Government of India
Ministry of Environment, Forest and Climate Change
IA Division
(River Valley and Hydroelectric Projects)
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सत्यमेव जयते

Minutes of 51ST MEETING OF EXPERT APPRAISAL COMMITTEE Expert Appraisal Committee meeting River Valley and Hydroelectric Projects held from 12/09/2023 to 12/09/2023

Date: 03/10/2023

MoM ID: EC/MOM/EAC/370591/9/2023

Agenda ID: EC/AGENDA/EAC/370591/9/2023

Meeting Venue: MoEF&CC

Meeting Mode: Physical

Date & Time:

12/09/2023	10:30 AM	05:30 PM

1. Opening remarks

The 51st meeting of the re-constituted EAC for River Valley & Hydroelectric Projects organized by the Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi, was held on 12th September, 2023 through physical mode, under the Chairmanship of Dr. K Gopakumar.

2. Confirmation of the minutes of previous meeting

The EAC confirmed the minutes of 50th EAC meeting held on 11th August, 2023.

3. Details of proposals considered by the committee

Day 1 -12/09/2023

3.1. Agenda Item No 1:

3.1.1. Details of the proposal

Raiwada Pumped Storage Project by **ADANI GREEN ENERGY LIMITED** located at **ANAKAPALLI,ANDHRA PRADESH**			
Proposal For		Fresh ToR	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/AP/RIV/438787/2023	J-12011/45/2023-IA.I (R)	04/08/2023	River Valley/Irrigation projects (1(c))

3.1.2. Project Salient Features

The proposal is for grant of Terms of Reference (ToR) to the project for Raiwada Close Loop Pumped Storage Project of capacity 850 MW in an area 337.10 ha of at Village Mariki and Sammeda, Tehsil Devarapalle and Vepada, District Anakapalli and Vizianagaram (Andhra Pradesh) by M/s Adani Green Energy Limited.

The Project Proponent and the accredited Consultant M/s. R. S. Envirolink Technologies Pvt. Ltd., made a detailed presentation on the salient features of the project and informed that:

1. The proposal is for grant of ToR to the project for Raiwada Pumped Storage Project located (850MW) at Mariki and Sammeda villages, Vepada & Devarapalle Mandal, Vizianagaram & Anakapalle Districts, Andhra Pradesh by M/s Adani Green Energy Limited.
2. The project is listed at S.N. 1 (c) of the Schedule for the Environment Impact Assessment (EIA) Notification under category 'A' and is appraised at Central Level by Expert Appraisal Committee (EAC).
3. Both upper and lower dams located in the upper reaches of Sarada river basin, which is a minor east flowing river. The upper dam is located near Mariki village, Vepada Mandal, Vizianagaram district with the geographical latitude of 18°02'34.5"N and longitude of 83°01' 58.9"E. The lower reservoir is located near Sammeda village, Devarapalle Mandal, Anakapalle district of Andhra Pradesh state having a geographical latitude of 18°03'12.1"N & longitude 83°00'52.2"E.
4. It is proposed to take the water from the annual yield of Sarda River during monsoon season for initial filling of the reservoirs in period of two to three years. The Project is proposed with gross storage capacity of 19.23 MCM in the lower reservoir and 9.38 MCM in the upper reservoir.
5. **Land requirement:** A total of 337.10 ha of land will be required for the project. 39.80 ha is forest land, and 297.30 ha is revenue land (Government & Private Land).
6. **Water Source and availability:** It is proposed to store water into the lower reservoir during monsoon season for initial filling. The water required for initial filling of reservoirs and recuperation of losses every year has been estimated to be about 23.0 MCM whereas the live storage requirement is only 5.2 MCM for daily operations. The annual yield of Project site is 93.1 MCM out of which 23 MCM is taken considering all the loses, live storage and dead storage.
7. This Project envisages non-consumptive re-utilization of 5.20MCM of water for recirculation among two proposed reservoirs for power generation.
8. The estimated project cost is Rs. 3455 Crores including IDC & FC at 2022-23 price level. As a preliminary estimate, a construction period of 5 years (60months) from the date of award of civil works package has been estimated for this project. Total capital cost earmarked towards environmental pollution control measures will be worked out during EIA study as well as the Recurring cost (operation and maintenance).
9. **Environmental Sensitivity:** Kamblakonda Wildlife Sanctuary, located about 34km south-east from site, is the nearest protected area.
10. **Alternative studies:** Total 3 alternative sites and Five Layouts were studied. Out of these alternatives, alternative-3, Layout-5 covers the least forest area. The area will be planted on completion of muck dumping in addition to other green belt areas, which will be proposed during EIA study. Therefore, alternative 5, Layout-5 site selected for further studies.
11. Details of Solid waste/ Hazardous waste generation/ Muck and its management will be covered in EIA report.
12. Status of Litigation Pending against the proposal, if any. No
13. The salient features of the project are as under:

EAC MEETING DETAILS

EAC Meeting's	:	51st Meeting
Date of Meeting	:	12.09.2023
Date of earlier EAC meetings	:	Nil

PROJECT DETAILS:

Name of Proposal	:	Raiwada Pumped Storage Project
Location including Coordinate	:	Upper Dam: 18°02'34.5"N and 83°01' 58.9"E Lower Dam: 18°03'12.1"N & longitude 83°00'52.2"E
Inter- state issue involved	:	NO

Seismic Zone	:	II

CATEGORY DETAILS:

Category of the project	:	A
Provisions	:	
Capacity / Cultural command area (CCA)	:	850MW
Attracts the General Conditions (Yes/No)	:	Yes
Additional information (if any)	:	-

ELECTRICITY GENERATION CAPACITY:

Powerhouse Installed Capacity	:	850MW
Generation of Electricity Annually	:	1768MU
No. of Units	:	3 (3 x 283.33) MW
Additional information (if any)	:	

ToR/EC Details:

Cost of project	3455.0 Cr.
Total area of Project	337.10 ha
Height of Dam from River Bed (EL)	Lower Dam – 16 m Upper Dam – 47 m
Length of Tunnel/Channel	1500
Details of Submergence area	293.0 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	Not Applicable, as this is Off-Stream Open Loop Pumped Storage Project (PSP)
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then 1. E-flow with TOR /Recommendation by 2. EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustaining river ecosystem.	No

Muck Management Details:

No. of proposed disposal area/ (type of land-Forest/Pvt. land)	20 ha Private Land
Muck Management Plan	Will be Provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

Land Area Breakup:

Government land/Forest Land	39.80
Submergence area/Reservoir area	293.0 ha
Land required for project components	44.10 ha
Additional information (if any)	Nil

Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone	**Yes/No**	**Details of Certificate / letter/ Remarks**
Reserve Forest/Protected Forest Land	--	There is no Protected Area in the vicinity of the proposed project. Kambalakonda WLS is about 34.0 Km from site, is the nearest protected area.
National Park	--- --	
Wildlife Sanctuary	--- --	

Court case details: Nil

Affidavit/Undertaking details:

Affidavit/Undertaking	Enclosed
Additional information (if any)	Nil

Previous EC compliance and necessary approvals:

Particulars	**Letter no. and date**
Certified EC compliance report (if applicable)	Not Applicable
Status of Stage-I FC	Yet to Apply
Additional detail (If any)	Nil
Is FRA (2006)done for FC-I	Yet to apply

Miscellaneous

Particulars	**Details**
Details of consultant	M/s. R S Envirolink Technologies Pvt. Ltd. (RSET) (*NABET* Accredited *Consultant Organization*) Certificate No : NABET/EIA/2225/RA0274 Validity : August 15, 2025
Project Benefits	• Pumped storage hydropower is a modified use of conventional hydropower technology to store and manage energy or electricity by moving water between an upper and lower reservoir. Currently, pumped storage round-trip or cycle energy efficiencies exceed 80%, comparing favorably to other energy storage technologies and thermal technologies. This effectively shifts,

	stores, and reuses energy generated until there is corresponding demand for system reserves and variable energy integration. This shifting can also occur to avoid transmission congestion periods, to help more efficiently manage transmission grid, and to avoid potential interruptions to energy supply. This is important because many of the renewable energy resources being developed (e.g., wind and solar) are generated at times of low demand and off-peak energy demand periods are still being met with fossil fuel resources, often at inefficient performance levels that increase the release of greenhouse gas emissions. • Further, pumped storage projects are critical to the national economy and overall energy reliability because it's: ◦ Least expensive source of electricity, not requiring fossil fuel for generation ◦ An emission-free renewable source ◦ Balancing grid for demand driven variations ◦ Balancing generation driven variations ◦ Voltage support and grid stability Apart from this, proposed PSP will also benefit the local community by creating employment opportunities and will result in upliftment of livelihood and socio-economic conditions.
Status of other statutory clearances	Forest Clearance - Online application seeking forest diversion for around 39.8 Ha after receipt of ToR Approval. Alongside, other statutory clearances (as applicable) from State as well as Central government will be obtained post completion of Detailed Project Report.
R&R details	Details shall be evaluated during EIA/EMP Studies
Additional detail(If any)	Nil

3.1.3. Deliberations by the EAC in previous meetings

Date of EAC 1 :11/08/2023

Deliberations of EAC 1 :
The EAC decided to **defer** the proposal.

3.1.4. Deliberations by the EAC in current meetings

The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of terms of reference to the Raiwada Close Loop Pumped Storage Project (850 MW) in an area 337.10 ha of at Village Mariki and Sammeda, Tehsil Devarapalle and Vepada, District Anakapalli and Vizianagaram, Andhra Pradesh by M/s Adani Green Energy Limited**.**

The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

3.1.5. Recommendation of EAC

Recommended

3.1.6. Details of Terms of Reference

3.1.6.1. Specific

Environmental Management and Biodiversity Conservation::	
1.	1. Conducting site specific ecological study w.r.t riverine ecology focus on fishes diversity and aquatic biota due to construction of lower reservoir across Sharda river. 2. Stage I FC for 39.8 ha of forest land involved in the project shall be submitted prior to grant of EC 3. Conduct Environmental Cost Benefit Analysis in terms of loss of Forest ecosystem due to diversion of Forest land/ loss of biodiversity and its impacts on ecosystem, water availability, water uses for generation of hydro power in study area 10 km from periphery of Project components 4. Cumulative Impact of project on carrying capacity and sustainability of East flowing river between **Mahanadi and Pennar** due to tapping of water for filling lower reservoir. 5. Alternative sites for various components shall be identified in terms of loss of forest area and other environmental aspects. Explore to minimize forest land. 6. Action plan for survival of the rivulets located in the study area. 7. Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Standard ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all three seasons. 8. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared. 9. Sampling locations be located to cover villages situated near the reservoir and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report. 10. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report. 11. A detailed wildlife conservation plan for Schedule –I species, duly approved by the Chief Wild Life Warden, be submitted. 12. In case any Wildlife corridor is located within 10 km radius of the project site a detailed study shall be conducted to assess the impact of project on safe movement of wild animals. 13. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP. 14. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Govt. institutions/ Indian Council of Agriculture Research (ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report. 15. MoU for water uses for the project shall be signed and approved by concerned authority. 16. Environmental matrix during construction and operational phase needs to be submitted. 17. Matrix formulated on the basis of detailed study and field survey of flora and fauna methodology used shall be mentioned in the EIA report. 18. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State. 19. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component. 20. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.

Miscellaneous**	
1.	1. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted. 2. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose. 3. Both capital and recurring expenditure under EMP shall be submitted. 4. The photograph should bear the date, time, latitude & longitude of the monitoring station/ sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyse the samples. 5. Arial view video of project site shall be recorded and to be submitted. 6. Detailed plan to restore wider roads and convert them into narrow upto10m after construction of the project. 7. Specific Terms of Reference (ToRs) issued by the Ministry vide Office Memorandum No. F. No. IA3-22/33/2022-IA.III dated 14.08.2023 for Pump storage projects shall be used for preparation of EIA/ EMP reports
Muck Management/Disaster Management..	
1.	1. Details of quantity of muck generation component wise and disposal site along with transportation plan and its monitoring to be provided. 2. Detailsof Muck Management plan prepared along with estimated cost incorporated in EIA/ EMP report. 3. Techno-economic viability of the project must be recommended from CEA/ CWC.
Socio-economic Study	
1.	1. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project. 2. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter. 3. Statement on the commitments (activity-wise) made during public hearing to facilitate the discussion on the CER in compliance of the Ministry's OM F. No. 22- 65/2017- IA.III dated 30th September, 2020 shall be submitted. 4. Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared. 5. Details of settlement in 10 km area shall be submitted.

3.1.6.2. Standard

1(c)	**River Valley/Irrigation projects**
Scope of EIA Study	
1.	The EIA Report should identify the relevant environmental concerns and focus on potential impacts that may change due to the construction of proposed project. Based on the baseline data collected for three (3) seasons (Pre-monsoon, Monsoon and Winter seasons), the status of the existing environment in the area and capacity to bear the impact on this should be analysed. Based on this analysis, the mitigation measures for minimizing the impact shall be suggested in the EIA/EMP study.
Details of the Project and Site	
1.	General introduction about the proposed project.

2.	Details of Project and site giving L-Sections of all U/S and D/S Projects with all relevant maps and figures. Connect such information as to establish the total length of interference of Natural River and the committed unrestricted release from the site of Dam/Barrage into the main river.
3.	A map of boundary of the project site giving details of protected areas in the vicinity of 25 km of project location.
4.	Location details on a map of the project area with contours indicating main project features. The project layout shall be superimposed on a contour map of ground elevation showing main project features (viz. location of dam, Head works, main canal, branch canals, quarrying etc.) shall be depicted in a scaled map.
5.	Layout details and map of the project along with contours with project components clearly marked with proper scale maps of at least 1:50,000 scale and printed at least on A3 scale for clarity.
6.	Existence of National Park, Sanctuary, Biosphere Reserve etc. in the study area, if any, should be detailed and presented on a map with distinct distances from the project components.
7.	Drainage pattern and map of the river catchment up to the proposed project site.
8.	Delineation of critically degraded areas in the directly draining catchment on the basis of Silt Yield Index as per the methodology of Soil and Land use Survey of India.
9.	Soil characteristics and map of the project area.
10.	Geological and Seismo-tectonic details and maps of the area surrounding the proposed project site showing location of dam site and canal sites.
11.	Remote Sensing studies, interpretation of satellite imagery, topographic sheets along with ground verification shall be used to develop the land use/land cover pattern of the study using overlaying mapping techniques viz. Geographic Information System (GIS), False Color Composite (FCC) generated from satellite data of project area.
12.	Land details including forests, private and other land.
13.	Demarcation of snow fed and rain fed areas for a realistic estimate of the water availability.
14.	Different riverine habitats like rapids, pools, side pools and variations in the river substratum bedrocks, rocks, boulders, sand/silt or clay etc. need to be covered under the study
Description of Environment and Baseline Data	
1.	To know the present status of environment in the area, baseline data with respect to environmental components air, water, noise, soil, land and biology & biodiversity (flora & fauna), wildlife, socioeconomic status etc. should be collected within 10 km radius of the main components of the project/site i.e. dam site and power house site. The air quality and noise are to be monitored at such locations which are environmentally & ecologically more sensitive in the study area. The baseline studies should be collected for 1 season (Preferably Monsoon season). Flora-Fauna in the catchment and command area should be documented. The study area should comprise of the following:
2.	(i) Catchment area up to the dam/barrage site.
3.	(ii) Submergence Area.
4.	(iii) Project area or the direct impact area should comprise of area within 10 km radius of the main project components like dam, canals etc.

5.	(iv) Downstream upto 10 km from the tip of the reservoir.
Details of the Methology	
1.	The methodology followed for collection of base line data along with details of number of samples and their locations in the map should be included. Study area should be demarcated properly on the appropriate scale map. Sampling sites should be depicted on map for each parameter with proper legends. For Forest Classification, Champion and Seth (1968) methodology should be followed.
Methodology for Collection of Biodiversity Data	
1.	The number of sampling locations should be adequate to get a reasonable idea of the diversity and other attributes of flora and fauna. The guiding principles should be the size of the study area (larger area should have larger number of sampling locations) and inherent diversity at the location, as known from secondary sources (e.g. eastern Himalayan and low altitude sites should have a larger number of sampling locations owing to higher diversity).
2.	The entire area should be divided in grids of 5kmX5km preferably on a GIS domain. There after 25% of the grids should be randomly selected for sampling of which half should be in the directly affected area (grids including project components such as reservoir, dam, powerhouse, tunnel, canal etc.) and the remaining in the rest of the area (areas of influence in 10 km radius form project components). At such chosen location, the size and number of sampling units (e.g. quadrates in case of flora/transects in case of fauna) must be decided by species area curves and the details of the same (graphs and cumulative number of species in a tabulated form) should be provided in the EIA report. Some of the grids on the edges may not be completely overlapping with the study area boundaries. However, these should be counted and considered for selecting 25% of the grids. The number of grids to be surveyed may come out as a decimal number (i.e. it has an integral and a fractional part) which should be rounded to the next whole number.
3.	The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.
4.	The R.E.T. species referred to in this point should include species listed in Schedule I and II of Wildlife (Protection) Act, 1972 and those listed in the red data books (BSI, ZSI and IUCN).
Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as	

follows:	
1.	null
2.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.
3.	Tectonics, seismicity and history of past earthquakes in the area. A site specific study of the earthquake parameters will be done. The results of the site specific earthquake design shall be sent for approval of the NCSDP (National Committee of Seismic Design Parameters, Central water Commission, New Delhi for large dams.
4.	Landslide zone or area prone to landslide existing in the study area should be examined.
5.	Presence of important economic mineral deposit, if any.
6.	Justification for location & execution of the project in relation to structural components (dam /barrage height).
7.	Impact of project on geological environment.
8.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD station.
9.	Ambient Air Quality with parameters viz. Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM) i.e. suspended particulate materials < 10 microns, Sulphur dioxide (SO2) and Oxides of Nitrogen (NOX) in the study area at 5-6 Locations.
10.	Existing Noise Levels and traffic density in the study area at 5-6 Locations.
11.	Soil classification, physical parameters (viz., texture, Porosity, Bulk Density and water holding capacity) and chemical parameters (viz. pH, electrical conductivity, magnesium, calcium, total alkalinity, chlorides, sodium, potassium, organic carbon, available potassium, available phosphorus, SAR, nitrogen and salinity, etc.) at @ one sample/ha of command area.
12.	(i) Generation of thematic maps viz, slope map, drainage map, soil map, land use and land cover map, etc. Based on these, thematic maps, an erosion intensity map should be prepared.
13.	History of the ground water table fluctuation in the study area.
14.	Water quality for both surface water and ground water for (i) Physical parameters (pH, temperature, electrical conductivity, TSS); (ii) Chemical parameters (Alkalinity, Hardness, BOD, COD, NO2, PO4, CI, SO4, Na, K, Ca, Mg, Silica, Oil & Grease, phenolic compounds, residual sodium carbonate); (iii) Bacteriological parameter (MPN, Total coliform) and (iv) Heavy Metals (Pb, As, Hg, Cd, Cr-6, total Cr, Cu, Zn, Fe) (6 locations).
15.	Delineation of sub and micro-watersheds, their locations and extent based on the All India Soil and Land Use Survey of India (AISLUS), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through silt yield index (SYI) method of AISLUS
16.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.
17.	Run off, discharge, water availability for the project, sedimentation rate, etc.
18.	Basin characteristics
19.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.

20.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km2 year-1.
21.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
22.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
23.	Information on the 10-daily flow basis for the 90 per cent dependable year the flow intercepted at the dam, the flow diverted to the power house and the spill comprising the environmental flow and additional flow towards downstream of the dam for the project may be given.
24.	The minimum environmental flow shall be 20% of the flow of four consecutive lean months of 90% dependable year, 30% of the average monsoon flow. The flow for remaining months shall be in between 20-30%, depending on the site specific requirements. A site specific study shall be carried out by an expert organization.
25.	Sedimentation data available with CWC may be used to find out the loss in storage over the years.
26.	Hydrological studies/data as approved by CWC shall be utilized in the preparation of EIA/EMP report. Actual hydrological annual yield may also be given in the report. Sedimentation data available with CWC may be used to find out the loss in storage over the years.
27.	A minimum of 1 km distance from the tip of the reservoir to the tail race tunnel should be maintained between upstream and downstream projects.
28.	Besides primary studies, review of secondary data/literature published for project area on flora & fauna including RET species shall be reported in EIA/EMP report.
29.	Characterization of forest types (as per Champion and Seth method) in the study area and extent of each forest type as per the Forest Working Plan.
30.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteriodophytes, Bryophytes (all groups).
31.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.
32.	Assessment of plant species with respect to dominance, density, frequency, abundance, diversity index, similarity index, importance value index (IVI) , Shannon Weiner index etc. of the species to be provided. Methodology used for calculating various diversity indices along with details of locations of quadrates, size of quadrates etc. to be reported within the study area in different ecosystems.
33.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
34.	Economically important species like medicinal plants, timber, fuel wood etc.
35.	Details of endemic species found in the project area.
36.	Flora under RET categories should be documented using International Union for the Conservation of Nature and Natural Resources (IUCN) criteria and Botanical Survey of India's Red Data list along-with economic significance. Species diversity curve for RET species should be given.
37.	Cropping pattern and Horticultural Practices in the study area.
38.	Fauna study and inventorisation should be carried out for all groups of animals in the study area. Their present status alongwith Schedule of the species.

39.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.
40.	Information (authenticated) on Avi-fauna and wildlife in the study area.
41.	Status of avifauna their resident/ migratory/ passage migrants etc.
42.	Documentation of butterflies, if any, found in the area.
43.	RET species-voucher specimens should be collected along-with GPS readings to facilitate rehabilitation. RET faunal species to be classified as per IUCN Red Data list and as per different schedule of Indian Wildlife (Protection) Act, 1972.
44.	Existence of barriers and corridors, if any, for wild animals.
45.	Compensatory afforestation to compensate the green belt area that will be removed, if any, as part of the proposed project development and loss of biodiversity.
46.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
47.	For categorization of sub-catchment into various erosion classes and for the consequent CAT plan, the entire catchment (Indian Portion) is to be considered and not only the directly the draining catchment.
48.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplantktons, benthos etc.
49.	Fish and fisheries, their migration and breeding grounds.
50.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
51.	Conservation status of aquatic fauna.
52.	Sampling for aquatic ecology and fisheries and fisheries must be conducted during three seasons Pre-monsoon (summer), monsoon and winter. Sizes (length & weight) of important fish species need to be collected and breeding and feeding grounds should also be identified along the project site or in vicinity.
53.	Collection of baseline data on human settlements, health status of the community and existing infrastructure facilities for social welfare including sources of livelihood, job opportunities and safety and security of workers and surroundings population.
54.	Collection of information with respect to social awareness about the developmental activity in the area and social welfare measures existing and proposed by project proponent.
55.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
56.	The socio-economic survey/ profile within 10 km of the study area for demographic profile; Economic Structure; Developmental Profile; Agricultural Practices; Infrastructure, education facilities; health and sanitation facilities; available communication network etc.
57.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
58.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
59.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.

60.	List of all the Project Affected Families with their name, age, educational qualification, family size, sex, religion, caste, sources of income, land & house holdings, other properties, occupation, source of income, house/land to be acquired for the project and house/land left with the family, any other property, possession of cattle, type of house etc.
61.	Special attention has to be given to vulnerable groups like women, aged persons etc. and to any ethnic/indigenous groups that are getting affected by the project.
Impact Prediction and Mitigation Measures	
1.	The adverse impact due to the proposed project should be assessed and effective mitigation steps to abate these impacts should be described.
2.	Changes in ambient and ground level concentrations due to total emissions from point, line and area sources.
3.	Effect on soil, material, vegetation and human health.
4.	Impact of emissions from DG set used for power during the construction, if any, on air environment.
5.	Pollution due to fuel combustion in equipments and vehicles
6.	Fugitive emissions from various sources
7.	Changes in surface and ground water quality
8.	Steps to develop pisci-culture and recreational facilities
9.	Changes in hydraulic regime and downstream flow.
10.	Water pollution due to disposal of sewage
11.	Water pollution from labour colonies/ camps and washing equipment.
12.	Adverse impact on land stability, catchment of soil erosion, reservoir sedimentation and spring flow (if any) (a) due to considerable road construction / widening activity (b) interference of reservoir with the inflowing stream (c) blasting for commissioning of HRT, TRT and some other structures.
13.	Changes in land use / land cover and drainage pattern
14.	Immigration of labour population
15.	Quarrying operation and muck disposal
16.	Changes in land quality including effects of waste disposal
17.	River bank and their stability
18.	Impact due to submergence.
19.	Impact on forests, flora, fauna including wildlife, migratory avi-fauna, rare and endangered species, medicinal plants etc.
20.	Pressure on existing natural resources
21.	Deforestation and disturbance to wildlife, habitat fragmentation and wild animal's migratory corridors

22.	Compensatory afforestation-identification of suitable native tree species for compensatory afforestation and green belt.
23.	Impact on fish migration and habitat degradation due to decreased flow of water
24.	Impact on breeding and nesting grounds of animals and fish.
25.	Impact on local community including demographic profile.
26.	Impact on socio-economic status
27.	Impact on economic status.
28.	Impact on human health due to water / vector borne disease
29.	Impact on increase traffic
30.	Impact on Holy Places and Tourism
31.	Impacts of blasting activity during project construction which generally destabilize the land mass and leads to landslides, damage to properties and drying up of natural springs and cause noise population will be studies. Proper record shall be maintained of the baseline information in the post project period.
32.	Positive and negative impacts likely to be accrued due to the project are listed.
Environmental Management Plan	
1.	Biodiversity and Wildlife Conservation and Management Plan for the conservation and preservation of rare, endangered or endemic floral/faunal species or some National Park/Sanctuary/ Biosphere Reserve or other protected area is going to get affected directly or indirectly by construction of the project, then suitable conservation measures should be prepared in consultation with the State Forest Department and with the physical and financial details. Suitable conservation techniques (in-situ/ ex-situ) will be proposed under the plan and the areas where such conservation is proposed will be marked on a project layout map.
2.	Compensatory Afforestation shall 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. Choice of plants for afforestation should include native and RET species, if any. This will be a part of the forest clearance proposal.
3.	Fisheries Conservation and Management Plan - a specific fisheries management measures should be prepared for river and reservoir. If the construction of fish ladder/ fish-way etc. is not feasible then measures for reservoir fisheries will be proposed. The plan will detail out the number of hatcheries, nurseries, rearing ponds etc. proposed under the plan with proper drawings. If any migratory fish species is getting affected then the migratory routes, time/season of upstream and downstream migration, spawning grounds etc will be discussed in details.
4.	Green Belt Development Plan along the periphery of the reservoir, approach roads around the colonies and other project components, local plant species must be suggested with physical and financial details. A layout map showing the proposed sites for developing the green belt should be prepared.
5.	Environmental Monitoring Programme to monitor the mitigatory measures implemented at the project site is required will be prepared. Provision for Environment Management Cell should be made. The plan will spell out the aspects required to be monitored, monitoring indicators/parameters with respect to each aspect and the agency responsible for the monitoring of that particular aspect throughout the project implementation.
6.	Catchment Area Treatment (CAT) Plan should be prepared micro-watershed wise. Identification of free draining/ directly draining catchment based upon Remote Sensing and Geographical Information System (GIS) methodology and Sediment Yield Index (SYI) method of AISLUS, Deptt. of Agriculture, Govt. of India coupled

	with ground survey. Areas or watersheds falling under 'very severe' and 'severe' erosion categories should be provided and required to be treated. Both biological as well as engineering measures should be proposed in consultation with State Forest Department for areas requiring treatment. Year-wise schedule of work and monetary allocation should be provided. Mitigation measures to check shifting cultivation in the catchment area with provision for alternative and better agricultural practices should be included.
7.	Study of Design Earthquake Parameters: A site specific study of earthquake parameters should be done. Results of the site specific earthquake design parameters should be approved by National Committee of Seismic Design Parameters, Central Water Commission (NCSDP), New Delhi.
8.	Dam Break Analysis and Disaster Management Plan The outputs of dam break model should be illustrated with appropriate graphs and maps clearly bringing out the impact of Dam Break scenario. To identify inundation areas, population and structures likely to be affected due to catastrophic floods in the event of dam failure. DMP will 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 will be marked on a detailed contour map of the downstream area, to show the extent of inundation. The action plan will include Emergency Action and Management plan including measures like preventive action notification, warning procedure and action plan for co-ordination with various authorities.
9.	Reservoir Rim Treatment Plan for stabilization of land slide / land slip zones, if any, around the reservoir periphery is to be prepared based on detailed survey of geology of the reservoir rim area. Suitable engineering and biological measures for treatment of identified slip zones to be suggested with physical and financial schedule. Layout map showing the landslide/landslip zones shall be prepared and appended in the chapter.
10.	Muck Disposal Plan- suitable sites for dumping of excavated material should be identified in consultation with the State Pollution Control Board and Forest Department. All Muck disposal sites should be minimum 30 m away from the HFL of river. Plan for rehabilitation of muck disposal sites should also be given. The L- section/ cross section of muck disposal sites and approach roads to be given. Financial out lay for this may be given separately. Deatailed muck transportation plan delinating the path ways, number of trucks, quantity of muck to be transportated along with monitoring mechanism using latest technology, shall be prepared.
11.	Restoration Plan for Quarry Sites and landscaping of colony areas, working areas, roads etc. Details of the coarse/fine aggregate/clay etc. required for construction of the project and the rock/clay quarries/river shoal sites identified for 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.
12.	Resettlement and Rehabilitation Plan needed to be prepared on the basis of findings of the socio- economic survey coupled with the outcome of public consultation held. The R&R package shall be prepared after consultation with the representatives of the project affected families and the State Government. Detailed budgetary estimates are to be provided. Resettlements site should be identified. The plan will also incorporate community development strategies.
13.	Public Health Delivery Plan including the provisions of drinking water supply for local population shall be in the EIA/EMP Report. Status of the existing medical facilities in the project area shall be discussed. Possibilities of strengthening of existing medical facilities, construction of new medical infrastructure etc. will be explored after assessing the need of the labour force and local populace.
14.	Local Area Development Plan to be formulated in consultation with the Revenue Officials and Village Pancahayats. Appropriate schemes shall be prepared under EMP for the Local Area Development Plan with sufficient financial provisions.
15.	Labour Management Plan for their Health and Safety.
16.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.
17.	Energy Conservation Measures for the work force during construction with physical and financial details. Alternatives will be proposed for the labour force so that the exploitation of the natural resource (wood) for the domestic and commercial use is curbed.

18.	Environmental safeguards during construction activities including Road Construction.
19.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
20.	Water, Air and Noise Management Plans to be implemented during construction and post-construction periods.

3.2. Agenda Item No 2:

3.2.1. Details of the proposal

Emra-II Hydro Electric Project by **ATHENA EMRA POWER PRIVATE LIMITED** located at **DIBANG VALLEY,ARUNACHAL PRADESH**			
Proposal For		Fresh ToR	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/AR/RIV/439743/2023	J-12011/49/2023-IA.I (R)	09/08/2023	River Valley/Irrigation projects (1(c))

3.2.2. Project Salient Features

The proposal is for grant of Terms of Reference (TOR) to the project for Emra-II Hydro Electric Project of capacity 315 MW in an area of 236 ha at District Dibang Valley, Arunachal Pradesh by M/s Athena Emra Power Private Limited.

The Project Proponent and the accredited Consultant M/s. R S Envirolink Technologies Pvt. Ltd., made a detailed presentation on the salient features of the project and informed that:

1. The proposal is for ToR to the project for Emra-II Hydro Electric Project of capacity 315 MW in an area of 236 ha at District Dibang Valley, Arunachal Pradesh by M/s Athena Emra Power Private Limited**.**
2. The project is listed at S.N. 1(c) of the Schedule to the Environment Impact Assessment (EIA) Notification under category 'A' and is appraised at Central Level by Expert Appraisal Committee (EAC).
3. The estimated project cost is **Rs. 3656.64 Crore**. Total capital cost earmarked towards environmental pollution control measures will be worked out during EIA study as well as the Recurring cost (operation and maintenance).
4. There are **no** national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site. River **Emra** is flowing at a distance of **0** km in **south east** direction.
5. Details of Solid waste/ Hazardous waste generation/ Muck and its management **will be incorporated in EIA/EMP report.**
6. Status of Litigation Pending against the proposal, if any. **No**
7. The salient features of the project are as under: -

Project details:

Name of the Proposal	Emra-II Hydro Electric Project
Location (Including coordinates)	Dam site is proposed near Angolin village, Etalin circle, Dibang Valley district of Arunachal Pradesh with the geographical latitude of 28 ^{o}34'42.86"N and longitude 95 ^{o}49'12.98"E.
Inter- state issue involved	No
Seismic zone	Zone - V

Category details:

Category of the project	1(c) River Valley Projects
Provisions	
Capacity / Cultural command area (CCA)	315 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

Electricity generation capacity:

Powerhouse Installed Capacity	315 MW
Generation of Electricity Annually	1323.51 GWh
No. of Units	3 nos. (105 MW each)
Additional information (if any)	Nil

ToR Details:

Cost of project	3656.64 Cr.
Total area of Project	236 ha
Height of Dam from River Bed (EL)	113.0 m
Length of Tunnel/Channel	705.52 m
Details of Submergence area	130.0 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	As per the approved CIA&CC study of Dibang Basin report the E-flow of 20%, 25% & 20 % to be maintained during lean, monsoon & intermediate period respectively.
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then 1. E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. 2. If not the E-Flows maintain criteria for sustaining river ecosystem.	As per the approved CIA&CC study of Dibang Basin report the E-flow of 20%, 25% & 20 % to be maintained during lean, monsoon & intermediate period respectively.

Muck Management Details:

No. of proposed disposal area/ (type of land-Forest/Pvt. land)	1 no. of 22 ha in private land
Muck Management Plan	Will be studied in detail and will be provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be studied in detail and will be provided in EIA/EMP report

Land Area Breakup:

Private Land	82 ha
Government land/Forest Land	154 ha Forest Land

Submergence area/Reservoir area	130 ha
Land required for project components	106 ha
Additional information (if any)	Total land required – 236 ha

Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone	**Yes/No**	**Details of Certificate / letter/ Remarks**
Reserve Forest/Protected Forest Land	No	Nil
National Park	No	
Wildlife Sanctuary	No	

Court case details: Nil
Affidavit/Undertaking details:

Affidavit/Undertaking	Enclosed
Additional information (if any)	Nil

Previous EC compliance and necessary approvals:

Particulars	**Letter no. and date**
Certified EC compliance report(if applicable)	Not Applicable
Status of Stage- I FC	Yet to Apply
Additional detail(If any)	Nil
Is FRA (2006)done for FC-I	Yet to Apply

Miscellaneous

Particulars	**Details**
Details of consultant	M/s. R S Envirolink Technologies Pvt. Ltd. (RSET) (*NABET* Accredited *Consultant Organization*) E-mail : ravi@rstechnologies.co.in Land Line : (0124) 4295383 Cellular : (+91) 9810136853
Project Benefits	On completion of the Project the following benefits can be derived: • The levelized tariff for 40 years has been found to be Rs 5.76 per unit. The project is with diurnal peaking power benefits. The project has been found commercially viable and the generation from the project shall mitigate the miseries of power-starved industry and people particularly in the eastern and north eastern state. • A number of marginal activities and jobs will be available to the locals during the construction phase. • Local Area Development, facilities in Education, medical, transportation, road network and other infrastructure. • An opportunity for small-scale and cottage industries to develop in the area.
Status of other statutory clearances	**Forest Clearance:** Online application seeking forest diversion for around 154.0 ha will be submitted after receipt of ToR approval. Alongside, other statutory clearances (as applicable) from State as well as Central government will be

Particulars	Details
	obtained post completion of Detailed Project Report.
R&R details	The process of R&R is yet to be initiated. Detailed R&R plan will be Provided in EIA/EMP report

3.2.3. Deliberations by the EAC in previous meetings

N/A

3.2.4. Deliberations by the EAC in current meetings

The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of Terms of Reference to the project for Emra-II Hydro Electric Project of capacity 315 MW in an area of 236 ha at District Dibang Valley, Arunachal Pradesh by M/s Athena Emra Power Private Limited**.**

The project/activity is covered under Category A of item 1 (c) 'River Valley Projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

3.2.5. Recommendation of EAC

Recommended

3.2.6. Details of Terms of Reference

3.2.6.1. Specific

Environmental Management and Biodiversity Conservation::	
1.	1. Conducting site specific ecological study w.r.t riverine ecology focus on fishes diversity and aquatic biota. 2. Explore the possibilities to reduce forest area for the construction of proposed project. 3. Prepare Environmental Cost Benefit Analysis in terms of loss of Forest ecosystem due to diversion of Forest land/ loss of biodiversity and its impacts on ecosystem, water availability, water uses for generation of hydro power in study area 10 km from periphery of Project components. 4. Environmental Flows maintained by Project as per CIA&CCS study of Dibang River Basin Study. 5. Cumulative Impact of project on carrying capacity and sustainability of EMRA River due to construction of proposed project. 6. Mahseer zone covers the main Dibang river below confluence of EMRA river. Proposed Project fall in Mahseer zone. Therefore, Impact assessment on the fish diversity based on the hydrological alteration at the water in the Emra river and d/s of confluence with Dibang river studied and accordingly prepare Conservation and mitigation plan. 7. Alternative sites for various components shall be identified in terms of loss of forest area and environmental aspects. 8. Mitigation plan to avoid Human-Wildlife Conflict should be prepared scientifically with the help of Wildlife Experts. 9. Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Standard ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all

	three seasons. 10. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared. 11. Sampling locations be located to cover villages situated near the reservoir and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report. 12. Identify the sand mining/ quarrying sites in submergence area and downstream of reservoir. 13. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with expert Govt. institutions/ Indian Council of Agriculture Research(ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report. 14. Source of construction material and its distance from the project site along with detailed transportation plan for construction material. 15. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report. 16. Reservoir/ River banks protectionplan all along the submergence need to be prepared and incorporated in EIA/ EMP. 17. MoU for water uses for the project signed and approved by concerned authority shall be submitted. 18. Environmental matrix during construction and operational phase needs to be submitted. Matrix formulated on the basis of detailed study and field survey of flora and Fauna methodology used shall be mentioned in the EIA report. 19. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State. 20. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component. 21. Stage-I Forest Clearance shall be obtained. 22. Muck disposal sites and approach roads should be outside the forest area.
Miscellaneous**	
1.	1. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted. 2. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose. 3. Both capital and recurring expenditure under EMP shall be submitted. 4. The photograph should bear the date, time, latitude & longitude of the monitoring station/ sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyse the samples. 5. Arial view video of project site shall be recorded and to be submitted. 6. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.
Muck Management/Disaster Management..	
1.	1. Details of quantity of muck generation component wise and disposal site along with transportation plan and its monitoring to be provided. 2. Techno-economic viability of the project must be recommended from CEA/ CWC.
Socio-economic study	
1.	1. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue

	is involved with any State in the project. 2. Statement on the commitments (activity-wise) made during public hearing to facilitate the discussion on the CER in compliance of the Ministry's OM F. No. 22- 65/2017-IA.III dated 30th September, 2020 shall be submitted.

3.2.6.2. Standard

1(c)	**River Valley/Irrigation projects**
Scope of EIA Study	
1.	The EIA Report should identify the relevant environmental concerns and focus on potential impacts that may change due to the construction of proposed project. Based on the baseline data collected for three (3) seasons (Pre-monsoon, Monsoon and Winter seasons), the status of the existing environment in the area and capacity to bear the impact on this should be analysed. Based on this analysis, the mitigation measures for minimizing the impact shall be suggested in the EIA/EMP study.
Details of the Project and Site	
1.	General introduction about the proposed project.
2.	Details of Project and site giving L-Sections of all U/S and D/S Projects with all relevant maps and figures. Connect such information as to establish the total length of interference of Natural River and the committed unrestricted release from the site of Dam/Barrage into the main river.
3.	A map of boundary of the project site giving details of protected areas in the vicinity of 25 km of project location.
4.	Location details on a map of the project area with contours indicating main project features. The project layout shall be superimposed on a contour map of ground elevation showing main project features (viz. location of dam, Head works, main canal, branch canals, quarrying etc.) shall be depicted in a scaled map.
5.	Layout details and map of the project along with contours with project components clearly marked with proper scale maps of at least 1:50,000 scale and printed at least on A3 scale for clarity.
6.	Existence of National Park, Sanctuary, Biosphere Reserve etc. in the study area, if any, should be detailed and presented on a map with distinct distances from the project components.
7.	Drainage pattern and map of the river catchment up to the proposed project site.
8.	Delineation of critically degraded areas in the directly draining catchment on the basis of Silt Yield Index as per the methodology of Soil and Land use Survey of India.
9.	Soil characteristics and map of the project area.
10.	Geological and Seismo-tectonic details and maps of the area surrounding the proposed project site showing location of dam site and canal sites.
11.	Remote Sensing studies, interpretation of satellite imagery, topographic sheets along with ground verification shall be used to develop the land use/land cover pattern of the study using overlaying mapping techniques viz. Geographic Information System (GIS), False Color Composite (FCC) generated from satellite data of project area.
12.	Land details including forests, private and other land.

13.	Demarcation of snow fed and rain fed areas for a realistic estimate of the water availability.
14.	Different riverine habitats like rapids, pools, side pools and variations in the river substratum bedrocks, rocks, boulders, sand/silt or clay etc. need to be covered under the study
Description of Environment and Baseline Data	
1.	To know the present status of environment in the area, baseline data with respect to environmental components air, water, noise, soil, land and biology & biodiversity (flora & fauna), wildlife, socioeconomic status etc. should be collected within 10 km radius of the main components of the project/site i.e. dam site and power house site. The air quality and noise are to be monitored at such locations which are environmentally & ecologically more sensitive in the study area. The baseline studies should be collected for 1 season (Preferably Monsoon season). Flora-Fauna in the catchment and command area should be documented. The study area should comprise of the following:
2.	(i) Catchment area up to the dam/barrage site.
3.	(ii) Submergence Area.
4.	(iii) Project area or the direct impact area should comprise of area within 10 km radius of the main project components like dam, canals etc.
5.	(iv) Downstream upto 10 km from the tip of the reservoir.
Details of the Methology	
1.	The methodology followed for collection of base line data along with details of number of samples and their locations in the map should be included. Study area should be demarcated properly on the appropriate scale map. Sampling sites should be depicted on map for each parameter with proper legends. For Forest Classification, Champion and Seth (1968) methodology should be followed.
Methodology for Collection of Biodiversity Data	
1.	The number of sampling locations should be adequate to get a reasonable idea of the diversity and other attributes of flora and fauna. The guiding principles should be the size of the study area (larger area should have larger number of sampling locations) and inherent diversity at the location, as known from secondary sources (e.g. eastern Himalayan and low altitude sites should have a larger number of sampling locations owing to higher diversity).
2.	The entire area should be divided in grids of 5kmX5km preferably on a GIS domain. There after 25% of the grids should be randomly selected for sampling of which half should be in the directly affected area (grids including project components such as reservoir, dam, powerhouse, tunnel, canal etc.) and the remaining in the rest of the area (areas of influence in 10 km radius form project components). At such chosen location, the size and number of sampling units (e.g. quadrates in case of flora/transects in case of fauna) must be decided by species area curves and the details of the same (graphs and cumulative number of species in a tabulated form) should be provided in the EIA report. Some of the grids on the edges may not be completely overlapping with the study area boundaries. However, these should be counted and considered for selecting 25% of the grids. The number of grids to be surveyed may come out as a decimal number (i.e. it has an integral and a fractional part) which should be rounded to the next whole number.
3.	The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in

	question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.
4.	The R.E.T. species referred to in this point should include species listed in Schedule I and II of Wildlife (Protection) Act, 1972 and those listed in the red data books (BSI, ZSI and IUCN).
Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as follows:	
1.	null
2.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.
3.	Tectonics, seismicity and history of past earthquakes in the area. A site specific study of the earthquake parameters will be done. The results of the site specific earthquake design shall be sent for approval of the NCSDP (National Committee of Seismic Design Parameters, Central water Commission, New Delhi for large dams.
4.	Landslide zone or area prone to landslide existing in the study area should be examined.
5.	Presence of important economic mineral deposit, if any.
6.	Justification for location & execution of the project in relation to structural components (dam /barrage height).
7.	Impact of project on geological environment.
8.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD station.
9.	Ambient Air Quality with parameters viz. Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM) i.e. suspended particulate materials < 10 microns, Sulphur dioxide (SO2) and Oxides of Nitrogen (NOX) in the study area at 5-6 Locations.
10.	Existing Noise Levels and traffic density in the study area at 5-6 Locations.
11.	Soil classification, physical parameters (viz., texture, Porosity, Bulk Density and water holding capacity) and chemical parameters (viz. pH, electrical conductivity, magnesium, calcium, total alkalinity, chlorides, sodium, potassium, organic carbon, available potassium, available phosphorus, SAR, nitrogen and salinity, etc.) at @ one sample/ha of command area.
12.	(i) Generation of thematic maps viz, slope map, drainage map, soil map, land use and land cover map, etc.

	Based on these, thematic maps, an erosion intensity map should be prepared.
13.	History of the ground water table fluctuation in the study area.
14.	Water quality for both surface water and ground water for (i) Physical parameters (pH, temperature, electrical conductivity, TSS); (ii) Chemical parameters (Alkalinity, Hardness, BOD, COD, NO2, PO4, CI, SO4, Na, K, Ca, Mg, Silica, Oil & Grease, phenolic compounds, residual sodium carbonate); (iii) Bacteriological parameter (MPN, Total coliform) and (iv) Heavy Metals (Pb, As, Hg, Cd, Cr-6, total Cr, Cu, Zn, Fe) (6 locations).
15.	Delineation of sub and micro-watersheds, their locations and extent based on the All India Soil and Land Use Survey of India (AISLUS), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through silt yield index (SYI) method of AISLUS
16.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.
17.	Run off, discharge, water availability for the project, sedimentation rate, etc.
18.	Basin characteristics
19.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
20.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km2 year-1.
21.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
22.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
23.	Information on the 10-daily flow basis for the 90 per cent dependable year the flow intercepted at the dam, the flow diverted to the power house and the spill comprising the environmental flow and additional flow towards downstream of the dam for the project may be given.
24.	The minimum environmental flow shall be 20% of the flow of four consecutive lean months of 90% dependable year, 30% of the average monsoon flow. The flow for remaining months shall be in between 20-30%, depending on the site specific requirements. A site specific study shall be carried out by an expert organization.
25.	Sedimentation data available with CWC may be used to find out the loss in storage over the years.
26.	Hydrological studies/data as approved by CWC shall be utilized in the preparation of EIA/EMP report. Actual hydrological annual yield may also be given in the report. Sedimentation data available with CWC may be used to find out the loss in storage over the years.
27.	A minimum of 1 km distance from the tip of the reservoir to the tail race tunnel should be maintained between upstream and downstream projects.
28.	Besides primary studies, review of secondary data/literature published for project area on flora & fauna including RET species shall be reported in EIA/EMP report.
29.	Characterization of forest types (as per Champion and Seth method) in the study area and extent of each forest type as per the Forest Working Plan.
30.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteriodophytes, Bryophytes (all groups).

31.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.
32.	Assessment of plant species with respect to dominance, density, frequency, abundance, diversity index, similarity index, importance value index (IVI) , Shannon Weiner index etc. of the species to be provided. Methodology used for calculating various diversity indices along with details of locations of quadrates, size of quadrates etc. to be reported within the study area in different ecosystems.
33.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
34.	Economically important species like medicinal plants, timber, fuel wood etc.
35.	Details of endemic species found in the project area.
36.	Flora under RET categories should be documented using International Union for the Conservation of Nature and Natural Resources (IUCN) criteria and Botanical Survey of India's Red Data list along-with economic significance. Species diversity curve for RET species should be given.
37.	Cropping pattern and Horticultural Practices in the study area.
38.	Fauna study and inventorisation should be carried out for all groups of animals in the study area. Their present status alongwith Schedule of the species.
39.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.
40.	Information (authenticated) on Avi-fauna and wildlife in the study area.
41.	Status of avifauna their resident/ migratory/ passage migrants etc.
42.	Documentation of butterflies, if any, found in the area.
43.	RET species-voucher specimens should be collected along-with GPS readings to facilitate rehabilitation. RET faunal species to be classified as per IUCN Red Data list and as per different schedule of Indian Wildlife (Protection) Act, 1972.
44.	Existence of barriers and corridors, if any, for wild animals.
45.	Compensatory afforestation to compensate the green belt area that will be removed, if any, as part of the proposed project development and loss of biodiversity.
46.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
47.	For categorization of sub-catchment into various erosion classes and for the consequent CAT plan, the entire catchment (Indian Portion) is to be considered and not only the directly the draining catchment.
48.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplantktons, benthos etc.
49.	Fish and fisheries, their migration and breeding grounds.
50.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
51.	Conservation status of aquatic fauna.

52.	Sampling for aquatic ecology and fisheries and fisheries must be conducted during three seasons Pre-monsoon (summer), monsoon and winter. Sizes (length & weight) of important fish species need to be collected and breeding and feeding grounds should also be identified along the project site or in vicinity.
53.	Collection of baseline data on human settlements, health status of the community and existing infrastructure facilities for social welfare including sources of livelihood, job opportunities and safety and security of workers and surroundings population.
54.	Collection of information with respect to social awareness about the developmental activity in the area and social welfare measures existing and proposed by project proponent.
55.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
56.	The socio-economic survey/ profile within 10 km of the study area for demographic profile; Economic Structure; Developmental Profile; Agricultural Practices; Infrastructure, education facilities; health and sanitation facilities; available communication network etc.
57.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
58.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
59.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
60.	List of all the Project Affected Families with their name, age, educational qualification, family size, sex, religion, caste, sources of income, land & house holdings, other properties, occupation, source of income, house/land to be acquired for the project and house/land left with the family, any other property, possession of cattle, type of house etc.
61.	Special attention has to be given to vulnerable groups like women, aged persons etc. and to any ethnic/indigenous groups that are getting affected by the project.
Impact Prediction and Mitigation Measures	
1.	The adverse impact due to the proposed project should be assessed and effective mitigation steps to abate these impacts should be described.
2.	Changes in ambient and ground level concentrations due to total emissions from point, line and area sources.
3.	Effect on soil, material, vegetation and human health.
4.	Impact of emissions from DG set used for power during the construction, if any, on air environment.
5.	Pollution due to fuel combustion in equipments and vehicles
6.	Fugitive emissions from various sources
7.	Changes in surface and ground water quality
8.	Steps to develop pisci-culture and recreational facilities
9.	Changes in hydraulic regime and downstream flow.
10.	Water pollution due to disposal of sewage
11.	Water pollution from labour colonies/ camps and washing equipment.

12.	Adverse impact on land stability, catchment of soil erosion, reservoir sedimentation and spring flow (if any) (a) due to considerable road construction / widening activity (b) interference of reservoir with the inflowing stream (c) blasting for commissioning of HRT, TRT and some other structures.
13.	Changes in land use / land cover and drainage pattern
14.	Immigration of labour population
15.	Quarrying operation and muck disposal
16.	Changes in land quality including effects of waste disposal
17.	River bank and their stability
18.	Impact due to submergence.
19.	Impact on forests, flora, fauna including wildlife, migratory avi-fauna, rare and endangered species, medicinal plants etc.
20.	Pressure on existing natural resources
21.	Deforestation and disturbance to wildlife, habitat fragmentation and wild animal's migratory corridors
22.	Compensatory afforestation-identification of suitable native tree species for compensatory afforestation and green belt.
23.	Impact on fish migration and habitat degradation due to decreased flow of water
24.	Impact on breeding and nesting grounds of animals and fish.
25.	Impact on local community including demographic profile.
26.	Impact on socio-economic status
27.	Impact on economic status.
28.	Impact on human health due to water / vector borne disease
29.	Impact on increase traffic
30.	Impact on Holy Places and Tourism
31.	Impacts of blasting activity during project construction which generally destabilize the land mass and leads to landslides, damage to properties and drying up of natural springs and cause noise population will be studies. Proper record shall be maintained of the baseline information in the post project period.
32.	Positive and negative impacts likely to be accrued due to the project are listed.
Environmental Management Plan	
1.	Biodiversity and Wildlife Conservation and Management Plan for the conservation and preservation of rare, endangered or endemic floral/faunal species or some National Park/Sanctuary/ Biosphere Reserve or other protected area is going to get affected directly or indirectly by construction of the project, then suitable conservation measures should be prepared in consultation with the State Forest Department and with the physical and financial details. Suitable conservation techniques (in-situ/ ex-situ) will be proposed under the plan

	and the areas where such conservation is proposed will be marked on a project layout map.
2.	Compensatory Afforestation shall 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. Choice of plants for afforestation should include native and RET species, if any. This will be a part of the forest clearance proposal.
3.	Fisheries Conservation and Management Plan - a specific fisheries management measures should be prepared for river and reservoir. If the construction of fish ladder/ fish-way etc. is not feasible then measures for reservoir fisheries will be proposed. The plan will detail out the number of hatcheries, nurseries, rearing ponds etc. proposed under the plan with proper drawings. If any migratory fish species is getting affected then the migratory routes, time/season of upstream and downstream migration, spawning grounds etc will be discussed in details.
4.	Green Belt Development Plan along the periphery of the reservoir, approach roads around the colonies and other project components, local plant species must be suggested with physical and financial details. A layout map showing the proposed sites for developing the green belt should be prepared.
5.	Environmental Monitoring Programme to monitor the mitigatory measures implemented at the project site is required will be prepared. Provision for Environment Management Cell should be made. The plan will spell out the aspects required to be monitored, monitoring indicators/parameters with respect to each aspect and the agency responsible for the monitoring of that particular aspect throughout the project implementation.
6.	Catchment Area Treatment (CAT) Plan should be prepared micro-watershed wise. Identification of free draining/ directly draining catchment based upon Remote Sensing and Geographical Information System (GIS) methodology and Sediment Yield Index (SYI) method of AISLUS, Deptt. of Agriculture, Govt. of India coupled with ground survey. Areas or watersheds falling under 'very severe' and 'severe' erosion categories should be provided and required to be treated. Both biological as well as engineering measures should be proposed in consultation with State Forest Department for areas requiring treatment. Year-wise schedule of work and monetary allocation should be provided. Mitigation measures to check shifting cultivation in the catchment area with provision for alternative and better agricultural practices should be included.
7.	Study of Design Earthquake Parameters: A site specific study of earthquake parameters should be done. Results of the site specific earthquake design parameters should be approved by National Committee of Seismic Design Parameters, Central Water Commission (NCSDP), New Delhi.
8.	Dam Break Analysis and Disaster Management Plan The outputs of dam break model should be illustrated with appropriate graphs and maps clearly bringing out the impact of Dam Break scenario. To identify inundation areas, population and structures likely to be affected due to catastrophic floods in the event of dam failure. DMP will 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 will be marked on a detailed contour map of the downstream area, to show the extent of inundation. The action plan will include Emergency Action and Management plan including measures like preventive action notification, warning procedure and action plan for co-ordination with various authorities.
9.	Reservoir Rim Treatment Plan for stabilization of land slide / land slip zones, if any, around the reservoir periphery is to be prepared based on detailed survey of geology of the reservoir rim area. Suitable engineering and biological measures for treatment of identified slip zones to be suggested with physical and financial schedule. Layout map showing the landslide/landslip zones shall be prepared and appended in the chapter.
10.	Muck Disposal Plan- suitable sites for dumping of excavated material should be identified in consultation with the State Pollution Control Board and Forest Department. All Muck disposal sites should be minimum 30 m away from the HFL of river. Plan for rehabilitation of muck disposal sites should also be given. The L- section/ cross section of muck disposal sites and approach roads to be given. Financial out lay for this may be given separately. Deatailed muck transportation plan delinating the path ways, number of trucks, quantity of muck to be transportated along with monitoring mechanism using latest technology, shall be prepared.
11.	Restoration Plan for Quarry Sites and landscaping of colony areas, working areas, roads etc. Details of the coarse/fine aggregate/clay etc. required for construction of the project and the rock/clay quarries/river shoal sites identified for 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.
12.	Resettlement and Rehabilitation Plan needed to be prepared on the basis of findings of the socio- economic survey coupled with the outcome of public consultation held. The R&R package shall be prepared after consultation with the representatives of the project affected families and the State Government. Detailed budgetary estimates are to be provided. Resettlements site should be identified. The plan will also incorporate community development strategies.
13.	Public Health Delivery Plan including the provisions of drinking water supply for local population shall be in the EIA/EMP Report. Status of the existing medical facilities in the project area shall be discussed. Possibilities of strengthening of existing medical facilities, construction of new medical infrastructure etc. will be explored after assessing the need of the labour force and local populace.
14.	Local Area Development Plan to be formulated in consultation with the Revenue Officials and Village Pancahayats. Appropriate schemes shall be prepared under EMP for the Local Area Development Plan with sufficient financial provisions.
15.	Labour Management Plan for their Health and Safety.
16.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.
17.	Energy Conservation Measures for the work force during construction with physical and financial details. Alternatives will be proposed for the labour force so that the exploitation of the natural resource (wood) for the domestic and commercial use is curbed.
18.	Environmental safeguards during construction activities including Road Construction.
19.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
20.	Water, Air and Noise Management Plans to be implemented during construction and post-construction periods.

3.3. Agenda Item No 3:

3.3.1. Details of the proposal

Proposed Expansion of Tembhu Lift Irrigation Project Taluka Karad, District Satara, Maharashtra by **Department of Irrigation** located at **SATARA,MAHARASHTRA**			
Proposal For		Fresh ToR	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/MH/RIV/439901/2023	J-12011/48/2023-IA.I (R)	09/08/2023	River Valley/Irrigation projects (1(c))

3.3.2. Project Salient Features

The proposal is for grant of Terms of References (TOR) to the Expansion of Tembhu Lift Irrigation Project in an area of 2284.601 ha at Village Tembhu, District Satara, Sangli and Solapur, Maharashtra by M/s Department of Irrigation, Maharashtra.

The Project Proponent and the accredited Consultant M/s MITCON Consultancy & Engineering Services Ltd, made a detailed presentation on the salient features of the project and informed that:

1. The proposal is for ToR to the project for Proposed Expansion of Tembhu Lift Irrigation Project, Dist. Satara, Sangli and Solapur Maharashtra located at Sangli district by M/s. Minor Irrigation Division, Sangli Water Resources Department.
2. The project is listed at S.N. 1 (C) of the Schedule to the Environment Impact Assessment (EIA) Notification under category 'A' and are appraised at Central Level by Expert Appraisal Committee (EAC).
3. Tembhu Lift Irrigation Project envisages construction of Barrage across river Krishna near village Tembhu and lifting the impounded water in Six stages to irrigate 121475 Ha. (Existing ICA 80472 ha + Proposed expansion ICA 41003 ha) of land from drought prone regions of Satara, Sangli and Solapur districts of Maharashtra state.
4. Ministry had issued EC earlier ***vide letter no. 12011/43/2003-IA.I, dt. 17/08/2007 for ICA 80472 ha***.
5. **Land requirement details are as below:**

Nature of Land involved in (Ha)	**Area Existing in Ha**	**Additional Area Proposed in Ha**	**Total Area required after expansion in Ha**
Non-Forest Land	2259.38	8.54	2267.92
Forest Land	7.051	7.93	14.981
Total	**2266.431**	**16.87**	**2282.902**

1. Total 16.87 land required for expansion of the project. Out of 16.87 ha, 7.93 ha Forest land and 8.54 Non- Forest land required.
2. **Forest Clearance:** Total area of forest required for project is 16.681 ha. Out of which 7.051ha., area is principally approved by forest department vide Letter No. 8C/006/2001-FCW/594 dated March 3, 2005. The proposal for approval of 9.63 ha land is under progress.
3. Provision for Ecology & Biodiversity /Green Belt Development is Rs. 755.58 L and will do plantation around project periphery.
4. The estimated project cost as under:

Existing Project : Rs. 4088.14
Proposed Expansion: Rs.3281.89
Total Cost : Rs. 7370.03

1. Details of Solid waste/ Hazardous waste generation/ Muck and its management

Sr No	**Type of material**	**Total generated quantity in excavation in cum**	**Total generated quantity in excavation in Mm^3**
1	Soft Soil	225174.6	0.225175
2	Hard murum & soft Rock	505580.2	0.50558
3	Hard Rock	2178380	2.17838
	Total	2909135	2..909135

1. **Proposed Water utilization of the project:**

Original Water utilization of the Tembhu Lift Irrigation project was 22.00 TMC and Proposed Water utilization is 30.00 TMC. This quantity will be available from following sources.

Sr. No.	Sources	Content
1	Koyana Dam	18.46 TMC
2	Wang Dam	0.97 TMC
3	Tarali Dam	1.67 TMC
4	Krishna river monsoon flow	0.90 TMC
5	Balance Water of Tembhu Project (As per 1st Tribunal report)	3.50 TMC
6	Krishna Canal Project-Difference in Total provision & actul use of water (as per 1st Tribunal report)	2.50TMC
7	Saving of water (Qty to be diverted towards western from Koyna Project)	2.00 TMC

Quantity of water shown in the above table at Sr.No.5,6& 7 is approved by Government of Maharashtra vide letter No. 2021/ (216/2021) dated 29/04/2022

1. Status of Litigation Pending against the proposal, if any. – **Not any**
2. The salient features of the project are as under: -

Project details:

Name of the Proposal	Proposed Expansion of Tembhu Lift Irrigation Project, Dist. Satara, Sangli and Solapur Maharashtra
Location (Including coordinates)	Longitude : 74^{o} 14’ (East) Latitude : 17^{o}17’ (North)
Inter- state issue involved	No
Seismic zone	III

Category details:

Cate-gory of the project	A
Pro-visions	Irrigation to draught prone area of Dist. Satara, Sangli and Solapur Maharashtra
Capacity / Cultural command area (CCA)	Expansion of Tembhu Lift Irrigation Project **SR NO** **Taluka** **District** **COMMAND AREA** **GCA** **CCA**

	ICA
	Existing
	Extended Area
	Existing
	Extended Area
	Existing
	Extended Area
	A
	Karad
	Satara
	1150
	330
	860
	0
	600
	0
	B
	Khanapur
	Sangli
	41135
	19691
	32921
	11902
	18975
	6471
	C
	Kadegaon
	Sangli
	20215
	2799

	16179
	0
	9325
	0
	D
Tasgaon	
Sangli	
	20570
	15280
	15450
	11083
	7700
	6026
	E
Atpadi	
Sangli	
	61569
	9015
	43100
	9737
	16000
	5294
	F
Sangola	
Solapur	
	36500
	20745
	29200
	5876
	20000

	5000 **G** **Jat** **Sangli** - 6506 - 4848 - 2636 **H** **K Mahankal** **Sangli** 17475 12455 10300 7826 7872 2450 **I** **Khatav** **Satara** - 18362 - 13685 - 7440 **J** **Man** **Satara**

	- 14033 - 10458 - 5686 **Total** **198614** **119216** **148010** **75415** **80472** **41003**
Attracts the General Con-ditions (Yes/~~No~~)	Yes, Mayani Bird Conservation Reserve, Khatav is within 10 km radius

Electricity generationcapacity:

Powerhouse Installed Capacity	NA
Generation of Electricity Annually	NA
No. of Units	0
Additional information (if any)	Total electricity requirement will be 22 MW

Details:

Cost of project	Existing Project : Rs. 4088.14 Proposed Expansion: Rs.3281.89 Total Cost : Rs. 7370.03

Total area of Project	**SR NO** **Taluka** **District** **Command Area** **GCA** **CCA** **ICA** **Existing** **Extended Area** **Existing** **Extended Area** **Existing** **Extended Area** **A** **Karad** **Satara** 1150 330 860 0 600 0 **B** **Khanapur** **Sangli** 41135 19691 32921 11902 18975

	6471 **C** **Kadegaon** **Sangli** 20215 2799 16179 0 9325 0 **D** **Tasgaon** **Sangli** 20570 15280 15450 11083 7700 6026 **E** **Atpadi** **Sangli** 61569 9015 43100 9737 16000 5294 **F** **Sangola**

	Solapur 36500 20745 29200 5876 20000 5000 **G** **Jat** **Sangli** - 6506 - 4848 - 2636 **H** **K Mahankal** **Sangli** 17475 12455 10300 7826 7872 2450 **I** **Khatav** **Satara** - 18362

	- 13685 - 7440 **J** **Man Satara** - 14033 - 10458 - 5686 **Total** **198614** **119216** **148010** **75415** **80472** **41003**
Height of Dam from River Bed (EL)	NA
Length of Tunnel/Channel	Length of Proposed Tunnel: 700 m Length of new pipeline proposed: 200km Length of Distributaries 1000 km
Details of Submergence area	NA
Types of Waste and quantity of generation during construction/ Operation	**Domestic Waste:** **Name of Waste Source**

	Qty (TPA) Dry Waste Labour Colony 39.42 Wet Waste Labour Colony 26.28 **Excavation Waste** **Name of Waste Source** **Qty (cu.m)** Muck Excavation & Tunnel Work 4101.35
E-Flows for the Project	NA
Is Projects earlierstudies in Cumulative Impact assessment &Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then 1. E-flow with TOR /Recommendation by EAC as per CIA&CC study of RiverBasin. 1. If not the E-Flows maintain criteria for sustaining river ecosystem.	NA

Muck Management Details:

No. of proposed disposal area/(type of land-Forest/Pvt. land)	Quantity of muck likely to be generated : 4101.35cu.m
Muck Management Plan	Mode of Disposal : Excavated material will be utilized in filling and road work (IP and SR)
Monitoring mechanism for Muck Disposal	Environmental Management Cell (EMC) shall monitor mechanism of muck disposal

Land Area Breakup:

Private land	2259.38+8.54= 2267.92 Ha
Government land/Forest Land	7.051+7.63 = 14.981
Submergence area/Reservoir area	NA
Land required for project components	Nature of Land involved in (Ha) Area Existing in Ha Additional Area Proposed in Ha Total Area required after expansion in Ha Non-Forest Land 2259.38 8.54 2267.92 Forest Land 7.051 7.93 14.981 Total 2266.431 16.87 2282.902

Presence of Environmentally Sensitiveareas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone	Yes /No	Details of Certificate/letter/Remarks
Reserve Forest/Protected Forest Land	Yes	Nature of Land involved in (Ha) Area Existing in Ha Additional Area Proposed in Ha Total Area required after expansion in Ha Forest Land 7.051 9.63 16.681
National Park	No	Not within 10 km radius from proposed command area

		boundary
Wildlife Sanctuary	No	Following Sacred groves present in the command area **Sr. No.** **Name of the Grove** **Deity** **Tahsil** **Distance** **Direction** 1 Arewadi Biroba KavatheMahankal 3 km SE 2 Raywadi Lord Shiva KavatheMahankal 3 km W 3 Shukacharya Sukhdev Khanpur-Atpadi 2 km NE 4 Mayani Bird Conserve Reserve Khatav 1.2 km

		NE

Court case details:

Court Case	NA
Additional information (if any)	NA

Affidavit/Undertaking details:

Affidavit/Undertaking	Enclosed
Additional information (if any)	NA

Previous EC compliance and necessary approvals:

Particulars	**Letter no. and date**
Certified EC compliance report(if applicable)	Applied, will be incorporated in EIA EMP report
Status of Stage- I FC	Forest Land approval for 7.051 ha vide Letter No. 8C/006/2001-FCW/594 dated March 3, 2005
Additional detail(If any)	NA
Is FRA (2006)done for FC-I	NA

Miscellaneous

Particulars	**Details**
Details of consultant	MITCON Consultancy & Engineering Services Ltd. Pune **Certificate No.** NABET/EIA/2124/RA 0229_Rev 02 Valid up to Feb 05, 2024
Project Benefits	• The proposed expansion intends to irrigate 41003 ha land of 113 villages Satara, Sangli and Solapur districts of Maharashtra • Due to PDN, there is increase in water use efficiency, Speedy construction early benefits and more irrigation per Mcft • **During construction phase** ***Permanent employment*** No. of permanent employment: 360 Period of employment (days): 730 ***Temporary employment*** Temporary / Contractual employment (No. of Man days): 33000

	During operational phase Permanent employment proposed: 10 Temporary employment proposed: 5
Status of other statutory clearances	**Environmental Clearance** • Letter No. 12011/43/2003-IA.I Dated August 17 2007 **Forest Clearance** • Forest Land approval for 7.051 ha vide Letter No. 8C/006/2001-FCW/594 dated March 3, 2005 • Additional application for 9.63 ha land is in progress
R&R details	NA

3.3.3. Deliberations by the EAC in previous meetings

N/A

3.3.4. Deliberations by the EAC in current meetings

The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of Terms of Reference to the project for Expansion of Tembhu Lift Irrigation Project in an area of 2284.601 ha at Village Tembhu, District Satara, Sangli and Solapur, Maharashtra by M/s Department of Irrigation, Maharashtra.

The EAC also noted that Mayani Bird Conservation Reserve, Khatav is within 10 km radius from the proposed project site. The project/activity is covered under Category A of item 1 (c) 'River Valley Projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

3.3.5. Recommendation of EAC

Recommended

3.3.6. Details of Terms of Reference

3.3.6.1. Specific

	Environmental Management and Biodiversity Conservation::
1.	1. The EAC shall conduct site visit before considering the proposal for grant environmental clearance. 2. Mitigation plan to avoid Human-Wildlife Conflict should be prepared scientifically with the help of Wildlife Experts. 3. Stage I FC for 7.93 ha of forest land involved in the project shall be submitted prior to grant of EC. 4. In view of project location within 10 km radius of Mayani Bird Conservation Reserve, Khatav necessary clearance before start of the construction work. 5. Certificate and certified map from Chief Wildlife Warden shall be submitted mentioning that project boundary is Sensitive Zone (ESZ) / Wild Life Sanctuary and no Tiger/elephant corridor/Critically polluted area falls within 10 km 6. The water of rainfall yield of self-catchment of the reservoir shall be released to downstream through body of dam/ ba

	7. Prepare Wildlife conservation plan specifically for avi-fauna with mitigation measures for minimizing the huma suitably incorporated in the wildlife conservation plan in consultation with reputed government expert institute and Sta 8. Cumulative Impact of project on carrying capacity and sustainability of Reservoir/ nallahs of catchment area / due to li 9. Prepare Environmental Cost Benefit Analysis in terms of loss of Forest ecosystem due to diversion of Forest land/ l impacts on ecosystem, water availability, water uses for generation of hydro power in study area 10 km from periphery 10. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, with the impact zones (highly impact/low impact zone)based on seasonal variations and covering the aspects related to impa primary productivity due to quantity of water to be lifted and thermal stratification. Accordingly, Environmer shall be prepared. 11. Sampling locations be located to cover villages situated near the reservoir and of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report. 12. Source of construction material and its distance from the project site along with detailed transportation plan for elaborated in the EIA EMP report. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in th 13. A detailed wildlife conservation plan for Schedule –I species, duly approved by the Chief Wild Life Warden, be submi 14. In case any Wildlife corridor is located within 10 km radius of the project site a detailed study shall be conducted to a on safe movement of wild animals. 15. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP. 16. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Govt. insti Agriculture Research (ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorpor 17. MoU for water uses for the project shall be signed and approved by concerned authority.
Socio-economic Study	
1.	1. Statement on the commitments (activity-wise) made during public hearing to facilitate the discussion on the C Ministry's OM F. No. 22- 65/2017- IA.III dated 30th September, 2020 shall be submitted.
Miscellaneous**	
1.	1. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted. 2. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and wate shall not be diverted to other purpose. 3. Both capital and recurring expenditure under EMP shall be submitted. 4. The photograph should bear the date, time, latitude & longitude of the monitoring station/ sampling l PP should submit the original test reports and certificates of the labs which will analyse the samples. 5. Arial view video of project site shall be recorded and to be submitted.
Muck Management/Disaster Management..	
1.	1. Details of quantity of muck generation component wise and disposal site along with transportation plan and its monito 2. Details of Muck Management plan prepared along with estimated cost incorporated in EIA/ EMPreport. 3. Techno-economic viability of theproject must be recommended from CEA/ CWC.

3.3.6.2. Standard

1(c)	**River Valley/Irrigation projects**
Scope of EIA Study	
1.	The EIA Report should identify the relevant environmental concerns and focus on potential impacts that may change due to the construction of proposed project. Based on the baseline data collected for three (3) seasons (Pre-monsoon, Monsoon and Winter seasons), the status of the existing environment in the area and capacity to

	bear the impact on this should be analysed. Based on this analysis, the mitigation measures for minimizing the impact shall be suggested in the EIA/EMP study.
Details of the Project and Site	
1.	General introduction about the proposed project.
2.	Details of Project and site giving L-Sections of all U/S and D/S Projects with all relevant maps and figures. Connect such information as to establish the total length of interference of Natural River and the committed unrestricted release from the site of Dam/Barrage into the main river.
3.	A map of boundary of the project site giving details of protected areas in the vicinity of 25 km of project location.
4.	Location details on a map of the project area with contours indicating main project features. The project layout shall be superimposed on a contour map of ground elevation showing main project features (viz. location of dam, Head works, main canal, branch canals, quarrying etc.) shall be depicted in a scaled map.
5.	Layout details and map of the project along with contours with project components clearly marked with proper scale maps of at least 1:50,000 scale and printed at least on A3 scale for clarity.
6.	Existence of National Park, Sanctuary, Biosphere Reserve etc. in the study area, if any, should be detailed and presented on a map with distinct distances from the project components.
7.	Drainage pattern and map of the river catchment up to the proposed project site.
8.	Delineation of critically degraded areas in the directly draining catchment on the basis of Silt Yield Index as per the methodology of Soil and Land use Survey of India.
9.	Soil characteristics and map of the project area.
10.	Geological and Seismo-tectonic details and maps of the area surrounding the proposed project site showing location of dam site and canal sites.
11.	Remote Sensing studies, interpretation of satellite imagery, topographic sheets along with ground verification shall be used to develop the land use/land cover pattern of the study using overlaying mapping techniques viz. Geographic Information System (GIS), False Color Composite (FCC) generated from satellite data of project area.
12.	Land details including forests, private and other land.
13.	Demarcation of snow fed and rain fed areas for a realistic estimate of the water availability
Description of Environment and Baseline Data	
1.	To know the present status of environment in the area, baseline data with respect to environmental components air, water, noise, soil, land and biology & biodiversity (flora & fauna), wildlife, socioeconomic status etc. should be collected within 10 km radius of the main components of the project/site i.e. dam site and power house site. The air quality and noise are to be monitored at such locations which are environmentally & ecologically more sensitive in the study area. The baseline studies should be collected for 1 season (Preferably Monsoon season). Flora-Fauna in the catchment and command area should be documented. The study area should comprise of the following:
2.	(i) Catchment area up to the dam/barrage site.
3.	(ii) Submergence Area.

4.	(iii) Project area or the direct impact area should comprise of area within 10 km radius of the main project components like dam, canals etc.
5.	(iv) Downstream upto 10 km from the tip of the reservoir.
Details of the Methology	
1.	The methodology followed for collection of base line data along with details of number of samples and their locations in the map should be included. Study area should be demarcated properly on the appropriate scale map. Sampling sites should be depicted on map for each parameter with proper legends. For Forest Classification, Champion and Seth (1968) methodology should be followed.
Methodology for Collection of Biodiversity Data	
1.	The number of sampling locations should be adequate to get a reasonable idea of the diversity and other attributes of flora and fauna. The guiding principles should be the size of the study area (larger area should have larger number of sampling locations) and inherent diversity at the location, as known from secondary sources (e.g. eastern Himalayan and low altitude sites should have a larger number of sampling locations owing to higher diversity).
2.	The entire area should be divided in grids of 5kmX5km preferably on a GIS domain. There after 25% of the grids should be randomly selected for sampling of which half should be in the directly affected area (grids including project components such as reservoir, dam, powerhouse, tunnel, canal etc.) and the remaining in the rest of the area (areas of influence in 10 km radius form project components). At such chosen location, the size and number of sampling units (e.g. quadrates in case of flora/transects in case of fauna) must be decided by species area curves and the details of the same (graphs and cumulative number of species in a tabulated form) should be provided in the EIA report. Some of the grids on the edges may not be completely overlapping with the study area boundaries. However, these should be counted and considered for selecting 25% of the grids. The number of grids to be surveyed may come out as a decimal number (i.e. it has an integral and a fractional part) which should be rounded to the next whole number.
3.	The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.The conventional sampling is likely to miss the presence of rare, endangered and threatened (r.e.t.) species since they often occur in low densities and in case of faunal species are usually secretive in behaviour. Reaching the conclusion about the absence of such species in the study area based on such methodology is misleading. It is very important to document the status of such species owing to their high conservation value. Hence likely presence of such species should be ascertained from secondary sources by a proper literature survey for the said area including referring to field guides which are now available for many taxonomic groups in India. Even literature from studies/surveys in the larger landscapes which include the study area for the concerned project must be referred to, since most species from adjoining catchments is likely to be present in the catchments in question. In fact such literature form the entire state can be referred to. Once a listing of possible r.e.t. species form the said area is developed, species specific methodologies should be adopted to ascertain their presence in the study area which would be far more conclusive as compared to the conventional sampling. If the need be, modern methods like camera trapping can be resorted to, particularly for areas in the eastern Himalayas and for secretive/nocturnal species. A detailed listing of the literature referred to, for developing lists of r.e.t. species should be provided in the EIA reports.
4.	The R.E.T. species referred to in this point should include species listed in Schedule I and II of Wildlife

	(Protection) Act, 1972 and those listed in the red data books (BSI, ZSI and IUCN).
Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as follows:	
1.	null
2.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.
3.	Tectonics, seismicity and history of past earthquakes in the area. A site specific study of the earthquake parameters will be done. The results of the site specific earthquake design shall be sent for approval of the NCSDP (National Committee of Seismic Design Parameters, Central water Commission, New Delhi for large dams.
4.	Landslide zone or area prone to landslide existing in the study area should be examined.
5.	Presence of important economic mineral deposit, if any.
6.	Justification for location & execution of the project in relation to structural components (dam /barrage height).
7.	Impact of project on geological environment.
8.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD station.
9.	Ambient Air Quality with parameters viz. Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM) i.e. suspended particulate materials < 10 microns, Sulphur dioxide (SO2) and Oxides of Nitrogen (NOX) in the study area at 5-6 Locations.
10.	Existing Noise Levels and traffic density in the study area at 5-6 Locations.
11.	Soil classification, physical parameters (viz., texture, Porosity, Bulk Density and water holding capacity) and chemical parameters (viz. pH, electrical conductivity, magnesium, calcium, total alkalinity, chlorides, sodium, potassium, organic carbon, available potassium, available phosphorus, SAR, nitrogen and salinity, etc.) at @ one sample/ha of command area.
12.	Generation of thematic maps viz, slope map, drainage map, soil map, land use and land cover map, etc. Based on these, thematic maps, an erosion intensity map should be prepared.
13.	New configuration map to be given in the EIA Report
14.	History of the ground water table fluctuation in the study area.
15.	Water Quality for both surface water and ground water for [i] Physical parameters (pH, Temperature, Electrical Conductivity, TSS); [ii] Chemical parameters (Alkalinity, Hardness, BOD, COD, NO3, PO4, Cl, So4, Na, K, Ca, Mg, Silica, Oil & grease, phenolic compounds, residual sodium carbonate);[iii] Bacteriological parameter (MPN, Total coliform); and [iv] Heavy Metals (Pb, As, Hg, Cd, Cr6,Total Cr, Cu, Zn, Fe) at minimum10 Locations, however, the sampling numbers should be increased depending on the command area.
16.	Delineation of sub and micro watersheds, their locations and extent based on the Soil and Land Use Survey of India (SLUSOI), Department of Agriculture, Government of India. Erosion levels in each micro-watershed and prioritization of micro-watershed through Silt Yield Index (SYI) method of SLUSOI.
17.	Hydro-Meteorology of the project viz. precipitation (snowfall, rainfall), temperature, relative humidity, etc. Hydro-meteorological studies in the catchment area should be established along-with real time telemetry and data acquisition system for inflows monitoring.

18.	Run off, discharge, water availability for the project, sedimentation rate, etc.
19.	Basin characteristics
20.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
21.	For estimation of Sedimentation Rate, direct sampling of river flow is to be done during the EIA study. The study should be conducted for minimum one year. Actual silt flow rate to be expressed in ha-m km2 year-1.
22.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
23.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
24.	Environmental flow release should be 20% of the average of the 4 lean months of 90% dependable year during the lean season and 30% of Monsoon flow during monsoon season. For remaining months, the flow shall be decided by the Committee based on the hydrology and available discharge.
25.	A site specific study on minimum environment flow should be carried
26.	Characterization of forest types (as per Champion and Seth method) in the study area and extent of each forest type as per the Forest Working Plan.
27.	General vegetation profile and floral diversity covering all groups of flora including Bryophytes, Pteridophytes, Lichens and Orchids. A species wise list may be provided.
28.	Assessment of plant species with respect to dominance, density, frequency, abundance, diversity index, similarity index, importance value index [IVI], Shannon Weiner Index etc. of the species to be provided. Methodology used for calculating various diversity indices along with details of locations of quadrats, size of quadrats etc. to be reported within the study area in different ecosystems.
29.	Existence of National Park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
30.	Economically important species like medicinal plants, timber, fuel wood etc.
31.	Details of endemic species found in the project area.
32.	Flora under RET categories should be documented using International Union for the Conservation of Nature and Natural Resources (IUCN) criteria and Botanical Survey of India's Red Data list along with economic significance. Species diversity curve for RET species should be given.
33.	Fauna study and inventorisation should be carried out for all groups of animals including reptiles and nocturnal animals in the study area. Their present status along with Schedule of the species.
34.	Information (authenticated) on Avi-fauna and wild life in the study area.
35.	Status of avifauna their resident/migratory/ passage migrants etc.
36.	Documentation of butterflies, if any, found in the area.
37.	RET species- voucher specimens should be collected along with GPS readings to facilitate rehabilitation. RET faunal species to be classified as per IUCN Red Data list and as per different schedule of Indian Wildlife (Protection) Act, 1972.
38.	Existence of barriers and corridors, if any, for wild animals.

39.	Compensatory afforestation to compensate the green belt area that will be removed, if any, as part of the proposed project development and loss of biodiversity.
40.	For categorization of sub-catchments into various erosion classes and for the consequent CAT plan, the entire catchment (Indian Portion) is to be considered and not only the directly the draining catc
41.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplanktons, benthos etc.
42.	Fish and fisheries, their migration and breeding grounds.
43.	Fish diversity, composition and maximum length & weight of the measured populations to be studied for estimation of environmental flow.
44.	Conservation status of aquatic fauna.
45.	Cropping pattern and Horticultural practices in the study area.
46.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities component.
47.	Component of pressurized/drip irrigation and micro irrigation.
48.	Details of Conjunctive use of water for irrigation
49.	Collection of Baseline data on human settlements, health status of the community and existing infrastructure facilities for social welfare including sources of livelihood, job opportunities and safety and security of workers and surrounding population.
50.	Collection of information with respect to social awareness about the developmental activity in the area and social welfare measures existing and proposed by project proponent.
51.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
52.	The Socio-economic survey/profile within 10 Km of the study area for Demographic profile; Economic Structure; Development Profile; Agricultural Practices; Infrastructure, education facilities; health and sanitation facilities; available communication network etc.
53.	Documentation of Demographic, Ethnographic, Economic structure and development profile of the area
54.	Information on Agricultural practices, Cultural and aesthetic sites, Infrastructure facilities etc
55.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
56.	List of all the Project Affected Families with their names, education, land holdings, other properties, occupation, source of income, land and other properties to be acquired, etc.
57.	In addition to Socio-economic aspects of the study area, a separate chapter on socio-cultural aspects based upon study on Ethnography of the area should be provided.
Impact Prediction and Mitigation Measures	
1.	The adverse impact due to the proposed project should be assessed and effective mitigation steps to abate these impacts should be described.
2.	Changes in ambient and ground level concentrations due to total emissions from point, line and area sources

3.	Effect on soils, material, vegetation and human health
4.	Impact of emissions from DG sets used for power during the construction, if any, on air environment.
5.	Pollution due to fuel combustions in equipments & vehicles
6.	Fugitive emissions from various sources.
7.	Impact on micro climate
8.	Changes in surface & ground water quality. Steps to develop pisci-culture and recreational facilities.
9.	Changes in hydraulic regime and down stream flow.
10.	Water pollution due to disposal of sewage.
11.	Water pollution from labour colony/camps and washing equipment.
12.	Adverse impact on land stability, catchment of soil erosion, reservoir sedimentation and spring flow (if any) [a] due to considerable road construction/widening activity [b] interference of reservoir with the inflowing streams [c] blasting for excavation of canals and some other structures
13.	Changes in land use/land cover and drainage pattern.
14.	Immigration of labour population.
15.	Quarrying operation and muck disposal.
16.	Changes in land quality including effects of waste disposal
17.	River bank and their stability
18.	Impact due to submergence
19.	Impact on forests, flora, fauna including wildlife, migratory avi-fauna, rare and endangered species, medicinal plants etc.
20.	Pressure on existing natural resources
21.	Deforestation and disturbance to wildlife, habitat fragmentation and wild animal's migratory corridors
22.	Compensatory afforestation-Identification of suitable native tree species for compensatory afforestation & green belt.
23.	Impact on fish migration and habitat degradation due to decreased flow of water
24.	Impact on breeding and nesting grounds of animal
25.	Impact on local community including demographic profile.
26.	Impact on socio-economic status.
27.	Impact on economic status.

28.	Impact on human health due to water / vector borne disease.
29.	Impact on increases traffic.
30.	Impact on Holy Places and Tourism.
31.	Impacts of blasting activity during project construction which generally destabilize the land mass and lead to landslides, damage to properties and drying up of natural springs and cause noise pollution, will be studied. Proper record shall be maintained of the base line information in the post project period.
32.	Positive as well as negative impacts likely to be accrued due to the project are to be listed.
Environment Impact Analysis	
1.	Environmental Impact Analysis due to the project on the above mentioned components should be carried out for construction and operation phases using qualitative or quantitative methods.
Environmental Management Plan	
1.	Environmental Management Plan aimed at minimizing the negative impacts of the project should be given in detail. The mitigation measures are to be presented for all the likely adverse impacts on the environment. The following suggestive mitigating plans should be included
2.	Biodiversity and Wild Life Conservation & Management Plan for conservation and preservation of endemic, rare and endangered species of flora and fauna to be prepared in consultation with State Forest Department.
3.	Compensatory Afforestation in lieu of the forest land required for the project needs to be proposed.Choice of plants should be made in consultation with State Forest Department including native and RET species, if any.
4.	Fisheries Conservation & Management Plan-Fish fauna inhabiting the affected stretch of river, a specific fisheries management plan should be prepared for river and reservoir.
5.	Plan for Green Belt Development along the periphery of reservoir, colonies, approach road, canals etc. to be prepared in consultation with the State Forest Department. Local plant species suitable for greenbelt development should be selected.
6.	Environmental Monitoring Programme with physical & financial details covering all the aspects of EMP. A summary of cost estimate for all the plans, cost for implementing all Environmental Management Plans including the cost for implementing environmental monitoring programme should be given. Provision for an Environmental Management Cell should be made.
7.	Catchment Area Treatment (CAT) Plan should be prepared micro-watershed wise. Identification of area for treatment based upon Remote Sensing & GIS methodology and Silt Yield Index (SYI) method of SLUSOI coupled with ground survey. Areas/watersheds falling under 'very severe' and `severe' erosion categories are required to be treated. Both biological and engineering measures should be proposed in consultation with State Forest Department. Year-wise schedule of work and monetary allocation should be provided. CAT plan is to be completed prior to reservoir impoundment. Mitigations measures to check shifting cultivation in the catchment area with provision for alternative and better agricultural practices should be include.
8.	Study of Design Earthquake Parameters: A site specific study of earthquake parameters should be done. The results of the site specific earth quake design parameters should be approval by National Committee of Seismic Design Parameters, Central Water Commission (NCSDP), New Delhi.
9.	Dam Break Analysis and Disaster Management Plan: The outputs of Dam Break Model should be illustrated with appropriate graphs and maps clearly bringing out the impact of Dam break scenario. Provision for early warning systems should be provided.

10.	Reservoir Rim Treatment Plan for stabilization of land slide/land slip zones if any, around the reservoir periphery to be prepared. Suitable engineering and biological measures for treatment of the identified slip zones to be provided with physical and financial schedule.
11.	Muck Disposal Plan- suitable sites for dumping of excavated material should be identified in consultation with the State Pollution Control Board and Forest Department. All Muck disposal sites should be minimum 30 m away from the HFL of river. Plan for rehabilitation of muck disposal sites should also be given. The L- section/ cross section of muck disposal sites and approach roads to be given. Financial out lay for this may be given separately. Deatailed muck transportation plan delinating the path ways, number of trucks, quantity of muck to be transportated along with monitoring mechanism using latest technology, shall be prepared.
12.	Plan for Restoration of quarry sites and landscaping of colony areas, working areas, roads, etc.
13.	Command Area Development (CAD) Plan giving details of implementation schedule with a sample CAD plan.
14.	In the EMP, also include a sample CAD plan for a distributary outlet command. Such a plan is to show the alignment of irrigation and drainage channels. The components of the OFD works to be undertaken may be clearly mentioned along with a time schedule for their completion vis-à-vis the progress of irrigation development.
15.	Mitigating measures for impacts due to Blasting on the structures in the vicinity.
16.	Resettlement and Rehabilitation (R&R) Plan need to be prepared with due consultation with Project Affected Families (PAFs). The provision of the d R&R plan should be according to the National Resettlement and Rehabilitation Policy (NRRP-2007) as well as State Resettlement and Rehabilitation Policy. Detailed budgetary estimates are to be provided. Resettlements sites should be identified.
17.	Public Health Delivery Plan including the provisions for drinking water facility for the local community.
18.	Local Area Development Plan to be formulated in consultation with the Revenue Officials and Village Panchayats. Local skill development schemes should be given. Details of various activities to be undertaken along with its financial out lay should be provided.
19.	Labour Management Plan for their Health and Safety.
20.	Sanitation and Solid Waste Management Plan for domestic waste from colonies and labour camps etc.
21.	Plan for Land Restoration and Landscaping of project sites.
22.	Energy Conservation Measures.
23.	Environmental safeguards during construction activities including Road Construction.
24.	Ground Water Management Plan.
25.	Water and Air Quality & Noise Management Plans to be implemented during construction and post-construction periods.

3.4. Agenda Item No 4:

3.4.1. Details of the proposal

Tainsar Pumped Storage Project by **JINDAL RENEWABLE POWER PRIVATE LIMITED** located at **DEOGARH,ODISHA**

Proposal For		Fresh ToR	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/OR/RIV/439983/2023	J-12011/47/2023-IA.I (R)	10/08/2023	River Valley/Irrigation projects (1(c))

3.4.2. Project Salient Features

The proposal is for grant of Terms of References (ToR) to the project for Tainsar Pumped Storage Project of capacity 675 MW in an area of 281 ha at Village Gailo & Kailash, District Deogarh, Odisha by M/s Jindal Renewable Power Private Limited.

The Project Proponent and the accredited Consultant **M/s WAPCOS Limited**, made a detailed presentation on the salient features of the project and informed that:

1. The proposal is for Terms of Reference (ToR) to the project for Tainsar Pumped Storage Project (675 MW) located at Village Gailo & Kailash, District Deogarh, Odisha by M/s. Jindal Renewable Power Private Limited.
2. The project is listed at item no. **1(c)** of the Schedule to the Environment Impact Assessment (EIA) Notification,2006 under Category 'A' and; hence, would be appraised at Central Level by Expert Appraisal Committee (EAC).
3. Tainsar Pumped Storage Project (PSP) is located in Deogarh District, Odisha. The installed capacity of the project is estimated as 675 MW. The project envisages creation of two artificial reservoirs interconnected with water conductor system, feeding the reversible pump-turbine units before draining into the lower reservoir through tailrace tunnel. Both the reservoirs are located away from all existing nearby rivers/streams/nallahs.
4. **Land requirement:** The total land requirement for construction of various civil structures, associated infrastructure facilities and muck disposal area /green belt area is estimated as 281 ha. Out **of 281 ha of land, about 167.10 ha falls under the category of forest land and 113.90 ha under non-forest land**. Forest land requirement (Ha)/ MW is worked out as 0.247 ha/MW in selected Alt.-II in comparison to the other alternative (0.253 ha/MW in Alt.-III).
5. **Environmental sensitivity**: There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc., within 10 km distance from the project site. River/water body is flowing at a distance of 1 km from Lower reservoir. **The Upper and Lower reservoir area falls under the Pradhanpat reserved forest.** The nearest wildlife sanctuary **is Usha Kothi,** located at about 43 km from the proposed project site.
6. **Water requirement:** Required quantum of **8.82 MCM** of water for one-time filling of the proposed Tainsar PSP lower reservoir will be taken up from nearby **Jaraikela** Stream **by pumping which is located at about 0.9 km from the proposed lower reservoir**. Both the reservoirs will be interconnected through a water conductor system and the generator and turbines installed at the underground powerhouse**.**
7. **Hydrological studies**: Tainsar Standalone PSP is proposed between two reservoirs i.e., upper and lower reservoir (both reservoirs to be constructed newly). These two reservoirs are not located across any perennial streams and few seasonal streams are draining towards the lower reservoir area which are having very small catchment areas and hence no specific hydrological studies are required to be carried out.
8. Details of Solid waste/ Hazardous waste generation/ Muck and its management: **Muck Generation**: 2.01 lakh $m^{3.}$ **Solid waste Generation**: 0.18 tonnes/day.
9. **Alternative analysis**: Four alternatives of the project layout were studied for the selection of most optimized project layout. Out of these four alternatives, the project layout as per Alternative-II has been preferred which will be equipped with four nos. of reversible Francis pump turbines (2 units of 225 MW/245 MW & 2 units of 125 MW/137.5 MW) housed in a pit type of surface powerhouse**.** The selected alternative (Alt.-II) is considered better alternative owing to the advantages over other alternatives (Alternative-I & I with IC-630 MW, Alt.-IV with IC-675 MW) in terms of shorter water conductor length, length to head ratio (L/H) ratio within 5 and relatively lesser land requirement. In addition, issues related to R&R, environmental and social considerations are minimal in the selected alternative.
10. **Project Cost and Financial Analysis:** It has been planned to construct and commission the project within a period of 36 months excluding pre-construction activities (27 months). The hard cost of the project is estimated **as INR 3325.36 Crore** and total completion cost is estimated as **INR 3792.17 Crores** considering escalation and

interest during construction. The cost per MW is worked out as **INR 5.62 Cr**. The levelized tariff for one cycle generation works out to **INR 6.34/ kWh** corresponding to pumping cost per unit of **INR 2.63/kWh**

11. Status of Litigation Pending against the proposal, if any. –**No**
12. The salient features of the project are as under:-

EAC Meeting Details:

EAC meeting/s	51st EAC meeting (River Valley & Hydro-electric Projects) EC/AGENDA/EAC/760324/8/2023
Date of Meeting/s	12.09.2023
Date of earlier EAC meetings	-

Project details:

Name of the Proposal	Tainsar Pumped Storage Project (675 MW)
Location (Including coordinates)	Upper reservoir is located near Gailo & Kailash villages of Deogarh district (21°34'9.91"N 84°39'32.74"E) Lower reservoir is located near Tainsar village of Deogarh district (21°33'0.95"N 84°39'11.41"E)
Inter- state issue involved	No
Seismic zone	Zone -II

Category details:

Category of the project	A
Provisions	-
Capacity / Cultural command area (CCA)	675 MW
Attracts the General Conditions (Yes/No)	No

Electricity generation capacity:

Powerhouse Installed Capacity	675 MW (2 x 225 MW & 2 x 112.5 MW)
Generation of Electricity Annually	1895.7 MU
No. of Units	4

ToR Details:

Cost of project	Rs. 3792.17 Crores
Total area of Project	281 ha
Height of Dam from deepest Foundation Level (EL)	26 m (Upper Reservoir) 29 m (Lower Reservoir)
Length of Tunnel/Channel	Main Access Tunnel (MAT) - 718 m Tailrace Tunnel (TRT) - 143.4 m
Details of Submergence area	Upper Reservoir - 33.83 ha Lower Reservoir - 41.51 ha
Types of Waste and quantity of generation during construction/ Operation	Sewage generated from Labour camps 175 KLD per day approx. Muck Generation: 2.01 lakh m^3

	Solid waste Generation: 0.18 tonnes/day
E-Flows for the Project	-
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. b) If not the E-Flows maintain criteria for sustaining river ecosystem.	NA

Reservoir Operating Parameters

S.No.	Reservoir parameters	Upper Reservoir	Lower Reservoir
1.	Full Reservoir Level (m)	641	300
1.	Minimum Drawdown Level (m)	619.5	280
1.	Finished Reservoir Bed Level (m)	618	278
1.	Gross Storage (Mm^3)	7.06	8.4
1.	Live storage (Mm^3)	6.64	7.69

Muck Management Details:

No. of proposed disposal area/(type of land-Forest/Pvt. land)	04 Muck disposal area 93 hectares in Non-Forest land
Muck Management Plan	Will be prepared during CEIA study
Monitoring mechanism for Muck Disposal	Will be prepared during CEIA study

Land Area Breakup:

Non- Forest Land	113.9 Hectares
Forest Land	167.1 Hectares
Submergence area	Upper Reservoir - 33.83 ha Lower Reservoir - 41.51 ha
Total Land required	281 Hectares

Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone	Yes/No	Details of Certificate/letter/Remarks

Protected/ Reserved Forest Land	Yes	
National Park	-	
Wildlife Sanctuary	-	

Court case details: NA
Affidavit/Undertaking details:

Affidavit/Undertaking	-
Additional information (if any)	-

Previous EC compliance and necessary approvals:

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	-
Status of Stage- I FC	Yet to be applied
Additional detail (If any)	-
Is FRA (2006) done for FC-I	-

Miscellaneous

Particulars	**Details**
Details of consultant	WAPCOS Limited
Project Benefits	Annual peak energy generation of 1895.70 MU and Up-liftment of socioeconomic Status of the surrounding villages
Status of other statutory clearances	-
R&R details	Shall be done as a part of EIA study

3.4.3. Deliberations by the EAC in previous meetings

N/A

3.4.4. Deliberations by the EAC in current meetings

The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of terms of reference to the project for grant of Terms of References (ToR) to the project for Tainsar Pumped Storage Project of capacity 675 MW in an area of 281 ha at Village Gailo & Kailash, District Deogarh, Odisha by M/s Jindal Renewable Power Private Limited.

The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry**.**

The EAC noted that the project cover area involves around 167.10 ha of forest land out of total 281 ha. land for establishment of project and its components. The Upper and Lower reservoir area of the proposed project falls under the

Pradhanpat reserved forest. No exercise has been done for optimization of forest land.

The EAC after detailed deliberations deferred the proposal for want of following additional information:

1. Explore the alternative sites and relocate site to reduce forest area.
2. Alternative Site Analysis in terms of ecological aspects viz. loss of Forest ecosystem due to diversion of Forest land/loss of biodiversity and its impacts on productivity of the ecosystem.

*The proposal was therefore **deferred** on the above lines.*

3.4.5. Recommendation of EAC

Deferred for ADS

3.5. Agenda Item No 5:

3.5.1. Details of the proposal

Kadopada Pumped Storage Project by **JINDAL RENEWABLE POWER PRIVATE LIMITED** located at **DEOGARH,ODISHA**			
Proposal For		Fresh ToR	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/OR/RIV/439994/2023	J-12011/46/2023-IA.I (R)	11/08/2023	River Valley/Irrigation projects (1(c))

3.5.2. Project Salient Features

51.2.1: The proposal is for grant of Terms of Reference (ToR) to the project for Kadopada Pumped Storage Project of capacity 750 MW (off stream closed loop) in an area of 325 ha at Village Guradikhol & Kadopada, District Deogarh, Odisha by M/s Jindal Renewable Power Private Limited.

51.2.2: The Project Proponent and the accredited Consultant M/s WAPCOS Limited, made a detailed presentation on the salient features of the project and informed that:

1. The proposal is for **ToR** to the project for Kadopada Pumped Storage Project of capacity 750 MW (off stream closed loop) in an area of 325 ha at Village Guradikhol & Kadopada, District Deogarh, Odisha by M/s Jindal Renewable Power Private Limited.

1. The project is listed at S.N. **1(c)** of the Schedule to the Environment Impact Assessment (EIA) Notification under category 'A' and are appraised at Central Level by Expert Appraisal Committee (EAC).

1. Kadopada PSP is an Off-Stream Closed Loop Pumped Storage Project (OCPSP) proposed between two reservoirs i.e., Kadopada Upper & Lower Reservoirs (both to be constructed).

1. **Water availability**: Required quantum of 12.97 MCM of water for one-time filling of the proposed Kadopada PSP lower reservoir will be taken up from nearby existing **Brahmani River** by pumping which is located at about 6.5 km from the proposed lower reservoir. Both the reservoirs will be interconnected through a water conductor system and the generator and turbines installed at the underground powerhouse.

1. To implement the proposed scheme, JRPPL has carried out Pre-Feasibility Study (PFR) for the Kadopada Pumped Storage Project, 750 MW.

1. This scheme will support the global commitment of Paris Agreement for Climate Change and the commitment of Hon'ble Prime Minister of India, reiterated, in COP26 to meet the Net Zero Emission by the year 2070.

1. **Land requirement**: Total land requirement is about **325.00 Ha in which 166.00 Ha will be forest land** and 159.00 Ha will be non-forest land

1. **Environmental Sensitive Area**: There are no National Park, Wildlife Sanctuaries, Biosphere Reserve, Tiger Reserve within 10 km distance from the project site. **Brahmani River** is flowing at a distance of 6.5 km from Lower Reservoir in East direction. Nearest wildlife sanctuary is **Badrama** which is about 61 km from the proposed Project site and **Bankasala Bird sanctuary** which is about 58 km from the proposed Project site**.**

1. **Hydrological studies**: Upper and Lower reservoirs are not located across any perennial streams and few seasonal streams are draining towards the lower reservoir area which are having very small catchment areas and hence no specific hydrological studies are required to be carried out. First time filling of reservoir is planned to be carried out in monsoon months from **Brahmani river,** utilizing excess river inflows during this season.

1. **Alternative studies:** Three alternatives of project layout were studied for selection the most suitable project layout. Out of the three alternatives, the project layout (Alt.-1) with maximum installed capacity of 750 MW with underground powerhouse was selected.**Alternative 1** works out to be a better option from R&R, environmental and social considerations, hence is adopted for further development.

1. **Project Cost and Financial Analysis:** It has been planned to construct and commission the project within a period of 42 months excluding pre-construction activities (27 months). The hard cost of the project is estimated as INR 3811.83 Crore and total completion cost is estimated as INR **4416.53** Crores considering escalation and interest during construction. The cost per MW is worked out as INR 5.89 Cr. The levelized tariff for one cycle works out to INR 6.41 corresponding to pumping cost per unit of INR 2.63.

1. Status of Litigation Pending against the proposal, if any. – **No**

1. The salient features of the project are as under:-

EAC Meeting Details:

EAC meeting/s	51st EAC meeting (River Valley & Hydro-electric

	Projects) EC/AGENDA/EAC/760324/8/2023
Date of Meeting/s	31.08.2023
Date of earlier EAC meetings	NA

Project details:

Name of the Proposal	Kadopada Pumped Storage Project (750 MW)
Location (Including coordinates)	Upper reservoir is located near Gurandikhol village of Deogarh district Latitude 21°35'55.47" N and longitude 84°55'31.55" E Lower reservoir is located near Kadopada village in Deogarh district Latitude 21°37’15.13” North and longitude 84°56’3.95” East.
Inter- state issue involved	No
Seismic zone	Zone II

Category details:

Category of the project	A
Provisions	
Capacity / Cultural command area (CCA)	750 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	

Electricity generation capacity:

Powerhouse Installed Capacity	750 MW
Generation of Electricity Annually	2098.3 MU
No. of Units	4 units (2x250MW and 2x125MW)
Additional information (if any)	

ToR Details:

Cost of project	**4416.53 Cr.**
Total area of Project	325 ha
Height of Dam from River Bed (EL)	28 m for Upper Reservoir and 28 m for Lower Reservoir
Length of Tunnel/Channel	556.83 m TRT
Details of Submergence area	50.75 ha Upper Reservoir and 71.01 ha in Lower reservoir
Types of Waste and quantity of generation during construction/ Operation	Solid waste generation- 0.18 tonne/day Liquid waste generation- 200 KLD Muck Generation-6.42 lakh m^3
E-Flows for the Project	Not Applicable as reservoir is not located on any river

Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity	NA
Studies (CIA&CC) for River in which project located. If yes, then 1. E-flow with TOR/Recommendation by EAC as per CIA&CC study of River Basin. 2. If not the E-flows maintain criteria for sustaining river ecosystem.	NA

Muck Management Details:

No. of proposed disposal area/(type of land- Forest/Pvt. land)	01 No. of Muck Disposal Site identified (114 ha) in Non-Forest Land
Muck Management Plan	Shall be prepared as a part of EIA Study
Monitoring mechanism for Muck Disposal	Shall be prepared as a part of EIA Study

Land Area Breakup:

Non Forest Land	159 ha
Forest Land	166 ha
Submergence area	121.76 ha
Total Land	325 ha

Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone	**Yes/No**	**Details of Certificate/letter/Remarks**
Reserve Forest/Protected Forest Land	Yes	
National Park	No	
Wildlife Sanctuary	No	

Court case details: Nill

Affidavit/Undertaking details: NA

Previous EC compliance and necessary approvals:

Particulars	**Letter no. and date**
Certified EC compliance report (if applicable)	NA
Status of Stage- I FC	Yet To Be Applied
Additional detail (If any)	-
Is FRA (2006) done for FC-I	-

Miscellaneous

Particulars	Details
Details of consultant	WAPCOS LTD.
Project Benefits	Annual peak energy generation of 2098.3MU and Up-liftment of socioeconomic Status of the surrounding villages
Status of other statutory clearances	-
R&R details	Shall be done as a part of EIA Study

3.5.3. Deliberations by the EAC in previous meetings

N/A

3.5.4. Deliberations by the EAC in current meetings

The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of TOR to the project for Kadopada Pumped Storage Project of capacity 750 MW (off stream closed loop) in an area of 325 ha at Village Guradikhol & Kadopada, District Deogarh, Odisha by M/s Jindal Renewable Power Private Limited.

The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry**.**

The EAC noted that presentation made by the PP/ consultant M/s WAPCOS was not satisfactory as they could not highlight major issues like eco-sensitivity of the region, location comes in dense forest land. Also, the project has not carried out alternate site analysis etc. It is also came to know that the consultant has not visited the site yet.

The EAC after detailed deliberations, deferred the proposal for want of following additional information:

1. Alternative site analysis shall be carried out in terms of ecological aspects viz. loss of Forest ecosystem due to diversion of Forest land/loss of biodiversity and its impacts on productivity of the ecosystem, water availability. The alternate sites should be explored changing the geographical region just changing the alignment of the selected alternatives on same location will defeat the purpose of such analysis.
2. Explore the possibilities to select such sites which involves no forest land or bare minimum forest area should be involved for the construction of proposed project.
3. Comments may be obtained from CWC on viability of the project in terms of water availability, as well as inter-state issues etc.
4. Hydrograph of **Brahmani river**- Flow pattern of river during Pre- Monsoon, Monsoon, and Post- Monsoon be submitted. Plan for water withdrawal and precaution for aquatic fauna be submitted.
5. Report on carbon fixation ratio of existing forest area to be submitted.

*The proposal was therefore **deferred** on the above lines.*

3.5.5. Recommendation of EAC

Deferred for ADS

4. Any Other Item(s)

N/A

5. List of Attendees

Sr. No.	Name	Designation	Email ID	Remarks
1	Dr K Gopakumar	Chairman, EAC	kgopa@iisc.ac.in	
2	Dr N Lakshman	Member (EAC)	lnand@rocketmail.com	Absent
3	Dr Mukesh Sharma	Member (EAC)	mukesh@iitk.ac.in	Absent
4	Dr B K Panigrahi	Member (EAC)	bijayaketan.panigrahi@gmail.com	Absent
5	Dr Chandrahas Deshpande	Member (EAC)	chandrahas.despande@welingkar.org	Absent
6	Dr A K Malhotra	Member (EAC)	ajitkumarmalhotra463@gmail.com	
7	Dr Uday Kumar R Y	Member (EAC)	udaykumarry@yahoo.com	
8	Dr Narayan Shenoy K	Member (EAC)	kn.shenoy@manipal.edu	Absent
9	Shri Sharvan Kumar	Member (EAC)	Dirhpa3@gmail.com	Absent
10	Shri Ashok Kumar Kharya	Member (EAC)	ceenvtmgmt@nic.in	
11	Dr J A Johnson	Member (EAC)	jaj@wii.gov.in	Absent
12	Dr B K Das	Member (EAC)	amiya.sahoo@icar.gov.in	
13	Dr Vijay Kumar	Member (EAC)	vijay.kumar66@nic.in	Absent
14	Yogendra Pal Singh	Scientist E	yogendra78@nic.in	

MINUTES OF THE 51st MEETING OF THE EXPERT APPRAISAL COMMITTEE FOR RIVER VALLEY AND HYDROELECTRIC PROJECTS HELD ON 12TH SEPTEMBER, 2023 FROM 10:30 AM – 05.30 PM THROUGH VIDEO CONFERENCE.

The 51st meeting of the re-constituted EAC for River Valley & Hydroelectric Projects organized by the Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi, was held on 12th September, 2023 through physical mode, under the Chairmanship of Dr. K Gopakumar. The list of Members present in the meeting is at **Annexure**.

Agenda Item No. 51.1: Confirmation of Minutes of 50th EAC meeting held on 11th August, 2023.

The EAC confirmed the minutes of 50th EAC meeting held on 11th August, 2023.

Agenda Item No. 51.2

Kadopada Pumped Storage Project of capacity 750 MW (off stream closed loop) in an area of 325 ha at Village Guradikhol & Kadopada, District Deogarh, Odisha by M/s Jindal Renewable Power Private Limited – Terms of References (TOR) – reg.

[Proposal No. IA/OR/RIV/439994/2023; F. No. J-12011/46/2023-IA.I (R)]

51.2.1: The proposal is for grant of Terms of Reference (ToR) to the project for Kadopada Pumped Storage Project of capacity 750 MW (off stream closed loop) in an area of 325 ha at Village Guradikhol & Kadopada, District Deogarh, Odisha by M/s Jindal Renewable Power Private Limited.

51.2.2: The Project Proponent and the accredited Consultant M/s WAPCOS Limited, made a detailed presentation on the salient features of the project and informed that:

i. The proposal is for **ToR** to the project for Kadopada Pumped Storage Project of capacity 750 MW (off stream closed loop) in an area of 325 ha at Village Guradikhol & Kadopada, District Deogarh, Odisha by M/s Jindal Renewable Power Private Limited.

ii. The project is listed at S.N. **1(c)** of the Schedule to the Environment Impact Assessment (EIA) Notification under category 'A' and are appraised at Central Level by Expert Appraisal Committee (EAC).

iii. Kadopada PSP is an Off-Stream Closed Loop Pumped Storage Project (OCPSP) proposed between two reservoirs i.e., Kadopada Upper & Lower Reservoirs (both to be constructed).

iv. **Water availability**: Required quantum of 12.97 MCM of water for one-time filling of the proposed Kadopada PSP lower reservoir will be taken up from nearby existing **Brahmani River** by pumping which is located at about 6.5 km from the proposed lower reservoir. Both the reservoirs will be interconnected through a water conductor system and the generator and turbines installed at the underground powerhouse.

v. To implement the proposed scheme, JRPPL has carried out Pre-Feasibility Study (PFR) for the Kadopada Pumped Storage Project, 750 MW.

vi. This scheme will support the global commitment of Paris Agreement for Climate Change and the commitment of Hon'ble Prime Minister of India, reiterated, in COP26 to meet the Net Zero Emission by the year 2070.

vii. **Land requirement**: Total land requirement is about **325.00 Ha in which 166.00 Ha will be forest land** and 159.00 Ha will be non-forest land

viii. **Environmental Sensitive Area**: There are no National Park, Wildlife Sanctuaries, Biosphere Reserve, Tiger Reserve within 10 km distance from the project site. **Brahmani River** is flowing at a distance of 6.5 km from Lower Reservoir in East direction. Nearest wildlife sanctuary is **Badrama** which is about 61 km from the proposed Project site and **Bankasala Bird sanctuary** which is about 58 km from the proposed Project site**.**

ix. **Hydrological studies**: Upper and Lower reservoirs are not located across any perennial streams and few seasonal streams are draining towards the lower reservoir area which are having very small catchment areas and hence no specific hydrological studies are required to be carried out. First time filling of reservoir is planned to be carried out in monsoon months from **Brahmani river,** utilizing excess river inflows during this season.

x. **Alternative studies:** Three alternatives of project layout were studied for selection the most suitable project layout. Out of the three alternatives, the project layout (Alt.-1) with maximum installed capacity of 750 MW with underground powerhouse was selected. **Alternative 1** works out to be a better option from R&R, environmental and social considerations, hence is adopted for further development.

xi. **Project Cost and Financial Analysis:** It has been planned to construct and commission the project within a period of 42 months excluding pre-construction activities (27 months). The hard cost of the project is estimated as INR 3811.83 Crore and total completion cost is estimated as INR **4416.53** Crores considering escalation and interest during construction. The cost per MW is worked out as INR 5.89 Cr. The levelized tariff for one cycle works out to INR 6.41 corresponding to pumping cost per unit of INR 2.63.

xii. Status of Litigation Pending against the proposal, if any. – **No**

xiii. The salient features of the project are as under:-

EAC Meeting Details:

EAC meeting/s	51st EAC meeting (River Valley & Hydro-electric Projects) EC/AGENDA/EAC/760324/8/2023
Date of Meeting/s	31.08.2023
Date of earlier EAC meetings	NA

Project details:

Name of the Proposal	Kadopada Pumped Storage Project (750 MW)
Location (Including coordinates)	Upper reservoir is located near Gurandikhol village of Deogarh district Latitude 21°35'55.47" N and longitude 84°55'31.55" E Lower reservoir is located near Kadopada village in Deogarh district Latitude 21°37’15.13” North and longitude 84°56’3.95” East.

Inter- state issue involved	No
Seismic zone	Zone II

Category details:

Category of the project	A
Provisions	
Capacity / Cultural command area (CCA)	750 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	

Electricity generation capacity:

Powerhouse Installed Capacity	750 MW
Generation of Electricity Annually	2098.3 MU
No. of Units	4 units (2x250MW and 2x125MW)
Additional information (if any)	

ToR Details:

Cost of project	**4416.53 Cr.**
Total area of Project	325 ha
Height of Dam from River Bed (EL)	28 m for Upper Reservoir and 28 m for Lower Reservoir
Length of Tunnel/Channel	556.83 m TRT
Details of Submergence area	50.75 ha Upper Reservoir and 71.01 ha in Lower reservoir
Types of Waste and quantity of generation during construction/ Operation	Solid waste generation- 0.18 tonne/day Liquid waste generation- 200 KLD Muck Generation-6.42 lakh m^3
E-Flows for the Project	Not Applicable as reservoir is not located on any river
Is Projects earlier studies in Cumulative Impact assessment& Carrying Capacity	NA
Studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR/Recommendation by EAC as per CIA&CC study of River Basin. b) If not the E-flows maintain criteria for sustaining river ecosystem.	NA

Muck Management Details:

No. of proposed disposal area/(type of land-Forest/Pvt. land)	01 No. of Muck Disposal Site identified (114 ha) in Non-Forest Land
Muck Management Plan	Shall be prepared as a part of EIA Study

Monitoring mechanism for Muck Disposal	Shall be prepared as a part of EIA Study

Land Area Breakup:

Non Forest Land	159 ha
Forest Land	166 ha
Submergence area	121.76 ha
Total Land	325 ha

Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone	**Yes/No**	**Details of Certificate/letter/Remarks**
Reserve Forest/Protected Forest Land	Yes	
National Park	No	
Wildlife Sanctuary	No	

Court case details: Nill

Affidavit/Undertaking details: NA

Previous EC compliance and necessary approvals:

Particulars	**Letter no. and date**
Certified EC compliance report (if applicable)	NA
Status of Stage- I FC	Yet To Be Applied
Additional detail (If any)	-
Is FRA (2006) done for FC-I	-

Miscellaneous

Particulars	**Details**
Details of consultant	WAPCOS LTD.
Project Benefits	Annual peak energy generation of 2098.3MU and Up-liftment of socioeconomic Status of the surrounding villages
Status of other statutory clearances	-
R&R details	Shall be done as a part of EIA Study

51.2.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of TOR to the project for Kadopada Pumped Storage Project of capacity 750 MW (off stream closed loop) in an area of 325 ha at Village Guradikhol & Kadopada, District Deogarh, Odisha by M/s Jindal Renewable Power Private Limited.

The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry**.**

51.2.4: The EAC noted that presentation made by the PP/ consultant M/s WAPCOS was not satisfactory as they could not highlight major issues like eco-sensitivity of the region, location comes in dense forest land. Also, the project has not carried out alternate site analysis etc. It is also came to know that the consultant has not visited the site yet.

The EAC after detailed deliberations, deferred the proposal for want of following additional information:

I. Alternative site analysis shall be carried out in terms of ecological aspects viz. loss of Forest ecosystem due to diversion of Forest land/loss of biodiversity and its impacts on productivity of the ecosystem, water availability. The alternate sites should be explored changing the geographical region just changing the alignment of the selected alternatives on same location will defeat the purpose of such analysis.

II. Explore the possibilities to select such sites which involves no forest land or bare minimum forest area should be involved for the construction of proposed project.

III. Comments may be obtained from CWC on viability of the project in terms of water availability, as well as inter-state issues etc.

IV. Hydrograph of **Brahmani river-** Flow pattern of river during Pre- Monsoon, Monsoon, and Post- Monsoon be submitted. Plan for water withdrawal and precaution for aquatic fauna be submitted.

V. Report on carbon fixation ratio of existing forest area to be submitted.

*The proposal was therefore **deferred** on the above lines.*

Agenda Item No. 51.3:

Tainsar Pumped Storage Project of capacity 675 MW in an area of 281 ha at Village Gailo & Kailash, District Deogarh, Odisha by M/s Jindal Renewable Power Private Limited – Terms of References (ToR) – reg.

[Proposal No. IA/OR/RIV/439983/2023; F. No. J-12011/47/2023-IA.I (R)]

51.3.1: The proposal is for grant of Terms of References (ToR) to the project for Tainsar Pumped Storage Project of capacity 675 MW in an area of 281 ha at Village Gailo & Kailash, District Deogarh, Odisha by M/s Jindal Renewable Power Private Limited.

51.3.2: The Project Proponent and the accredited Consultant **M/s WAPCOS Limited**, made a detailed presentation on the salient features of the project and informed that:

i. The proposal is for Terms of Reference (ToR) to the project for Tainsar Pumped Storage Project (675 MW) located at Village Gailo & Kailash, District Deogarh, Odisha by M/s. Jindal Renewable Power Private Limited.
ii. The project is listed at item no. **1(c)** of the Schedule to the Environment Impact Assessment (EIA) Notification,2006 under Category 'A' and; hence, would be appraised at Central Level by Expert Appraisal Committee (EAC).
iii. Tainsar Pumped Storage Project (PSP) is located in Deogarh District, Odisha. The installed capacity of the project is estimated as 675 MW. The project envisages creation of two artificial reservoirs interconnected with water conductor system, feeding the reversible pump-turbine

units before draining into the lower reservoir through tailrace tunnel. Both the reservoirs are located away from all existing nearby rivers/streams/nallahs.

iv. **Land requirement:** The total land requirement for construction of various civil structures, associated infrastructure facilities and muck disposal area /green belt area is estimated as 281 ha. Out **of 281 ha of land, about 167.10 ha falls under the category of forest land and 113.90 ha under non-forest land**. Forest land requirement (Ha)/ MW is worked out as 0.247 ha/MW in selected Alt.-II in comparison to the other alternative (0.253 ha/MW in Alt.-III).

v. **Environmental sensitivity**: There are no national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc., within 10 km distance from the project site. River/water body is flowing at a distance of 1 km from Lower reservoir. **The Upper and Lower reservoir area falls under the Pradhanpat reserved forest.** The nearest wildlife sanctuary **is Usha Kothi,** located at about 43 km from the proposed project site.

vi. **Water requirement:** Required quantum of **8.82 MCM** of water for one-time filling of the proposed Tainsar PSP lower reservoir will be taken up from nearby **Jaraikela** Stream **by pumping which is located at about 0.9 km from the proposed lower reservoir**. Both the reservoirs will be interconnected through a water conductor system and the generator and turbines installed at the underground powerhouse**.**

vii. **Hydrological studies**: Tainsar Standalone PSP is proposed between two reservoirs i.e., upper and lower reservoir (both reservoirs to be constructed newly). These two reservoirs are not located across any perennial streams and few seasonal streams are draining towards the lower reservoir area which are having very small catchment areas and hence no specific hydrological studies are required to be carried out.

viii. Details of Solid waste/ Hazardous waste generation/ Muck and its management: **Muck Generation**: 2.01 lakh $m^{3.}$ **Solid waste Generation**: 0.18 tonnes/day.

ix. **Alternative analysis**: Four alternatives of the project layout were studied for the selection of most optimized project layout. Out of these four alternatives, the project layout as per Alternative-II has been preferred which will be equipped with four nos. of reversible Francis pump turbines (2 units of 225 MW/245 MW & 2 units of 125 MW/137.5 MW) housed in a pit type of surface powerhouse**.** The selected alternative (Alt.-II) is considered better alternative owing to the advantages over other alternatives (Alternative-I & I with IC-630 MW, Alt.-IV with IC-675 MW) in terms of shorter water conductor length, length to head ratio (L/H) ratio within 5 and relatively lesser land requirement. In addition, issues related to R&R, environmental and social considerations are minimal in the selected alternative.

x. **Project Cost and Financial Analysis:** It has been planned to construct and commission the project within a period of 36 months excluding pre-construction activities (27 months). The hard cost of the project is estimated **as INR 3325.36 Crore** and total completion cost is estimated as **INR 3792.17 Crores** considering escalation and interest during construction. The cost per MW is worked out as **INR 5.62 Cr**. The levelized tariff for one cycle generation works out to **INR 6.34/ kWh** corresponding to pumping cost per unit of **INR 2.63/kWh**

xi. Status of Litigation Pending against the proposal, if any. –**No**

xii. The salient features of the project are as under:-

EAC Meeting Details:

EAC meeting/s	51st EAC meeting (River Valley & Hydro-electric Projects) EC/AGENDA/EAC/760324/8/2023
Date of Meeting/s	12.09.2023
Date of earlier EAC meetings	-

Project details:

Name of the Proposal	Tainsar Pumped Storage Project (675 MW)

Location (Including coordinates)	Upper reservoir is located near Gailo & Kailash villages of Deogarh district (21°34'9.91"N 84°39'32.74"E) Lower reservoir is located near Tainsar village of Deogarh district (21°33'0.95"N 84°39'11.41"E)
Inter- state issue involved	No
Seismic zone	Zone -II

Category details:

Category of the project	A
Provisions	-
Capacity / Cultural command area (CCA)	675 MW
Attracts the General Conditions (Yes/No)	No

Electricity generation capacity:

Powerhouse Installed Capacity	675 MW (2 x 225 MW & 2 x 112.5 MW)
Generation of Electricity Annually	1895.7 MU
No. of Units	4

ToR Details:

Cost of project	Rs. 3792.17 Crores
Total area of Project	281 ha
Height of Dam from deepest Foundation Level (EL)	26 m (Upper Reservoir) 29 m (Lower Reservoir)
Length of Tunnel/Channel	Main Access Tunnel (MAT) - 718 m Tailrace Tunnel (TRT) - 143.4 m
Details of Submergence area	Upper Reservoir - 33.83 ha Lower Reservoir - 41.51 ha
Types of Waste and quantity of generation during construction/ Operation	Sewage generated from Labour camps 175 KLD per day approx. Muck Generation: 2.01 lakh m^3 Solid waste Generation: 0.18 tonnes/day
E-Flows for the Project	-
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. b) If not the E-Flows maintain criteria for sustaining river ecosystem.	NA

Reservoir Operating Parameters

S.No.	Reservoir parameters	Upper Reservoir	Lower Reservoir
1.	Full Reservoir Level (m)	641	300

2.	Minimum Drawdown Level (m)	619.5	280
3.	Finished Reservoir Bed Level (m)	618	278
4.	Gross Storage (Mm^3)	7.06	8.4
5.	Live storage (Mm^3)	6.64	7.69

Muck Management Details:

No. of proposed disposal area/(type of land-Forest/Pvt. land)	04 Muck disposal area 93 hectares in Non-Forest land
Muck Management Plan	Will be prepared during CEIA study
Monitoring mechanism for Muck Disposal	Will be prepared during CEIA study

Land Area Breakup:

Non- Forest Land	113.9 Hectares
Forest Land	167.1 Hectares
Submergence area	Upper Reservoir - 33.83 ha Lower Reservoir - 41.51 ha
Total Land required	281 Hectares

Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone	Yes/No	Details of Certificate/letter/Remarks
Protected/ Reserved Forest Land	Yes	
National Park	-	
Wildlife Sanctuary	-	

Court case details: NA
Affidavit/Undertaking details:

Affidavit/Undertaking	-
Additional information (if any)	-

Previous EC compliance and necessary approvals:

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	-
Status of Stage- I FC	Yet to be applied
Additional detail (If any)	-
Is FRA (2006) done for FC-I	-

Miscellaneous

Particulars	**Details**
Details of consultant	WAPCOS Limited
Project Benefits	Annual peak energy generation of 1895.70 MU and Up-liftment of socioeconomic Status of the surrounding villages
Status of other statutory clearances	-

R&R details	Shall be done as a part of EIA study

51.3.3 **The EAC during deliberations noted the following:**

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of terms of reference to the project for grant of Terms of References (ToR) to the project for Tainsar Pumped Storage Project of capacity 675 MW in an area of 281 ha at Village Gailo & Kailash, District Deogarh, Odisha by M/s Jindal Renewable Power Private Limited.

The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry**.**

The EAC noted that the project cover area involves around 167.10 ha of forest land out of total 281 ha. land for establishment of project and its components. The Upper and Lower reservoir area of the proposed project falls under the Pradhanpat reserved forest. No exercise has been done for optimization of forest land.

The EAC after detailed deliberations deferred the proposal for want of following additional information:

i. Explore the alternative sites and relocate site to reduce forest area.
ii. Alternative Site Analysis in terms of ecological aspects viz. loss of Forest ecosystem due to diversion of Forest land/loss of biodiversity and its impacts on productivity of the ecosystem.

*The proposal was therefore **deferred** on the above lines*

Agenda Item No. 51.4:

Expansion of Tembhu Lift Irrigation Project in an area of 2284.601 ha at Village Tembhu, District Satara, Sangli and Solapur, Maharashtra by M/s Department of Irrigation, Maharashtra – Terms of References (TOR) – reg.

[Proposal No. IA/MH/RIV/439901/2023; F. No. J-12011/48/2023-IA.I (R)]

51.4.1: The proposal is for grant of Terms of References (TOR) to the Expansion of Tembhu Lift Irrigation Project in an area of 2284.601 ha at Village Tembhu, District Satara, Sangli and Solapur, Maharashtra by M/s Department of Irrigation, Maharashtra.

51.4.2: The Project Proponent and the accredited Consultant M/s MITCON Consultancy & Engineering Services Ltd, made a detailed presentation on the salient features of the project and informed that:

i. The proposal is for ToR to the project for Proposed Expansion of Tembhu Lift Irrigation Project, Dist. Satara, Sangli and Solapur Maharashtra located at Sangli district by M/s. Minor Irrigation Division, Sangli Water Resources Department.
ii. The project is listed at S.N. 1 (C) of the Schedule to the Environment Impact Assessment (EIA) Notification under category 'A' and are appraised at Central Level by Expert Appraisal Committee (EAC).
iii. Tembhu Lift Irrigation Project envisages construction of Barrage across river Krishna near

village Tembhu and lifting the impounded water in Six stages to irrigate 121475 Ha. (Existing ICA 80472 ha + Proposed expansion ICA 41003 ha) of land from drought prone regions of Satara, Sangli and Solapur districts of Maharashtra state.

iv. Ministry had issued EC earlier ***vide letter no. 12011/43/2003-IA.I, dt. 17/08/2007 for ICA 80472 ha***.

v. **Land requirement details are as below:**

Nature of Land involved in (Ha)	**Area Existing in Ha**	**Additional Area Proposed in Ha**	**Total Area required after expansion in Ha**
Non-Forest Land	2259.38	8.54	2267.92
Forest Land	7.051	7.93	14.981
Total	**2266.431**	**16.87**	**2282.902**

vi. Total 16.87 land required for expansion of the project. Out of 16.87 ha, 7.93 ha Forest land and 8.54 Non- Forest land required.

vii. **Forest Clearance:** Total area of forest required for project is 16.681 ha. Out of which 7.051ha., area is principally approved by forest department vide Letter No. 8C/006/2001-FCW/594 dated March 3, 2005. The proposal for approval of 9.63 ha land is under progress.

viii. Provision for Ecology & Biodiversity /Green Belt Development is Rs. 755.58 L and will do plantation around project periphery.

ix. The estimated project cost as under:

Existing Project : Rs. 4088.14
Proposed Expansion: Rs.3281.89
Total Cost : Rs. 7370.03

x. Details of Solid waste/ Hazardous waste generation/ Muck and its management

Sr No	**Type of material**	**Total generated quantity in excavation in cum**	**Total generated quantity in excavation in Mm^3**
1	Soft Soil	225174.6	0.225175
2	Hard murum & soft Rock	505580.2	0.50558
3	Hard Rock	2178380	2.17838
	Total	2909135	2..909135

xi. **Proposed Water utilization of the project:**

Original Water utilization of the Tembhu Lift Irrigation project was 22.00 TMC and **Proposed Water utilization is 30.00 TMC**. This quantity will be available from following sources.

Sr. No.	**Sources**	**Content**
1	Koyana Dam	18.46 TMC
2	Wang Dam	0.97 TMC
3	Tarali Dam	1.67 TMC
4	Krishna river monsoon flow	0.90 TMC
5	Balance Water of Tembhu Project (As per 1st Tribunal report)	3.50 TMC
6	Krishna Canal Project-Difference in Total provision &actul use of water (as per 1st Tribunal report)	2.50TMC

7	Saving of water (Qty to be diverted towards western from Koyna Project)	2.00 TMC

Quantity of water shown in the above table at Sr.No.5,6& 7 is approved by Government of Maharashtra vide letter No. 2021/ (216/2021) dated 29/04/2022

xii. Status of Litigation Pending against the proposal, if any. – **Not any**

xiii. The salient features of the project are as under: -

Project details:

Name of the Proposal	Proposed Expansion of Tembhu Lift Irrigation Project, Dist. Satara, Sangli and Solapur Maharashtra
Location (Including coordinates)	Longitude : 74º 14' (East) Latitude : 17º17' (North)
Inter- state issue involved	No
Seismic zone	III

Category details:

Cate-gory of the project	A
Pro-visions	Irrigation to draught prone area of Dist. Satara, Sangli and Solapur Maharashtra
Capacity / Cultural comm-and area (CCA)	Expansion of Tembhu Lift Irrigation Project

SR NO	Taluka	District	COMMAND AREA					
			GCA		CCA		ICA	
			Existing	Extended Area	Existing	Extended Area	Existing	Extended Area
A	**Karad**	**Satara**	1150	330	860	0	600	0
B	**Khanapur**	**Sangli**	41135	19691	32921	11902	18975	6471
C	**Kadegaon**	**Sangli**	20215	2799	16179	0	9325	0
D	**Tasgaon**	**Sangli**	20570	15280	15450	11083	7700	6026
E	**Atpadi**	**Sangli**	61569	9015	43100	9737	16000	5294
F	**Sangola**	**Solapur**	36500	20745	29200	5876	20000	5000
G	**Jat**	**Sangli**	-	6506	-	4848	-	2636
H	**K Mahankal**	**Sangli**	17475	12455	10300	7826	7872	2450

	I	**Khatav**	**Satara**	-	18362	-	13685	-	7440
	J	**Man**	**Satara**	-	14033	-	10458	-	5686
		Total		**198614**	**119216**	**148010**	**75415**	**80472**	**41003**
Attracts the General Con-ditions (Yes/~~No~~)	Yes, Mayani Bird Conservation Reserve, Khatav is within 10 km radius								

Electricity generation capacity:

Powerhouse Installed Capacity	NA
Generation of Electricity Annually	NA
No. of Units	0
Additional information (if any)	Total electricity requirement will be 22 MW

Details:

Cost of project	Existing Project : Rs. 4088.14 Proposed Expansion: Rs.3281.89 Total Cost : Rs. 7370.03								
Total area of Project	**SR NO**	**Taluka**	**District**	**Command Area**					
				GCA		**CCA**		**ICA**	
				Existing	**Extended Area**	**Existing**	**Extended Area**	**Existing**	**Extended Area**
	A	**Karad**	**Satara**	1150	330	860	0	600	0
	B	**Khanapur**	**Sangli**	41135	19691	32921	11902	18975	6471
	C	**Kadegaon**	**Sangli**	20215	2799	16179	0	9325	0
	D	**Tasgaon**	**Sangli**	20570	15280	15450	11083	7700	6026
	E	**Atpadi**	**Sangli**	61569	9015	43100	9737	16000	5294
	F	**Sangola**	**Solapur**	36500	20745	29200	5876	20000	5000
	G	**Jat**	**Sangli**	-	6506	-	4848	-	2636
	H	**K Mahankal**	**Sangli**	17475	12455	10300	7826	7872	2450
	I	**Khatav**	**Satara**	-	18362	-	13685	-	7440
	J	**Man**	**Satara**	-	14033	-	10458	-	5686
		Total		**198614**	**119216**	**148010**	**75415**	**80472**	**41003**

<table>
<tr><td>Height of Dam from River Bed (EL)</td><td>NA</td></tr>
<tr><td>Length of Tunnel/Channel</td><td>Length of Proposed Tunnel: 700 m
Length of new pipeline proposed: 200km
Length of Distributaries 1000 km</td></tr>
<tr><td>Details of Submergence area</td><td>NA</td></tr>
<tr><td>Types of Waste and quantity of generation during construction/ Operation</td><td>Domestic Waste:
<table>
<tr><th>Name of Waste</th><th>Source</th><th>Qty (TPA)</th></tr>
<tr><td>Dry Waste</td><td>Labour Colony</td><td>39.42</td></tr>
<tr><td>Wet Waste</td><td>Labour Colony</td><td>26.28</td></tr>
</table>
Excavation Waste
<table>
<tr><th>Name of Waste</th><th>Source</th><th>Qty (cu.m)</th></tr>
<tr><td>Muck</td><td>Excavation & Tunnel Work</td><td>4101.35</td></tr>
</table></td></tr>
<tr><td>E-Flows for the Project</td><td>NA</td></tr>
<tr><td>Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then
e) E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin.

f) If not the E-Flows maintain criteria for sustaining river ecosystem.</td><td>NA</td></tr>
</table>

Muck Management Details:

No. of proposed disposal area/(type of land-Forest/Pvt. land)	Quantity of muck likely to be generated : 4101.35cu.m
Muck Management Plan	Mode of Disposal : Excavated material will be utilized in filling and road work (IP and SR)
Monitoring mechanism for Muck Disposal	Environmental Management Cell (EMC) shall monitor mechanism of muck disposal

Land Area Breakup:

Private land	2259.38+8.54= 2267.92 Ha			
Government land/Forest Land	7.051+7.63 = 14.981			
Submergence area/Reservoir area	NA			
Land required for project components	Nature of Land involved in (Ha)	Area Existing in Ha	Additional Area Proposed in Ha	Total Area required after expansion in Ha
	Non-Forest Land	2259.38	8.54	2267.92
	Forest Land	7.051	7.93	14.981
	Total	2266.431	16.87	2282.902

Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone	Yes /No	Details of Certificate/letter/Remarks
Reserve Forest/Protected Forest Land	Yes	Nature of Land involved in (Ha) / Area Existing in Ha / Additional Area Proposed in Ha / Total Area required after expansion in Ha Forest Land / 7.051 / 9.63 / 16.681
National Park	No	Not within 10 km radius from proposed command area boundary
Wildlife Sanctuary	No	Following Sacred groves present in the command area

Sr. No.	Name of the Grove	Deity	Tahsil	Distance	Direction
1	Arewadi	Biroba	KavatheMahankal	3 km	SE
2	Raywadi	Lord Shiva	KavatheMahankal	3 km	W

		3	Shukachary a	Sukhdev	Khanpur-Atpadi	2 km	NE
		4	Mayani	Bird Conserv e Reserve	Khatav	1.2 km	NE

Court case details:

Court Case	NA
Additional information (if any)	NA

Affidavit/Undertaking details:

Affidavit/Undertaking	Enclosed
Additional information (if any)	NA

Previous EC compliance and necessary approvals:

Particulars	**Letter no. and date**
Certified EC compliance report (if applicable)	Applied, will be incorporated in EIA EMP report
Status of Stage- I FC	Forest Land approval for 7.051 ha vide Letter No. 8C/006/2001-FCW/594 dated March 3, 2005
Additional detail (If any)	NA
Is FRA (2006) done for FC-I	NA

Miscellaneous

Particulars	**Details**
Details of consultant	MITCON Consultancy & Engineering Services Ltd. Pune **Certificate No.** NABET/EIA/2124/RA 0229_Rev 02 Valid up to Feb 05, 2024
Project Benefits	❖ The proposed expansion intends to irrigate 41003 ha land of 113 villages Satara, Sangli and Solapur districts of Maharashtra ❖ Due to PDN, there is increase in water use efficiency, Speedy construction early benefits and more irrigation per Mcft ❖ **During construction phase** ***Permanent employment*** No. of permanent employment: 360 Period of employment (days): 730 ***Temporary employment*** Temporary / Contractual employment (No. of Man days): 33000 **During operational phase**

	Permanent employment proposed: 10 Temporary employment proposed: 5
Status of other statutory clearances	**Environmental Clearance** ❖ Letter No. 12011/43/2003-IA.I Dated August 17 2007 **Forest Clearance** ❖ Forest Land approval for 7.051 ha vide Letter No. 8C/006/2001-FCW/594 dated March 3, 2005 ❖ Additional application for 9.63 ha land is in progress
R&R details	NA

51.4.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc**.)** and as presented in the meeting and observed that the proposal is for grant of Terms of Reference to the project for Expansion of Tembhu Lift Irrigation Project in an area of 2284.601 ha at Village Tembhu, District Satara, Sangli and Solapur, Maharashtra by M/s Department of Irrigation, Maharashtra.

The EAC also noted that Mayani Bird Conservation Reserve, Khatav is within 10 km radius from the proposed project site. The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

51.4.4: The EAC after detailed deliberation on the information submitted and as presented during the meeting **recommended** for grant of Standard ToR for to the Expansion of Tembhu Lift Irrigation Project in an area of 2284.601 ha at Village Tembhu, District Satara, Sangli and Solapur, Maharashtra by M/s Department of Irrigation, Maharashtra under the provisions of EIA Notification, 2006, as amended along with the following additional/specific ToR:

[A] Environmental Management and Biodiversity Conservation:

i. The EAC shall conduct site visit before considering the proposal for grant environmental clearance.
ii. Mitigation plan to avoid Human-Wildlife Conflict should be prepared scientifically with the help of Wildlife Experts.
iii. Stage I FC for 7.93 ha of forest land involved in the project shall be submitted prior to grant of EC.
iv. In view of project location within 10 km radius of Mayani Bird Conservation Reserve, Khatav necessary clearance from NBWL is required before start of the construction work.
v. Certificate and certified map from Chief Wildlife Warden shall be submitted mentioning that project boundary is located outside the Eco-Sensitive Zone (ESZ) / Wild Life Sanctuary and no Tiger/elephant corridor/Critically polluted area falls within 10 km of Project site.
vi. The water of rainfall yield of self-catchment of the reservoir shall be released to downstream through body of dam/ barrage/ embankment etc.
vii. Prepare Wildlife conservation plan specifically for avi-fauna with mitigation measures for minimizing the human–animal conflict and be suitably incorporated in the wildlife conservation plan in consultation with reputed government expert institute and State Forest Department.

viii. Cumulative Impact of project on carrying capacity and sustainability of Reservoir/ nallahs of catchment area / due to lifting of water from river.

ix. Prepare Environmental Cost Benefit Analysis in terms of loss of Forest ecosystem due to diversion of Forest land/ loss of biodiversity and its impacts on ecosystem, water availability, water uses for generation of hydro power in study area 10 km from periphery of Project components.

x. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted and thermal stratification. Accordingly, Environment Management plan shall be prepared.

xi. Sampling locations be located to cover villages situated near the reservoir and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report.

xii. Source of construction material and its distance from the project site along with detailed transportation plan for construction material be elaborated in the EIA EMP report. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report.

xiii. A detailed wildlife conservation plan for Schedule –I species, duly approved by the Chief Wild Life Warden, be submitted.

xiv. In case any Wildlife corridor is located within 10 km radius of the project site a detailed study shall be conducted to assess the impact of project on safe movement of wild animals.

xv. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.

xvi. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Govt. institutions/ Indian Council of Agriculture Research (ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report.

xvii. MoU for water uses for the project shall be signed and approved by concerned authority.

[B] Socio-economic Study

xviii. Statement on the commitments (activity-wise) made during public hearing to facilitate the discussion on the CER in compliance of the Ministry's OM F. No. 22- 65/2017- IA.III dated 30th September, 2020 shall be submitted.

[C] Muck Management/ Disaster Management

xix. Details of quantity of muck generation component wise and disposal site along with transportation plan and its monitoring to be provided.

xx. Details of Muck Management plan prepared along with estimated cost incorporated in EIA/ EMP report.

xxi. Techno-economic viability of the project must be recommended from CEA/ CWC.

[D] Miscellaneous.

xxii. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted.

xxiii. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose.

xxiv. Both capital and recurring expenditure under EMP shall be submitted.

xxv. The photograph should bear the date, time, latitude & longitude of the monitoring station/ sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyse the samples.

xxvi. Arial view video of project site shall be recorded and to be submitted.

Agenda Item No. 51.5:

Emra-II Hydro Electric Project (315 MW) in an area of 236 ha at District Dibang Valley, Arunachal Pradesh by M/s Athena Emra Power Private Limited – Terms of Reference (ToR) – reg.

[Proposal No. IA/AR/RIV/439743/2023; F. No. J-12011/49/2023-IA.I (R)]

51.5.1: The proposal is for grant of Terms of Reference (TOR) to the project for Emra-II Hydro Electric Project of capacity 315 MW in an area of 236 ha at District Dibang Valley, Arunachal Pradesh by M/s Athena Emra Power Private Limited.

51.5.2: The Project Proponent and the accredited Consultant M/s. R S Envirolink Technologies Pvt. Ltd., made a detailed presentation on the salient features of the project and informed that:

i. The proposal is for ToR to the project for Emra-II Hydro Electric Project of capacity 315 MW in an area of 236 ha at District Dibang Valley, Arunachal Pradesh by M/s Athena Emra Power Private Limited**.**

ii. The project is listed at S.N. 1(c) of the Schedule to the Environment Impact Assessment (EIA) Notification under category 'A' and is appraised at Central Level by Expert Appraisal Committee (EAC).

iii. The estimated project cost is **Rs. 3656.64 Crore**. Total capital cost earmarked towards environmental pollution control measures will be worked out during EIA study as well as the Recurring cost (operation and maintenance).

iv. There are **no** national parks, wildlife sanctuaries, Biosphere Reserves, Tiger/Elephant Reserves, Wildlife Corridors etc. within 10 km distance from the project site. River **Emra** is flowing at a distance of **0** km in **south east** direction.

v. Details of Solid waste/ Hazardous waste generation/ Muck and its management **will be incorporated in EIA/EMP report.**

vi. Status of Litigation Pending against the proposal, if any. **No**

vii. The salient features of the project are as under: -

Project details:

Name of the Proposal	Emra-II Hydro Electric Project
Location (Including coordinates)	Dam site is proposed near Angolin village, Etalin circle, Dibang Valley district of Arunachal Pradesh with the geographical latitude of 28 º34'42.86"N and longitude 95 º49'12.98"E.
Inter- state issue involved	No

Seismic zone	Zone - V

Category details:

Category of the project	1(c) River Valley Projects
Provisions	
Capacity / Cultural command area (CCA)	315 MW
Attracts the General Conditions (Yes/No)	No
Additional information (if any)	Nil

Electricity generation capacity:

Powerhouse Installed Capacity	315 MW
Generation of Electricity Annually	1323.51 GWh
No. of Units	3 nos. (105 MW each)
Additional information (if any)	Nil

ToR Details:

Cost of project	3656.64 Cr.
Total area of Project	236 ha
Height of Dam from River Bed (EL)	113.0 m
Length of Tunnel/Channel	705.52 m
Details of Submergence area	130.0 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	As per the approved CIA&CC study of Dibang Basin report the E-flow of 20%, 25% & 20 % to be maintained during lean, monsoon & intermediate period respectively.
Is Projects earlier studies in Cumulative Impactassessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. b) If not the E-Flows maintain criteria for sustaining river ecosystem.	As per the approved CIA&CC study of Dibang Basin report the E-flow of 20%, 25% & 20 % to be maintained during lean, monsoon & intermediate period respectively.

Muck Management Details:

No. of proposed disposal area/ (type of land-Forest/Pvt. land)	1 no. of 22 ha in private land
Muck Management Plan	Will be studied in detail and will be provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be studied in detail and will be provided in EIA/EMP report

Land Area Breakup:

Private Land	82 ha

Government land/Forest Land	154 ha Forest Land
Submergence area/Reservoir area	130 ha
Land required for project components	106 ha
Additional information (if any)	Total land required – 236 ha

Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone	**Yes/No**	**Details of Certificate / letter/ Remarks**
Reserve Forest/Protected Forest Land	No	Nil
National Park	No	
Wildlife Sanctuary	No	

Court case details: Nil
Affidavit/Undertaking details:

Affidavit/Undertaking	Enclosed
Additional information (if any)	Nil

Previous EC compliance and necessary approvals:

Particulars	**Letter no. and date**
Certified EC compliance report (if applicable)	Not Applicable
Status of Stage- I FC	Yet to Apply
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	Yet to Apply

Miscellaneous

Particulars	**Details**
Details of consultant	M/s. R S Envirolink Technologies Pvt. Ltd. (RSET) (*NABET* Accredited *Consultant Organization*) E-mail : ravi@rstechnologies.co.in Land Line : (0124) 4295383 Cellular : (+91) 9810136853
Project Benefits	On completion of the Project the following benefits can be derived: • The levelized tariff for 40 years has been found to be Rs 5.76 per unit. The project is with diurnal peaking power benefits. The project has been found commercially viable and the generation from the project shall mitigate the miseries of power-starved industry and people particularly in the eastern and north eastern state. • A number of marginal activities and jobs will be available to the locals during the construction phase. • Local Area Development, facilities in Education, medical, transportation, road network and other infrastructure. • An opportunity for small-scale and cottage industries to develop in the area.
Status of other statutory clearances	**Forest Clearance:** Online application seeking forest diversion for around 154.0 ha will be submitted after receipt of ToR approval. Alongside, other statutory clearances (as applicable) from State as well as Central government will be obtained post completion of Detailed Project Report.

Particulars	Details
R&R details	The process of R&R is yet to be initiated. Detailed R&R plan will be Provided in EIA/EMP report

51.5.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of Terms of Reference to the project for Emra-II Hydro Electric Project of capacity 315 MW in an area of 236 ha at District Dibang Valley, Arunachal Pradesh by M/s Athena Emra Power Private Limited**.**

The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

51.5.4 : The EAC after detailed deliberation on the information submitted and as presented during the meeting **recommended** for grant of Standard ToR for to the project for Emra-II Hydro Electric Project of capacity 315 MW in an area of 236 ha at District Dibang Valley, Arunachal Pradesh by M/s Athena Emra Power Private Limited under the provisions of EIA Notification, 2006, as amended along with the following additional/specific ToR:

[A] Environmental Management and Biodiversity Conservation:

i. Conducting site specific ecological study w.r.t riverine ecology focus on fishes diversity and aquatic biota.
ii. Explore the possibilities to reduce forest area for the construction of proposed project.
iii. Prepare Environmental Cost Benefit Analysis in terms of loss of Forest ecosystem due to diversion of Forest land/ loss of biodiversity and its impacts on ecosystem, water availability, water uses for generation of hydro power in study area 10 km from periphery of Project components.
iv. Environmental Flows maintained by Project as per CIA&CCS study of Dibang River Basin Study.
v. Cumulative Impact of project on carrying capacity and sustainability of EMRA River due to construction of proposed project.
vi. Mahseer zone covers the main Dibang river below confluence of EMRA river. Proposed Project fall in Mahseer zone. Therefore, Impact assessment on the fish diversity based on the hydrological alteration at the water in the Emra river and d/s of confluence with Dibang river studied and accordingly prepare Conservation and mitigation plan.
vii. Alternative sites for various components shall be identified in terms of loss of forest area and environmental aspects.
viii. Mitigation plan to avoid Human-Wildlife Conflict should be prepared scientifically with the help of Wildlife Experts.
ix. Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Standard ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all three seasons.
x. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic

ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.

xi. Sampling locations be located to cover villages situated near the reservoir and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report.

xii. Identify the sand mining/ quarrying sites in submergence area and downstream of reservoir.

xiii. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with expert Govt. institutions/ Indian Council of Agriculture Research(ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report.

xiv. Source of construction material and its distance from the project site along with detailed transportation plan for construction material.

xv. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report.

xvi. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.

xvii. MoU for water uses for the project signed and approved by concerned authority shall be submitted.

xviii. Environmental matrix during construction and operational phase needs to be submitted. Matrix formulated on the basis of detailed study and field survey of flora and Fauna methodology used shall be mentioned in the EIA report.

xix. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.

xx. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component.

xxi. Stage-I Forest Clearance shall be obtained.

xxii. Muck disposal sites and approach roads should be outside the forest area.

[B] Socio-economic Study

xxiii. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.

xxiv. Statement on the commitments (activity-wise) made during public hearing to facilitate the discussion on the CER in compliance of the Ministry's OM F. No. 22- 65/2017-IA.III dated 30th September, 2020 shall be submitted.

[C] Muck Management/ Disaster Management

xxv. Details of quantity of muck generation component wise and disposal site along with transportation plan and its monitoring to be provided.

xxvi. Techno-economic viability of the project must be recommended from CEA/ CWC.

[D] Miscellaneous.

xxvii. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted.

xxviii. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose.

xxix. Both capital and recurring expenditure under EMP shall be submitted.

xxx. The photograph should bear the date, time, latitude & longitude of the monitoring station/ sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyse the samples.

xxxi. Arial view video of project site shall be recorded and to be submitted.

xxxii. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.

Agenda Item No. 51.6:

Raiwada Close Loop Pumped Storage Project of capacity 850 MW in an area 337.10 ha of at Village Mariki and Sammeda, Tehsil Devarapalle and Vepada, District Anakapalli and Vizianagaram (Andhra Pradesh) by M/s Adani Green Energy Limited – Terms of References (TOR) – reg.

[Proposal No. IA/AP/RIV/438787/2023; F. No. J-12011/45/2023-IA.I (R)]

51.6.1 The proposal is for grant of Terms of Reference (ToR) to the project for Raiwada Close Loop Pumped Storage Project of capacity 850 MW in an area 337.10 ha of at Village Mariki and Sammeda, Tehsil Devarapalle and Vepada, District Anakapalli and Vizianagaram (Andhra Pradesh) by M/s Adani Green Energy Limited.

51.6.2 The Project Proponent and the accredited Consultant M/s. R. S. Envirolink Technologies Pvt. Ltd., made a detailed presentation on the salient features of the project and informed that:

1. The proposal is for grant of ToR to the project for Raiwada Pumped Storage Project located (850MW) at Mariki and Sammeda villages, Vepada & Devarapalle Mandal, Vizianagaram & Anakapalle Districts, Andhra Pradesh by M/s Adani Green Energy Limited.

2. The project is listed at S.N. 1 (c) of the Schedule for the Environment Impact Assessment (EIA) Notification under category 'A' and is appraised at Central Level by Expert Appraisal Committee (EAC).

3. Both upper and lower dams located in the upper reaches of Sarada river basin, which is a minor east flowing river. The upper dam is located near Mariki village, Vepada Mandal, Vizianagaram district with the geographical latitude of 18°02'34.5"N and longitude of 83°01' 58.9"E. The lower reservoir is located near Sammeda village, Devarapalle Mandal, Anakapalle district of Andhra Pradesh state having a geographical latitude of 18°03'12.1"N & longitude 83°00'52.2"E.

4. It is proposed to take the water from the annual yield of Sarda River during monsoon season for initial filling of the reservoirs in period of two to three years. The Project is proposed with gross storage capacity of 19.23 MCM in the lower reservoir and 9.38 MCM in the upper reservoir.

5. **Land requirement:** A total of 337.10 ha of land will be required for the project. 39.80 ha is forest land, and 297.30 ha is revenue land (Government & Private Land).

6. **Water Source and availability:** It is proposed to store water into the lower reservoir during monsoon season for initial filling. The water required for initial filling of reservoirs and recuperation of losses every year has been estimated to be about 23.0 MCM whereas the live storage requirement is only 5.2 MCM for daily operations. The annual yield of Project site is 93.1 MCM out of which 23 MCM is taken considering all the loses, live storage and dead storage.

7. This Project envisages non-consumptive re-utilization of 5.20MCM of water for recirculation among two proposed reservoirs for power generation.

8. The estimated project cost is Rs. 3455 Crores including IDC & FC at 2022-23 price level. As a preliminary estimate, a construction period of 5 years (60months) from the date of award of civil works package has been estimated for this project. Total capital cost earmarked towards environmental pollution control measures will be worked out during EIA study as well as the Recurring cost (operation and maintenance).

9. **Environmental Sensitivity:** Kamblakonda Wildlife Sanctuary, located about 34km south-east from site, is the nearest protected area.

10. **Alternative studies:** Total 3 alternative sites and Five Layouts were studied. Out of these alternatives, alternative-3, Layout-5 covers the least forest area. The area will be planted on completion of muck dumping in addition to other green belt areas, which will be proposed during EIA study. Therefore, alternative 5, Layout-5 site selected for further studies.

11. Details of Solid waste/ Hazardous waste generation/ Muck and its management will be covered in EIA report.

12. Status of Litigation Pending against the proposal, if any. No

13. The salient features of the project are as under:

EAC MEETING DETAILS

EAC Meeting's	:	51st Meeting
Date of Meeting	:	12.09.2023
Date of earlier EAC meetings	:	Nil

PROJECT DETAILS:

Name of Proposal	:	Raiwada Pumped Storage Project
Location including Coordinate	:	Upper Dam: 18°02'34.5"N and 83°01' 58.9"E Lower Dam: 18°03'12.1"N & longitude 83°00'52.2"E
Inter- state issue involved	:	NO
Seismic Zone	:	II

CATEGORY DETAILS:

Category of the project	:	A
Provisions	:	
Capacity / Cultural command area (CCA)	:	850MW
Attracts the General Conditions (Yes/No)	:	Yes
Additional information (if any)	:	-

ELECTRICITY GENERATION CAPACITY:

Powerhouse Installed Capacity	:	850MW

Generation of Electricity Annually	:	1768MU
No. of Units	:	3 (3 x 283.33) MW
Additional information (if any)	:	

ToR/EC Details:

Cost of project	3455.0 Cr.
Total area of Project	337.10 ha
Height of Dam from River Bed (EL)	Lower Dam – 16 m Upper Dam – 47 m
Length of Tunnel/Channel	1500
Details of Submergence area	293.0 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste
E-Flows for the Project	Not Applicable, as this is Off-Stream Open Loop Pumped Storage Project (PSP)
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR /Recommendation by b) EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustaining river ecosystem.	No

Muck Management Details:

No. of proposed disposal area/ (type of land-Forest/Pvt. land)	20 ha Private Land
Muck Management Plan	Will be Provided in EIA/EMP report
Monitoring mechanism for Muck Disposal	Will be Provided in EIA/EMP report

Land Area Breakup:

Government land/Forest Land	39.80
Submergence area/Reservoir area	293.0 ha
Land required for project components	44.10 ha
Additional information (if any)	Nil

Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Sensitivity Zone		Details of Certificate / letter/ Remarks
Reserve Forest/Protected Forest Land	--	There is no Protected Area in the vicinity of the proposed project. Kambalakonda WLS is about 34.0 Km from site, is the nearest protected area.
National Park	--	
Wildlife Sanctuary	--	

Court case details: Nil

Affidavit/Undertaking details:

Affidavit/Undertaking	Enclosed
Additional information (if any)	Nil

Previous EC compliance and necessary approvals:

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	Not Applicable
Status of Stage- I FC	Yet to Apply
Additional detail (If any)	Nil
Is FRA (2006) done for FC-I	Yet to apply

Miscellaneous

Particulars	Details
Details of consultant	M/s. R S Envirolink Technologies Pvt. Ltd. (RSET) (*NABET* Accredited *Consultant Organization*) Certificate No : NABET/EIA/2225/RA0274 Validity : August 15, 2025
Project Benefits	• Pumped storage hydropower is a modified use of conventional hydropower technology to store and manage energy or electricity by moving water between an upper and lower reservoir. Currently, pumped storage round-trip or cycle energy efficiencies exceed 80%, comparing favorably to other energy storage technologies and thermal technologies. This effectively shifts, stores, and reuses energy generated until there is corresponding demand for system reserves and variable energy integration. This shifting can also occur to avoid transmission congestion periods, to help more efficiently manage transmission grid, and to avoid potential interruptions to energy supply. This is important because many of the renewable energy resources being

	developed (e.g., wind and solar) are generated at times of low demand and off-peak energy demand periods are still being met with fossil fuel resources, often at inefficient performance levels that increase the release of greenhouse gas emissions. • Further, pumped storage projects are critical to the national economy and overall energy reliability because it's: o Least expensive source of electricity, not requiring fossil fuel for generation o An emission-free renewable source o Balancing grid for demand driven variations o Balancing generation driven variations o Voltage support and grid stability Apart from this, proposed PSP will also benefit the local community by creating employment opportunities and will result in upliftment of livelihood and socio-economic conditions.
Status of other statutory clearances	Forest Clearance - Online application seeking forest diversion for around 39.8 Ha after receipt of ToR Approval. Alongside, other statutory clearances (as applicable) from State as well as Central government will be obtained post completion of Detailed Project Report.
R&R details	Details shall be evaluated during EIA/EMP Studies
Additional detail (If any)	Nil

51.6.3 The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, kml file, etc.) and as presented in the meeting and observed that the proposal is for grant of terms of reference to the Raiwada Close Loop Pumped Storage Project (850 MW) in an area 337.10 ha of at Village Mariki and Sammeda, Tehsil Devarapalle and Vepada, District Anakapalli and Vizianagaram, Andhra Pradesh by M/s Adani Green Energy Limited**.**

The project/activity is covered under Category A of item 1 (c) 'River Valley projects' of the Schedule to the Environmental Impact Assessment Notification, 2006 and requires appraisal at Central level by the sectoral EAC in the Ministry.

51.6.4: The EAC after detailed deliberation on the information submitted and as presented during the meeting recommended for grant of Specific ToR for Raiwada Close Loop Pumped Storage Project (850 MW) in an area 337.10 ha of at Village Mariki and Sammeda, Tehsil Devarapalle and Vepada, District Anakapalli and Vizianagaram, Andhra Pradesh by M/s Adani Green Energy Limited under

the provisions of EIA Notification, 2006, as amended along with the following additional/specific ToR:

[A] Environmental Management and Biodiversity Conservation:

i. Conducting site specific ecological study w.r.t riverine ecology focus on fishes diversity and aquatic biota due to construction of lower reservoir across Sharda river.
ii. Stage I FC for 39.8 ha of forest land involved in the project shall be submitted prior to grant of EC
iii. Conduct Environmental Cost Benefit Analysis in terms of loss of Forest ecosystem due to diversion of Forest land/ loss of biodiversity and its impacts on ecosystem, water availability, water uses for generation of hydro power in study area 10 km from periphery of Project components
iv. Cumulative Impact of project on carrying capacity and sustainability of East flowing river between **Mahanadi and Pennar** due to tapping of water for filling lower reservoir.
v. Alternative sites for various components shall be identified in terms of loss of forest area and other environmental aspects. Explore to minimize forest land.
vi. Action plan for survival of the rivulets located in the study area.
vii. Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Standard ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all three seasons.
viii. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.
ix. Sampling locations be located to cover villages situated near the reservoir and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report.
x. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report.
xi. A detailed wildlife conservation plan for Schedule –I species, duly approved by the Chief Wild Life Warden, be submitted.
xii. In case any Wildlife corridor is located within 10 km radius of the project site a detailed study shall be conducted to assess the impact of project on safe movement of wild animals.
xiii. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
xiv. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Govt. institutions/ Indian Council of Agriculture Research (ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report.
xv. MoU for water uses for the project shall be signed and approved by concerned authority.
xvi. Environmental matrix during construction and operational phase needs to be submitted.
xvii. Matrix formulated on the basis of detailed study and field survey of flora and fauna methodology used shall be mentioned in the EIA report.
xviii. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.
xix. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component.

xxii. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.

[B] Socio-economic Study

xxiii. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.

xxiv. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.

xxv. Statement on the commitments (activity-wise) made during public hearing to facilitate the discussion on the CER in compliance of the Ministry's OM F. No. 22- 65/2017- IA.III dated 30th September, 2020 shall be submitted.

xxvi. Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared.

xxvii. Details of settlement in 10 km area shall be submitted.

[C] Muck Management/ Disaster Management

xxvii. Details of quantity of muck generation component wise and disposal site along with transportation plan and its monitoring to be provided.

xxviii. Details of Muck Management plan prepared along with estimated cost incorporated in EIA/ EMP report.

xxix. Techno-economic viability of the project must be recommended from CEA/ CWC

[D] Miscellaneous.

xxx. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted.

xxxi. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose.

xxxii. Both capital and recurring expenditure under EMP shall be submitted.

xxxiii. The photograph should bear the date, time, latitude & longitude of the monitoring station/ sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyse the samples.

xxxiv. Arial view video of project site shall be recorded and to be submitted.

xxxv. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.

xxxvi. Specific Terms of Reference (ToRs) issued by the Ministry vide Office Memorandum No. F. No. IA3-22/33/2022-IA.III dated 14.08.2023 for Pump storage projects shall be used for preparation of EIA/ EMP reports.

Additional Agenda Item No. 51.1:

Kurha Vadhoda Islampur Lift Irrigation Scheme of Culturable Command Area (CCA) of 32372 Ha at Village Rigaon, Tehsil Muktainagar District Jalgaon (Maharashtra) by M/s Tapi Irrigation Development Corporation, Jalgaon, Maharashtra - Environmental Clearance (EC) - reg.

[Proposal No. IA/MH/RIV/423561/2023; F. No. J-12011/05/2021-IA.I (R)]

51.7.1 The Member Secretary informed the EAC that the instant proposal is for grant of Environmental Clearance (EC) to the project for Kurha Vadhoda Islampur Lift Irrigation Scheme of Culturable Command Area (CCA) of 32372 Ha at Village Rigaon, Tehsil Muktainagar District Jalgaon (Maharashtra) by M/s Tapi Irrigation Development Corporation, Jalgaon, Maharashtra.

The proposal was earlier considered by the EAC in it 45th meeting held on 26th April, 2023, wherein the EAC recommended the proposal for grant of environmental clearance.

The recommendation of the EAC was processed in the Ministry and it has been emerged that the due process has not been followed by the project proponent during Public Consultation as prescribed under the EIA Notification, 2006, as amended. Accordingly, the proposal referred back to EAC for re-consideration by the EAC.

51.7.3: The EAC during deliberations noted that the proposal was earlier recommended for grant of EC , as the project is being constructed in drought prone area of Jalgaon District of Maharashtra and is of immense importance for local public. The EAC further noted that as the public consultation process has not been done as per the provisions of EIA Notification, 2006, the EAC suggested the project proponent to conduct public consultation as per procedure prescribed.

Additional Agenda Item No. 51.2

Consideration of Site Visit Report the EAC (Sub-Committee) Visit for Kodayar Pumped Storage Hydro Electric Project of capacity 1500 MW located at Village Pechiparai, Taluk Thiruvattar, District Kanyakumari (Tamil Nadu) by M/s Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO)- Terms of Reference (TOR).

The EAC noted that:

1. The proposal is under consideration for grant of Terms of Reference to the project for Kodayar Pumped Storage Hydro Electric Project of capacity 1500 MW in an area of 40.72 ha located at Village Pechiparai, Taluk Thiruvattar, District Kanyakumari (Tamil Nadu) by M/s Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) was submitted on 17.02.2023.
2. The proposal was considered by the EAC (River Valley and Hydroelectric Projects) in 43rd meeting held on 7th March, 2023.
3. After detailed deliberations the EAC observed that the project location is sensitive in terms of dense forest cover, Tiger reserve, Wildlife sanctuary and biodiversity. Therefore, the EAC deferred the proposal and decided to conduct site-visit by EAC sub-committee members before making any recommendations on proposal.
4. Accordingly, sub-committee of Expert Appraisal Committee (EAC) comprising of the following 4 members visited the proposed for Kodayar Pumped Storage Hydro Electric Project site from 28.05.2023 to 31.05.2023. The detailed site visit report is annexed.

    1. Dr. A.K. Malhotra
    2. Shri Ashok Kumar Kharya
    3. Dr. Anthony Jhonson
    4. Shri Yogendra Pal Singh

6. The officials visited the lower intake reservoir and the location of upper reservoir. The locations inspected in the lower reaches are detailed below.

1. Pechiparai Dam top.
2. Ferry point
3. Lower intake location through ferry.
4. Tachamalai Kanikudi.
5. Kallar river and interaction with WRD official.
6. Road leading to Kalaparai Kannikudi from Mothiramalai.
7. Kuttiyar river & Rubber plantation area.
8. Power house location proposed for PSP.
9. Tail race area.
10. The Terrain of MAT.

7. The areas inspections at Upper intake area are detailed below:

a. The Kodayar dam I U/S – D/S Viewed from dam top.
b. The road leading to saddle 7 of Kodayar dam I
c. Proposed intake of Kodayar dam I (Upper intake)
d. Chinnakuttiyar dam.
e. Water spread area of Kodayar dam I

Observations of Sub-committee

1. The extent of the project falls within the Wildlife sanctuary and Tiger reserves. The entire road falls within the KWLS bounds. Movement of heavy dumpers for Muck dumping within the forest roads was a major concern and needs to be restricted.
2. Eutrophication is occuring in the Upper reservoir. It was requested to TANGEDCO to take action for cutting and disposal of the existing withered trees in the water spread area of Kodayar Dam-I.
3. The committee is of the opinion that the project area falls within the Kalakad Mundanthurai Tiger Reserve (KMTR) as well as Kanyakumari Wildlife Sanctuary, Tamil Nadu. Scientific studies reveal that the area is of high ecological importance and habitat for various critical and endangered wildlife species including Tigers, Guars, Elephants and many endemic plant species. Though the main components of the projects viz. inlet tunnel and the power house are proposed underground, there will be a high probability of disturbance in various ecological attributes which may ultimately affect the wildlife habitat. Hence, it is appropriate to take opinion of the Standing Committee of National Board for Wildlife (NBWL) before taking any decision on the proposal. Accordingly, the project proponent may be requested to obtain necessary consent of NBWL for construction of project at proposed location.

The EAC after detailed examination of the site visit report recommended that the PP should submit the following information for further consideration of the proposal for grant of Terms of Reference:

1. Permission of the Standing Committee of National Board for Wildlife (NBWL) for construction of the project at proposed location.

2. Valid document indicating that proposed project is the permissible activity on permissible activity inside the Kalakad Mundanthurai Tiger Reserve (KMTR) as well as Kanyakumari Wildlife Sanctuary, Tamil Nadu.

Additional Agenda item No. 51.2

Consideration of Site Visit Report the EAC (Sub-Committee) of Upper Indravati Pumped Storage Project 600 MW (4x150 MW) in an area of 164 Ha located at Village Mukhiguda, Kalahandi District (Odisha) by M/s Odisha Hydro Power Corporation Limited

The EAC noted that:

1. The proposal is under consideration for grant of Terms of Reference to the project for Upper Indravati Pumped Storage Project 600 MW (4x150 MW) in an area of 164 Ha located at Village Mukhiguda, Kalahandi District (Odisha) by M/s Odisha Hydro Power Corporation Limited submitted on 13.03.2023.

2. The proposal was considered by the EAC (River Valley and Hydroelectric Projects) in in 44th meeting held on 27th – 28th March, 2023

3. After detailed deliberations the EAC observed that the PP informed that some construction activities (sub-surface exploration) have already been started, so, the EAC desired to verify the status of construction activities at site. Therefore, the EAC deferred the proposal and decided to conduct site-visit by EAC sub-committee members before making any recommendations on proposal.
4. Accordingly, a sub-committee of Expert Appraisal Committee (EAC) comprising of the following 4 members visited the proposed Upper Indravati Pumped Storage Project 600 MW (4x150 MW) site from 17th August 2023 to 20th August 2023.

    1. Dr. A.K Malhotra
    2. Dr. Uday Kumar R.Y
    3. Dr. J. A. Johnson
    4. Shri Yogendra Pal Singh, Scientist 'E'

5. Observations of Sub-committee

i. The proposed Head race Tunnel is underground and falls within forest area. It was suggested to the Project Proponent that the Muck disposal area should be kept outside the Forest area to the extent possible. Also, necessary steps may be taken for plantation of fodder crops on the Muck disposal area during the time of construction stage.

ii. The material proposed to be excavated from the Lower reservoir, and other project components during construction of the project should be utilized as construction material to the extent possible and possibilities may be worked out for avoiding the use of existing approved identified rock quarry coming under the Forest.

iii. The proposed Lower Reservoir area is covering 46 ha. of land out of which tentative 26 ha. of land is coming under the Forest Land. It was suggested by EAC to work out best possible measure for the optimization of Lower Reservoir area so that minimum Forest Land could be affected.

iv. As suggested by GSI, New Delhi vide their letter no-731- 734/160/EPE/GSI/ND/2018 dated-6.10.2018 and letter no- 169/Upper Indravati PSP/EPE/GSI/2019/1303-1305 dated-21.10.2019 and according to IS-10060 the subsurface exploration has been carried out by the project proponent to finalize the requisite rock mechanics parameters for the proposed UIPSP Underground Power house. So that mandatory requirements from GSI and CWC can be fulfilled for obtaining DPR Clearances. OHPC apprised that project is under Survey and Investigation Stage and no construction activities has been undertaken yet.

v. During the visit EAC members also visited the area near to Lower reservoir and interacted with villagers of Ranibahal and after discussion it was found that there is an awareness and positive response towards the proposed project.

vi. After visiting the proposed Upper and Lower reservoir site of the project the Sub Committee observed that some preliminary geological investigations have carried out by the project proponent to decide the alignment of the inlet tunnel, location of power house, etc. Further, it is also observed that at multiple locations stability tests were conducted for finalizing the project location. However, the activities have not disturbed the natural environment settings.

The EAC after critical examination of the site visit report and detailed deliberations recommended the proposal for grant of specific/standard terms of reference as issued by the Ministry vide Office Memorandum No. F. No. IA3-22/33/2022-IA.III dated 14.08.2023 for Pump storage projects shall be used for preparation of EIA/ EMP report along with following additional ToR:

[A] Environmental Management and Biodiversity Conservation:

xx. Conducting site specific ecological study w.r.t riverine ecology focus on fishes diversity and aquatic biota due to construction of lower reservoir across Sharda river.

xxi. Stage I FC for forest land involved in the project shall be submitted prior to grant of EC

xxii. Conduct Environmental Cost Benefit Analysis in terms of loss of Forest ecosystem due to diversion of Forest land/ loss of biodiversity and its impacts on ecosystem, water availability, water uses for generation of hydro power in study area 10 km from periphery of Project components

xxiii. Cumulative Impact of project on carrying capacity and sustainability of the river which source of water for filling lower reservoir.

xxiv. Alternative sites for various components shall be identified in terms of loss of forest area and other environmental aspects. Explore to minimize forest land.

xxv. Action plan for survival of the rivulets located in the study area.

xxvi. Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentioned in Standard ToR shall be collected for preparation of EIA/ EMP report along with soil characteristics which shall be studied at minimum 10 locations. The ground water level at 10 locations shall be measured in project area in all three seasons.

xxvii. A study shall be carried out on impact of project activity on the aquatic and terrestrial ecosystem, within project area classifying the impact zones (highly impact/low impact zone) based on seasonal variations and covering the aspects related to impacts on aquatic ecosystem/ primary productivity due to quantity of water to be lifted for power generation and thermal stratification. Accordingly, Environment Management plan shall be prepared.

xxviii. Sampling locations be located to cover villages situated near the reservoir and around boundary of forest area for collection of baseline data and data to be incorporated in EIA/ EMP report.

xxix. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report.

xxx. A detailed wildlife conservation plan for Schedule –I species, duly approved by the Chief Wild Life Warden, be submitted.

xxxi. In case any Wildlife corridor is located within 10 km radius of the project site a detailed study shall be conducted to assess the impact of project on safe movement of wild animals.

xxxii. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.

xxxiii. Scope of watershed development in the 10 km radius of the project shall be studied in consultation with Govt. institutions/ Indian Council of Agriculture Research (ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report.

xxxiv. MoU for water uses for the project shall be signed and approved by concerned authority.

xxxv. Environmental matrix during construction and operational phase needs to be submitted.

xxxvi. Matrix formulated on the basis of detailed study and field survey of flora and fauna methodology used shall be mentioned in the EIA report.

xxxvii. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.

xxxviii. Details of Flora and Fauna reported in submergence area, Nos. of tree along with their density and nomenclature of the tree species required to be felled for reservoir creation and other project component.

xxviii. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources shall be studied.

[B] Socio-economic Study

xxix. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.

xxx. All the tasks including conducting public hearing shall be done as per the provisions of EIA Notification, 2006 and as amended from time to time. Public hearing issues raised and compliance of the same shall be incorporated in the EIA/ EMP report in the relevant chapter.

xxxi. Statement on the commitments (activity-wise) made during public hearing to facilitate the discussion on the CER in compliance of the Ministry's OM F. No. 22- 65/2017- IA.III dated 30th September, 2020 shall be submitted.

xxxii. Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared.

xxxiii. Details of settlement in 10 km area shall be submitted.

[C] Muck Management/ Disaster Management

xxx. Details of quantity of muck generation component wise and disposal site along with transportation plan and its monitoring to be provided.

xxxi. Details of Muck Management plan prepared along with estimated cost incorporated in EIA/ EMP report.

xxxii. Techno-economic viability of the project must be recommended from CEA/ CWC

[D] Miscellaneous.

xxxvii. Pre-DPR Chapters viz. Layout Map and Power Potential Studies duly approved by CWC/CEA shall be submitted.

xxxviii. Undertaking need to submitted on affidavit that regarding no activities has been yet started on the project site and water allocated to this scheme shall not be diverted to other purpose.

xxxix. Both capital and recurring expenditure under EMP shall be submitted.

xl. The photograph should bear the date, time, latitude & longitude of the monitoring station/ sampling location. In addition to this PP should submit the original test reports and certificates of the labs which will analyse the samples.

xli. Arial view video of project site shall be recorded and to be submitted.

xlii. Detailed plan to restore wider roads and convert them into narrow upto 10m after construction of the project.

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ANNEXURE

ATTENDANCE

51st MEETING OF RE-CONSTITUTED EXPERT APPRAISAL COMMITTEE (EAC)
RIVER VALLEY & HYDROELECTRIC PROJECTS

DATE : **12th September 2023**

TIME : **10:30 am onwards**

VENUE : **Narmada Hall, Jal Block, Indira Paryavaran Bhawan, New Delhi.**

Sl.No.	Name of Member	Role	Signature
1.	Dr. K. Gopakumar.	Chairman (Non-Official)	Joined through VC
2.	Dr. N. Lakshman	Member (Non-Official)	– Ab –
3.	Dr. Mukesh Sharma	Member (Non-Official)	– Ab –
4.	Dr. B.K. Panigrahi	Member (Non-Official)	– Ab –
5.	Dr. Chandrahas Deshpande	Member (Non-Official)	– Ab –
6.	Dr. A.K. Malhotra	Member (Non-Official)	12/9/23
7.	Dr. Uday Kumar R. Y.	Member (Non-Official)	12/9
8.	Dr. Narayan Shenoy K.	Member (Non-Official)	– Ab –
9.	Shri Sharvan Kumar	Member (Official) Representative of Central Electricity Authority (CEA)	– Ab –
10.	Shri Rishi Srivastava	Member (Official) Representative of Central Water Commission (CWC)	Joined through VC
11.	Dr. J.A. Johnson	Member (Official) Representative of Wildlife Institute of India (WII)	– Ab –
12.	Dr. B. K. Das (Director) / Dr. Amiya Sahoo (Senior Scientist)	Member (Official) Representative of Central Water Commission (CWC)	12/9/23
13.	Dr. Vijay Kumar	Member (Official), Representative of Ministry of Earth Sciences	– Ab –
14.	Shri Yogendra Pal Singh	Member Secretary, Ministry of Environment, Forest and Climate Change	

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Annexure-I

Site Visit Report the EAC (Sub-Committee) Visit for Kodayar Pumped Storage Hydro Electric Project of capacity 1500 MW located at Village Pechiparai, Taluk Thiruvattar, District Kanyakumari (Tamil Nadu) by M/s Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) Terms of Reference (TOR) from 28.05.2023 to 31.05.2023.

[A] Background

1. The proposal is for grant of Terms of Reference to the project for Kodayar Pumped Storage Hydro Electric Project of capacity 1500 MW in an area of 40.72 ha located at Village Pechiparai, Taluk Thiruvattar, District Kanyakumari (Tamil Nadu) by M/s Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) was submitted on 17.02.2023.
2. The proposal was considered by the EAC (River Valley and Hydroelectric Projects) in 43rd meeting held on 7th March, 2023.
3. **Project Details:**

   i. Kodayar Pumped Storage Hydro Electric Project is in Kanyakumari district of Tamil Nadu which has been envisaged by utilizing the existing TANGEDCO's Kodayar Dam I as Upper Reservoir which is Masonry Gravity Dam with storage capacity of 98.66 MCM at FRL of 1325.90 m and existing TNPWD's Pechiparai Dam as Lower Reservoir is a Gravity Dam with storage capacity of 150.22 MCM at FRL of 92.07 m. Project's both reservoirs are the existing one.

   ii. At present a Conventional Powerhouse i.e., Kodayar Hydro Electric System with an installed capacity of 1 x 60 MW (PH - I) is functioning by utilizing the water from Kodayar Dam I. The discharge of PH - I is stored in Kodayar Dam II. This Kodayar Dam II forms the forebay, utilized for generation in Kodayar PH - II (1 x 40 MW) and then the discharge goes to Pechiparai Reservoir.

   iii. The Kodayar reservoir (Existing Upper) has storage capacity of 98.66 MCM at FRL of 1325.90 m. and the Pechiparai reservoir (Existing Lower) has storage capacity of 150.22 MCM at FRL of 92.07 m.

   iv. Proposed Kodayar PSHEP has an installed capacity of 1500 MW (6 x 250 MW) with six units of Pelton Turbine Generating Units of 250 MW each. Rated Net Head for the project is about 1188.04 m & Rated Design Discharge (total) is about 143.53 cumec with an Annual Energy Generation of 3120.75 MU.

4. After detailed deliberations the EAC observed that the project location is sensitive in terms of dense forest cover, Tiger reserve, Wildlife sanctuary and biodiversity. Therefore, the EAC deferred the proposal and decided to conduct site-visit by EAC sub-committee members before making any recommendations on proposal.

[B] EAC (Sub- Committee) site visit:

5. A sub-committee of Expert Appraisal Committee (EAC) comprising of the following 4 members visited the proposed for Kodayar Pumped Storage Hydro Electric Project site from 28.05.2023 to 31.05.2023.

    i. Dr. A.K. Malhotra
    ii. Shri Ashok Kumar Kharya
    iii. Dr. Anthony Jhonson
    iv. Shri Yogendra Pal Singh

6. The officials visited the lower intake reservoir and the location of intake. The locations inspected in the lower reaches are detailed below.

    i. Pechiparai Dam top.
    ii. Ferry point.
    iii. Lower intake location through ferry.
    iv. Tachamalai Kanikudi.
    v. Kallar river and interaction with WRD official.
    vi. Road leading to Kalaparai Kannikudi from Mothiramalai.
    vii. Kuttiyar river & Rubber plantation area.
    viii. Power house location proposed for PSP.
    ix. Tail race area.
    x. The Terrain of MAT.

7. The areas inspections at Upper intake area are detailed below:

    i. The Kodayar dam I U/S – D/S Viewed from dam top.
    ii. The road leading to saddle 7 of Kodayar dam I
    iii. Proposed intake of Kodayar dam I (Upper intake)
    iv. Chinnakuttiyar dam.
    v. Water spread area of Kodayar dam I

Observations of Sub-committee

8. The extent of the project falls within the Wildlife sanctuary and Tiger reserves. The entire road falls within the KWLS bounds. Movement of heavy dumpers for Muck dumping within the forest roads was a major concern and needs to be restricted.

9. Eutrophication is occuring in the Upper reservoir. It was requested to TANGEDCO to take action for cutting and disposal of the existing withered trees in the water spread area of Kodayar Dam-I.

10. The committee is of the opinion that the project area falls within the Kalakad Mundanthurai Tiger Reserve (KMTR) as well as Kanyakumari Wildlife Sanctuary, Tamil Nadu. Scientific studies reveal that the area is of high ecological importance and habitat for various critical and endangered wildlife species including Tigers, Guars, Elephants and many endemic plant species. Though the main components of the projects viz. inlet tunnel and the power house

are proposed underground, there will be a high probability of disturbance in various ecological attributes which may ultimately affect the wildlife habitat. Hence, it is appropriate to take opinion of the Standing Committee of National Board for Wildlife (NBWL) before taking any decision on the proposal. Accordingly, the project proponent may be requested to obtain necessary consent of NBWL for construction of project at proposed location.

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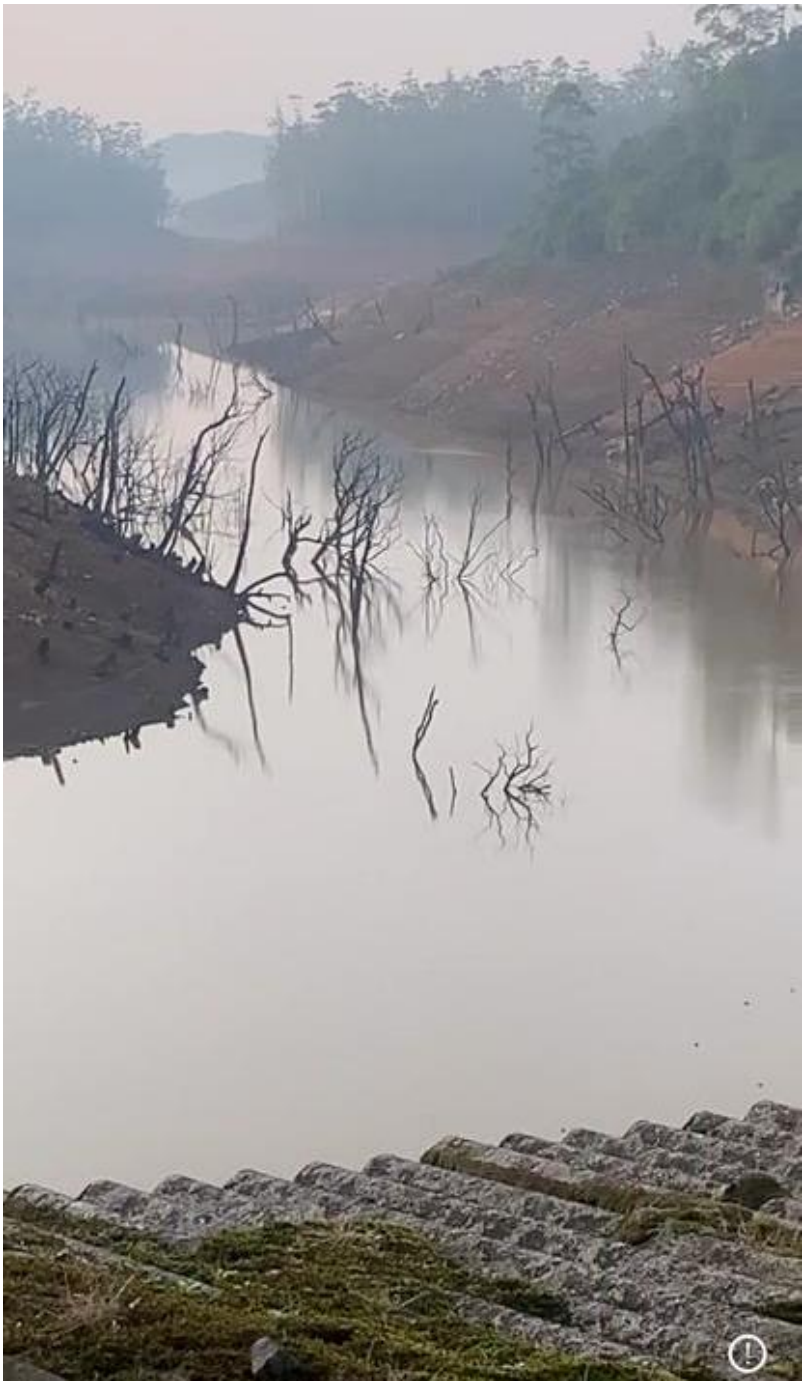

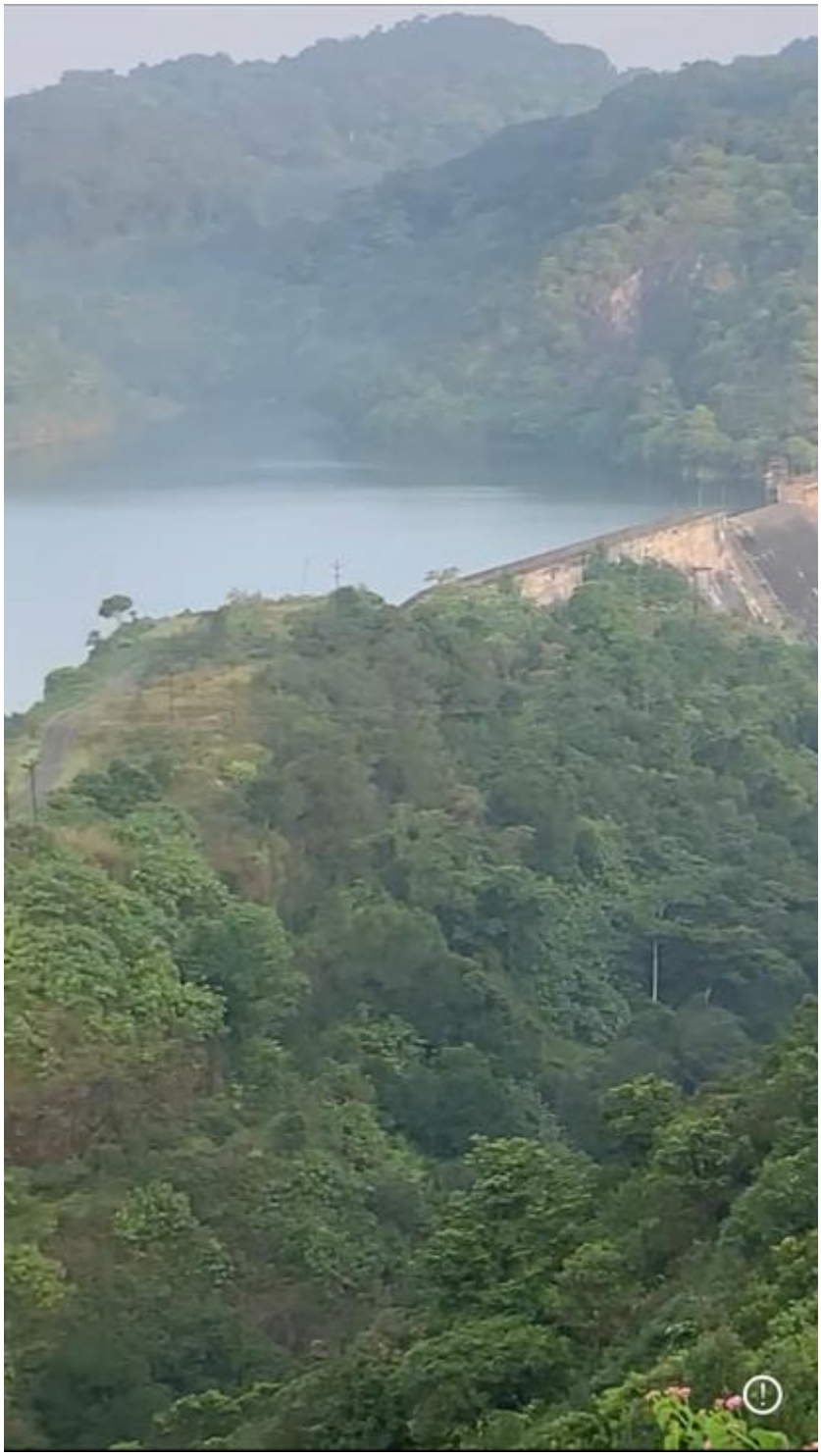

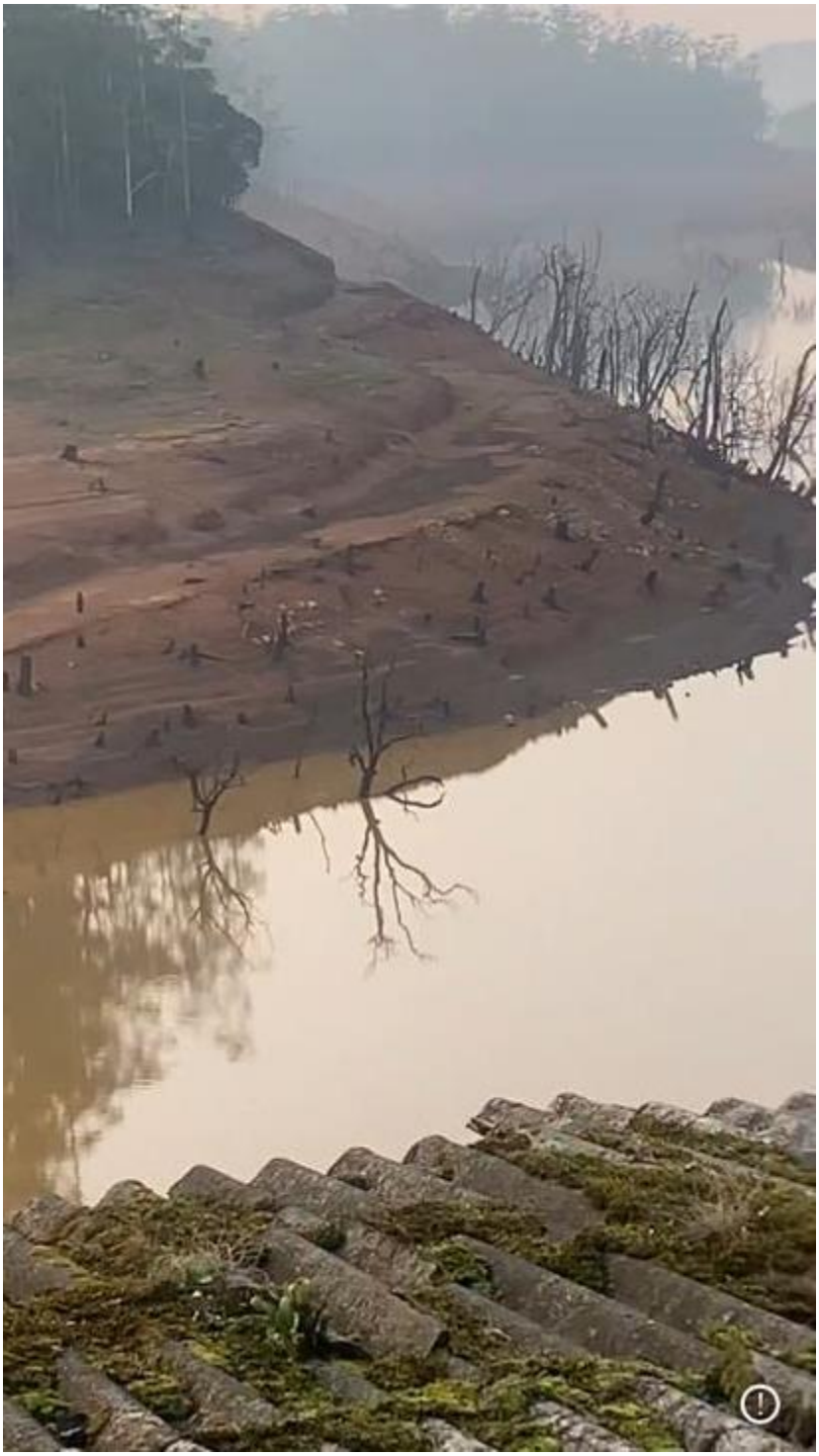

Annexure-II

Site Visit Report the EAC (Sub-Committee) Visit of Upper Indravati Pumped Storage Project 600 MW (4x150 MW) in an area of 164 Ha located at Village Mukhiguda, Kalahandi District (Odisha) by M/s Odisha Hydro Power Corporation Limited- Terms of Reference (TOR) from 17th August 2023 to 20th August 2023.

[A] Background

1. The proposal is for grant of Terms of Reference to the project for Upper Indravati Pumped Storage Project 600 MW (4x150 MW) in an area of 164 Ha located at Village Mukhiguda, Kalahandi District (Odisha) by M/s Odisha Hydro Power Corporation Limited submitted on 13.03.2023.
2. The proposal was considered by the EAC (River Valley and Hydroelectric Projects) in in 44th meeting held on 27th – 28th March, 2023.
3. Project Details:

   i. The Upper Indrāvati Hydro-Electric Project (UIHEP) is a large multipurpose project on the Indrāvati River, covering Kalahandi, Koraput and Nabarangpur Districts of South-Western Odisha. It is located near Mukhiguda village in Kalahandi District. The existing Upper Indravati Multipurpose Project in Odisha state comprises of 4 dams namely (1) Indravati dam on Indravati river, (2) Kapur dam on Kapurnallah, (3) Muran dam on Muranriver and (4) Podagada dam to form a common reservoir for utilization of their water resources for irrigation and Hydro-power development.

   ii. Upper reservoir: The present scheme aims to utilize the existing Upper Indravati Multipurpose Project (called as Upper Reservoir) which already has 600MW capacity machines. This reservoir intercepts an area of 2630 Sq km and has a gross storage/Live storage capacity as 2307/1455 MCM. No modifications are proposed in the existing Upper Indravati reservoir and as such, no modifications in the operating levels and existing structures are needed/ proposed. The existing Reservoir having live storage capacity of 1455.76 Mm3, created for the UIHEP will act as the Upper Reservoir. The water will be used from this reservoir through tunnel for the present scheme during the peak period of 5 hours and the same water will be replaced during off peak period from lower reservoir to upper reservoir.

   iii. Lower reservoir: A new small reservoir has been proposed after construction in the foothills of Mukhiguda Town. This will act as a balancing reservoir to enable storage of water released after hydro-power generation through proposed installation of 4x150 MW PSP Units. The live storage capacity of this new lower reservoir is 4.0 MCM. The water needed in this proposed PSP Unit shall be recycled and there is no consumptive use of water except Only one time requirement of water of 3.78 MCM is needed which shall be re-cycled during operation of PSP. The lower reservoir of proposed Upper

Indrāvati Pump Storage Project (UIPSP) is located at Lat. $19^0 25' 20''$ N and Long. $82^0 51' 5.0''$ E, near Ranibahal Village in Kalahandi District of Odisha. Ranibahal village is situated at about 1 km from Mukhiguda town. District Headquarter is at Bhawanipatna which is at about 90 km from Mukhiguda town by road. The location of Power Intake is situated at Lat. 19^0 23.267' N & Long. 82^0 52.198' E.

iv. The Lower Reservoir was proposed to be formed with Zoned Earth Embankments of 18m height to act as a Balancing Reservoir in the downstream in the foothill towards Mukhiguda to serve as a buffer stock so as to feed back its water into the Upper Reservoir by pumping. Live storage of this storage was estimated to around 3.78 Mm3 whereas gross storage is estimated as 4 Mm3. Area of the proposed reservoir at FRL is around 29.7 Ha. The width of the reservoir is 530 m and varying length from 530m to 605m.

v. The proposed 600MW pumped storage plant will be underground located in the adjoining area. The power plant shall be equipped with reversible type hydroelectric unit (4 nos.) each having a generator motor and a pump reversible turbine with a generating capacity of 150 MW.

vi. The proposed scheme envisages to utilize only 4 MCM (live storage capacity of lower reservoir proposed) through re-cycling of water from upper reservoir which is existing and meeting the irrigation and water for hydro-power generation, as such hydrological study is required to the extent to see that this requirement of 4.0 MCM (one time) do not alter the release pattern and requirements of existing scheme i.e., meeting irrigation and hydro-power requirement of existing command.

4. After detailed deliberations the EAC observed that the PP informed that some construction activities (sub-surface exploration) have already been started, so, the EAC desired to verify the status of construction activities at site. Therefore, the EAC deferred the proposal and decided to conduct site-visit by EAC sub-committee members before making any recommendations on proposal.

[B] EAC (sub-committee) site visit:

5. A sub-committee of Expert Appraisal Committee (EAC) comprising of the following 4 members visited the proposed Upper Indravati Pumped Storage Project 600 MW (4x150 MW) site from 17th August 2023 to 20th August 2023.

i. Dr. A.K Malhotra
ii. Dr. Uday Kumar R.Y
iii. Dr. J. A. Johnson
iv. Shri Yogendra Pal Singh, Scientist 'E'

Observations of Sub-committee

6. The proposed Head race Tunnel is underground and falls within forest area. It was suggested to the Project Proponent that the Muck disposal area should be kept outside the Forest area to the extent possible. Also, necessary steps may be taken for plantation of fodder crops on the Muck disposal area during the time of construction stage.
7. The material proposed to be excavated from the Lower reservoir, and other project components during construction of the project should be utilized as construction material to the extent possible and possibilities may be worked out for avoiding the use of existing approved identified rock quarry coming under the Forest.
8. The proposed Lower Reservoir area is covering 46 ha. of land out of which tentative 26 ha. of land is coming under the Forest Land. It was suggested by EAC to work out best possible measure for the optimization of Lower Reservoir area so that minimum Forest Land could be affected.
9. As suggested by GSI, New Delhi vide their letter no-731- 734/160/EPE/GSI/ND/2018 dated-6.10.2018 and letter no- 169/Upper Indravati PSP/EPE/GSI/2019/1303-1305 dated-21.10.2019 and according to IS-10060 the subsurface exploration has been carried out by the project proponent to finalize the requisite rock mechanics parameters for the proposed UIPSP Underground Power house. So that mandatory requirements from GSI and CWC can be fulfilled for obtaining DPR Clearances. OHPC apprised that project is under Survey and Investigation Stage and no construction activities has been undertaken yet.
10. During the visit EAC members also visited the area near to Lower reservoir and interacted with villagers of Ranibahal and after discussion it was found that there is an awareness and positive response towards the proposed project.
11. After visiting the proposed Upper and Lower reservoir site of the project the Sub Committee observed that some preliminary geological investigations have carried out by the project proponent to decide the alignment of the inlet tunnel, location of power house, etc. Further, it is also observed that at multiple locations stability tests were conducted for finalizing the project location. However, the activities have not disturbed the natural environment settings.

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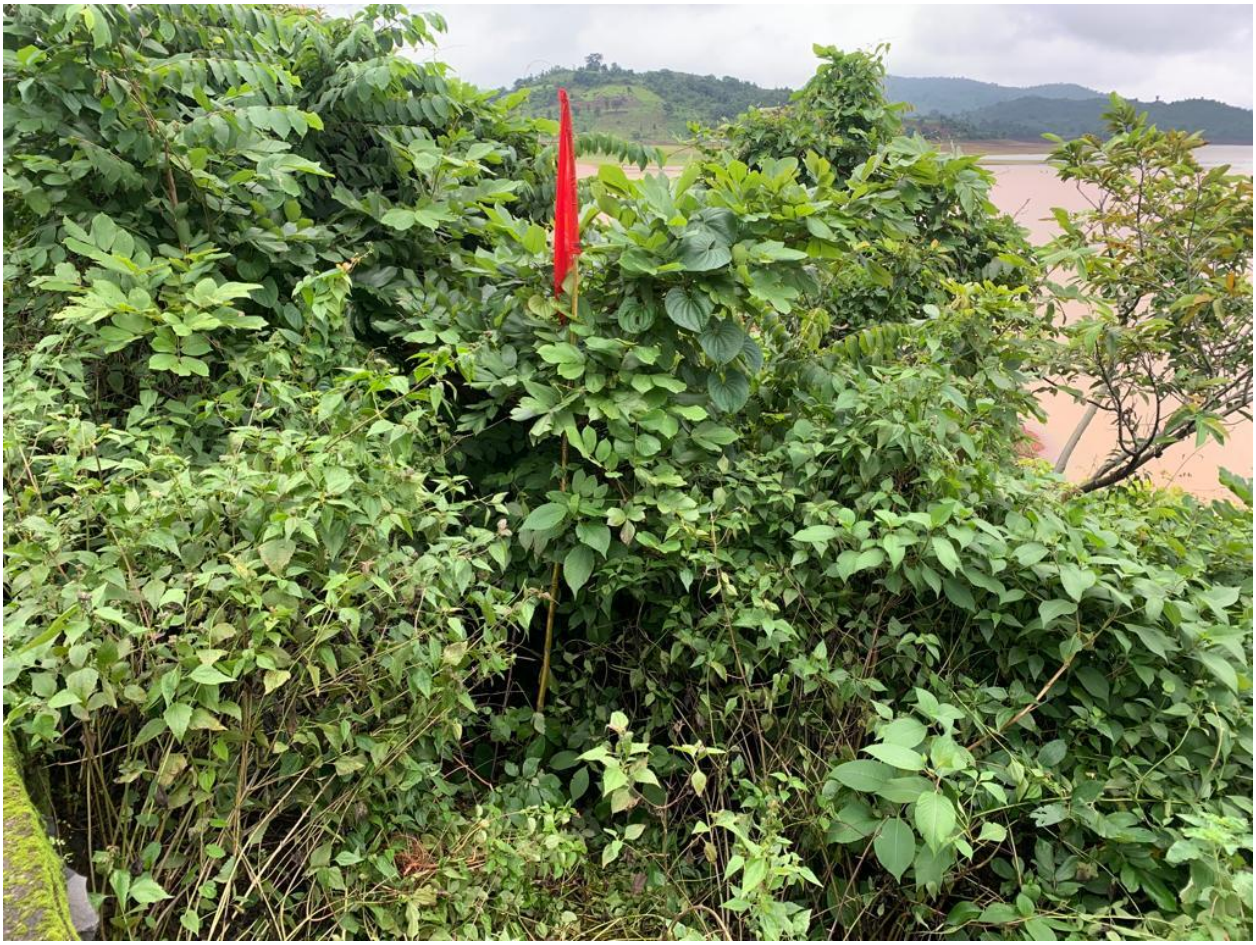

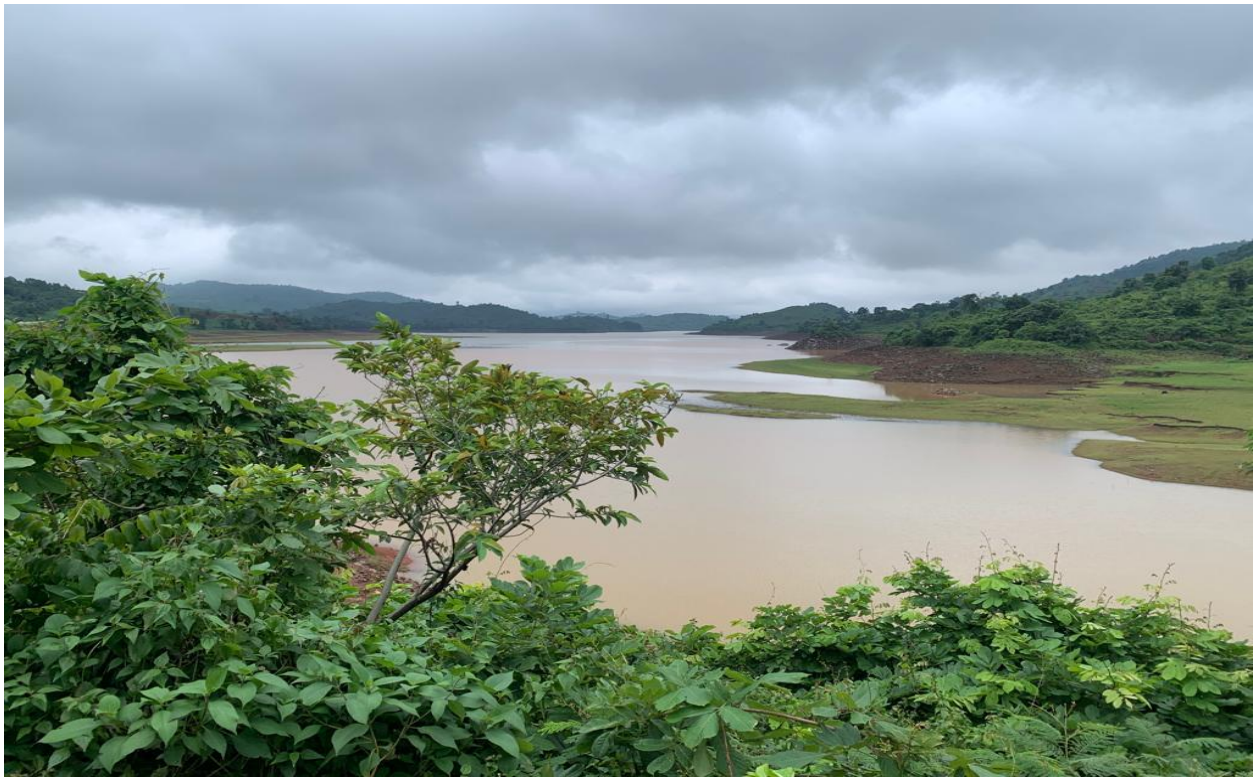

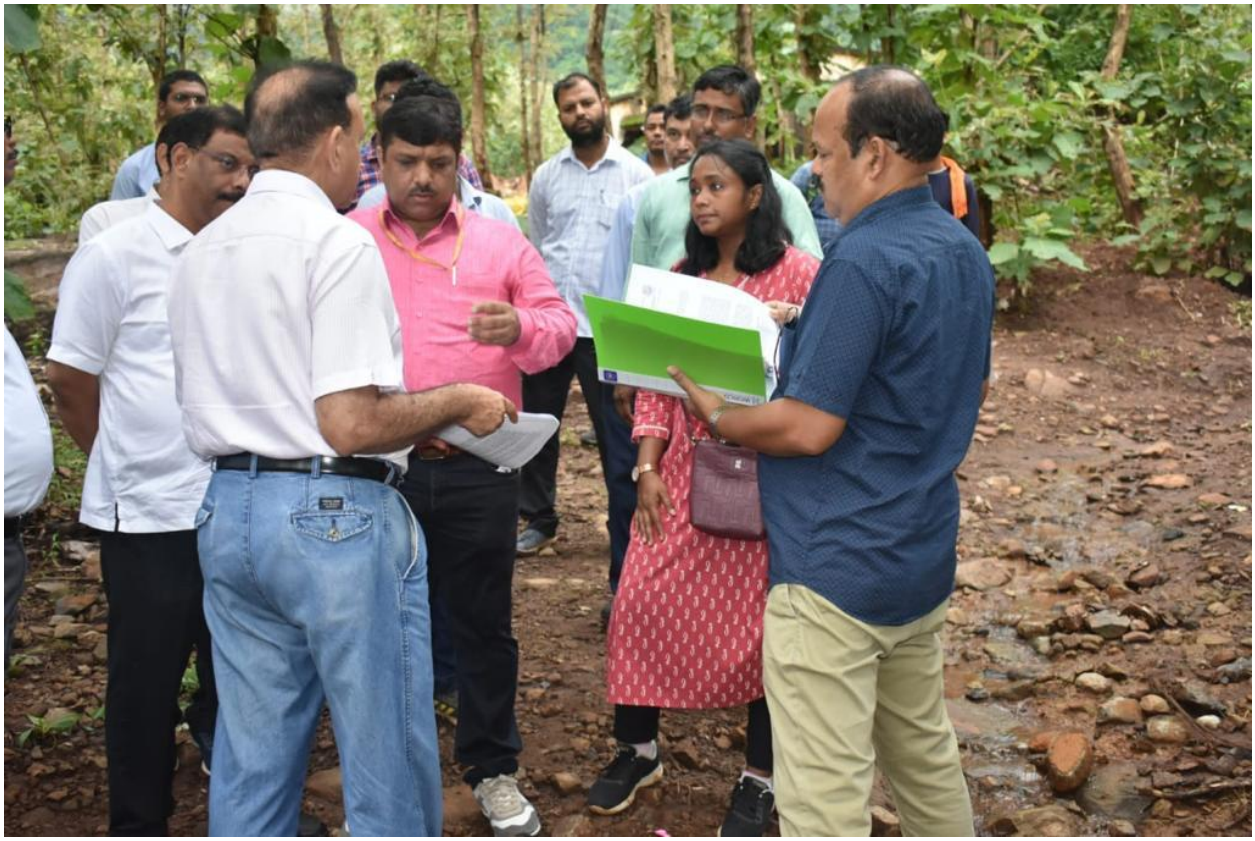

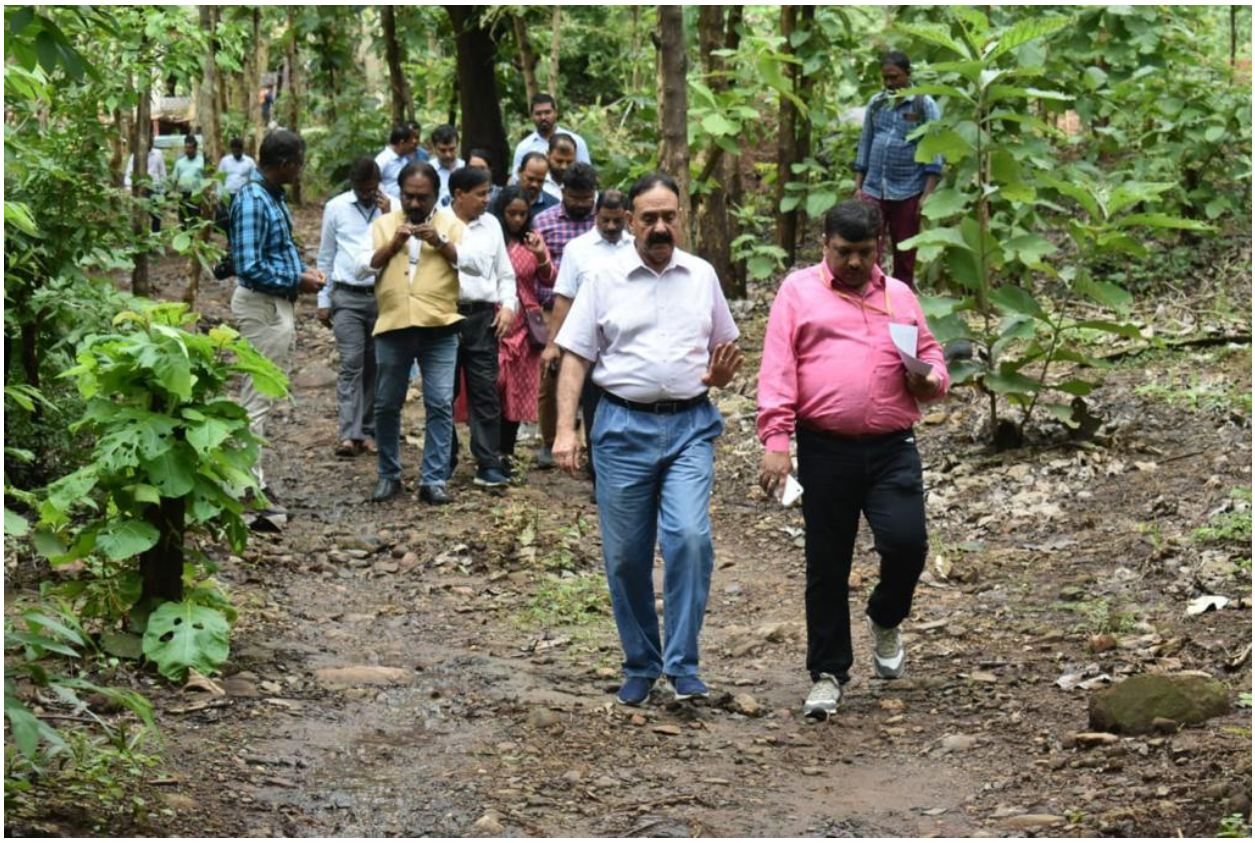

APPROVAL OF THE CHAIRMAN

From: kgopa@iisc.ac.in

To: "Yogendra Pal Singh" <yogendra78@nic.in>, jaj@wii.gov.in, ajitkumarmalhotra463@gmail.com, "amiya sahoo" <amiya.sahoo@icar.gov.in>, amiya7@gmail.com, "bijayaketan panigrahi" <bijayaketan.panigrahi@gmail.com>, "chandrahas deshpande" <chandrahas.deshpande@wellingkar.org>, dchandrahas@gmail.com, mukesh@iitk.ac.in, lnand@rocketmail.com, "kn shenoy" <kn.shenoy@manipal.edu>, udaykumarry@yahoo.com, "Dr. Vijay Kumar" <vijay.kumar66@nic.in>, "Shanan Kumar" <krshanan@nic.in>

Cc: "Saurabh Upadhyay" <saurabh.upadhyay85@gov.in>, "Sourabh Kumar" <sourabh.9@govcontractor.in>, mkkd@rediffmail.com

Sent: Sunday, October 1, 2023 7:15:13 PM

Subject: Re: Draft MOM of the EAC (RV&HEP) held on 12/09/2023 under the Chairmanship of Dr. K. Gopakumar -reg.

Yes Sir I approve it

With regards

Gopakumar