twelve), either of which can be used for passing environmental flow. The spillway crest level has been kept 2.5m below the MDDL to ensure flow at all times. With the above constraint, the width of the spillway required to ensure the minimum & maximum EFlow discharges is 7m.

The summary of calculations done to pass various discharges through the ogee spillway is given in Table-7.

Table 7: Calculation of discharge through Ogee spillway

| FRL (m) | MDDL (m) | Res Level (m) | Reqd. Discharge (Cumecs) | Spillway Width (m) | Spillway Crest level (m) |
|----------------|-----------------|----------------------|---------------------------------|---------------------------|---------------------------------|
| 904.8 | 900 | 904.8 | 238 | 7 | 897.5 |
| 904.8 | 900 | 900 | 56 | 7 | 897.5 |

The reservoir level fluctuates between 904.8m (FRL) and 900m (MDDL) on a daily basis throughout the year. With this, the EFlow discharges through un-gated spillway would accordingly vary between 56 Cumecs and 238 Cumecs on daily basis irrespective of the season. Hence the option of an ungated spillway to meet the seasonal E-Flow requirement is not feasible.

Ungated spillway, even if provided, would result in daily and regular flows with very high exit velocities which result in erosion of the river bed, dam toe, river banks and detrimental for the ecosystem as explained supra.

View of the Developer:

The open channel studied to provide longitudinal connectivity would be a very expensive proposition, substantial environmental degradation, encroaching into the u/s Kalai-I project, with very high exit velocities affecting the aquatic life, a proposition having far reaching negative impacts. Thus not found to be a feasible option.

In both the un-gated options, it is not possible to pass varying discharges through a single sized un-gated opening due to large seasonal variations. Moreover, the high exit velocities from the un-gated opening would hit the river bed downstream of dam, erode river bed and adversely affect the stability the downstream toe of dam; thereby causing safety concerns to the dam block. Besides, with time, the un-gated openings (Pipe / Slit) will get blocked due to deposition of coarser particles.

Due to plant operation / variation in daily reservoir levels, the un-gated ogee spillway, would discharge varying E-flow depending upon the reservoir level irrespective of seasons.

The high velocities at the exit would be detrimental for the ecosystem, since it disturbs higher river strata benthos ultimately the food chain of the ecology, Disturbs the fish fauna during spawning and breeding and migration and effects water temperature.

Thus an un-gated mechanism will be not capable of regulating varied seasonal E-Flow making the option unfeasible.

Keeping in view the above, one unit each of 60MW and 190MW has been proposed in the Detailed Project Report which would ensure the mandatory environmental releases and also ensure varying seasonal variations in the E-flow.

This provision is also in compliance to condition No. 7 of the Scoping Clearance / Terms of Reference dated 09-Dec-09 which provides for captive unit for 24 hour running for the continuous release of water downstream of dam.

In view of this, one unit each of 60MW and 190MW proposed to ensure the mandatory seasonal environmental releases may please be maintained.

Comment No.3 Updation of the list of mammals species based on the information outlined in the Book on Mammals of North-Eastern India by Dr. Anwaruddin Ahmed.

The updated list of mammals reported in the Study Area based on books on the mammals of Arunachal Pradesh by Dr. Anwaruddin Choudhury is given in Table-8.

Table-8: Updated list of Mammals in the Study Area

| Common name | Scientific name | Schedule as per WPA, 1972 |
|--------------------------------|-----------------------------------|----------------------------------|
| Family: Cercopithacidae | | |
| Common langur | <i>Semnopithecus entellus</i> | II |
| Assamese macaque | <i>Macaca assamensis</i> | II |
| Rhesus macaque | <i>Macaca mulatta</i> | II |
| Pig-tailed macaque | <i>Macaca nemestrina</i> | II |
| Family: Felidae | | |
| Jungle cat | <i>Felis chaus</i> | II |
| Leopard cat | <i>Felis bengalensis</i> | I |
| Family: Canidae | | |
| Indian fox | <i>Vulpes bengalensis</i> | II |
| Golden Jackal | <i>Canis aureus</i> | II |
| Wild dog | <i>Cuon alpinus</i> | II |
| Family: Viverridae | | |
| Large Indian Civet | <i>Viverra zibetha</i> | II |
| Common palm civet | <i>Paradoxurus hermaphroditus</i> | |
| Small Indian Civet | <i>Viverricula indica</i> | |
| Masked palm civet | <i>Paguma larvata</i> | - |
| Family: Herpestidae | | |
| Common Mongoose | <i>Herpestes edwardsii</i> | IV |
| Small Asian mongoose | <i>Herpestes javanicus</i> | - |

| Common name | Scientific name | Schedule as per WPA, 1972 |
|-----------------------------------|---------------------------------|----------------------------------|
| Family Bovidae | | |
| Mithun | <i>Bos frontalis</i> | |
| Goral | <i>Naemorhedus goral</i> | III |
| Wild water buffalo | <i>Bubalus arnee</i> | I |
| Takin | <i>Budorcas taxicolor</i> | I |
| Family: Cervidae | | |
| Barking Deer | <i>Muntiacus muntjak</i> | III |
| Black muntjak | <i>Muntiacus crinifrons</i> | I |
| Hog Deer | <i>Axis porcinus</i> | III |
| Family: Suidae | | |
| Wild boar | <i>Sus scrofa</i> | III |
| Family: Leporidae | | |
| Indian Hare | <i>Lepus nigricollis</i> | IV |
| Family: Manidae | | |
| Indian Pangolin | <i>Manis crassicaudata</i> | I |
| Family : Sciuridae | | |
| Himalayan Stripped Squirrel | <i>Tamiops macclellandi</i> | |
| Hodgson's flying Squirrel | <i>Petaurista magnificus</i> | |
| Particolored Flying Squirrel. | <i>Hylopetes alboniger</i> | |
| Himalayan hoary- bellied squirrel | <i>Callosciurus pygerythrus</i> | - |
| Hairy- footed flying squirrel | <i>Trogopterus pearsonii</i> | II |
| Family: Muridae | | |
| Large Bandicoot-Rat | <i>Bandicota indica</i> | V |
| House Rat | <i>Rattus rattus</i> | V |
| Palm mouse | <i>Vandeleuria oleracea</i> | - |
| Family: Vespertilionidae | | |
| Indian Pipistrelle | <i>Pipistrellus coromandra</i> | V |
| Javan pipistrelle | <i>Pipistrellus javanicus</i> | - |

| Common name | Scientific name | Schedule as per WPA, 1972 |
|--------------------------|----------------------------|---------------------------|
| Inidan Pygmy Bat | <i>Pipistrellus tenuis</i> | V |
| Family:Tupaiaidae | | |
| Tree- shrew | <i>Tupaia belangeri</i> | - |
| Family:SORICIDAE | | |
| Grey musk shrew | <i>Suncus murinus</i> | - |

Comment No. 4- Year wise physical and financial targets to be given for implementation of Catchment Area Treatment Plan

The cost required for Catchment Area Treatment is **Rs. 3195.39 lakh**. The details are given in Table-9.

Table-9: Cost estimate for Catchment Area Treatment of Kalai-II H. E. Project

| S. No. | Item | Rate* (first year) (Rs.) | Unit | Target | |
|----------------------------|-----------------------------------|--------------------------------|------|----------|-------------------------|
| | | | | Physical | Financial (Rs. lakh) |
| Biological Measures | | | | | |
| 1. | Afforestation | 195,000/ha | ha | 683 | 1331.85 |
| 2. | Maintenance of afforestation area | 50,000/ha | ha | 683 | 341.5 |
| 3. | Gap Plantation | 60,000/ha | ha | 876 | 525.6 |
| 4. | Pasture development | 30,000/ha | ha | 370 | 111.0 |
| 5. | Nursery development | 2,80,000/no. | no. | 10 | 28.0 |
| 6. | Maintenance of nursery | 1,40,000/no. | no. | 10 | 14.0 |
| 7. | Vegetative fencing | 65,000/km | km | 30 | 19.5 |

| S. No. | Item | Rate* (first year) (Rs.) | Unit | Target | |
|-----------------------------|---|--------------------------------|------------|----------|-------------------------|
| | | | | Physical | Financial (Rs. lakh) |
| 8. | Watch and ward for 5 years @ 20 persons | 12,000/man-month | Man-months | 1200 | 144.0 |
| Engineering Measures | | | | | |
| 9. | Check Dams | 3,50,000 | Nos. | 55 | 192.5 |
| | Total | | | | 2707.95 |

Total cost for Biological and Engineering measures = Rs. 2707.95 lakh

Administrative expenditure

Government Expenditure 5% of Total (including O&M) = Rs. 135.40 lakh

Establishment cost 8% of Total = Rs. 216.64 lakh

Contingency @5% of Total = Rs. 135.40 lakh

Total = Rs. 3195.39 lakh

The phasing / year wise breakup of implementation of Catchment Area Treatment Plan is given in Table-10.

Table-10: Phasing - Year wise implementation schedule of CAT Plan for Kalai-II HEP

| # | Activity | Year I | | Year II | | Year III | | Year IV | | Year V | | Total | |
|-----------|----------------------------|--------|-------------------|---------|-------------------|----------|-------------------|---------|-------------------|--------|-------------------|-------|-------------------|
| | | Phy. | Fin. (Rs. lac) | Phy. | Fin. (Rs. lac) | Phy. | Fin. (Rs. lac) | Phy. | Fin. (Rs. lac) | Phy. | Fin. (Rs. lac) | Phy | Fin. (Rs. lac) |
| A. | Biological Measures | | | | | | | | | | | | |
| 1 | Afforestation | 250 | 487.50 | 250 | 487.50 | 183 | 356.85 | | | | | 683 | 1331.85 |
| 2 | Maintenance of | | | 250 | 125 | 250 | 125 | 183 | 91.5 | | | 683 | 341.5 |

| # | Activity | Year I | | Year II | | Year III | | Year IV | | Year V | | Total | |
|-----------|-------------------------------------|----------------|----------------------|----------------|----------------------|----------------|----------------------|---------------|----------------------|---------------|----------------------|----------------|----------------------|
| | | Phy. | Fin. (Rs. lac) | Phy. | Fin. (Rs. lac) | Phy. | Fin. (Rs. lac) | Phy. | Fin. (Rs. lac) | Phy. | Fin. (Rs. lac) | Phy | Fin. (Rs. lac) |
| | afforestation area | | | | | | | | | | | | |
| 3 | Gap Plantation | 300 | 180.0 | 300 | 180.0 | 276 | 165.6 | | | | | 876 | 525.60 |
| 4 | Pasture Development | 170 | 51.0 | 100 | 30.0 | 100 | 30.0 | | | | | 370 | 111.00 |
| 5 | Nursery Development | 10 | 28.0 | | | | | | | | | 10 | 28.00 |
| 6 | Vegetative Fencing | 10 | 6.5 | 10 | 6.5 | 10 | 6.5 | | | | | 30 | 19.5 |
| 7 | Maintenance of Nursery | | | | 5.0 | | 5.0 | | 4.0 | | | | 14.00 |
| 8 | Watch and ward | 240 | 28.8 | 240 | 28.8 | 240 | 28.8 | 240 | 28.8 | 240 | 28.8 | 1200 | 144.00 |
| B. | Engineering Measures | | | | | | | | | | | | |
| 1 | Check Dams | 20 | 70.0 | 20 | 70.0 | 15 | 52.5 | | | | | 55 | 192.50 |
| | Sub-Total (A) | 1000.00 | 851.80 | 1170.00 | 932.80 | 1074.00 | 770.25 | 423.00 | 124.30 | 240.00 | 28.80 | 3907.00 | 2707.95 |
| | Govt. Exp. Cost-5% of (A) | 50.00 | 42.59 | 58.50 | 46.64 | 53.70 | 38.51 | 21.15 | 6.22 | 12.00 | 1.44 | 195.35 | 135.40 |
| | Establishment Cost-8% of (A) | 80.00 | 68.14 | 93.60 | 74.62 | 85.92 | 61.62 | 33.84 | 9.94 | 19.20 | 2.30 | 312.56 | 216.64 |
| C | Contingencies 5% of A | 50.00 | 42.59 | 58.50 | 46.64 | 53.70 | 38.51 | 21.15 | 6.22 | 12.00 | 1.44 | 195.35 | 135.40 |
| | Grand Total | 1180.00 | 1005.12 | 1380.60 | 1100.7 | 1267.32 | 908.90 | 499.14 | 146.67 | 283.20 | 33.98 | 4610.2 | 3195.39 |

| # | Activity | Year I | | Year II | | Year III | | Year IV | | Year V | | Total | |
|---|----------|--------|----------------------|---------|----------------------|----------|----------------------|---------|----------------------|--------|----------------------|-------|----------------------|
| | | Phy. | Fin. (Rs. lac) | Phy. | Fin. (Rs. lac) | Phy. | Fin. (Rs. lac) | Phy. | Fin. (Rs. lac) | Phy. | Fin. (Rs. lac) | Phy | Fin. (Rs. lac) |
| | | | | | 0 | | | | | | | 6 | |

Comment No.5 :The Project Proponent was handed over representations from SANDRP, a Delhi based NGO, and were asked to submit a detailed response to the same to various clarifications sought in the said representations.

The clarifications of various representatives of SANDRP are given in Annexure-I to IV. The TOR compliance is given in Annexure-V.

EAC, after a lot of deliberations, recommended the project for grant of EC with the following additional conditions:

- (i) Proper arrangement for releasing e-flow with suitable terminal velocity has to be put in place. Slit method as explained above appeared to be better among all but, this will have very high exit velocity of more than 20 m/sec. Such high velocity may not be desirable. In such case, dam toe turbine may be preferable which will facilitate controlled exit velocity.
- (ii) Provision of Dam toe power house will enhance installed capacity and shall need approval from CEA/CWC and Developer may inform the Ministry accordingly. In case of going for a Dam toe power house entailing higher installed capacity, this will require re-consideration of the proposal by EAC.
- (iii) Automatic monitoring mechanism for e-flow release should be ensured.

The meeting ended with vote of thanks to Chair

ANNEXURE-I: Response to First Representation of SANDRP

| SI | Comments | Response |
|----|---|--|
| 1. | <p>The 1200 MW Kalai II HEP located on Lohit River in Anjaw district of Arunachal Pradesh is being developed by Kalai Power Private Limited (KPPL), which is the Special Purpose Vehicle of Reliance Power Limited. The company had signed the Memorandum of Agreement (MOA) with Govt. of Arunachal Pradesh on 2-Mar-09. The EIA consultant for the project is WAPCOS. The project was recommended for scoping clearance in 31st Meeting of Expert Appraisal Committee (EAC) held on 21-22 October 2009. The project was considered in the 70th EAC meeting on 10-11 Dec 2013 for extension of TOR validity. The advertisement published in Arunachal Times suggests the date as 18th January 2014.</p> | <p>TOR was issued to the project on 9th December 2009. Draft EIA/EMP report for 1200MW Kalai-II HEP was prepared and submitted to Arunachal Pradesh State Pollution Control Board (APSPCB) vide letter dated 31st July 2013, for conducting Public Hearing. As per MOEF dated 22nd March 2010, the validity of the TOR was initially up to 8th December 2013. The same has been extended up to 8th December 2014 by MOEF.</p> |
| 2. | <p>The EIA study cannot clearly state whether Kalai II is a storage project or a run of the river project. The EIA study is also not clear about the height of the dam. Detail analysis of the EIA study reveals that the study is incomplete, inadequate and</p> | <p>Reference chapter-2 of EIA report – Project Description clearly mentions that the 1200 MW Kalai-II H.E.</p> |

| SI | Comments | Response |
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| . | shoddy. The study cannot qualify to be called an EIA study. | Project envisages run of the river with pondage scheme on river Lohit and dam height above the river bed level is 128.20 m. It is not correct to say that EIA study is incomplete, inadequate and shoddy. EIA/EMP report has been prepared by an accredited consultant, as per the TOR approved by MoEF, Govt. of India. |
| 3. | It is also important to note that EIA and EMP reports prepared by WAPCOS have not fulfilled a very large number of the TOR (Terms of Reference) that the project was to cover in EIA-EMP as per the TOR clearance given for the project on 9.12.2009. Such EIA-EMP will clearly not be acceptable even from statutory and legal point of view and cannot be basis for a public hearing. A report on the status of compliance with TOR in EIA and EMP is available here – http://sandrp.wordpress.com/2014/01/15/eia-emp-of-kalai-ii-hydropower-project-doesnt- | The EIA and EMP reports prepared by WAPCOS have made a sincere effort to assess the impacts on various facets of environment. The impacts on following aspects have been covered in detail as a part of the study: |

| SI | Comments | Response |
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| . | <p>comply-with-its-terms-of-reference/. Arunachal Pradesh State Pollution Control Board (APSPCB) and MoEF should immediately cancel the public hearing and ask the EIA-EMP consultants to comply with the TOR first. A letter sent to APSPCB in this regard can be found here - http://sandrp.wordpress.com/2014/01/15/letter-to-apspcb-public-hearing-for-kalai-ii-hep-to-be-held-violating-the-norms/.</p> | <p>Impacts on Water Environment, Impacts on Hydrologic Regime, Impacts on Air Environment, Impacts on Noise Environment, Impacts on Land Environment, Impacts due to geological aspects, Impacts on Biological Environment Impacts on Socio-Economic Environment.</p> <p>The draft EIA report, prepared by WAPCOS is as per the guidelines as given in the EIA Notification, 2006. The guidelines & requirements have been adhered to by all agencies. The details of TOR</p> |

| SI | Comments | Response |
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| . | | Compliance is attached as Annexure-I. |
| 4. | <p>Cumulative Impacts Assessment Study of Lohit Basin Prepared by WAPCOS is Farce. The local people from Lohit basin have categorically stated that the cumulative impact assessment study done for the Lohit basin by WAPCOS is farce. In news published in Arunachal Times (available in Annexure I) people have stated "Water and Power Consultancy Services (WAPCOS) had earlier conducted a cumulative impact assessment of various hydropower projects in the entire Lohit river basin, as per the directives of MoEF. WAPCOS made a farce report, completing within 2-3 weeks. The study is very poor and shoddy....." Now for the Kalai II project the same organization is preparing the EIA report. From the track record of WAPCOS and from the experiences of the people in the Lohit basin, it is clear that an EIA prepared by WAPCOS cannot at be accepted as a complete, unbiased study</p> | <p>The work for Cumulative Impacts Assessment Study of Lohit Basin was awarded to M/s WAPCOS Limited, a Government of India undertaking under Ministry of Water Resources, vide letter no. J-12011/ 34/08-IA-I, dated 26/03/09, after discussing the same in four EAC meetings held on 16th – 17th July, 2008, 15th – 16th December, 2008, 22nd January, 2009 and 16th – 17th February, 2009.</p> <p>The cumulative impact assessment study for Lohit basin was uploaded on MOEF website and that point</p> |

| SI | Comments | Response |
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| . | | <p>of time SANDRP has given comments on Lohit Basin Report. The interim report was discussed by EAC on 23.03.2010.</p> <p>The final report of the study submitted by WAPCOS after incorporating the suggestions of EAC was discussed on 12.11.2011.</p> <p>The report was discussed by EAC on 22/23.03.2013 and was again presented before EAC on 20.1.2014.</p> <p>The Lohit Basin Study has been conducted as per the TOR approved by MoEF. Field studies for water quality and aquatic ecology has been conducted once in a month for six months. Terrestrial Ecology was conducted</p> |

| SI | Comments | Response |
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| . | | <p>for two seasons. Thus, it is incorrect to say that the study has been completed in 2-3 weeks.</p> <p>The study was initiated by MoEF while according environment clearance to Demwe Lower Hydroelectric Power Project.</p> <p>M/s WAPCOS is a NABET accredited, institute working in this field for more than two decades. The said government institute is having more than 300 EIA's prepared to its credit. It is wrong to question their capabilities on this platform and use terms as "biased".</p> |
| 5. | <p>People of Lohit Basin will not Accept Studies done by WAPCOS It is important to note that people of Lohit basin have already expressed their anger and disbelief on studies done by WAPCOS. In a</p> | <p>This allegation is vehemently denied.</p> |

| SI | Comments | Response |
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| . | <p>letter written to the Union Minister on Environment and Forests on 15 march 2012 the, Peoples Forum For Project Affected Family (PFPAF) had clearly stated the following “....no study of WAPCOS would be acceptable to the people of the Lohit Valley and other social and environment conscious people for two main reasons. Firstly, WAPCOS is an organization under the Union Water Resources Ministry, and Union Water Resources Ministry is basically a pro dam lobby. WAPCOS also does other pro dam studies like the feasibility reports and Detailed Project Reports for Big dams, such studies are done in favour of Big dams and an organization that is doing such business cannot be entrusted to do an environment or cumulative impact assessment study. Secondly, WAPCOS also has had very poor track record and has done very poor quality EIA and CIA reports. Hence, in future, we will not accept any reports done by such organizations.”</p> | |
| 6. | <p>It is important to note that when the people of the whole Lohit basin had raised objections against WAPCOS, the government and companies should not have hired WAPCOS the project consultant. This indicates a hidden strategy on the part of the project authorities to employ only pro-dam EIA consultants to get favourable outcomes.</p> | <p>M/s WAPCOS is a NABET accredited, institute working in this field for more than one & half decade. The said government institute is having more than 300 EIA’s prepared to its credit. The reports are</p> |

| SI | Comments | Response |
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| . | | authentic and as per the approved TOR of MoEF, Govt. of India. |
| 7. | <p>Biased EIA An EIA report should be an unbiased assessment of impacts of the project. The EIA report of Kalai II HEP is a biased towards hydropower, as can be seen from what has been written in section 1.3, page 1-3: "In Arunachal Pradesh so far a capacity of 423.5 MW has been developed which is just 0.84 % of the total potential. Hydro projects of about 2600 MW are being constructed which is about 5.17 % of the total potential. It is evident from the above that the capacity developed and under development will be achieved for 3023.5 MW in very near future, still leaving behind a potential of about 47304.5 MW (93.99%)." These shows clear towards hydropower project and this EIA report of Kalai II HEP prepared by WAPCOS cannot be considered a neutral assessment of impacts of the project.</p> | <p>The data depicted was sourced from CEA's website.</p> <p>The comments are generic and show bias towards the consultant. No specific point / issue have been raised.</p> |
| 8. | <p>EIA does not mention Maximum Water Level of the reservoir The EIA study does not mention the Maximum Water Level of the reservoir when the dam passes peak flood. It only mentions the FRL as 904.80 m.</p> | <p>The spillway with gates has been designed so that the PMF passes with maximum water level not rising above the FRL. Hence, both the levels are the same</p> |

| SI | Comments | Response |
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| . | | i.e. 904.80 |
| 9. | <p>Large Submergence Area The area which Kalai II project will submerge is very large considering that it is RoR project. The EIA document in Section 6.4 mentioned "The construction of a 198 m high concrete gravity dam shall create a reservoir of area approx. 640 Ha at FRL of El.904.8m. The reservoir will extend up to 15 km along the river Lohit. The reservoir width shall range from about 600 m to 1000 m over most of its length." But news report published Arunachal Times states that submergence route extends up to 23 km upstream. The report also stated that the project will submerge the entire Hawai circle and all the major villages directly affecting 1500 people.</p> | <p>The facts mentioned in EIA are based on the actual surveys undertaken for DPR.</p> <p>The authenticity of the referred news report is questionable.</p> |
| 10 | <p>It is important to note here is that size of the total area required the number of affected villages and population mentioned in this EIA is much higher than the numbers mentioned for the project when it was considered for TOR clearance in EAC on 21.10.2009. The minutes of that EAC for Kalai II stated that Total land requirement is 830 ha, which has now grown by 32.5% to 1100 ha (Section 2.2 of EIA), No of affected villages has grown from four villages to 25 (525% increase), No of PAFs has grown from 22 to 595 (2605% increase) and no of affected people has grown</p> | <p>The TOR was based on prefeasibility studies which were initial desk studies.</p> <p>The EIA data is based on the DPR level surveys, investigations and studies carried-out at site. The allegation that inputs were grossly understated at scoping stage is denied</p> |

| SI | Comments | Response |
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| . | from 122 to 2279 (1768% increase). This means that the impacts were grossly understated at scoping stage. Is such gross and deliberate understatement acceptable? | and shows the bias against the project. |
| 11 | Huge land requirement not justified The project claims to require 1100 ha of land, 370 ha more than the land requirement of 830 ha stated at the time of scoping. This land demand seems unjustified and inflated and cannot be accepted at face value. The EIA does not even attempt to look into this issue. | The land requirement is finalized after finalization of project layout by appraisal from directorates of CWC/CEA/GSI/CSMRS/MOWR based on the geological appraisal, designs, regulatory aspects etc. |
| 12 | EIA under estimates the number of affected population Even though the EIA has stated 595 as PAFs it still seems a hugely under stated number of affected families. The report claims that their survey team contacted a total of 595 PAFs where the total population of the project affected area is stated as 2279. But the detailed news report of Arunachal Times says that the project will submerge the entire Hawai circle and all the major villages. If this is true then the project will affect much larger no of people. | The EIA/ EMP report is based on the data collected from field surveys. The claims in the news papers that entire Hawai Circle will be submerged is not true, as area and covering under reservoir submergence is governed by FRL. The submergence area map also does not indicate |

| SI | Comments | Response |
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| . | | that entire Hawai Circle shall be submerged. |
| 13 | It is also relevant to note that even as the Kalai II project will affect 595 families (according to the EIA) in order to generate electricity, 565 families or 91.6% project affected families already have electricity supply. (EIA report page 9-13) | The generated power will not only benefit the local population, but will cater to the overall development of the local area, state and country. |
| 14 | Submergence of the existing national highway: Impacts of alternative road not assessed The reservoir of Kalai II HEP will submerge 16 km of existing national highway. The border roads organization will construct two lane roads at a higher elevation in place of this. The construction of this alternative road will imply land use, more social impacts, more blasting and other construction related activities, but these impacts have not been included in the EIA. | The impacts due to road construction have been assessed in Chapter-9 of the EIA report. (Volume-I). |
| 15 | The alternative highway is planned to be constructed at elevation 910 m. However, since MWL is not given and also backwater effect, which will be higher than MWL at times of peak flood, it is not clear if the alternative elevation would be affected by back water effect. | The source of information is not correct. The alternate road shall be constructed, which shall be aligned at an elevation much above the FRL. |

| SI | Comments | Response |
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| 16 | <p>Many Maps are not readable The project layout map at Figure-2.1 is not legible. The map is very small and except title none of the other details or legends are legible. The EIA must provide a detailed layout map for the Kalai II HEP. The same is case with Geological Plan of Reservoir Area map (Fig 6.1 and 6.2) which are two very important maps but they are not at all legible.</p> | <p>The reports were uploaded at the designated website and map can be zoomed as desired.</p> |
| 17 | <p>In most places the project consultant have used unclear maps. e.g. 'Fig 7.7 – Water Sampling location map' or 'Fig 8.1 Terrestrial Ecological sampling location map'. An EIA with such illegible maps cannot be acceptable.</p> | <p>The reports were uploaded at the designated website and map can be zoomed as desired</p> |
| 18 | <p>Impacts on Migratory Fish Construction of Kalai HEP II will have devastating impacts on fish in the river. The path of the migratory fish will be blocked and this has been accepted by the EIA as well – “The dam construction activities will also create a problem for migratory fish species (Tor tor and Tor putitora).” (Page 8-38). The two species of Mahseer, Tor tor and Tor putitora, locally known as Ngorika and Ngauch respectively and have been listed as 'endangered' in IUCN list. But it is surprising to see that EIA opining that “These migratory fish species may move into the small tributaries of Lohit River.” It is no clear what is the basis of this statement by WAPCOS, it does not seem to show sufficient ecological literacy.</p> | <p>Migratory fish species are observed in the project area, scientific management of the existing stock will be adopted. It is proposed to implement reservoir and supplementary stocking programmes for the project. It is proposed to stock the reservoir and river Lohit for a length of 16 km upstream and 2</p> |

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| . | <p>The EIA prepared by WAPCOS also seem to ignore that several dams have been proposed in the tributaries as well. The EIA also does not say how well the area has been studied and what kind of biodiversity we may be losing.</p> | <p>km downstream of the dam. The rate of stocking is proposed as 100 fingerlings of about 30 mm size per km. For reservoir area, stocking shall be 1000 fingerlings/ha of 30 mm size.</p> <p>The migratory fish species namely, mahaseer and snow trout can be stocked. The stocking shall be done annually by the Fisheries Department, State Government of Arunachal Pradesh. To achieve this objective, facilities to produce seeds of mahaseer and snow trout would have to be created at suitable sites. The site would be identified in consultation with Fisheries Department, State Government of Arunachal Pradesh. An</p> |

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| . | | amount of Rs.516.80 lakh has been earmarked for this purpose. (Ref-Table 3.3 of EMP) |
| 19 | <p>Wrong claims about reservoir water quality The EIA says about reservoir water quality, "The proposed project is envisaged as a runoff the river scheme, with significant diurnal variations in reservoir water level. In such a scenario, significant re-aeration from natural atmosphere takes place, which maintains Dissolved Oxygen in the water body. Thus, in the proposed project, no significant reduction in D.O. level in reservoir water is anticipated." This conclusion is clearly wrong. The EIA says about the reservoir: "The Gross and diurnal Storage of the Kalai-II reservoir are 318.8 M cum and 29.76 M cum with FRL at El 904.80 m and MDDL at El 900.00 m respectively". This means that 93.35% of the reservoir is dead storage and only 6.65% of the reservoir capacity acts as live storage. Such a large quantity of dead storage will have huge impact on the water quality and the claim to the otherwise by the EIA is clearly wrong and misleading. Similarly the EIA claim of no Eutrophication risk due to "significant diurnal variations in reservoir water level" is clearly wrong.</p> | <p>The dissolved oxygen content of river water is close to saturation level. The D.O. level up to MDDL will remain significantly high due to reaeration on account of diurnal variations. The pollution loading in the area is negligible. Thus, no impacts on reservoir water quality is anticipated. Likewise, agriculture area is quite less in the catchment area. Use of agro-chemicals too is quite low in the area. Thus, eutrophication risks are not envisaged as cropping intensity is quite low in the Catchment area. Even</p> |

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| . | | in the cropped area, agrochemical dosing is quite low. |
| 20 | No Options Assessment. The EIA of Kalai II HEP does not do any options assessment. The EIA religiously focuses on the construction of 1200 MW project without mentioning the fact that successful sub-megawatt capacity hydropower projects (Less than 1 MW) are operational in Anjaw district (see Annexure II). | The state government of Arunachal Pradesh has allotted the project and has mandated to carry out studies within FRL 904.8m and TWL 779.8m. The project proponent is not mandated to carry-out option studies of other projects in the EIA of Kalai-II HEP. However, MOEF has entrusted Lohit Basin Study to WAPCOS, to carry-out comprehensive Impact studies in Lohit river basin |
| 21 | Conversion of community land into forest land can have negative impacts on the communities The EIA on page 10-25 states, "The total land requirement for the project, is 1100 ha. The entire land is considered as forest land. A part of the community land also includes forest land as | Entire land in the area is categorized by the state government as Unclassified State Forest Land. The compensatory |

| SI | Comments | Response |
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| . | well. For EMP purposes, the entire quantity of land has been considered as the forest land." This can lead to severe impacts on the communities. | measures have been formulated accordingly. Adequate provisions have been made in the EMP report to minimize the adverse impacts on the community. |
| 22 | Here it is important note the implications of actions of similar nature on the Meyor community in the Kithibo area of Anjaw district, in the upstream of Kalai II HEP. A news published by Asian Human Rights Commission (see Annexure III) reports, "The Asian Human Rights Commission (AHRC) has received information from civil society groups regarding death threats, arbitrary detention and harassment of members of the Meyor community, a group of indigenous people in Arunachal Pradesh. They are being targeted for their activities on conservation of community land and natural resources." The leaders of the community reported to have "protested the conversion of the community forest land of Walong and Kibitho area into reserved forest land because it was carried out without the free, prior and informed consent of the Meyor community." It is important to note that this report also mentioned about impact of dams and other development activities on tribal | The EIA study has been conducted as per the TOR approved by EAC for River Valley and Hydroelectric projects of MoEF. The impact assessment study beyond prescribed study area does not come within the purview of the EIA Report. |

| SI | Comments | Response |
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| . | ethnic communities. However, the EIA is silent on these aspects. | |
| 23 | <p>Cumulative impact migrant population in Lohit valley can be catastrophic The Kalai II project EIA states that the maximum number of people coming from outside the region for construction will be 3000 and the impacts are predicted to be only in the construction phase. Here it is important note that the number of outside workers provided by EIAs have proved to be gross under-estimates. But the EIA here does not mention anything about the cumulative impacts of migrant population for other projects along with Kalai II. In fact in a letter written to the Minister of Environment and Forests by the PFFAF, it was mentioned that the whole area of Lohit valley is inhabited by tribal population. The total tribal population as according to 2011 census is 16500. The cumulative number of migrant workers will clearly surpass this population figure, leading to severe impacts on the people of the area.</p> | <p>At the peak construction phase of the project a maximum 1000 labours will employed with a 3000 total population. The labour colony is planned to be established at a distance from the existing population. The colony will have all the basic amenities within the premises of colony.</p> <p>A detailed plan for mitigation of adverse impacts of cultural aspects of the locality too has been prepared as a part of the EMP Report (Volume-III).</p> |
| 24 | <p>Disaster Management Plans do not mention about seismic risks Discussing the disaster management plan for the dam, the EIA study mentions only</p> | <p>Disaster Management Plan is based on the Dam Break Analysis</p> |

| SI | Comments | Response |
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| . | <p>few issues and ignores the issue of earthquakes: "However, in the eventuality of dam failures in rare conditions, catastrophic condition of flooding may occur in the downstream area resulting in huge loss to human life and property. Floods resulting from the failure of constructed dams have also produced some of the most devastating disasters of the last two centuries. Major causes of failures identified by Costa are overtopping due to inadequate spillway capacity (34 percent), foundation defects (30 percent), and piping and seepage (28 percent)."</p> | <p>and covers the measures for downstream areas for the hypothetical event of dam break. The site specific seismic studies have been conducted by IIT, Roorkee. Seismic design parameters approved by National Committee on seismic design have been during detailed engineering</p> |
| 25 | <p>Assessment of impacts of quarrying on the river bed and river banks The Kalai II project will require 72.6 lac cumec boulders for construction of the project and all of these will be extracted from the river bed and river banks. Even though the EIA itself mentions how the removing of boulders and gravel from the river bed will affect spawning areas of fishes (page 10-29), but does not suggest for any detail impacts assessment. It limits itself by stating about adequate precautions during dredging period. But it is highly doubtful that any of those precautions will be followed when actual dredging will be done to extract lakh</p> | <p>The restoration and landscaping methodology to stabilized degraded areas have been taken in consideration for pre & post quarrying, filling of depression, construction of retaining wall, barbed wire fencing, re-vegetation. A total budget of 325 lakh has</p> |

| SI | Comments | Response |
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| . | cumecs of construction material when there are no specific steps or mechanisms suggested. Without full assessment and management plan, the EIA cannot be considered adequate. | been kept to meet these provisions in EMP (Ref- Chapter.7) |
| 26 | Assessment of impacts of blasting for tunneling and other works in the pristine and fragile hill range – Blasting in the fragile hill ranges of Arunachal can have severe impacts, especially in increasing the probability of landslides. In Such circumstances, the EIA stating that no major impacts of blasting are envisaged at the ground level is wrong and puts a big question mark on the EIA. | In EMP, appropriate control measures have been recommended to minimize the adverse impact on this account. |
| 27 | Impact of the project on disaster potential of the area has not been assessed. | It is a generic remark. |
| 28 | Impacts of peaking power operation on hydrological regime, biodiversity, and life & livelihoods of people | To mitigate the adverse impacts, Environmental flows shall be released as follows: <ul style="list-style-type: none"> • Monsoon Season- May to September - 30% of the average flows during 90 % dependable year, |

| SI | Comments | Response |
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| . | | <ul style="list-style-type: none"> • Non-monsoon Non lean Season- October & April - 25% of the average flows during 90% dependable year. • Lean Season- November to March - 20% of the average flows during 90% dependable year. |
| 29 | Impact of flushing out of silt from the reservoir | <p>Unlike rivers of other part of country, the flow in river Lohit carries low silt.</p> <p>The reservoir shall act as a desilting basin. Silt flushing may be required after about 25 years of plant operation.</p> |
| 30 | Impacts of climate change on the project and | Climate change is a |

| SI | Comments | Response |
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| . | project's impacts on local climate | global issue and is beyond the scope of a project specific EIA Study. |
| 31 | There is no assessment of the value of the river that will be destroyed by submergence in the upstream and drying up and changed hydrology in the downstream. | Appropriate control measures have been suggested to minimize the adverse impacts on this account in EMP. (Volume-III). |
| 32 | The EIA has not properly assessed the downstream impacts of the project. It may be recalled that the ongoing massive agitation in Assam against such impacts of the under construction 2000 MW Lower Subansiri HEP, that has led to stoppage of work there since Dec 2011 is focused on downstream impacts and this project will face the same fate if this is not attended to. | Downstream Impact Assessment study is required for the last project in cascade development. MOEF had not included the Downstream Impact Assessment study in the approved TOR. However, Downstream Impact Assessment study has been made one of the conditions of EC for Demwe Lower HEP, which is the last project in cascade development on river Lohit. |

| SI | Comments | Response |
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| . | | Similarly, MOEF has asked Downstream Impact Assessment study for Dibang multi-purpose project and Siang Lower project which are the last projects in cascade development on rivers Dibang and Siang respectively. The issue for Lower Subansiri HEP is valid, as it is the last project in cascade development on river Subansiri. |
| 33 | No public consultations in Assam Linked to the above issue is the need for public consultations in downstream Assam about this and all other Lohit basin projects, without which there will be no question of public acceptability of the project and the project may face the same fate as that of Lower Subansiri HEP. | As per the EIA Notification, 2006, public consultation has been conducted by Arunachal Pradesh State Pollution Control Board on 18th January 2014 at Hawaii, District Anjaw. |
| 34 | Doubtful, contradictory and sweeping statements in EIA The EIA at several places have stated made such statements: | Most of the land has rocky outcrops. Jhum cultivation as |

| SI | Comments | Response |
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| . | <p>Page 10 -23, para 4: "The construction of the dam would form the reservoir which will submerge about 640 ha of area in upstream. The area witnessed jhum/shift cultivation practiced by local inhabitants. Submergence of the area would not impact much on the prevailing land use pattern."This is clearly wrong, since jhum cultivation is one of the key livelihood supporting activity in these areas and if such land is submerged, it will have major impacts on the land use pattern.</p> <p>Page 10 – 30, para 3: "As a result, barring for monsoon season, (May to September), the river Lohit will have dry periods for few hours for generation of peaking power."</p> <p>The idea of 'few hours' a complete misnomer and misleading, it will happen daily for 15-20 hours. In the analysis of Lohit basin study SANDRP had found that for Kalai II, "In lean season river water will be stored for a period of 15-20 hours. As a result, downstream stretch of river from the dam site will remain dry for that period. This will be followed by a continuous flow of 1112.27 cumecs (rated discharge) for a period of 4 to 9 hours." (Lohit Basin Study by WAPCOS: A mockery of e-flows and cumulative impacts – http://sandrp.in/rivers/Lohit_Basin_Study_by_WAPCOS_A_mockery_of_e-</p> | <p>mentioned in EIA will have little or no impact as Jhum cultivation in practiced at altitude much higher than the level of submergence.</p> <p>For the families losing land, detailed R&R plan as per the norms of Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013, has been prepared.</p> <p>The KPPL power station is proposed to comprise of 6 units of 190 MW each and 1 unit of 60 MW. One unit each of 60MW and 190MW i.e. 250 MW is envisaged to utilize the mandatory environmental releases. These two units shall run to meet</p> |

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| . | flows_and_cumulative_impacts.pdf) | the requirement of the environmental flows into the river just downstream of the dam. |

ANNEXURE-II: Response to Second Representation of SANDRP

| SI# | Comments | Response |
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| 1. | <p>The EIA EMP reports of the proposed 1200 MW Kalai II HEP in Lohit basin in Anjaw district in Arunachal Pradesh has been put up on the Arunachal Pradesh Pollution Control Board in advance of the public hearing slated for January 18, 2014. The EIA-EMP report is supposed to comply with the Terms of Reference (TOR) for the EIA-EMP given by the EAC and MoEF, this is statutory requirement as per the EIA notification of Sept 2006. We have just checked this compliance and find that the EIA and EMP reports have not fulfilled a very large number of the TOR (Terms of Reference) that the project was to cover in EIA-EMP as per the TOR clearance given for the project on 9.12.2009. Such EIA-EMP will clearly not be acceptable even from statutory and legal point of view and cannot be basis for a public hearing. Hence Arunachal Pradesh State Pollution Control Board (APSPCB) and MoEF</p> | <p>TOR Compliance Statement is enclosed as Annexure-I</p> |

| SI# | Comments | Response |
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| | should immediately cancel the public hearing and ask the EIA-EMP consultants to comply first with the TOR. | |
| 2. | A letter has been sent to APSPCB pointing out the violation of norms in organizing the public hearing and asking them to cancel the public hearing. This letter is available at "Letter to APSPCB – Public Hearing for Kalai-II HEP to be held Violating the Norms". A detailed critique of the EIA-EMP report of Kalai II project is also available at "Critique of Kalai II HEP's Environment Impact Assessment (EIA) Study and Environment Management Plan" | Replied separately. Copy attached as Annexure-II |
| 3. | Invalid extension since EIA-EMP does not comply with the TOR Here it may be added that as per minutes of 70th EAC meeting dated Dec 10-11, 2013, "In the mean while, MOEF issued an Office Memorandum dated 22-Mar-10 which stipulates that the proposals which were granted TORs prior to the issue of this OM, the EIA / EMP reports should be submitted after public consultation no later than four years from the date of the grant of the TORs | Validity of TOR has been extended by MOEF up to 8 th December 2014. |

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| | <p>with primary data not older than three years. Thus the TOR issued to the project on 9th December 2009 is valid up to 8th December 2013". By this norm, the Kalai II TOR clearance should have lapsed on Dec 8, 2013. However, EAC decided to give an extension to TOR for this project, since the project developer claimed, as noted in EAC minutes, "With the completion of all the studies, the draft EIA/EMP report for 1200MW Kalai-II HEP was prepared and submitted by the developer to Arunachal Pradesh State Pollution Control Board (APSPCB) vide letter dated 31st July 2013...". However, this assumes that the EIA-EMP submitted complies with the TOR given by MoEF. But this analysis shows that there is serious non compliance of the EIA-EMP with the TOR and hence submission of such fundamentally inadequate EIA-EMP cannot be a valid reason for providing TOR extension beyond legally stipulated period.</p> | |
| 4. | <p>Geological and Geophysical Aspects Regional Geology and structure of the catchment – some details only about has been mentioned in the EIA, the</p> | <p>TOR Compliance Statement is attached as Annexure-I</p> |

| SI# | Comments | Response |
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| | <p>latter is not available</p> <p>Seismicity , tectonics and history of past earthquakes in the area – the EIA only mentioned about seismicity, the latter two has been completely ignored</p> <p>Critical review of the geological features around the project area – not available</p> <p>Impact of project on geological environment – not available</p> <p>Justification for location & execution of the project in relation to structural components (Dam height) – not available</p> | |
| 5. | <p>Hydrology</p> <p>Graph of 10 – daily discharge before and after the project at the dam site immediately below the dam should be provided in the EIA study – Not available</p> <p>The TOR mentioned “An elementary stream gauging station should be established at a suitable location downstream to the Dam site of the project” and “Installation of two Rainfall Gauge Stations at upstream of dam site” but none of these has been complied with.</p> <p>Surprisingly the EIA also mentioned</p> | <p>TOR Compliance Statement is attached as Annexure-I.</p> |

| SI# | Comments | Response |
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| | <p>"No gauge and discharge (G&D) data is available at the Kalai-II project site or in the neighborhood."</p> | |
| 6. | <p>Biological resources</p> <p>1) "Cropping and horticulture pattern and practices in the study area" – no mention of this in the EIA</p> <p>2) Regarding identification of rare and endangered flora and fauna the EIA report mentioned only one "During the study in various seasons in Kalai-II HE project area, following IUCN Red List of threatened plant, Lagerstroemia minuticarpa falls under endangered category. Rest of the species are common in Arunachal Pradesh. However, this species though observed in the study area but not found in the land to be acquired for the project." (section 8.7 page 8 -22) This is a strange claim that the species is observed in the study area but not found in the land for the project.</p> <p>3) Fish and Fisheries</p> <p>a) The 5 location of study of Fish migrations & Breeding grounds was not done</p> <p>b) Impact of Barrage building on fish migration and habitat degradation was</p> | <p>TOR Compliance Statement is attached as Annexure-I.</p> |

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| | <p>not studied</p> <p>c) Overall ecological impact upto 10 Km d/ s from the confluence of the TRT with the river or reach of the river in India have not been not studied. The impact of untreated and waste water into the river was not studied and no alternatives explored.</p> <p>4) In the part of impact prediction, impacts on flora and fauna due to changed water quality has not been assessed</p> | |
| 7. | <p>Socio Economic aspects In terms of Socio-economic aspects the following should have been included in the EIA report.</p> <ul style="list-style-type: none"> · Land details* · Demographic profile · Ethnographic Profile · Economic structure · Development profile · Agricultural practices · Cultural and aesthetics sites · Infrastructure facilities: education, health and hygiene, communication network, etc. · Impact on socio- cultural and ethnographic aspects due to | <p>TOR Compliance Statement is attached as Annexure-I.</p> |

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| | <p>Construction of Barrage</p> <p>But the EIA does not do several of these profiles and limits itself to – Demographic profile, Educational levels, Occupational Profile, Land holding pattern, Assets owned and Livestock and other socio-economic parameters etc.</p> <p>In page 11- 8 EIA report says “Impacts on cultural, archeological and religious properties Monuments of cultural/ religious/ historical/ archaeological importance are not reported in the project area. Thus, no impacts on such structures is envisaged.” However, the EIA should have looked into the impact of project on places of cultural, religious importance for the local communities.</p> | |
| 8. | <p>Impacts related to Land The EIA ignores what has been suggested in terms of impact prediction for land. The EIA completely ignores –</p> <ul style="list-style-type: none"> a) Changes in land use and drainage pattern b) Changes in land quality including effects of waste disposal c) River bank and their stability d) Impact due to submergence | TOR Compliance Statement is attached as Annexure-I. |

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| | <p>However, in page no 10-23 in the section "Impact of Impoundment on Landuse" the EIA mentions: "The construction of the dam would form the reservoir which will submerge about 640 ha of area in upstream. The area witnessed jhum/shift cultivation practiced by local inhabitants. Submergence of the area would not impact much on the prevailing land use pattern." This is a false and misleading statement since in the hilly areas of Arunachal Pradesh, shifting cultivation is the main process of cultivation and submergence of such a large area is sure to have impacts on land environment.</p> | |
| 9. | <p>Under Catchment Area Treatment Plan, the TOR letter had asked the project proponent to prepare 5 thematic maps v i z . Slope map, Drainage map, soil map, Land use/ Land cover Map, Aspect map. Basing on these maps an Erosion Intensity map should have been prepared. But the EMP only has two maps Slope map and Land use Map. No Erosion Intensity map was prepared.</p> | <p>TOR Compliance Statement is attached as Annexure-I.</p> |
| 10. | <p>Under Compensatory Afforestation Plan</p> | <p>TOR Compliance Statement is</p> |

| SI# | Comments | Response |
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| | it was mentioned that "The choice of species for Afforestation should be suggested and the proper sites for the same should be demarcated on the maps." There is no map in the EMP report's chapter on Compensatory Afforestation Plan. | attached as Annexure-I. |
| 11. | Under Greenbelt Plan the scoping clearance asked for "...suitable plant species should be recommended with physical and financial details. A layout map showing the proposed sites for developing the green belt should be prepared." But the EMP report chapter on greenbelt does not at all comply with it. It makes no mention of any species and no map had been prepared. | TOR Compliance Statement is attached as Annexure-I. |
| 12. | The TOR clearance letter under "Reservoir Rim Treatment Plan" asked for "Layout map showing the landslide/ landslip zones should be prepared." But the maps provided in chapter 17 of the EMP report are not at all clear and the when zoomed in they get blurred. So the sites, even if they exist in the maps cannot at all the located. | TOR Compliance Statement is attached as Annexure-I. |
| 13. | The TOR clearance letter under "Muck Disposal Plan" had asked for "The | TOR Compliance Statement is attached as Annexure-I. |

| SI# | Comments | Response |
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| | <p>quantity of muck to be generated and the quantity of muck proposed to be utilized should be calculated." This was not complied with and EMP report in chapter 6 mentioned only about the muck generated from excavation. Under the same, the scoping clearance also asked for "Layout map showing the dumping sites viz – viz other project components should be prepared." There is no layout map showing the dumping sites.</p> | |
| 14. | <p>The TOR clearance letter under "Restoration Plan For Stone Quarries" asked for "Layout map showing quarry sites vis-à-vis other project components should be prepared." There is no map prepared for complying with this condition.</p> | <p>TOR Compliance Statement is attached as Annexure-I.</p> |
| 15. | <p>For "Landscaping and Restoration Plan" TOR letter asked for proper map showing landscaping and restoration site but this was not complied with in the EIA report.</p> | <p>TOR Compliance Statement is attached as Annexure-I.</p> |
| 16. | <p>The TOR letter asked the consultant to include a "Certificate" in EIA/EMP report regarding portion of EIA/EMP prepared by them and data provided</p> | <p>The field studies have been done by North-Eastern hill University and other NABL Accredited laboratories.</p> |

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| | by other organization (s)/Laboratories including status of approval of such laboratories. The consultant WAPCOS did not comply with this. | |

ANNEXURE-III: Response to Third Representation of SANDRP

| SI# | Comments | Response |
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| 1. | The statutory Public hearing conducted on Saturday, January 18, 2014 at Hawaii in Anjaw district in Arunachal Pradesh about the proposed 1200 MW Kalai II hydropower project in Lohit River Basin was marked by some serious violations that included intimidation of the affected people who wanted to raise questions and speak up, several people getting beaten up by the police and others, people that were not allowed to speak up, taking over of the public hearing by the MLA with his six hour long speech and public hearing stretched beyond midnight, apparently to manipulate the minutes of the public hearing. All these are serious violations of all the accepted norms of public hearing and cannot be acceptable. This is in addition to many procedural violations that were communicated through our written letter to Arunachal | The Public Hearing was successfully conducted on 18 th January 2014 as per the procedure laid down in EIA Notification 2006 and the report of the State Pollution Control Board and Deputy Commissioner on the same has been sent to MOEF. |

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| | Pradesh State Pollution Control Board, Deputy Commissioner of the Anjaw district and members of the Expert Appraisal Committee on River Valley Projects in Union Ministry of Environment and Forests, the letter remains unanswered. | |
| 2. | The hearing began at 10 AM with officials of WAPCOS (the EIA consultant agency) briefing the public about the EIA report. When Mr. Bihenso Pul, one of the project affected person stood up to question the officials on their false claim that a consultation was held with the affected land owners in the third stage of EIA, all of a sudden, the local MLA Mr. Kalikho Pul along with his close relatives and workers started threatening him and warning him of dire consequences. Witnessing this, the whole project affected public who had come to take part in the public hearing stood up in support and defense of Mr. Bihenso Pul. Following this, the personnel of Arunachal Pradesh Police started indiscriminately assaulting and lathi charging the public. Mr. Soti Tawsik, a Gram Panchayat Member from Nukung | The source of information of the newspapers can't be commented by us. The official document on the Public Hearing may please be referred. |

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| | <p>village from INC ticket was also grievously injured due to the lathi charge by police personnel when he tried to raise questions and express his opinion on the project. He was referred to Dibrugarh for further treatment as he was in a critical condition. Others injured include Baah Tawsik and Checheso Tawsik.</p> | |
| 3. | <p>During the presentation on EIA by WAPCOS (it is an agency under Union Ministry of Water Resources, which itself functions like a Big Dam lobby and hence there is conflict of interest in WAPCOS doing any impact assessment work since impact assessment is supposed to be done by an unbiased, independent agency. Moreover WAPCOS is also involved in feasibility studies and detailed project reports for justification of projects, its track record is also very poor with both Expert Appraisal Committee and Forest Advisory Committee of MoEF having criticized their work), even the illiterate villagers started expressing resentment over WAPCOS's complete lack of knowledge on the topology, flora and fauna of the project affected region which was evident from the multiple</p> | <p>The source of information of the newspapers can't be commented by us.</p> <p>The official document on the Public Hearing may please be referred.</p> |

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| | <p>factual mistakes made by the during the presentation. They were showing pictures of common fishes found in Parshuram Kund region and telling the villagers that the fishes were photographed from must higher elevation Kalai II project affected region. They did not even recognize the species of common Mynah available in the region and were calling it with different names.</p> | |
| 4. | <p>The Public hearing was completely dominated by Shri. Kalikho Pul, the local MLA who spoke for 6 hours at a stretch starting from 6 pm, trying to convince the project affected families with misleading facts, while his workers and the Police personnel were highhandedly suppressing and manhandling every single person who stood to express his opinion or raise a question. Mr. Kalikho Pul also levelled baseless allegation of corruption against Mr. Bihenso Pul who is not even a government servant. Eventually, after being frustrated by the arbitrary, coercive and one sided conduct of the Public hearing, the project affected people started leaving the venue shouting slogans against the</p> | <p>The source of information of the newspapers can't be commented by us.</p> <p>The official document on the Public Hearing may please be referred.</p> |

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| | <p>MLA and the administration stating they would never succumb to such illegitimate pressure tactics. If the public had not shown restraint and maturity during the mindless repressive act by police the incident could have taken an extremely dangerous turn.</p> | |
| 5. | <p>An overwhelming about 60% of the affected people are against the project now being taken up. Even those 30% of affected who may be giving conditional support, have put forward a list of 23 conditions that are yet to be responded to. The rest 10% of the affected are as yet undecided. It is thus clear that the project as it stands do not have public support and with people not allowed to participate in the public hearing, the opposition will only get stronger. It may also be added that the same WAPCOS had done a shoddy EIA of the under construction Lower Subansiri project that remains stall for over 25 months now due to public opposition. The fate of Kalai II, if pushed without proper credible assessment of the project and basin level impacts and credible public</p> | <p>The source of information of the newspapers can't be commented by us.</p> <p>The official document on the Public Hearing may please be referred.</p> |

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| | hearing, will not be any different. | |
| 6. | Finally, all the members of public left the meeting venue. The request to postpone the Public hearing in view of the incident to the next day by Mr. Bihenso Pul too was turned down and the hearing continued past 12 in midnight with only the Deputy Commissioner of Anjaw District, officials of Reliance Power Limited, Officials of WAPCOS & APSPCB and Mr. Kalikho Pul, Local MLA Anjaw district present during the meeting. This was clearly done to ensure finalization of manipulated minutes of public hearing. | The source of information of the newspapers can't be commented by us. The official document on the Public Hearing may please be referred. |
| 7. | This public hearing must be cancelled, an independent, credible enquiry conducted in the way in was sought to be conducted and in any case a fresh public hearing should be ordered after taking care of all the legal violations. | The source of information of the newspapers can't be commented by us. The official document on the Public Hearing may please be referred. |

ANNEXURE-IV: Response to Fourth Representation of SANDRP

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| 1. | The Arunachal Pradesh State Pollution Control Board (APSPCB) | No Comments |

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| | <p>has proposed to conduct a public hearing for the 1200 MW Kalai – II project at Hawaii on 18-01-2014. Through this communication we urge you to cancel the public hearing which is illegal for the following reasons.</p> | |
| 2. | <p>We would also like to point out that EIA and EMP reports prepared by WAPCOS have not fulfilled a very large number of the TOR (Terms of Reference) that the project was to cover in EIA-EMP as per the TOR clearance given for the project on 9.12.2009. Such EIA-EMP will clearly not be acceptable even from statutory and legal point of view and cannot be basis for a public hearing. A report on the status of compliance with TOR in EIA and EMP is attached along with a detailed critique of the EIA-EMP report. APSPCB and MoEF should immediately cancel the public hearing and ask the EIA-EMP consultants to comply with the TOR first.</p> | <p>TOR Compliance Statement is enclosed as Annexure-I.</p> |
| 3. | <p>1) Project currently has no valid Scoping (ToR) clearance The 1200 MW Kalai II project was granted</p> | <p>TOR was issued to the project on 9th December 2009. Draft EIA/EMP report for 1200MW</p> |

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| | <p>Scoping (ToR) clearance on 9-12-2009 by the Ministry of Environment & Forests (MoEF). As per MoEF Office Memorandum (OM) dated 22-3-2010 the validity of Scoping (ToR) clearances granted for carrying out pre-construction activities is four years and therefore the clearance for Kalai II has expired on 8-12-2013. Hence the public notice dated 13-12-2013 issued by the APSPCB in the Arunachal Times dated 14 – 12 – 2013 for conduct of public hearing (a pre-construction activity) is illegal as the project did not have valid Scoping / ToR clearance on those dates. Such a notice can only be issued if there is a valid Scoping clearance for carrying out pre-construction activities which is also placed in the public domain, which is not the case till date</p> | <p>Kalai-II HEP was prepared and submitted to Arunachal Pradesh State Pollution Control Board (APSPCB) vide letter dated 31st July 2013, for conducting Public Hearing. As per MOEF dated 22nd March 2010, the validity of the TOR was initially up to 8th December 2013. The same has been extended up to 8th December 2014 by MOEF.</p> |
| 4. | <p>We have noticed that the Expert Appraisal Committee (EAC) on River Valley & Hydroelectric projects discussed the issue of extension of Scoping clearance for the 1200 MW Kalai II project and recommended extension in its December 10-11 2013 meeting. However, an order</p> | <p>The validity of the TOR has been extended up to 8th December 2014 by MOEF.</p> |

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| | <p>granting fresh Scoping clearance for an additional year has not been issued by the MoEF, which is the concerned regulatory authority. A perusal of the MoEF website till today (11-01-2014) shows that the Scoping clearance order available for the 1200 MW Kalai II project is only the original one dated 9-12- 2009 (which has expired on 8-12-2013) and no additional/fresh Scoping clearance is available.</p> | |
| 5. | <p>In such a scenario, both the announcement and conduct of the public hearing on January 18th, 2014 is illegal, as no clearance existed on the date of public notice. It is only after the MoEF issues a fresh Scoping clearance for pre-construction activities to the 1200 MW Kalai II project (which is also placed in the public domain) can the APSPCB announce and conduct a public hearing (with no less than 30 days notice).</p> | <p>The validity of the TOR has been extended up to 8th December 2014 by MOEF.</p> |
| 6. | <p>Hence we urge you to immediately cancel the public hearing announced for the 1200 MW Kalai II project proposed for 18-1-2014. Please note</p> | <p>The validity of the TOR has been extended up to 8th December 2014 by MOEF.</p> |

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| | <p>that issue of fresh Scoping clearance for preconstruction activities by MoEF between now and 18-1-2014 will still render the conduct of public hearing on 18-1-2014 illegal. Fresh notice will require to be issued after MoEF issues a fresh Scoping clearance with at least 30 days notice.</p> | |
| 7. | <p>Law does not provide powers to MoEF to provide back dated extensions There is no provision in the EIA notification of Sept 2006 that could empower MoEF to provide back dated ToR clearances. Hence since MoEF has not issued any extension of the ToR to the Kalai II HEP before 8-12-2013 when the earlier ToR clearance expired, no extension of the ToR clearance can now be issued by MoEF and the project proponent will need to apply afresh for stage I or ToR clearance for the project. This will also be in fitness of things considering that WAPCOS is the consultant for the EIA for Kalai II HEP and we had written to the Chief Minister of Arunachal Pradesh (twice) and to the Union Minister of Environment</p> | <p>The validity of the TOR has been extended up to 8th December 2014 by MOEF. For other aspects, clarification has already been submitted in the earlier para's.</p> |

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| | <p>and Forests that an EIA done by the WAPCOS will not be acceptable. We reiterate that stand and suggest that the fresh EIA should be awarded to a credible independent agency and any study by WAPCOS will not be acceptable, both due to its poor track record and also due to the conflict of interest involved in the governance (WAPCOS is an agency under Union Ministry of Water Resources which is largely functioning as a lobby for large river valley projects) and functioning of WAPCOS (as business model of WAPCOS also involves doing pre-feasibility, feasibility and Detailed Project Reports.</p> | |
| 8. | <p>Non availability of Cumulative Impact Study Non availability of cumulative impact study of all the hydropower projects (including Kalai II) in the Lohit River Basin in the designated places 30 days before public hearing is another reason for the lack of legal backing for the public hearing. As per section 9.4 of form I of the EIA notification, it is necessary for the project proponents to provide information about</p> | <p>The EIA Notification 2006 provides for the draft EIA Report including the Summary Environment Impact Assessment report in English and in the local language shall be made available at designated places for inspection electronically or otherwise to the public during normal office hours till the Public Hearing is over. This was complied well on</p> |

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| | <p>cumulative impacts of the project along with other projects in the river basin. In the case of Kalai II, it would be cumulative impacts for all the hydropower projects in the Lohit River Basin. However, a cumulative impact study of Lohit basin is available. Hence the public hearing proposed on Jan 18, 2014 is illegal.</p> | <p>time.</p> |
| <p>9.</p> | <p>ToR of Kalai II not fulfilled As per the scoping Terms of Reference clearance issued to the 1200 MW Kalai II project on Dec 9, 2009, one of the objectives is to “perform a rigorous assessment of the significance of the bio-physical, socio-cultural and cumulative effects of the project.” However, the EIA of the project now available does not fulfill this (and a number of other TORs) and hence public hearing cannot be held without fulfilling the TORs.</p> | <p>TOR Compliance Statement is enclosed as Annexure-I.</p> <p>Sincere efforts have been made to assess the impacts on various facets of environment. The impacts on following aspects have been covered in detail as a part of the study:</p> <ul style="list-style-type: none"> • Impacts on Water Environment • Impacts on Hydrologic Regime • Impacts on Air Environment • Impacts on Noise Environment • Impacts on Land Environment • Impacts due to |

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| | | <p>geological aspects</p> <ul style="list-style-type: none"> • Impacts on Biological Environment • Impacts on Socio-Economic Environment |
| 10. | <p>MoEF OM stands violated Further, the MoEF vide Office Memorandum dated May 28, 2013 has stated that it will assess projects based on cumulative impact assessment studies. A Lohit River Basin study has been commissioned by EAC/ MoEF to study the cumulative impacts of all the projects in the Lohit River Basin (including Kalai II HEP). Although the draft report of this study is supposed to have been completed, it has not been approved by the Expert Appraisal Committee and thus and approved study is not available and such an approved study has also not been placed with the individual impact assessment study of the 1200 MW Kalai II project at all the designated places (DC office, etc) 30 days prior to public hearing. Thus public hearing for the project will also be in violation of the MoEF OM of May 28,</p> | <p>The MOEF OM of 28.05.2013 does not say that projects will not be considered for Environmental Clearance, till basin study is not completed. The basin study for Lohit, Siang, Subansiri, Kameng and Dibang Basin are still under preparation / discussion. Meanwhile, public hearing for Dibang project was conducted and the project is under appraisal at MOEF. Likewise, public hearing for Kangtangshri HEP in Siang Basin was conducted and is under appraisal. Similarly, public hearing for Simang-I and Simang-II HEPs were conducted and are under appraisal at MOEF.</p> <p>The standard practice is that EC is accorded with a condition that recommendations of Basin</p> |

| SI# | Comments | Response |
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| | 2013. This is one more strong ground for rendering the current announcement of the public hearing on 18-1-2014 as illegal. | Studies shall be binding on the project. This was followed while according EC to Demwe Lower HEP in Lohit Basin and Dibbin and Gongri HEPs in Bichom basin. |
| 11. | Lessons from Uttarakhand Disaster for June 2013 The Uttarakhand flood disaster of June 2013 and the Supreme Court order of Aug 13, 2013 underscore the need for learning lessons from the disaster and also doing advance and credible cumulative impact assessment of the projects and also assessment of disaster potential and how the large number of projects impact the disaster potential of the area. However, this has not been done as part of the EIA for the project or otherwise and hence conducting a public hearing without such a study will not be prudent or proper. | The hydrology has been approved by the Central Water Commission, an apex body of the country. The design parameters for flood i.e. the Probable Maximum Flood and Glacial Lake Outburst Flood have been built in the designs. Thus, the above issue has been adequately addressed. |
| 12. | Options Assessment not done Experience has shown that Anjaw district has huge potential of sub MW capacity micro hydro projects and these are sufficient for taking care of the power needs of the | The state government of Arunachal Pradesh has allotted the project and has mandated to carry out studies within FRL 904.8m and TWL 779.8m. The project proponent is not |

| SI# | Comments | Response |
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| | <p>district, state and region. However, taking up the public hearing without doing such assessment will be clearly violation of EIA notification as such exercise is necessary part of EIA and this has not been done for Kalai II HEP.</p> | <p>mandated to carry-out option studies of other projects in the EIA of Kalai-II HEP. However, MOEF has entrusted Lohit Basin Study to WAPCOS, to carry-out comprehensive Impact studies in Lohit river basin</p> |
| 13. | <p>Downstream Impacts not assessed, downstream consultations not done Downstream impacts of hydropower projects have proved to be huge and this is a very important and sensitive issue as is evident from the situation with respect of Lower Subansiri HEP in Assam where the project has been stopped for over two years now. In case of Kalai II HEP, comprehensive assessment of downstream impact assessment has not been done, nor has there been public consultations organized in downstream areas, nor has there been any public consultations for the Basin study in Anjaw or downstream areas. Without all these, the project public consultation will neither be useful nor legally valid.</p> | <p>Downstream Impact Assessment study is required for the last project in cascade development. MOEF had not included the Downstream Impact Assessment study in the approved TOR. However, Downstream Impact Assessment study has been made one of the conditions of EC for Demwe Lower HEP, which is the project in cascade development on river Lohit. Similarly, MOEF has asked Downstream Impact Assessment study for Dibang multi-purpose project and Siang Lower project which are the last projects in cascade development on rivers Dibang and Siang respectively. The issue for Lower Subansiri HEP is valid as, it is the last project in</p> |

| SI# | Comments | Response |
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| | | cascade development on river Subansiri. |
| 14. | <p>Full EIA-EMP not available in local languages The full EIA-EMP or even proper executive summary of the EIA-EMP or the basin study is not available in local languages and also to all the gram sabhas in the affected region a month in advance of the public hearing. Holding public hearing in absence of these will clearly not be valid or proper.</p> <p>Hoping for the prompt action in this respect from APSPCB to cancel the illegal public hearing for the 1200 MW Kalai II HEP. A failure to take action in this respect will lead to protests and legal action at the appropriate stage.</p> | As per EIA notification of MOEF, only the Executive Summary of draft EIA report is to be made available in local language. The same was done as per the norms and was made available at designated places. |

ANNEXURE-V: TOR Compliance

| SI. | Comments | Response |
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| Baseline Data | | |
| 17. | Geography & physiography of the project area | Physiographic division is given Figure-1.1 of Volume-I (EIA report) |
| 18. | Design discharge & its RI (Recurrence interval) | Covered in Table-2.1 of EIA Report, sections 5.3 and 5.4 of Volume-I (EIA Report) |
| 19. | Regional Geology and structure of the catchment | Covered in Sections 6.2 to 6.4 of Volume-I (EIA Report) |
| 20. | Seismicity, tectonics and history of past earthquakes in the area | Covered in Section 6.5 of Volume-I (EIA Report) |

| SI. | Comments | Response |
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| 21. | Critical review of the geological features around the project area | Covered in Sections 6.2 to 6.4 of Volume-I (EIA Report) |
| 22. | Impact of project on geological environment | Covered in Chapter-17 of Volume-II (EMP Report) |
| 23. | Justification for location & execution of the project in relation to structural components (Dam height) | The location of the dam and other project components is as per the FRL and TWL stipulated in the Memorandum of Agreement signed with the State Govt. and is based on the alternate studies and the geological / geotechnical investigations conducted at site. |
| Seismo-tectonics: | | |
| 24. | <p>Study of Design Earthquake Parameters</p> <p>A <i>site</i> specific study of earth quake parameters should be conducted. The results of the site specific earth quake design parameters should be sent for approval of the NCSDP (National Committee of Seismic Design Parameters. Central Water Commission, New Delhi)</p> | Covered in Section 2.4 of Volume-I (EIA Report) |
| 25. | Hydrology of the basin | Covered in Chapter-5 of Volume-I (EIA Report) |
| 26. | Basin characteristics | Covered in Section 5.1 of |

| Sl. | Comments | Response |
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| | | Volume-I (EIA Report) |
| 27. | Hydro-meteorology, drainage systems | Covered in Section 5.2 of Volume-I (EIA Report) |
| 28. | Catastrophic events like cloud bursts and flash floods, if any should be documented | Catastrophic events like cloud bursts and flash floods, are not recorded in the project area. PMF & GLOF is covered in Section 5.6 of Volume-I (EIA) |
| 29. | An elementary stream gauging station should be established at a suitable location downstream to the Dam site of the project and record the inflow as well as the sediment concentration of the river water during the 3 seasons of observations particularly during the lean season and during the monsoon season. | The stream gauging station was established approx. 500m downstream of dam in Oct-10 to record the inflows and the sediment concentration. The same is operational and the data is being recorded. |
| 30. | Graph of 10-daily discharge before and after the project at the dam site immediately below the dam should be provided in the EIA study | Covered in Sections 5.4 and 10.3 of Volume-I (EIA Report) |
| 31. | For estimation of Sedimentation rate direct sampling of river flow is to be done during EIA to get actual silt flow rate (to be expressed in ha-m/ km ² /year). The one year of EIA study should provide an opportunity to do | Covered in Section 5.7 of Volume-I (EIA Report) |

| Sl. | Comments | Response |
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| | this for ascertaining the actual silt flow rate. | |
| 32. | Water availability for the project and the aquatic fauna | Water availability covered under Chapter-5 and aquatic fauna is covered under Section 8.11 of Volume-I (EIA Report) |
| 33. | Design discharge and its recurrence interval | Covered in Table-2.1 of EIA Report, sections 5.3 and 5.4 of Volume-I (EIA Report) |
| 34. | Installation of two Rainfall Gauge Stations at upstream of dam site | Four Rain gauges are installed at locations upstream of dam i.e. at IB Walong, 7KM BRO Camp, Chigwanti BRO Camp and Hawaii Circuit House. Automatic Weather Station is also installed at Hawaii. |
| 35. | Physical and Chemical parameters of surface water quality. Physical parameters include temperature. pH, electrical conductivity. total dissolved solids (TDS). DO, turbidity. Chemical parameters are salinity. Alkalinity, Ca. Mg and total hardness. chlorides. nitrate nitrogen. phosphate. silicates. and total coliforms. Sampling should be covering the entire area of influence, including main river | Given in Tables-7.6 to 7.9 under section 7.5 of Volume-I (EIA Report) |

| SI. | Comments | Response |
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| | system and important tributaries of the river (<i>5 locations</i>) | |
| Biological Resources | | |
| 36. | Flora | Sections 8.3 section 8.4 of Volume-I (EIA Report) |
| Forests and forest types | | |
| 37. | Water body inundating forest area | Section 10.7 of Volume-I (EIA Report) |
| 38. | Vegetation profile (all groups). no. of species in the project area, etc. | Section 8.4 of Volume-I (EIA Report) |
| 39. | Community Structure through Vegetation mapping | Chapter-8 of Volume-I (EIA Report) |
| 40. | Species Diversity Index (Shanon-Weaver Index) of the biodiversity in the project area as well as plant fossil & phytoplankton (<i>5 Locations</i>) | Tables-8.4 to 8.6 of Volume-I (EIA Report) |
| 41. | Documentation of economically important plants, medicinal as well as timber, fuel wood etc. | Covered in Sections 8.8 and 8.9 of Volume-I (EIA Report) |
| 42. | Quantification and Inventorisation of flora and fauna of rare. endemic, endangered and threatened species. taking GPS observations | Covered in section 8.10 of EIA Report. of Volume-I (EIA Report) |
| 43. | Impact of impoundment and construction activities on the vegetation | Covered under section 10.7 of Volume-I (EIA Report) |

| SI. | Comments | Response |
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| 44. | Location of any Biosphere Reserve, National Park or Sanctuary in the vicinity of the project, if any | There is no Biosphere Reserve, National Park or Sanctuary in the Study Area |
| 45. | For categorization of sub-catchments into various erosion classes and for the consequent CAT plan, the entire catchment (Indian portion) is to be considered | Covered in Chapter-2 of EMP, section 2.5 of Chapter-2 of EMP |
| 46. | Cropping and horticulture pattern and practices in the study area | Covered in Section 9.2.2 of Volume-I (EIA Report) |
| 47. | Documentation of economically important plants, medicinal as well as timber, fuel wood etc. | Covered in Sections 8.8 and 8.9 of Volume-I (EIA Report) |
| 48. | Quantification and Inventorisation of flora and fauna of rare, endemic, endangered and threatened species. taking GPS observations | Covered in section 8.10 of EIA Report. of Volume-I (EIA Report) |
| 49. | Impact of impoundment and construction activities on the vegetation | Covered under section 10.7 of Volume-I (EIA Report) |
| 50. | Location of any Biosphere Reserve, National Park or Sanctuary in the vicinity of the project, if any | There is no Biosphere Reserve, National Park or Sanctuary in the Study Area |
| 51. | For categorization of sub-catchments into various erosion classes and for | Covered in Chapter-2 of EMP, section 2.5 of Chapter-2 of |

| Sl. | Comments | Response |
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| | the consequent CAT plan, the entire catchment (Indian portion) is to be considered | EMP |
| 52. | Cropping and horticulture pattern and practices in the study area | Covered in Section 9.2.2 of Volume-I (EIA Report) |
| 53. | Documentation of economically important plants, medicinal as well as timber, fuel wood etc. | Covered in Sections 8.8 and 8.9 of Volume-I (EIA Report) |
| 54. | Quantification and Inventorisation of flora and fauna of rare, endemic, endangered and threatened species. taking GPS observations | Covered in section 8.10 of EIA Report. of Volume-I (EIA Report) |
| 55. | Impact of impoundment and construction activities on the vegetation | Covered under section 10.7 of Volume-I (EIA Report) |
| Aquatic Ecology | | |
| 56. | Aqua-fauna like macro-invertebrates, zooplankton, phytoplanktons, Benthos etc. | Covered in Section 8.11 of Volume-I (EIA Report) |
| 57. | Conservation Status | Covered in Section 8.12 of Volume-I (EIA Report) |
| 58. | Fish and Fisheries | Covered in Section 8.11 of Volume-I (EIA Report) |
| 59. | Fish migrations, if any & Breeding grounds | Covered in Section 8.11 of Volume-I (EIA Report) |
| 60. | Impact of Barrage building on fish migration and habitat | Covered in Section 10.8.4 of |

| SI. | Comments | Response |
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| | degradation | Volume-I (EIA Report) |
| 61. | Overall ecological impact upto 10 Km distance from the confluence of the TRT with the river or reach of the river in India and the impact of untreated and waste water in to the river and the alternatives explored. | Covered in Section 10.8.4 of Volume-I (EIA Report) |
| Conservation areas and status of threatened/endangered taxa | | |
| 62. | Biotic Pressures | Covered in Sections 8.3 and 8.4 of Volume-I (EIA Report) |
| 63. | Management plan for conservation areas and threatened/endangered taxa | Compensatory Afforestation and Biodiversity Conservation Plan is given under Chapter-1 of Volume-II (EMP Report) |
| Remote Sensing & GIS studies | | |
| 64. | Delineation of critically degraded areas in the directly draining catchment on the basis of Silt Yield Index as per the methodology of AISLUS. Spatial information in each micro watershed should be earmarked on maps in the scale of 1:50.000 | Covered in Chapter-2 of Volume-II (EMP Report) |
| 65. | Land use and land cover mapping | Figure-2.2 of Chapter-2 of Volume-II (EMP Report) |
| 66. | Drainage pattern/map | Figure-2.1 of Chapter-2 of |

| Sl. | Comments | Response |
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| | | Volume-II (EMP Report) |
| 67. | Geo-physical features, slope and relief maps | Geological plan is given in Chapter-6 of Volume-I (EIA Report) Slope map is given in Figure-2.3 of Volume-II (EMP Report) |
| 68. | Demarcation of Snow fed and rain fed areas for a realistic estimate of the water availability | Covered in Chapter-5 of Volume-I (EIA Report) and Figure-2.2 of Volume-II (EMP Report) |
| 69. | Soil classification, physical parameters viz. texture, moisture content, porosity. bulk density and water holding capacity and chemical characteristics viz. pH. electrical conductivity, sodium. potassium. calcium. magnesium. nitrogen. total nitrogen, exchangeable sodium percentage (ESP), organic matter, phosphorus, etc. should be analyzed or the samples collected from different locations in the study area. | Covered in Section 7.4 of Volume-I (EIA Report) |
| Socio-economic aspects | | |
| 70. | Land details* | Covered in Section 10.6 of Volume-I (EIA Report) |
| 71. | Demographic profile | Covered under section 9.2 of Volume-I (EIA Report) |

| SI. | Comments | Response |
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| 72. | Ethnographic Profile | Covered under section 9.2 of Volume-I (EIA Report) |
| 73. | Economic structure | Covered under section 9.2 of Volume-I (EIA Report) |
| 74. | Development profile | Covered under section 9.2 of Volume-I (EIA Report) |
| 75. | Agricultural practices | Covered in Section 9.2.2 of Volume-I (EIA Report) |
| 76. | Cultural and aesthetics sites | Covered in Section 9.2 of Volume-I (EIA Report) |
| 77. | Infrastructure facilities :education, health and hygiene, communication network etc. | Covered in Section 9.2 of Volume-I (EIA Report) |
| 78. | Impact on socio-cultural and ethnographic aspects due to Construction of Barrage. Report should include list of all the project affected families with their names, education, land holdings, other properties, occupation etc. | Covered under Section 14.7 of Volume-II (EMP Report) The list of PAF is as per the socio economic survey conducted in the project affected villages. However, this would undergo change as revenue / land records do not exist in the State. The actual number of PAFs would be known after the property survey conducted by the District Administration for land acquisition is completed. |
| 79. | Collection of data pertaining to water | Covered under the Chapters - |

| SI. | Comments | Response |
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| | (physico-chemical and biological parameters). Air and noise environment and likely impact during construction and post construction periods. | 7, 8 and 10 of Volume-I (EIA Report) |
| 80. | Construction methodology and schedule including the tunnel driving operations, machinery and charge density etc. | Construction Methodology covered under Chapter-4 of Volume-I (EIA Report) |
| 81. | <p>Impact Prediction</p> <p>Impact prediction is a way of 'mapping' the environmental consequences of the significant aspects of the project and its alternative. Environmental Impact can never be predicted with absolute certainty and this is all the more reason to consider all possible factors and take all possible precautions for reducing the degree of uncertainty. The following impacts of the project should be assessed:</p> | |
| 82. | <p>Air</p> <ul style="list-style-type: none"> • Changes in ambient levels and ground level concentrations due to total emissions from point, line and area sources | Covered under Section 10.4 of Volume-I (EIA Report). |

| Sl. | Comments | Response |
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| | <ul style="list-style-type: none"> • Effects on soils, material. vegetation. and human health • Impact of emissions DG sets used for construction power <i>if</i> any, on air environment. | |
| 83. | <p>Noise</p> <p>a. Changes in ambient levels due to noise generated from equipment. blasting operations and movement of vehicles</p> <p>b. Effect on fauna and human health</p> | Covered under Section 10.5 of Volume-I (EIA Report). |
| 84. | <p>Water</p> <p>a) Changes in quality</p> <p>b) Sedimentation of reservoir</p> <p>c) Impact on fish fauna</p> <p>d) Impact of sewage disposal</p> | Covered under Section 10.2 of Volume-I (EIA Report). |
| 85. | <p>Land</p> <p>a) Changes in land use and drainage pattern</p> <p>b) Changes in land quality including effects of waste disposal</p> <p>c) Riverbank and their stability</p> <p>d) Impact due to submergence</p> | Covered under Section 10.6 of Volume-I (EIA Report). |
| 86. | <p>Ecological Aspects</p> <p>a) Deforestation and shrinkage of animal habitat</p> | Covered under Section 10.8 of Volume-I (EIA Report). |

| SI. | Comments | Response |
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| | <p>b) Impact on fauna and flora (including aquatic species if any) due to decreased flow of water</p> <p>c) Impact on rare and endangered species. endemic species. and migratory path/route of animals, if any</p> <p>d) Impact on breeding and nesting grounds, if any</p> <p>e) Impact on animal distribution. migration routes (if any), habitat fragmentation and destruction due to dam building activity</p> | |
| 87. | <p>Socio-economic Aspects</p> <p>a) Impact on the local community including demographic changes</p> <p>b) Impact on economic status</p> <p>c) Impact on human health</p> <p>d) Impact on increased traffic</p> <p>e) Impact on Holy Places and Tourism</p> | <p>Covered under Chapter-11 of Volume-I (EIA Report).</p> <p>There are no sites of holy places and tourism</p> |
| 88. | <p>Downstream impact on water, land & human environment due to drying up of the river at least 10 km downstream of the dam.●</p> | <p>Covered under section 10.2 of Volume-I (EIA Report).</p> |
| 89. | <p>Positive as well as negative impacts likely to be accrued due to the project are to be listed.</p> | <p>Covered in various sections of Chapter-10 Volume-I (EIA Report)</p> |
| ENVIRONMENTAL MANAGEMENT PLANS (A) | | |

| SI. | Comments | Response |
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| 90. | <p>R&R Plan</p> <p>A detailed R&R Plan should be prepared in line with NRRP-2007 on the basis of findings of the socio-economic survey coupled with the outcome of public consultation held. The R&R package should be prepared after consultation with the representatives of the project affected families and the State Government. Detailed budgetary estimates should be given. The plan should also incorporate community development strategies. The R&R package should essentially aim at improving their standard of living or at least achieving restoration of pre-displacement income level</p> | Covered under Chapter-14 of Volume-II (EMP Report) |
| 91. | <p>Catchment Area Treatment (CAT) Plan</p> <p>CAT plan will be prepared micro-watershed wise and should cover the following aspects:</p> | Covered under Chapter-2 of Volume-II (EMP Report) |
| 92. | <p>Covering the direct/indirectly draining catchment. Delineation of sub-watersheds and micro-watersheds. their location and extent should be done based on AIS-LUS</p> | Enclosed as Figures 2.1 to 2.5 of Volume-II (EMP Report) |

| Sl. | Comments | Response |
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| | watersheds Atlas. Identification of free/directly draining catchment area and preparation of CAT plan should be done based on Remote Sensing and Geographical Information System (GIS) studies. | |
| 93. | Generation of thematic maps viz. Slope map. Drainage map. soil map. Land use/ Land cover Map. Aspect map etc. Based on these thematic maps. Erosion Intensity map should be prepared using GIS tools. | Enclosed as Figures 2.1 to - 2.5 of Volume-II (EMP Report) |
| 94. | Erosion levels in each micro-watershed and prioritization of micro-watersheds should be done through Sediment Yield Index (SYt) method of All India Soil & Land use Survey (AtS & LUS), Deptt. of Agriculture, Government of India. | Figure 2.1 to 2.5 of Volume-II (EMP Report) |
| 95. | The treatment measures should be proposed for the areas falling under very severe and severe erosion categories. The areas requiring treatment should be proposed to be treated both by biological as well as engineering measures. The cost of the | Covered in Chapter-2 of Volume-II (EMP Report)Section 2.4 of Chapter-2 of Volume-II (EMP Report) |

| Sl. | Comments | Response |
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| | <p>administrative set up and mitigatory measures should be worked out. The plan should be prepared in consultation with the State Forest Department.</p> | |
| 96. | <p>Compensatory Afforestation Scheme</p> <p>The scheme should be prepared by the State Forest Department in lieu of the forest land proposed to be diverted for construction of the project as per the Forest (Conservation) Act, 1980. The choice of species for Afforestation should be suggested and the proper sites for the same should be demarcated on the maps.</p> | <p>Covered in Chapter-1 of Volume-II (EMP Report)</p> |
| 97. | <p>Green Belt Plan</p> <p>For the creation of Green belt along the periphery of the reservoir. approach roads around the colonies and other project components, suitable plant species should be recommended with physical and financial details. A layout map showing the proposed sites for developing the green belt should be prepared.</p> | <p>Covered in Chapter-9 of Volume-II (EMP Report)</p> |

| SI. | Comments | Response |
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| 98. | <p>Biodiversity Conservation and Wildlife Management Plan</p> <p>For the restoration and rehabilitation of rare, endangered or endemic floral/faunal species or some National Park/Sanctuary/Biosphere Reserve or other protected area going to get affected directly or indirectly by construction of the project. the suitable conservation measures should be suggested for the same in Bio- diversity Conservation Plan along with their physical and financial details. Biodiversity Conservation Plan should be prepared in consultation with the State Forest Authorities to facilitate its smooth implementation.</p> <p>Suitable conservation techniques (In-situ/ex-situ) should be proposed under the plan and the areas where such conservation is proposed should be marked on a project layout map.</p> | Covered in Chapter-1 of Volume-II (EMP Report) |
| 99. | <p>Reservoir Rim Treatment Plan</p> <p>A detailed survey on the basis of geology of the reservoir rim area should be conducted and all the</p> | Covered in Chapter-17 of Volume-II (EMP Report) |

| SI. | Comments | Response |
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| | <p>landslide zones/landslip zones around the reservoir periphery (up to MWL) should be identified and suitable Engineering and Biological measures for the treatment of such areas should be suggested with physical and financial details. Layout map showing the landslide/landslip zones should be prepared.</p> | |
| 100 | <p>Muck Disposal Plan Suitable sites for dumping of excavated materials should be identified in consultation with the State Pollution control Board and Forest Deptt.</p> | <p>Covered in Chapter-6 of Volume-II (EMP Report)</p> |
| 101 | <p>The quantity of muck to be generated and the quantity of muck proposed to be utilized should be calculated. Details of each dumping site viz. area. capacity. total quantity of muck that can be dumped etc. should be worked out and discussed in the plan.</p> | <p>Section 6.3 in Chapter-6 of EMP Report</p> |
| 102 | <p>Temporary muck dumping site should also be identified where the muck is to be dumped temporarily for utilization in the construction of other project components in future.</p> | <p>Section 6.4 in Chapter-6 of Volume-II (EMP Report)</p> |

| SI. | Comments | Response |
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| 103 | Layout map showing the dumping sites viz-viz other project components should be prepared. | Cross section of muck dumping sites is given in Figure-6.1 to 6.4 of Chapter-6 of Volume-II (EMP Report) The drawing showing location of muck dumping sites is attached. |
| 104 | Proper engineering protection measures viz. crate walls etc. should be proposed to prevent washing away of muck into the river or spilling over from the dumping sites. causing land or water pollution. Suitable plant species should be proposed for biological treatment of the dumping sites. | Section 6.5 in Chapter-6 of Volume-II (EMP Report) |
| 105 | Drawings showing site wise plan section showing protection measures, level up to which the muck is proposed to be dumped etc. should also be prepared along with their physical and financial details. | Cross section of muck dumping sites is given in Figures-6.1 to 6.4 of Chapter-6 of Volume-II (EMP Report) Budgetary estimate is given in Table-6.4 of Chapter 6 of Volume-II (EMP Report) |
| 106 | Restoration Plan for Quarry Sites Details of the coarse/fine aggregate/day etc. required for construction of the project and the rock/day quarries/river shoal sites identified by | Covered in Chapter-7 of Volume-II (EMP Report) |

| SI. | Comments | Response |
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| | <p>the project should be discussed along with the Engineering and Biological measures proposed for their restoration with physical and financial details. Layout map showing quarry sites vis-à-vis other project components should be prepared.</p> | |
| 107 | <p>Landscaping and Restoration Plan</p> <p>For the project areas (powerhouse/dam site/colonies etc.) landscape and restoration measures should be suggested with their physical and financial details. Proper map showing landscaping and restoration site should be prepared.</p> | <p>Covered in Chapter-7 of Volume-II (EMP Report)</p> |
| 108 | <p>Health Management Scheme</p> <p>Various suggestive measures for health management of project workers as well as the affected population should be given along with physical and financial details. Status of the existing medical facilities in the project area should also be discussed. Possibilities of strengthening of existing medical facilities. construction of new medical infrastructure etc. should be explored after assessing the need of the labour force and local populace.</p> | <p>Covered in Chapter-4 of Volume-II (EMP Report)</p> |

| SI. | Comments | Response |
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| 109 | <p>Fuel Supply</p> <p>Fuels for the work force during construction with physical and financial details should be worked out. Alternatives should be proposed for the labour force so that the exploitation of the natural resource (wood) for the domestic and commercial use be curbed.</p> | Covered in Chapter-5 of Volume-II (EMP Report) |
| 110 | <p>Sanitation & Solid waste management plan</p> <p>with physical and financial details for project colonies. labour camps. etc. should be incorporated in the project report.</p> | Covered in Chapter-5 of Volume-II (EMP Report) |
| 111 | <p>Fisheries Development and Management Plan</p> <p>Proper fish management measures should be proposed under the plan. If the construction of fish ladder/fishway etc. is not feasible then measures for reservoir fisheries should be proposed. The plan should detail out the number of hatcheries, nurseries, rearing ponds, etc. proposed under the plan with proper drawings. Fish species for conservation may be identified.</p> | Covered in Chapter-3 of Volume-II (EMP Report) |

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| | If any migratory fish species is getting affected then the migratory routes. time/season of upstream and downstream migration. spawning grounds etc. should be discussed in details. | |
| 112 | Water Quality Management During construction and post-construction periods should be thoroughly discussed. | Covered in Chapter-12 of Volume-II (EMP Report) |
| 113 | Air Quality Management Especially during the construction phase should be carried out at different times. | Covered in Chapter-10 of Volume-II (EMP Report) |
| 114 | Noise Quality Management During the construction phase should be proposed along with preventive measure. | Covered in Chapter-11 of Volume-II (EMP Report) |
| 115 | Energy Conservation Measures | Covered in Chapter-15 of Volume-II (EMP Report) |
| 116 | Dam Break Analysis & Disaster Management Plan The aim of the plan should be to identify inundation areas, population and structures likely to be affected due to catastrophic floods in the event of dam failure. The plan should also consider the scenario | Covered in Chapter-18 of Volume-II (EMP Report) |

| SI. | Comments | Response |
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| | <p>in case of dam failure of upstream projects and subsequent effect on other downstream projects. DMP should be prepared with the help of Dam Break Analysis. Maximum water level that would be attained at various points on the downstream in case of dam break should be marked on a detailed contour map of the downstream area, to show the extent of inundation. The action plan should possess Emergency Action and Management Plan including measures like preventive action notification warning procedure and action plan for co-ordination with various authorities.</p> | |
| 117 | <p>A scientific study should be done to assess the downstream requirement to decide minimum assured release of water for maintaining the aquatic ecology and water quality of river</p> | <p>The findings of Lohit Basin Study, which are applicable and binding on all the projects in Lohit Basin has been used. Based on recommended Environmental Flows, Power Potential Studies have been approved by CEA. The details are given in Section 3..3.1 of Volume-II (EMP Report)</p> |

| SI. | Comments | Response |
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| 118 | The findings of Lohit Basin Study, which are applicable and binding on all the projects in Lohit Basin has been used. Based on recommended Environmental Flows, Power Potential Studies have been approved by CEA. The details are given in Section 3..3.1 of Volume-II (EMP Report) | Covered in Chapter-19 of Volume-II (EMP Report) |
| 119 | A Summary of Cost Estimate Cost for implementing all environmental Plans | |
| 120 | Cost for implementing Environmental Monitoring Programme | Covered in Chapters-19 and 20 of Volume-II (EMP Report) |
| 121 | For accreditation, the concerned consultant who will be engaged for preparation of EIA/EMP report is requested to register them with Quality Council of India (QCI)/NABET under the scheme of accreditation & register. | WAPCOS is a NABET Accredited Consultant |
| 122 | Consultants should include a "Certificate" in EIA/EMP report regarding portion of EIA/EMP prepared by them and data provided by other organization(s)/Laboratories including status of approval of such laboratories. | WAPCOS is a NABET Accredited Consultant |
| 123 | Provision of captive unit for 24 hour | Captive unit for 24 hours |

| SI. | Comments | Response |
|------------|--|---|
| | running for continuous release of water in the downstream of dam should be done in the EIA/EMP report | running for continuous release of water just downstream of dam has been catered for in the project. |
| 124 | As per the provisions of the EIA Notifications of 2006. you are requested to submit draft EIA / EMP report as per above terms of references to the State Pollutions Control Board/Committee for conducting the Public Hearing / Public Consultation. | Public hearing conducted on 18.1.14 |
| 125 | All the issues discussed in the Public Hearing / Public Consultations shall be addressed to and incorporated in the final EIA / EMP report and submitted to the Ministry for considering the proposal for Environment Clearance | Incorporated in Final EIA Report |

**List of EAC members and Project Proponents who attended
81st Meeting of Expert Appraisal Committee for River Valley & Hydro
Electric Power Projects held on 27th- 28th January, 2015 in New Delhi**

A. Members of EAC

- | | | | |
|----|---------------------|---|-----------------------------------|
| 1. | Shri Alok Perthi | - | Chairman |
| 2. | Shri H. S. Kingra | - | Vice- Chairman |
| 3. | Dr. P. K. Choudhuri | - | Member |
| 4. | Shri N. N. Rai | - | Member |
| 5. | Shri B. B. Barman | - | Member Secretary & Director, MoEF |
| 6. | Dr. Vijay Kumar | - | Member |
| 7. | Dr. P. V. Subba Rao | - | MoEF |

**B. Chuzachen HEP in Sikkim by m/s Gati Infrastrure Pvt. Ltd.-
Consideration of Environmental Clearance (EC) for Capacity
enhancement from 99 MW to 110 MW.**

- | | | | |
|----|-----------------------------|---|-----------|
| 1. | Shri Sanjeev Kumar Upadhyay | - | President |
| 2. | Shri Sunil Gupta | - | CEO |
| 3. | Shri Kishor Krumar Singh | - | AGM |
| 4. | Shri Devesh Gautam | - | Manager |
| 5. | Shri Ravinder Bhatia | - | Director |

**C. Kynshi Stage-I (270MW) Hydroelectric Project in West Khasi Hill
District of Meghalaya by Athena Kynshi Power Pvt. Ltd. (AKPPL)-
Consideration of extension of validity of ToR/Scoping Approval**

- | | | | |
|----|----------------------|---|---------------------------|
| 1. | Shri Gagan Agarwal | - | Executive Director |
| 2. | Shri C. Sudhakar Raj | - | General Manager |
| 3. | Shri Javed Mohsin | - | Consultant |
| 4. | Shri Jaychandra | - | Assistant General Manager |
| 5. | Shri R. B. Singh | - | Sr. Manager |
| 6. | Shri R. V. Ramana | - | Chief (Env.) |
| 7. | Shri S. M. Dixit | - | Deputy Chief (Env.) |

**D. Kemeng Hydroelectric Project (600 MW)–Arunachal Pradesh–
Consideration of report of CICFRI regarding Fish pass**

- | | | | |
|----|-------------------------|---|---------------------|
| 1. | Shri B. C. Saha | - | Executive Director |
| 2. | Shri C. R. John Zeliang | - | Sr. Manager |
| 3. | Shri S. Dhar | - | Sr. Manager |
| 4. | Shri Rajeev Ranjan | - | Deputy Manager |
| 5. | Dr. M. A. Hassan | - | Principal Scientist |

- | | | | |
|----|---------------------|---|----------------------------|
| 6. | Shri Vikas Gupta | - | Deputy Technical Principal |
| 7. | Shri Piyush Isasare | - | Associate |

E. Reoli-Dugli Hydroelectric Project (420+9.2 MW) located in Lahaul & Spiti District of Himachal Pradesh-Consideration of extension of Validity of ToR/Scoping Approval

- | | | | |
|----|-----------------------|---|------------------------|
| 1. | Shri B. Bhattacharjee | - | Junior General Manager |
| 2. | Shri P. Kathiravan | - | Dy. General Manager |
| 3. | Shri D. N. Kalita | - | Senior DGM |
| 4. | Dr. Aman Sharma | - | General Manager |
| 5. | Shri s. M. Dixit | - | DCE (Envt.) |
| 6. | Shri Ratnakar Pandey | - | Manager (Env.) |

F. Final Reports on Cumulative Impact & Carrying Capacity Study of Subansiri Sub-basin including Down Stream Impacts-consideration thereof.

- | | | | |
|----|--------------------|---|-------------------|
| 1. | Shri Amit Jain | - | Managing Director |
| 2. | Shri S. K. Mittal | - | Director |
| 3. | Shri Krishna Kumar | - | General Manager |
| 4. | Dr. M. A. Khalid | - | Manager |
| 5. | Dr. Sunil Bhatt | - | EIA Specialist |

G. P. V. Narsimha Rao Kanthanpally Sujala Sravanthi Project in Warrangal District by Government of Telangana –Consideration of extension of Validity of ToR/Scoping Approval.

- | | | | |
|----|------------------------|---|----------------------------|
| 1. | Shri B. Venkateshwarlu | - | Superintending Engineering |
| 2. | Dr. N. P. Baduni | - | Manager |
| 3. | Shri B. Kiran Kumar | - | AEE |

H. Shirapur Lift Irrigation Scheme Project Solapur by Executive Engineer, Shirapur Lift Irrigation Project, Solapur-Consideration of ToR/Scoping Clearance.

- | | | | |
|----|---------------------|---|----------------------------|
| 1. | Shri B. D. Tonde | - | Superintending Engineering |
| 2. | Shri B. S. Birajdar | - | Executive Engineer |
| 3. | Shri C. P. Vibhuti | - | Consultant |

I. Kalai- II HEP (1200 MW) Project in Anjaw District, Arunachal Pradesh By M/s . Kalai Power Pvt. LTD. For consideration of Environment Clearance (EC).

- | | | | |
|----|----------------------|---|----------------|
| 1. | Shri Deepak Gopalani | - | Vice President |
| 2. | Shri Ashok Kumar | - | Vice President |

- | | | | |
|----|--------------------|---|---------------------------|
| 3. | Dr. Aman Sharma | - | General Manager |
| 4. | Shri Manoj Pradhan | - | Additional Vice President |
| 5. | Shri Naveen Alagh | - | Sr. Ex. Vice- President |
| 6. | Shri N. K. Deo | - | Sr. Vice President |
| 7. | Shri Manish | - | Manager |
