Minutes of the 28th meeting of the Expert Appraisal Committee for River Valley and Hydroelectric Projects held on 31st October, 2019at Teesta Hall, 1st Floor, Vayu Block, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi–3.

The 28th meeting of the re-constituted EAC for River Valley & Hydroelectric Projects was held on 31.10.2019 with the Chairmanship of Dr. S.K. Jain in the Ministry of Environment, Forest & Climate Change at Teesta Meeting Hall, 1st Floor, Vayu Block, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi–3. The following members were present:

1.	Dr. S.K. Jain	-	Chairman
2.	Shri Sharvan Kumar	-	Representative of CEA
3.	Shri N.N. Rai	-	Representative of CWC
4.	Dr. J.A. Johnson	-	Representative of WII
5.	Dr. A.K. Sahoo	-	Representative of CIFRI
6.	Shri Chetan Pandit	-	Member
7.	Dr. S. Kerketta	-	Member Secretary

Dr. D.M. More, Dr. Vijay Kumar, Prof. R.K. Kohli, Dr. S.R. Yadav, Dr. (Mrs.) Poonam Kumria, Dr. J.P. Shukla and Dr. Govind Chakrapani could not present due to pre-occupation. The deliberations held and the decisions taken are as under:

Item No. 28.0 Confirmation of the minutes of 27th EAC meeting.

The minutes of the 27th EAC (River Valley & Hydroelectric Projects) meeting held on 23.09.2019 were confirmed.

Item No. 28.1 Cummulative Impact Assessment and Carrying Capacity Study (CIA & CCS) of Satluj River Basin Study – reg. reconsideration of draft report

The Consultant informed that the requisite information as sought by the Ministry are yet to be obtained from the State Govt., and requested to defer for consideration in the EAC meeting. Accordingly, the **proposal has been deferred**.

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Item No. 28.2 Upper Kolab Pumped Storage Project (2x160 MW) in District-Koraput, Odisha by M/s Odisha Hydro Power Corporation Limited- Regarding Fresh ToR. Proposal No. IA/OR/RIV/120950/2019, File No. J-12011/16/2019- IA I (R)

Project Proponent did not attend the meeting. Accordingly, the **project has been deferred**.

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Item No. 28.3 Balimela Pumped Storage Project in district Malkangiri, Odisha by M/s Odisha Hydro Power Corporation Limited-Regarding Fresh ToR Proposal No. IA/OR/RIV/120536/2019, File No. J-12011/18/2019- IA I (R)

Project Proponent did not attend the meeting. Accordingly, the **project has been deferred**.

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Item No. 28.4 Jakhol Sankri Hydro Electric Project (44 MW), in district Uttarkashi, Uttarakhand by M/s SJVN Limited- Regarding reconsideration of Environmental Clearance. Proposal No. IA/UK/RIV/41642/2016, File No. J-12011/07/2016-IA-1 (R)

Project proponent along with the consultant M/s WAPCOS, the PP presented the proposal before the EAC and *inter alia*, provided the following:

The Jakhol Sankri Hydro Electric Project (44 MW) is proposed on river Supin (a tributary of River Tons), near village Jakhol in District Uttarkashi of Uttarakhand. The project envisages construction of a 7.2 m high (from average river bed level) barrage which will divert water through a 6.6 km long 3.0 m diameter HRT to an underground power house. Two units of 22 MW each shall be installed for generation of 166.19MU of electricity per annum. This is a run-of-the-river scheme. The catchment area of the project is 268.20 km^2.

At present JSHEP is the only hydropower project proposed under development on river Supin. Since, there is no project proposed upstream of this project, there is no impact on the flow volume or the flow pattern as far as JSHEP is concerned. Downstream of the proposed JSHEP is Naitwar Mori HEP (60 MW) on river Tons which is presently under construction. Hydrological analysis has been conducted on the basis of water years. The JSHEP catchment is a part of the bigger catchment of Tons at Tuini located downstream. The proportion of snow bound area is higher in case of the upper catchment (JSHEP). Some of the flow figures characterizing the flow pattern of the river at the project site are given in the table below:

Flow Pattern of Supin at Jakhol:

Characteristic Flow	Value in Mm^3
Average annual flow	359.72
Maximum annual flow	667.96 - Year 1990-91
Minimum annual flow	214.07 - Year 2000-01
Av. monsoon flow (July-Oct.)	205.98
Av. Non-monsoon flow (Remaining months)	153.74
Maximum 10-daily discharge	65.24 m^3/s
Minimum 10-daily discharge	1.56 m^3/s

PP informed EAC that MoEF & CC accorded ToR for IC of 51 MW on 11.01.2011. Accordingly, EIA/EMP report was prepared. However, due to June, 2013 floods in Uttarakhand, Hon'ble Supreme Court in its judgment dated 13.08.2013 directed MoEF & CC not to take up any new project for both EC & FC in Uttarakhand till further orders. Further, Hon'ble Supreme Court vide its order dated 24.11.2015 clarified that its judgment dated 13.08.2013 is not applicable to three projects of SJVN limited in Uttarakhand including JSHEP. Taking into account the same, the project capacity was revised to 44MW. However, the location of barrage site and powerhouse site remain unchanged.

Accordingly, EAC in its 92nd meeting held during 28-29 March, 2016 recommended the ToR for 44 MW project. Revised ToR was issued vide letter dated 07.06.2016.

Uttarakhand Environment Protection and Pollution Control Board organized the public Hearing for JSHEP on 01.03.2019 at Khand Vikas Adhikari Office, Mori, Uttarkashi and Chaired by the Additional District Magistrate, Uttarkashi. The Regional Officer and Assistant Scientist represented UEPPCB. The National Board has recommended the proposed project for Wildlife clearance on 21.09.2016. GoUK issued the TEC Clearance on 03.06.2019. PP submitted the EIA/EMP report to the MoEF&CC on 27.06.2019.

EAC observed that earlier Public Hearing was scheduled on 12.06.2018; however, PH could not be completed because of the protest against the proposed project. Subsequently, on 01.03.2019 PH was held at Vikas Khand Karvalaye Parisar, district Uttarkashi. EAC took the cognizance of the complaint received from the Matu Jan Sanghtan in the Ministry on the issue of Public Hearing. EAC further observed that proposed project is near to GPV Wildlife Sanctuary/ National Park and project was recommended in the 39thmeeting of Standing Committee of National Board of Wildlife (SC-NBWL).

Total land requirement is 39.088 ha, out of which 24.317 ha is forestland including Civil Soyam land and 14.771 ha is private land. Total submergence area is about 3 ha. An underground powerhouse is proposed with 2 units of 22 MW capacities each. About 216 families (average size 6 persons per family) in 4 villages are likely to be affected by this project. The total cost of project is about Rs. 477.15 crores. Forest Clearance, Stage I is under process. Presently file is with RO, MoEF & CC, Dehradun.

There are216 families losing land. There are 6 project affected villages in Tehsil Mori of District Uttarkashi namely Dhara, Jakhol, Sunkundi, Pawn Malla, Pawn Talla and Sawani. Whereas the private land is to be acquired in four villages, in village Jakhol & Sawani entire land to be acquired is Government Land. The R&R plan has been devised in line with the "Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013". SIA study is complete and the District Magistrate has approved the report on 26.06.2019. Notification under Section 11 is issued on 27thJune 2019.

Environment baseline status has been collected during 2017 for three seasons (winter: January 2017, Pre-Monsoon June 2017 and Monsoon in September 2017). Average PM_{10} levels are between 42.0 to 55.0 $\mu g/m^3$. Average $PM_{2.5}$ levels are to be found between 14.0 to 27.0 $\mu g/m^3$. The highest values of NOx observed during winter, pre-monsoon and monsoon season. The maximum SO_2 levels were 10.7, 11.1 and 10.0 $\mu g/m^3$ are 6.2, 7 and 7 $\mu g/m^3$ in the winter, pre-monsoon and monsoon season, respectively. Ambient air quality is good in the area. The noise level in winter and pre-monsoon seasons ranged from 36.6 to 38.1 dBA and 38.4 to 40.3 dBA, respectively. The daytime equivalent noise level in monsoon season at various sampling stations ranged from 36 to 38 dBA. The noise levels were well within the permissible limit. There are no major sources of organic pollution loading in the basin. The total hardness in various water samples was 24-44 mg/l, 21-42 mg/l and 20-44 mg/l in winter, pre-monsoon and monsoon seasons, respectively. The low calcium and magnesium levels are responsible for soft nature of water. The total hardness level in the water is well below the permissible limit of 200 mg/l. The low EC and TDS values indicate the lower concentration of cations and anions. The BOD and COD values were very low. Level of heavy metal in the water of the project area is found to be below the permissible limit used for drinking purposes.

The forests in the project area fall in the Tons Forest Division. As per "Revised Survey of Indian Forest type" by Champion & Seth (1968), following forest types have been observed: Sub-tropical chir pine forest, Banj Oak forests (Quercusleucotricophora, Moru oak forest (*Quercus floribunda*), Moist deodar forest (*Cedrus deodara*), Western mixed coniferous forest, Moist Temperate Deciduous Forest. The fauna of the study area consists mostly of species with zoo-geographic affinities of Palearctic, Indo-Malayan and indigenous species. Mammals (Wild Boar, Jackal, Rhesus Macaque, Yellow throated marten, Barking deer, etc.) Birds: White-cheeked Bulbul, Indian Myna, Hoopoe, Spotted Forktail, etc. Butterflies: Small copper, Common Sailor, Common leopard, etc. As per secondary data sources, total 9 species of reptiles and 4 species of amphibians has been recorded from the area. However, no such species was encountered except the Rock agama and skinks. Fishes: A total of 6 species (Schizothorax richardsoni, Schizothorax progastus, Garra gotyla gotyla, Barilius bendelisis, Paraschistura montana and Glyptothorax pectinopterus) were found close to the confluence of Tons and Supin River at downstream site of powerhouse under the area of JSHEP. No fish was found at other sites. PP presented the anticipated environment impacts due to proposed project such as diversion of forest land, deforestation, effect on wildlife, Erosion, silting, loss of trees, effects on reservoir periphery due to impoundment, Impact on Fishes, Impact on health due to pondage, vector borne diseases, etc., Muck generation, Quarrying activities, Construction activities, air and water pollution, noise pollution, scarring of land and submitted the corresponding environment management plan as a mitigation measures.

Project benefits include addition of 166.19 MU of energy in the northern grid, Generation of clean electricity replacing the requirement of Thermal Power Plant, Social up liftment of project affected persons, improved facilities w.r.t schools, dispensaries, medical facilities, banking, telecommunication, road network, etc., Local area development (infrastructural/community development) in project Panchayat.

EAC after detailed deliberation on the information as presented and submitted to the Ministry had deferred the project for want of following information:

i. Details of the public hearing issues raised along with the compliance shall be submitted.

ii. PP is required to submit clarification from the State Pollution Control Board that whether Public Hearing was conducted following the procedure mentioned in the appendix V of EIA Notification and as amended thereof along with the justification for conducting PH distant from the project site.

iii. Possibility of subsidized electricity demanded by the locals should be explored.

iv. Environmental Matrix during construction/operational phase needs to be submitted.

v. Environmental Management Plan with budget breakup (Capital as well as recurring) shall be submitted.

vi. Fund allocation for CER shall be made as per Ministry's O.M. No. 22-65/2017-IA.III dated 1st May, 2018 for various activities therein.

vii. The details of activities with budget allocation under CER shall be submitted and incorporated in EIA/EMP report.

viii. Consolidated EIA/EMP report is to be submitted as per the generic structure (Appendix III) given in the EIA Notification, 2006.

ix. Content of the summary EIA be made as per the Appendix III A of EIA Notification and therefore should be submitted in the EIA report

x. An undertaking as part of the EIA report from Project proponent, owning the contents (information and data) of the EIA report with the declaration about the contents of the EIA report pertaining to a project have not been copied from other EIA reports before grant of EC

xi. Fish species availability needs to be reviewed as Supin River has good number of Rainbow trout.

xii. Details of plant species of gymnosperm found in the area are to be included in plantation program.

xiii. Criteria taken into account for selection of threatened species is to be detailed out.

xiv. QCI & NABET Accredited certificate of the consultant for the period during which baseline data and other EIA/ EMP studies carried out

PP submitted the above information to the Ministry on 09.10.2019. Accordingly, proposal was listed in the agenda of the present meeting (28th EAC). Project proponent along with the consultant M/s WAPCOS made the detailed presentation on the information as sought by the EAC in 25thmeeting.EAC observed and noted the following from the information submitted and as presented before the committee:

- Clarification from the state pollution control Board that whether Public Hearing was conducted following the procedure mentioned in the appendix V of EIA Notification and as amended thereof along with the justification for conducting PH distant from the project site. EAC noted that the location for public Hearing was finalized by SPCB in consultation with Dist. Magistrate.
- Possibility of subsidized electricity demanded by the locals has been explored by the PP.PP informed that each PAF shall be provided 100 units of free electricity per month for 10 years after commissioning of the project. Further, solar lights can be provided at community places as per societal need under CSR provisions.

PP submitted the following cost of Environmental Management Plan with budget breakup:

S. No.	Item	Cost (Rs. Lakh)
A. EMP		
1.	Biodiversity Conservation Plan	724.50
2.	Catchment Area Treatment Plan	680.0
3.	Sustenance of riverine fisheries	105.88
4.	Health Delivery System	142.30
5.	Environmental Management in Labour Camps	490.43
6.	Stabilization of Muck Disposal Sites	421.00
7.	Landscaping and Restoration of Construction Area	100.00
8.	Environmental Management in Road Construction	270.00
9.	Greenbelt Development	30.00
10.	Control of Air Pollution	66.80
11.	Control of Noise Pollution	11.00

12.	Water Pollution Control	10.00
13.	Public Awareness Program	50.00
14.	Disaster Management Plan	60.00
15.	Resettlement and Rehabilitation Plan	1369.13
16.	Local Area Development Plan (LADP)	240.0
17.	Livelihood Plan for PAF	192.64
18.	Monitoring and Evaluation Aspects for social aspects	30.0
19.	Implementation of Environmental Monitoring Programme during construction stage	45.6
20.	Purchase of Meteorological Instruments and Noise Meter	15.0
Sub-total-A		5054.28 Say 50.54 Crore
B. Corporate Environmental Responsibility (CER) Plan		
1.	Corporate Environmental Responsibility	716.10
Sub-total-B		Say 7.16 Crore
Total (A+B)		**57.70 Say 58.00 Crore**

- PP also submitted that the following fund allocation for CER shall be made as per Ministry's O.M. No. 22-65/2017-IA-III dated 1st May, 2018 for various activities therein.

S. No.	**Particular**	**Amount (Rs. Lakh per school)**	**Amount (Rs. Lakh for 5 schools)**
A.	**Construction/Up-gradation of schools in Study Area**		
1.	Construction of new Hostel/Hall	-	150
2.	Furniture & Fixtures and equipment	10.0	50.0
3.	Improvement of drinking water facilities	3.0	15.0
4.	Purchase of school bus ×2 Nos.	30.0	60.0
	O&M cost of Rs. 8.75 lakh for 2 school buses (for 10 years including escalation @ 10% per annum)	-	139.45
	Total	**43.0**	**414.45**
B	**Scholarships to students in the Study Area**		
1.	Scholarship for School going students (50 Students × 600 per month for 12 years)		43.2
2.	Scholarship for meritorious Students-College/ higher education (a) Fees/course material @ Rs. 10,000/year×20student×4years) (b) Hostel expenses (@Rs. 5,000/years × 20 students × 4 years)		 8.0 4.0
	Total		**59.2**
C	**Improvement of Public Health Facility**		

		Cost (Rs lakhs)	Cost for 02 PHSCs (Rs Lakhs
1.	Furniture, Beds and other items	8.5	17.0
2.	Up-gradation of Medical laboratory	15.0	30.0
3.	Up-gradation of operation theatre (labor room)	8.0	16.0
4.	Purchase of 2 mobile clinic vans	40.0	40.0
	O&M cost of Rs. 8.75 lakh for 2 Vans (for 10 years including escalation @ 10% per annum)	-	139.45
	Total		**242.45**

- PP submitted the consolidated the Consolidated EIA/EMP report, the summary EIA be made as per the Appendix III A of EIA Notification and an undertaking as part of the EIA report from Project proponent.

EAC deliberated on the issue and sought the following additional information:

1. Environmental matrix during construction/operational phase needs to be revised.
2. Environmental Management Plan with budget breakup (both Capital as well as recurring) shall be revised.
3. Detailed status of Stage I FC.

The EAC **deferred the project** and it shall be taken up again in the EAC meeting after submission of the above information.

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Item No. 28.5 Saundatti HEP (1200 MW) Integrated Renewable Energy with Pumped Storage Project by M/s Greenko Solar Energy Pvt. Ltd. at village Karlakatti, Tehsil-Saundatti, District-Belgaum, Karnataka–reg. reconsideration of Environmental Clearance. Proposal No. IA/KA/RIV/74600/2018, File No. J-12011/11/2018-IA.I(R)

Standalone Pumped Storage Project (1260 MW/13734 MWH Storage Capacity) is a part of Saundatti Integrated Renewable Energy Project (IREP). The other components of Saundatti IREP include Wind and Solar energy projects. EC is being sought only for development of 1260 MW/13734 MWH Storage Capacity Standalone Pumped Storage component. The Standalone Pumped Storage Component of Saundatti IREP envisages construction of upper reservoir/submergence involving about 128.58 ha in Karlakatti forest area near Yekkundi Gram Panchayat whereas existing Renuka Sagar reservoir near Naviluteertha Dam, Vatnala village in Saundatti Taluk of Belagavi District will be the lower reservoir. The water in the Renuka Sagar reservoir (existing lower reservoir) will be pumped up and stored in the proposed Pumped Storage component of Saundatti IREP reservoir (upper Reservoir) and will be utilized for power generation. Project is located at Belagavi district of Karnataka. The total project cost including IDC is estimated to be about Rs 5965.33 Cr.

Study area for environmental study has been delineated as project area or the direct impact area within 10 km radius of the main project components like, Pump house, Power House, Dam, Reservoirs and approach roads, etc. The project is not located on river and therefore catchment area is not delineated. Submergence area created by upper reservoir is

about128.58ha; lower reservoir already exists and therefore project is not creating any additional submergence area.

First Scoping Clearance for Saundatti Pumped Storage Scheme with capacity of 1200 MW (as a part of Integrated Renewable Energy Project) was issued by MoEF&CC on 18.05.2018. Revised Scoping Clearance due to change in project capacity from 1200 MW to 1260 MW, was issued vide letter No. J-12011/12/2018-IA.I (R) dated 25.09.2018. Karnataka State Pollution Control Board (KSPCB) conducted the public Hearing on 07.01.2019 at project site adjacent to Mallur Electrical Sub-Station, Karlakatti Village, Yakkundi Gram Panchayat, Saundatti Taluk, Belagavi District, Karnataka. Thereafter, final report was submitted online for appraisal and project was discussed in EAC meeting held on 27.02.2019. EAC after detailed deliberation recommended the project for grant of environment clearance.

Post EAC recommendation for environment clearance, MoEF&CC has sought additional information vide its letter F.No.-J-12011/11/2018-IA-I dated 13.06.2019. Detailed response to the queries was submitted vide letter No. IRE-Saundatti/MOEF&CC/EC/191097 dated 09.10.2019. It was also requested that during DPR studies, it was evaluated that the project can be further optimized with minor change in upper reservoir location without any change in EIA study area, which has already been recommended by EAC for environmental clearance.

Request for approval of change of upper reservoir location was submitted online on 09-10-2019. It is mentioned that while undertaking studies for Detailed Project Report (DPR), the project can be further optimized with minor changes in upper reservoir, accordingly optimization studies have been carried out. Based on the optimization studies it was evaluated that by shifting the Upper Reservoir to the adjacent hillock having gradually sloping surface from the earlier proposed gorge/valley, the project shall result in–

- an increase in MWH from earlier 8.0 h to 10.90 h with the same quantity of water,
- the Gross Storage capacity has been optimized from 1.75 TMC to 1.03 TMC,
- dead Storage reduces from 0.74 TMC to 0.03 TMC,
- storage Capacity Increased from 10080 MWH to 13734 MWH,
- except shifting of Upper Reservoir, all other project component locations remain same,
- apart from increase in MWH, civil structures like HRT and Surge Shaft had been eliminated reducing the overall length of water conductor system,
- the total land requirement has been reduced from 228.97 ha to 213.70 ha,
- forestland has been reduced from 169.97 ha to 160.40 ha. The density of Forestland also changes from Medium Dense to Open Forest Type and
- all the Project Affected Villages and the PAPs remains the same.

With the shift of the Upper Reservoir, there is no significant change in the study area. Further, the total land requirement has slightly reduced to 213.70 ha from earlier estimated land requirement of 228.97 ha. Forestland to be diverted for the project is reduced to 160.40 ha from 169.97 ha and private land requirement to 34.64 ha from earlier estimate of 37.34 ha as can be seen from comparative table below. There is no change in project affected villages and project affected families also remain unchanged.

Break-up of the land	Updated Land Requirement (ha)	Land Requirement as per EIA Report (ha)
Forest Area	**160.40**	**167.65**
Surface	153.93	162.63
Underground	6.47	5.02
Non-Forest	**53.3**	**61.32**
Private	34.64	37.34
Govt./PWD	18.66	23.98
Total	**213.70**	**228.97**

Necessary application for diversion of forestland due to change in location of upper reservoir has been submitted online to State Forest Dept. /MoEF&CC.

The comparative statement of salient features of the project with reference to earlier proposal and revised proposal is given below in table format:

S. No.		Details	Original Proposal [As Per EIA]	Revised Proposal [Modified Layout]
1.	**Project**			
	a.	Type	Standalone Pumped Storage Project	Standalone Pumped Storage Project
	b.	Storage Capacity	10080 MWH	13734 MWH
	c.	Rating	1260 MW	1260 MW
	d.	Peak operation duration	8.00 Hours daily	10.90 Hours daily
2.	**Saundatti IREP Reservoir-Upper (Now Proposed)**			
	a.	Live Storage	1.01 TMC	1.00 TMC
	b.	Dead Storage	0.74 TMC	0.03 TMC
	c.	Gross Storage	1.75 TMC	1.03 TMC
	d.	Full Reservoir level (FRL)	EL +793.00 m	EL +855.00 m
	e.	Top of bund level	EL + 795.00	EL + 858.00 m
	f.	Min. Draw Down Level (MDDL)	EL +760.00 m	EL +825.00 m
	g.	Type of Dam	--	Rock fill Embankment with central clay core
	h.	Height of Dam from Deepest foundation level	96.00 m	38.00 m
	i.	Total length at the top of dam/Embankment	435.0 m	5177.00 m
	j.	Top width of the dam	6.0 m	10.0 m
3.	**Renuka Sagar Reservoir -Lower (Existing)**			
	a.	Catchment Area	2176 Sq. KM	2176 Sq. KM
	b.	Max. flood discharge	5239 cumecs	5239 cumecs
	c.	Live Storage	34.346 TMC (972.56 M Cum)	29.34 TMC (830.81 M Cum)

S. No.		Details	Original Proposal [As Per EIA]	Revised Proposal [Modified Layout]
	d.	Dead Storage	3.385 TMC (95.85 Mcum)	8.35 TMC (236.46 Mcum)
	e.	Gross Storage	37.731 TMC (1108.41 Mcum)	37.69 TMC (1067.27 Mcum)
	f.	Full Reservoir level (FRL)	EL +633.832 m	EL +633.832 m
	g.	Min. Draw Down Level (MDDL)	EL +623.93 m	EL +623.93 m
	h.	Length of Dam	154.53 m	154.53 m
	i.	Height of Dam	40.23 m	40.23 m
4.	**Power Intake Structure**			
	a.	Type	Open Semi Circular	Diffuser Type
	b.	No. of Vents	--	5 nos.
	c.	Size of Each Intake	--	23.50m (W) x 7.50 m (H) including piers
	d.	Length of each Intake	--	36.45 m (covered with RCC slab at top up to Intake Gate)
	e.	Elevation of Intake centerline	EL +745.26 m	EL 814.10m
	f.	Elevation of bell mouth bottom	EL +735.77 m	EL +811.10 m
	g.	Design Discharge of each Intake (Turbine mode)	--	142.31 Cumecs
	h.	Trash rack type	--	Vertical with inclination of 15^{o}
	i.	Size of Trash Rack	--	3 nos. of 6.83m(W) x 7.71m(H) for each unit
	j.	Numbers & Size of Intake Service Gate	--	5 Nos. – 4.95 m (W) x 6.0 m (H) with Rope drum Hoist
	k.	Numbers & Size of Intake Emergency Gate	--	1 No. – 4.95 m (W) x 6.0 m (H) with Rope drum Hoist
5.	**Head Race Tunnel**			
	a.	Head Race Tunnel – 2No's	Twin Tunnels	--
	b.	Type of tunnel	Modified Horse Shoe	--
	c.	Diameter of Tunnel	12.0 m	--
	d.	Length of Tunnel	833 m each	--
	e.	Bed Slope	1 in 1182	--
6	**Surge Chamber**			
	a.	Type	Open Surge	--
	b.	Dimensions	30m Dia. with orifice of 5 m, 2 nos.	--

S. No.		Details	Original Proposal [As Per EIA]	Revised Proposal [Modified Layout]
7	**Penstock Tunnel/Pressure Shafts**			
	a.	Type	Finished steel lined - circular	Finished steel lined - circular
	b.	Number of Penstocks	4 Nos. Independent Penstocks& 1 No Independent Penstock bifurcated in to 2	4 Nos. Independent Penstocks & 1 No Independent Penstock bifurcated in to 2
	c.	Diameter of penstock	7.5 m	6.0 m
	d.	Length of penstock	730 m	929.34 m
8	**Powerhouse**			
	a.	Type	Surface Powerhouse	Surface Powerhouse
	b.	Dimensions	L 200.00 m x B 25.00 m x H 49.50 m	L 200.00m x B 24.00 m x H 51.12 m
	c.	Centre line of Unit	---	EL 587.00 m
9		**Tail Race Channel**	Trapezoidal - lined	Trapezoidal Unlined
	a	Length of the channel	1930m	1688 m
	b	Bed width	70m	70m
	c	Full supply depth	5.50m	5.10m
	d	Bed fall /Slope	1 in 6000	1 in 10000
10		**Tail Race Tunnel**		
	a	Type	-	Concrete Lined – Circular
	b	No. of Tunnel	-	6 nos.
	c	Dia. of Tunnel	-	7m for larger unit & 5m for Smaller unit
	d	Length of Tunnel	-	250.85 m
	e	Design Discharge	-	142.31 Cumecs for larger units & 71.16 Cumecs for Smaller units
11		**Electro Mechanical Equipment**		
	i	**252 MW Turbines**		
	a	Pump Turbine	Francis type, vertical shaft reversible pump-turbine	Francis type, vertical shaft reversible pump-turbine
	b	Total No of units	4 Units (all 4 units are with Variable speed)	4 Units (All 4 units are Variable speed)
	c	Rated Pumping Head	156.39 m	218.12 m
	d	Pump Capacity	274 MW	303 MW
	e	Rated Head in Turbine mode	147.99 m	205.12 m
	f	Turbine Capacity	252 MW	252 MW
	g	Turbine Design Discharge	196.80 Cumecs for each unit	142.31 Cumecs for each unit
	h	Synchronous speed	150.00 rpm	187.50 rpm
	ii	**126 MW Turbines**		

S. No.		Details	Original Proposal [As Per EIA]	Revised Proposal [Modified Layout]
	a	Pump Turbine	Francis type, vertical shaft reversible pump-turbine	Francis type, vertical shaft reversible pump-turbine
	b	Total No of units	2 Units (Both are Variable speed)	2 Units (Both are Variable speed)
	c	Rated Pumping Head	156.39 m	218.12 m
	d	Pump Capacity	135 MW	170 MW
	e	Rated Head in Turbine mode	147.99 m	205.12 m
	f	Turbine Capacity	126 MW	126 MW
	g	Turbine Design Discharge	98.40 Cumecs	71.16 Cumecs
	h	Synchronous speed	214.28 rpm	250.00 rpm
12		**Estimated Cost**		
	a	Civil Works	2212.48 Cr	2607.47 Cr.
	b	E & M Works incl. transmission	2016.00 Cr	1719.00 Cr.
		Sub-Total	**4228.48 Cr**	**4326.47 Cr**
	c	IDC & Others	1306.74 Cr	1638.86 Cr.
		Total Project Cost	**5535.22 Cr**	**5965.33 Cr.**

Project was earlier discussed in the EAC meeting held on 27.02.2019, EAC had recommended the project for environment clearance subject to submission of Stage I Forest clearance. PP has now informed that during DPR studies, it was evaluated that the project can be further optimized with minor change in upper reservoir location, which has already been recommended by EAC for environmental clearance.

EAC noted that there are few changes proposed in the project configuration especially location of the dam site. However, Installation Capacity of the project (1260 MW) is the same. EAC based on the information as presented and submitted to the Ministry by the PP, decided to revisit the recommendation made in the meeting held on 27.02.2019 and **deferred the project** for following additional information:

1. One season baseline data to be collected afresh for all the environmental attributes and compared with the existing data.
2. Pre-DPR Chapters viz., Hydrology and Layout Map and Power Potential Studies duly approved by CWC/CEA.
3. Consolidated report based on the fresh one season baseline data to be prepared and uploaded on the Karnataka State PCB website for inviting the comments/suggestion from the general public for one month. EIA/EMP report incorporating the compliance on the comments/suggestion received shall be submitted to the Ministry for further necessary action.

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Item No. 28.6 Sillahalla Pumped Storage Hydroelectric Project Stage-I (4x250 MW), in district Nilgiris, Tamil Nadu by M/s Tamil Nadu Generation and Distribution Corporation-reg. Fresh ToR. Proposal No. IA/TN/RIV/120761/2019, File No. J-12011/17/2019-IA.I(R)

Project proponent along with the consultant M/s WAPCOS Limited, 76-C Institutional Area, Sector-18, Gurgaon-15, Haryana (India) presented the proposal before the EAC and *inter-alia*, provided the following:

The proposed Sillahalla Pumped Storage Project (PSP) Stage I (4x250 MW) is located in the Nilgiris District of the southern Indian state of Tamil Nadu. The upper reservoir is planned in Udhagamandalam and Kundah taluk and lower reservoir is planned in Kundah taluk of the Nilgiris district. The Upper dam is located on Sillahalla stream which is a tributary of Kundah River. The Sillahalla River joins Kundah River about 1.4 km upstream of Kundah Palam dam of existing Kundah Powerhouse–I project. The installed capacity of existing Kundah Powerhouse-I is 60 MW and the inflows of Sillahalla, Kanarhalla and other small tributaries are stored in Kundah Palam dam. The water stored in Kundah Palam dam is discharged to Kundah Powerhouse-II (5x35 MW) through tunnel and 5 Nos. penstocks and let into Pegumbahallah dam across Kundah river. The Kundah River ultimately joins Bhavani River near Pillur in Coimbatore.

Due to increase in demand of peak power, TANGEDCO envisages the Sillahalla Pumped Storage project utilizes the water of Sillahalla River, a perennial stream, a tributary to River Kundah and in turn to River Bhavani, remains unutilized till date. TANGEDCO contemplates to utilize the water by constructing an upper dam across Sillahalla stream and lower dam across Kundah River downstream of existing Kundah Palam Dam. A tunnel shall interconnect both the dams to generate electricity during peak hours and recycle the water from lower to upper dam at the time of non-peak hours. The annual energy generation is 6,000 MWh and pumping energy is 7,000 MWh of 85.7 % cycling efficiency.

The proposed project envisages construction of:

i. Concrete gravity upper dam of 82 m height and 327 m length across Sillahalla River (Latitude: $11^{0}18'53.72''$ & Longitude: 76°38'56.34").
ii. 1 No. Power intake with trash rack having mechanical raking arrangement and gate shaft.
iii. 1 No. 2,862 m long and 9 m dia. Circular concrete lined headrace tunnel (HRT).
iv. 1 No. 70 m high and 20 m dia. circular concrete lined HRT surge shaft.
v. 2 Nos. 533 m long, 6.5 m dia. Inclined circular steel lined pressure shaft.
vi. 4 Nos. 55 m long, 4.75 m dia. circular steel lined Penstocks.
vii. An underground powerhouse cavern of size of 160x24x55m to house 4 Nos. Francis reversible pump/turbine(2 fixed and 2 variable) generating units of 250 MW capacity each.
viii. 1 No. Transformer cavern 130x18x22.5m to house 4 Nos. generator transformers.
ix. 4 Nos. of draft tube tunnels of 5 m dia. and 81 m length.
x. 1 No. TRT surge chamber of size 85x10x88m.
xi. 1 No. 1567 m long, 9.75 m dia. circular concrete lined tail race tunnel to carry the water from powerhouse to lower reservoir.

xii. 1 No. of Tail Race outlet with 1 No. gate shaft and trash rack having mechanical raking arrangement.
xiii. Construction of concrete gravity lower dam of 112 m height and 470 m length acrossKundah River ((Latitude: 11°16'25.81" & Longitude: 76°40'13.34").
xiv. 1 no. Main Access Tunnel (MAT) D-shaped of 1,240 m long 8m width & 8vmheight.
xv. Construction of three Adit- one each Adit to HRT, HRT Surge Shaft and Butterfly Valve.

The total land requirement for the proposed project is 315 ha, of which, about 123.3 ha is forestland, 57 ha Government land and 134.7 ha is private land. About 170 ha of land shall come under submergence at FRL for Upper Reservoir (135 ha) and Lower Reservoir (35 ha). Additional land is to be acquired for dam, water conductor system, powerhouse and other project appurtenances work out to be 145 ha. The total land to be acquired for the project is 315 ha. Total Catchment area of the upper reservoir and lower reservoir are 65 $km^2$and 183.48 km^2, respectively. The cost of the project is Rs. 4,952.17 crores at 2019 PL. About 1,600 labourers and technical staff will be employed during construction phase. The Levelised Tariff is Rs. 5.57 and 1st year Tariff is Rs. 6.20. The project envisaged to be commissioned in 66 months.

EAC observed that as per records available on DSS portal, the instant project is located at a distance of 3.49 km from the Mukurthi National park and 4.18 km from the Mudumalai-mukurthi Tiger corridor. After detailed deliberation, EAC proposed to take up a site visit for prescribing the additional Terms of Reference for preparing EIA studies including the prevailing Environmental settingsincluding necessity of any specific measures to be taken up during construction work as the area falls within Western Ghat Ecosensitive Areas. The Sub-committee comprising of the following members:

1.	Shri Chetan Pandit	-	Chairman
2.	Prof. S.R. Yadav	-	Member
3.	Shri Sharvan Kumar	-	Member
4.	Dr. J.A. Johnson	-	Member
5.	Dr. S. Kerketta	-	Member Secretary

Besides, the PP shall submit the following additional information for further consideration:

1. Status of application of Forest clearance for diversion of forestland shall be submitted.
2. QCI & NABET Accredited certificate of the consultant for the period during which baseline data and other EIA/ EMP studies carried out.
3. Alternate sites to be proposed instead of one location of different underground powerhouse cavern to ensure reduction of submergence area, acquisition of forestland, etc.
4. This project is located at a distance of 3.49 km from the Mukurthi National park and 4.18 km from the Mudumalai-mukurthi Tiger corridor. Therefore, list of Schedule-I species including RET Species be provided during the site visit of the Sub-Committee.
5. Pre-DPR Chapters viz., Hydrology and Layout Map and Power Potential Studies duly approved by CWC/CEA.

Further, the EAC discussed and opined that the PP may not be called for in the subsequent EAC meeting for any clarification on the project. EAC shall deliberate the recommendations of the Sub-committee and if any, additional ToR is to be prescribed, that shall be a part of the standard ToR. Accordingly, proposal is **recommended for grant of ToR** but shall be processed only after the review of the EAC on the site visit report of the Sub-committee.

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Item No. 28.7 Kundah Pumped Storage Hydro Electric Project in tehsil Udhagamandalam, district the Nilgiris, Tamil Nadu by M/s Tamil Nadu Generation and Distribution Corporation- Regarding Fresh ToR Proposal No. IA/TN/RIV/121832/2019, File No. 12011/62/2006-IA.I (R)

The Project Proponent made a presentation of the project and *inter-alia*, provided the following information:

Kundah Pumped Storage HEP (4x125 MW) project is in Nilgiris District of Tamil Nadu is being developed by M/s Tamil Nadu Electricity Board, Government of Tamil Nadu. The Ministry on 08.05.2007 accorded the Environmental Clearance for this project for a period of 5 years for commencement of construction work and subsequently the validity of EC was extended up to 07.04.2020. As the project couldn't be commissioned within the validity period of EC i.e. on or before 07.04.2020, Ministry informed vide letter dated 17.10.2019 to initiate the process of obtaining EC *de-novo*. Subsequently, fresh ToR has been applied by the PP as per the extant guidelines of EIA Notification, 2006 and its subsequent amendments.

Brief Summary of the project:

Kundah Pumped Storage HEP (4x125 MW) in Nilgiris District is proposed to meet the peak power demands of the State grid with a view to provide quality and reliable power supply by flexible operation of State grid which will facilitate continued development of Tamil Nadu. Under Kundah Pumped Storage HEP (4x125 MW), the existing TANGEDCO's Porthimund and Avalanche-Emerald reservoirs in Nilgiris district will be utilized as Upper and Lower reservoirs, respectively. No new reservoirs to be formed. The water conductor system shall comprise one headrace tunnel, 2 numbers pressure shafts, 4 numbers penstocks, one tail race surge shaft and one tail race tunnel. An underground powerhouse is proposed to house 4 units of 125 MW each, which can be reached by means of an Access Tunnel.

Salient Features:

1.	Type	:	Pumped Storage HEP
2.	Installed Capacity	:	500 MW (4x125 MW)
3.	State	:	Tamil Nadu
4.	Location	:	Nilgiris district
5.	Existing Reservoirs	:	Upper Reservoir: Porthimund Reservoir *(Capacity: 49.03 Mm³)*
		:	Lower Reservoir: Avalanche-Emerald

Capacity: 149.57 Mm³)

6. Permission from State Govt. : Tamil Nadu Govt. has approved for execution of Phase-I (1x125 MW) vide GO. Ms. 133, dated 03.12.2008 at a cost of Rs. 488.48 crores.

: Tamil Nadu Govt. has approved for execution of Phase-II (2x125 MW) vide GO.Ms. 50, dated 29.04.2013 at a cost of Rs. 498.58 crores.

: Tamil Nadu Govt. has again approved for execution of Phase-III (1x125 MW) vide GO. Ms. 44, dated 20.06.2014 at a cost of Rs. 229.53 crores.

Project Features:

- Head Race Tunnel (HRT) –1,279 m long, 8.5 dia. Circular with peak discharge of 240 cumecs.
- Head Race Surge Shaft (Restricted Orifice)-64.94 m high, 16 dia. (lower), 24m dia. (upper).
- Adit to Head Race Surge Shaft - 410 m long, 6.5x7.5 m, D-shape.
- Pressure Shafts - 2 Nos. each 458 m long, 5.5 m dia. with peak discharge of 120cumecs.
- Penstocks 4 Nos. each 59.9 m long, 3.9 m dia. with peak discharge of 60 cumecs.
- Power House - An underground powerhouse of size 156 m (L) x22m (W) x 48 m (H) including service bay to accommodate 4 Nos. Francis reversible turbine type generating units of 125 MW each operating under rated generating net head of 236 m and a generating design discharge of 240 cumecs and rated pumping head of 248 m and a pumping design discharge of 183.28 cumecs.
- Transformer cavern - Size 144.20m (L) x 18 m (W) x 18 m (H)
- Tail Race Tunnel (TRT) - 915 m long 8.5 m dia. Circular with peak discharge of240 cumecs.
- Tail Race Surge Shaft - 76.50m high, 16 m dia. (lower), 22.5m dia. (upper)
- Adit to Tail Race Surge Shaft - 471 m long, 6.5x6.5m dia. D-Shape
- Access Tunnel – 1,249 m long, 8x8 m dia. D-Shape.
- Cable Cum Ventilation Tunnel - 827 m long, 6.5x 6.5 m dia. D-Shape.

Project Benefit:

The project would provide peaking benefits of 500 MW (daily peaking energy would be 3 MU) with all 4 units of 125 MW each operating for 6 hours daily for the whole year. Annual average energy generation will be 1005 MU.

Present status:

Main Access Tunnel works for a length of 1000m completed. Tunneling with concrete lining for a length of 500m including portal of Cable Cum Ventilation Tunnel(CCVT) has been completed. Formation of approach roads to Head Race Tunnel Intake, to Adit of Head Race Tunnel Surge Shaft, to Upper reservoir (Porthimund) and to Dumping yard completed. Power supply arrangements to Adit of Head Race Tunnel and other construction activities have been provided. Works completed to a value of Rs.128.36 Crores so far.

Besides, till date, under EPC Package-I (Civil and Hydro-mechanical) Works, 25% of Engineering work, 23% of Physical progress and 28% of Financial progress have been achieved. Similarly, under EPC Package-II (Upper Intake Structures, HRT, HR Surge Shaft, Adit to HRT, Pressure Shaft and Penstock) Works, 7% of Engineering work, 6% of Physical progress and 8.3% of Financial progress have already been achieved. The total cost of the project is Rs. 1,832 crores including IDC at 2014-15 PL, of which Rs. 256 crores have been spent till September, 2019. The tentative commissioning schedule of the project is 2023-24 (May, 2023). Main reason of delay in execution of works are due to paucity of funds during 2007-08 and 2912-13, non-availability of surplus power for pumping from 08.05.2007 to 07.05.2012, announcement of GST forced for re-evaluation of the bids and pending court cases. No additional land will be acquired for this on-going project. The total land requirement is 77.89 ha, of which 47.89 ha is Private land required for the execution of the project which has already been and 30 ha forestland has to be diverted for non-forest use for which Stage-I Forest Clearance has been obtained vide letter dated 27.11.2008 and Stage-II Forest Clearance has been obtained vide letter dated 21.08.2013. A total of 36 ha of private land has been handed over to the State Forest Department towards Compensatory Afforestation. Balance land is utilized for project purposes.

Further, the PP submitted the following:

1. Early grant of Fresh TOR for conducting EIA/EMP study based on one season data as there is no change in scope of project and including no major changes in the baseline environmental particulars in the project area. Further, this project is to be commissioned during 2022-23.
2. Exemption from conducting public hearing meeting as earlier TNPCB had conducted the public hearing meeting on 12.04.2007 for this Kundah Pumped Storage HEP. During the public hearing meeting, it was requested to give priority to local public for employment. Unskilled labour from local public is being utilized to the extent possible. It was also requested that none of the houses shall be affected due to extension of roads. No other major issues were raised during the Public hearing meeting.
3. Amendment to the validity extension of Environmental Clearance accorded vide letter dated 18.01.2018 as 07.05.2020 instead of 07.04.2020

After detailed deliberation based on the above facts as presented by the PP, Committee proposed to take up a site visit for prescribing the additional Terms of Reference for preparing EIA studies including the prevailing Environmental settings. As the project location of the Sillahalla Pumped Storage Hydroelectric Project Stage-I (4x250 MW) in district Nilgiris, Tamil Nadu by M/s Tamil Nadu Generation and Distribution Corporation is also located nearby to this proposed project, the Sub-committee visiting Sillahalla Pumped Storage Hydroelectric Project Stage-I shall also visit this project and submit a site visit report. The Sub-committee shall examine the requirement of collection of baseline data based on one/three seasons for preparation of EIA/EMP report including necessity of any specific measures to be taken up during construction work as the area falls within Western Ghat Ecosensitive Areas. Further, the EAC opined that a separate call may be taken up by the Ministry for exemption of Public Hearing to the project as there is no change of scope as well as no additional land acquisition is involved. Moreover, the project has undertaken more than 23% physical progress till September, 2019 and has incurred about Rs. 256 crores.

The EAC discussed and opined that the PP may not be called for in the subsequent EAC meeting for any clarification on the project. EAC shall deliberate the recommendations of the Sub-committee and if any, additional ToR is to be prescribed, that shall be a part of the standard ToR. Accordingly, proposal is **recommended for grant of ToR** but shall be processed only after the review by the EAC on the recommendations of the additional conditions, if any, of the site visit report.

Item No. 28.8 Any other time with the permission of the chair.

As no agenda item was left for discussions, the meeting ended with thanks to the Chair.

Dear Dr Kerketta,

I am sending the approved minutes of 28th meeting of EAC.

Thanking you,

(Sharad Jain)

Director NIH and Chairman EAC (RVH)

From: s.kerketta66@gov.in [mailto:s.kerketta66@gov.in]
Sent: Thursday, November 28, 2019 3:09 PM
To: Sharad Jain <s_k_jain@yahoo.com>; Dr Sharad Kumar Jain <skj.nihr@gov.in>
Subject: Re: Draft 28th EAC (RVP) meeting - approval reg.

Sir,

Correction incorporated and enclosed for approval please.

regards,

Kerketta

On 11/27/19 07:31 PM, **Sharad Jain** <s_k_jain@yahoo.com> wrote:

Dear Dr Kerketta,

I am sending the minutes with some parts highlighted. Pls see these and edit appropriately.

For item 28.4, the recommendations may be seen.

Regards,

Sharad K Jain / शरद कुमार जैन

Director

National Institute of Hydrology, Roorkee, India

Tel: +91 1332 272106/ 98970 18550

On Monday, 25 November, 2019, 05:27:22 pm IST, Dr S Kerketta <s.kerketta66@gov.in> wrote:

Sir,

PFA for kind approval please.

--

regards,

(Dr. S. Kerketta)

Director- IA (Thermal, River Valley & HEP)

MoEF&CC, New Delhi

Phone: 011-24695314 (O), 26113096 (R)

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regards,

Dr. S. Kerketta

Director- IA (Thermal, River Valley & HEP)

MoEF&CC, New Delhi

Phone: 011-24695314 (O), 26113096 (R)

LIST OF MEMBERS

28th MEETING OF RE-CONSTITUTED EXPERT APPRAISAL COMMITTEE (EAC) FOR RIVER VALLEY & HYDROELECTRIC PROJECTS

DATE : **31st October 2019**

TIME : **10:30 am onwards**

VENUE : **Teesta Hall, Vayu Block, Indira Paryavaran Bhawan, New Delhi**

Sl.No.	Name of Member	Signature
1.	Prof. Sharad Kumar Jain, Chairman	31/10
2.	Shri. Sharvan Kumar, Member	31.10.19
3.	Shri N. N. Rai, Member	31.10.2019
4.	Dr. J.A.Johnson, Member	31/10/19
5.	Dr. AK Sahoo, Member	31.10.19
6.	Dr. Vijay Kumar, Member	-Ab-
7.	Prof. Govind Chakrapani, Member	-Ab-
8.	Dr. Chetan Pandit, Member	
9.	Dr. Dinkar Madhavrao More, Member	-Ab-
10.	Prof. R.K. Kohli, Member	-Ab-
11.	Prof. S.R. Yadav, Member	-Ab-
12.	Dr. Jai Prakash Shukla, Member	-Ab-
13.	Dr. Poonam Kumria, Member	-Ab-
14.	Dr. Kerketta, Member Secretary Director (IA-1)	31.10.2019