

**Minutes of the 2<sup>nd</sup> meeting of the Expert Appraisal Committee for River Valley and Hydroelectric Projects held during 30-31 January, 2017 at Teesta Meeting Hall, Vayu Wing, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi - 3.**

The 2<sup>nd</sup> meeting of the EAC for River Valley & Hydroelectric Projects was held with the Chairmanship of Dr. Sharad Kumar Jain during 30-31 January, 2017 in the Ministry of Environment, Forest & Climate Change at Teesta Meeting Hall, Vayu Wing, 1<sup>st</sup> Floor, Indira Paryavaran Bhawan, Jorbagh Road, New Delhi. The following members were present:

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|--------------------------------|--|
| 1. Dr. Sharad Kumar Jain       | - Chairman                                     |
| 2. Prof. Pradeep P. Mujumdar   | - Member                                       |
| 3. Shri Sharvan Kumar          | - Representative of CEA                        |
| 4. Shri N.N. Rai               | - Representative of CWC                        |
| 5. Dr. J.A. Johnson:           | - Representative of WII                        |
| 6. Dr. A.K. Sahoo              | - Representative of CIFRI                      |
| 7. Dr. Vijay Kumar             | - Representative of Ministry of Earth Sciences |
| 8. Prof. Govind Chakrapani     | - Member                                       |
| 9. Shri Chetan Pandit          | - Member                                       |
| 10. Dr. Dinakar Madhavrao More | - Member                                       |
| 11. Dr. R. Vasudeva            | - Member                                       |
| 12. Dr. S.R. Yadav             | - Member                                       |
| 13. Dr. S. Kerketta            | - Member Secretary                             |

Dr. Jai Prakash Shukla could not be present.

**Agenda Item No. 2.1 Confirmation of minutes of 1<sup>st</sup> EAC Meeting.**

The Minutes of the 1<sup>st</sup> EAC (River Valley & Hydroelectric Projects) Meeting, held on 30<sup>th</sup> December, 2016 were confirmed with the following corrections:

1. Replace "Dr. Vijay Kumar" in place of Dr. Vijay Das, Expert Member (Para 1 of page No. 1).
2. Replace Para 6 of page No. 7 (Ken Betwa Link Project Phase I) "As the submergence area is very large (about 9,000 ha), micro-climatic change conditions in the project area during construction/post-construction period to be brought-out/reported at regular intervals."

with

*"As the submergence area is about 9,000 ha, micro-climatic change conditions in the project area during construction/post-construction period to be brought-out/reported at regular intervals."*

3. Replace Para 10 of page No. 11 (Kwar HEP) "The project-affected population should be resettled and rehabilitated with land-to-land and house-to-house to



and Secunderabad cities. Alternate Sites, i.e Alignment-II for Medigadda Barrage, Alignment-II for Annaram Barrage and Alignment-III for Sundilla Barrage have been preferred over other alignment/s and may be better due to no submergence of forestland; lesser pumping canal length & less land acquisition, respectively. The boundary of the project is near Maharashtra state and as per the information, about 302 ha of area is likely to be submerged in the state of Maharashtra. Total land requirement is about 32,000 ha, out of which 2,866 ha is forest land. The total submergence area is about 13,706 ha. In addition to Medigadda barrage, 2 more barrages between Medigadda and Sripada Yellampally Project are to be constructed, one at Annaram and the other at Sundilla. The total length of water canal system is about 1,832 km. Total estimated cost of the project is about Rs. 80,499.1 Crores and it is proposed to be completed in 3 years.

The EAC after detailed discussions felt that the observations of CWC and Techno-economic Feasibility of the project are to be obtained and produced by the PP. Hence the EAC **does not recommend** the project for scoping clearance and suggests that in principle clearance of CWC be submitted before the project is considered for scoping/ToR clearance.

**Agenda Item No. 2.8      Sawalkote HEP (1856 MW) in Ramban District of J&K by M/s J&K State Power Development Corporation - For reconsideration of EC**

The Project Proponent (PP) M/s Jammu & Kashmir State Power Development Corporation Limited (JKSPDC) and the Consultant, M/s R.S. Environlink Technologies Pvt. Ltd, Gurgaon, made a detailed presentation of the project and *inter-alia*, provided the following information.

The Sawalkote Hydroelectric Project envisages construction of a 192.5 m high concrete gravity dam to utilise water of Chenab River. The top level of the dam is at El 697.5 m. The riverbed level at the dam site is El 534 m. The reservoir to be created by the dam will operate between FRL 695 m & MDDL 692.8 m with rated head of 154.4m. Three Headrace Tunnels (HRT) of 200 m length each with design discharge of 519.16 m<sup>3</sup>/s and 479.19m<sup>3</sup>/s for Stage - I and 319.46 m<sup>3</sup>/s for Stage- II shall be constructed. Eight (8) steel lined pressure shafts/Penstock (6 for Stage 1 and 2 for Stage 2), each of 6m dia. except Penstock-6 with 6.7 m dia. and 2.75 m diameter for the penstock for 56 MW unit are envisaged. An underground Powerhouse is proposed with Vertical Francis turbines at axis level of El. 525m. The installed capacity of the power house will be 1,856 MW (6x225 MW & 1x56MW for Stage-I and for 2x225 MW for Stage-II). The design energy is 8,004 MU. Tail Race Tunnel: three for Stage-I and one for Stage-II (TRT1-1,733m, TRT2-1,710 m, TRT3-150m and TRT for Stage 2-1,904m) and 10.5 m dia. for all.

The project envisages utilization of flow of Chenab River for generation of electrical power in a run-of-the-river scheme. The diversion site is located near Tangar village, around 40 km from Ramban town. A 192.5m high concrete gravity dam (from deepest foundation) and underground powerhouse site will be located at Latitude 33°



11°N and Longitude 75°06'. Chenab river has a catchment area of about 19,475 km<sup>2</sup> at the proposed dam site. The Full Reservoir Level (FRL) and minimum draw down level (MDDL) of the reservoir are El 695 m and El 692.8 m, respectively, with storage capacity of 23.84 MCM for diurnal peaking capabilities. The total area of submergence is 1030.55 ha.

### **Scoping Clearance:**

The MoEF&CC had approved the ToR for a capacity of 1,200 MW vide letter No. J-12011/19/2010-IA-I dated 13.10.2011. In April 2012, CEA approved an aggregate installed capacity of 1,856 MW to be developed in two Stages, i.e 1,406 MW in Stage-I (1,350 MW in the main and 56 MW in auxiliary powerhouse) and 450 MW in Stage-II.

MoEF&CC then modified the installed capacity and accorded the revised ToR for 1,856 MW installed capacity vide letter No. J-12011/19/2011-IA-I dt. 12.06.2013 with a validity period of 2 years. Then an extension was granted for the same ToR for further period of one more year, i.e. till 11.06.2016, vide letter No. J-12011/19/2011-IA-I dated 01.10.2015. The PP completed all formalities before the expiry of the validity of ToR.

### **Land Requirement:**

Total land requirement for various project activities is about 1401.35 ha. Total land required for the project is spread over in 3 districts, i.e. Ramban, Udhampur and Reasi. Out of 1401.35 ha of total land requirement, 175.65 ha is proposed as private land to be acquired for the project which falls in Ramban district only, 541.55 ha is Govt. Land and 684.15 ha is Forestland. *Total project cost (estimate) shall be Rs 22,190.66 crore.*

### **Public Consultation:**

Public hearing meetings were conducted at the following 3 locations by JKPCB:

1. Pancheri, Udhampur on 18.01.2016.
2. Mahore, Reasi on 21.01.2016.
3. Tange, Ramban on 28.01.2016

It was informed by the PP that all the concerns of the General Public were explained and duly addressed during Public Hearing including R&R activities to be undertaken for the project oustees.

### **Submission of Final EIA, EMP reports, etc:**

Final EIA and EMP Report after addressing issues and observations made during Public Consultation process was submitted to Ministry on 16.04.2016.

### **Status of Forest Clearance**

The total forest land involved in the execution of the project is 684.15 ha, and it is coming under four Forest Divisions, i.e. Ramban & Batote Forest Divisions in



Ramban district, Udhampur Forest Division in Udhampur district and Mahore Forest Division in Reasi district. As conveyed by the PP, the indent for the diversion of forestland has been submitted to PCCF by the PP, joint survey of forest cover (land and trees) has been completed and the diversion of forestland for non-forest use is on active consideration of State Government.

### **Appraisal by the EAC:**

The project was appraised before the EAC in its first meeting held on 30.12.2016, wherein the EAC deliberated on the different aspects of the project and felt that it needs to be further deliberated.

The project was again deliberated in detail in the meeting of the EAC held during 30-31 January, 2017.

### **E-Flow Studies:**

Study on minimum environmental flow requirement for three seasons, viz., lean, non-lean & non-monsoon and monsoon seasons have been conducted based on habitat simulation and hydraulic modeling using Mike 11. 10-daily discharge data for 90% dependability (2004-05) from the long term discharge series prepared for the project has been considered as the basis for the study. Average discharge values for monsoon (June-sept), Lean (Nov-Feb) and remaining four months (Oct, Mar, Apr, May) are worked out as 1,394.32 cumec, 199.83 cumec and 606.96 cumec respectively. River cross sections are taken for immediate downstream stretch and simulation modeling was carried out for each period separately for different percentages of average values and corresponding values of water depth, flow top width and flow velocity are studied in comparison to pre-project or natural river conditions.

For lean season, 20% of average lean season flow in 90% dependable year, i.e. 39.97 cumec, giving an average depth of about 61 cm is recommended to be released through an auxiliary turbine of 56 MW with tail water release point immediately downstream of plunge pool. Two turbines of 225 MW with tail water release point immediately downstream of the plunge pool along with auxiliary turbine of 56 MW releasing water in the same TRT; has been proposed to operate continuously during monsoon. Each turbine of 225 MW will have a design discharge of 159.73 cumec and one turbine of 56 MW will have a design discharge of 39.97 MW. With these three turbines running together, a release of 359.43 cumec (25.77%) will be available immediately downstream of plunge pool giving a water depth of more than 2 m. This along with spillway discharge will increase to an average value of 571.89 cumec (41.02%) based on 90% - dependable year data. For remaining four months, one turbine with shorter tailrace tunnel is proposed for continuous operation, making a release of 159.73 cumec giving a water depth of 1.35 m.

### **Free Flow Stretch**

The project is located between Baglihar and Salal HEPs. Baglihar HEP (900 MW stage I & II) is the upstream project, Salal HEP (690 MW) is the downstream project



and both are in operation. These three projects have covered a total stretch of about 104 km of river Chenab with adequate free flow river stretch between adjacent projects. Reservoir lengths are 24 km, 30 km and 28 km for Salal, Sawalkote and Baglihar, respectively. Free stretch of 17.68 km and 4.42 km shall be maintained between Salal-Sawalkote and Sawalkote-Baglihar, respectively.

### **Environment Management Plans:**

Biodiversity conservation and management plan has been prepared with a total budget of Rs. 3.40 crore to focus on certain specific actions such as *In-situ* and *ex-situ* conservation of genetic resources, especially of threatened flora and fauna; Creation of biodiversity registers (at National, District, and Local Levels) for documenting genetic diversity and the associated traditional knowledge; The plan also broadly covered and budgeted for Non Timber Forest Produce (NTFP) Plantations, Habitat improvement programme, Wildlife management, conducting awareness programmes and monitoring.

Catchment Area Treatment Plan (CAT) has been prepared for the free draining catchment area, i.e. upstream of diversion structure of Sawalkote HEP up to diversion structure of Baglihar HEP, which works out to be 1307.85 sq. km. and falls under 20 sub-watersheds. Areas falling under severe and very-severe erosion categories are proposed for treatment, which works out to be 9,700.44 ha and 264.26 ha, respectively. Various engineering and biological treatment measures have been suggested under CAT Plan at a budget of Rs. 59.29 crore.

Fisheries Development Plan include a proposal for a well-equipped hatchery for stocking of reservoir. The plan shall be implemented by Department of Fisheries including training of local fisherman. Proposed budget for fisheries development plan is Rs. 4.88 crore.

Solid Waste Management plan has been prepared at a budget of Rs. 10.88 crore to ensure that the PP, within the territorial area of the project complex/ colony, be responsible for the Solid Waste Management by creating adequate facilities for collection, conveyance and disposal of solid waste. Plan covers the waste collection, segregation, transporting the recyclable waste to authorized vendors, composting of biodegradable waste and dumping of remaining waste in designated land fill site to be identified in consultation with local authorities.

Public health delivery system has been envisaged for ensuring improvement in local health care system in project area especially for the project workers and includes the provision of ambulances, strengthening of local medical facilities and awareness programs with a budget of Rs. 9.62 crore.

Energy conservation measures at a budget of Rs. 8.70 crore have been proposed to mitigate the biotic pressure on the forests for fuelwood and space heating by construction workers by providing subsidized LPG connections and Kerosene



supply, Distribution of Pressure Cookers and solar lanterns, community kitchen and canteen for workers and awareness programs.

Excavation work for underground activities will generate muck in the form of soil and rock of about 2.95 lakh cum and 74.35 lakh cum, respectively. After utilization of muck for construction work, net quantity for disposal is estimated to be 34.07 lakh cum for which two dumping sites viz. MDS-1 and MDS-2 with a capacity of 5.56 lakh cum and 42.64 lakh cum, respectively have been identified. After disposal, these sites will be rehabilitated by engineering and biological measures to restore the land to near natural condition. A budgetary provision of Rs. 51.28 crore has been made for these activities in the project cost.

In addition, an amount of Rs.3.22 crore is budgeted for landscape and restoration work to restore the land disturbed due to quarrying, construction of roads and infrastructure facilities.

Pollution control during construction activities will be carried out by taking appropriate measures by the PP and a budgetary provision of Rs. 2.82 crore is made for air and water pollution control. Stabilization of landslides along the periphery of reservoir is planned under Reservoir Rim Treatment at a budget cost of Rs. 12.34 crore. Compensatory afforestation and payment of Net Present Value (NPV) for forestland to be acquired for the project is budgeted as Rs. 39.90 crore. Dam break modeling has been done and an outline of Disaster Management Plan is suggested and a budget of Rs. 3.10 crore is proposed to include provisions for communication and warning systems, setting up of emergency response system and public information system, training and awareness programs, etc. Also, to monitor the various physico-chemical and biological parameters during project construction, a program is proposed and budgetary provision of Rs. 3.31 crore is made.

Out of 1,401.35 ha of total land for the proposed project, 175.65 ha of private land shall be acquired from the project Oustees. A total of 13 villages will be affected having 1,477 Project Affected Families (PAFs) belonging to 575 households with a total project affected population of 3,977. Detailed R&R Plan has been prepared to ensure resettlement and rehabilitation of project affected families. Project also includes the development of resettlement area with adequate infrastructure for displaced families and also local area development plan to benefit the local population. The plan will be implemented at a total budget cost of Rs. 220 crore.

Total EMP Budget is Rs. 432.75 crore as per the breakup given below:

Sl. No.	Management Plans	Amount (Rs. in lakh)
1	Biodiversity Conservation & Management Plan	340.00
2	Catchment Area Treatment Plan	5,929.00
3	Fisheries Development Plan	488.00
4	Solid Waste Management Plan	1,088.00



5	Public Health Delivery System	962.00
6	Energy Conservation Measures	870.00
7	Muck Disposal Plan	5,128.00
8	Landscaping and Restoration Plan	322.18
9	Air & Water Management Plan	282.50
10	Reservoir Rim TreatmentPlan	1,234.00
11	Compensatory Afforestation Plan &NPV	3,990.37
12	Rehabilitation & Resettlement Plan	22,000.00
13	Environmental Monitoring Programme	331.00
14	Dam Break and Disaster Management Plan	310.50
<b>Total</b>		<b>43,275.55</b>

After detailed deliberations and considering all the facts of the project as presented by the PP, the EAC **recommends for grant of Environmental Clearance** for the project with the following conditions:

- i. On-line monitoring system for the E-flow releases will be installed.
- ii. The plastic waste shall be disposed of by recycling and not by land filling.
- iii. Local indigenous varieties of plants to be grown and maintained till their full growth including gap filling.
- iv. Skill mapping be undertaken for the youths of the affected project area and based on the skill mapping, the trainings to the youths be incorporated for their appropriate engagements in the Project.
- v. Land acquired for the project shall be suitably compensated with the prevailing guidelines and all commitments made during the Public Hearing shall be fulfilled.
- vi. The project-affected population should be resettled and rehabilitated as per the Jammu & Kashmir state R & R Policy.
- vii. Six monthly compliance reports shall be submitted by the project proponent to Regional Office, MoEF& CC, Chandigarh without fail until completion of the works.
- viii. All the recommendations based on the CIA &CCS of the Chenab River Basin for SawalkoteHEP shall be followed in toto during the development of this project.

**Agenda Item No. 2.9      Etalin (3097 MW) in Dibang Valley District of Arunachal Pradesh by M/s Etalin Hydro Electric Power Company Limited - Reconsideration for EC**

The Project Proponent (PP) and the Consultant, M/s R.S. Environlink Technologies Pvt. Ltd, Gurgaon, made a detailed presentation of the project and *inter-alia*, provided the following information.

The project (3097 MW) is located in Dibang Valley District of Arunachal Pradesh. The project envisages construction of 2 dams namely (i)a 101.5 m high dam on Dir river near Yuron village about 22 km from Etalin and (ii)a 80 m high dam on