सत्यमेव जयते

Government of India
Ministry of Environment, Forest and Climate Change
IA Division
(River Valley and Hydroelectric Projects)
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Minutes of 4th EXPERT APPRAISAL COMMITTEE MEETING OF meeting River Valley and Hydroelectric Projects held from 24/11/2023 to 24/11/2023

Date: 18/12/2023

MoM ID: EC/MOM/EAC/603648/11/2023

Agenda ID: EC/AGENDA/EAC/603648/11/2023

Meeting Venue: N/A

Meeting Mode: Virtual

Date & Time:

24/11/2023	10:30 AM	05:30 PM

1. Opening remarks

The 4th 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 24th November, 2023 through online mode, under the Chairmanship of Prof. G. J. Chakrapani.

2. Confirmation of the minutes of previous meeting

The minutes of the 3rd EAC meeting held on 10th November, 2023 were confirmed.

3. Details of proposals considered by the committee

Day 1 -24/11/2023

3.1. Agenda Item No 1:

3.1.1. Details of the proposal

Yadaballi Pumped Storage Project (1200 MW) by **NEW AND RENEWABLE ENERGY DEVELOPMENT CORPORATION OF ANDHRA PRADESH LTD (NREDCAP)** located at **ANNAMAYYA,ANDHRA PRADESH**			
Proposal For		Fresh ToR	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/AP/RIV/451968/2023	J-12011/58/2023-IA.I (R)	14/11/2023	River Valley/Irrigation projects (1(c))

3.1.2. Project Salient Features

4.2.1: The proposal is for grant of terms of references (ToR) to the project for Yadaballi Closed Loop Pumped Storage Project of capacity 1200 MW in an area of 195.82 ha at Village Yadaballi, District Annamayya (Andhra Pradesh) by M/s New and Renewable Energy Development Corporation of Andhra Pradesh Ltd. (NREDCAP).

4.2.2: The project proponent and the accredited Consultant /s. RS Envirolink Technologies Pvt made a detailed presentation on the salient features of the project and informed that:

1. The proposed Yadaballi PSP (1200 MW) is envisaged as an Off Stream Closed Loop PSP in Annamayya district, Andhra Pradesh. Both the Upper and the Lower reservoirs are artificial reservoirs.
2. The proposed lower reservoir site is located on the left bank of **Mandavi river, near village Yadaballi, at about 30 km away from nearest town Rayachoty**. Based on geological data and the topographical setup, the upper and lower reservoirs are proposed by forming a Concrete Face Rockfill Dam (CFRD). The FRL and MDDL of the upper reservoir is kept at EL 816.00 m and EL 792.00 m respectively with a gross storage of 6.59 MCM and a live storage of 6.16 MCM. Similarly, the FRL and MDDL of the lower reservoir is kept at EL 309.00 m & EL 277.00 m respectively with a gross storage of 7.26 MCM and live storage of 6.90 MCM.
3. **Water sources:** The water required for initial reservoir filling is proposed to be met from **Mandavi River, located in proximity to the lower reservoir site**. The project would require one time filling of reservoir and later would require replenishing the water, lost due to evaporation in order to generate the stipulated energy.
4. The proposed project envisages following major civil components:

1. **Upper Reservoir**: A Concrete Faced Rock-Fill embankment dam, 2459.04 m long with average height of 31 m from excavated bed level of 790 m for creation of Upper reservoir with gross storage capacity of 6.59 MCM.
2. **Lower Reservoir**: The lower reservoir is proposed by construction of Concrete Faced Rock-Fill dam 1223.8 m long with average height of 39 m from excavated bed level of 275m. The Gross Storage capacity of the Lower reservoir is 7.26 MCM.
3. **Upper Intake**: 5 nos. of diffuser type Intakes are proposed at the upper reservoir comprising 3 nos. of bays in each intake. The same structure also acts as an outlet structure to discharge water into the upper reservoir during pumping.
4. **Buried Penstock/ Steel Lined Pressure Shaft**: 5 nos. of 3.6m dia., having average length of 1492 m circular steel lined buried penstock/ steel lined pressure shaft to feed 4 units of 240 MW and I no. of 3.6m dia., 1423 m long circular steel lined buried penstock/pressure shaft further bifurcated into 2 nos. of 2.7 m dia. unit pressure shaft of 67.14 m & 76.15m length to feed 2 units of 120 MW.
5. **Powerhouse Complex**: It comprises of an underground powerhouse of size 22 m(L) x 24m (W) x 51.4m (H) housing 4 units of 240MW & 2 units of 120MW. A Transformer cum GIS cavern of size 234.6 (L) x 16.00 (W) x 29 (H) to accommodate Transformers and GIS equipment.
6. One no. of 8 m diameter D—shaped, 473.6m long Main Access Tunnel has been proposed to provide access to the Underground powerhouse and a Pothead yard of size 73 m (L) x 30 m (W) is provided.
7. **Tail Race Tunnel**: 2 nos. of 3m diameter & 4 nos. of 4.2 m diameter circular TRT, each having varying length of 145.30m to 180.46 m has been proposed to discharge water from the draft tube to the lower reservoir.
8. **Lower Intake**: 6 nos. of diffuser type Intakes proposed at the lower reservoir comprising 3 nos. of bays having Tail Race Tunnel Diameter 4.2 and 2 nos of bays having Tail Race Tunnel Diameter 3m. The same acts as an inlet structure during pumping to draw water from the lower reservoir.
9. **Water Pipeline**: 125m diameter, 450 m long steel pipeline is proposed from the **Mandavi River** to the lower reservoir for initial reservoir filling and further replenishment.

1. **Land requirement:** The total land required for the construction of various components and related works for Yadaballi PSP is estimated to be around **195.82 ha, out of which is 60.10 ha is private land and 135.72** ha is forest/govt. land.
2. **Protected/Environmental Sensitive area: Sri Penusila Narsimha WLS** is about 23.10 Km from site is the nearest protected area from the proposed project.
3. **Project estimated cost:** The estimated project cost is Rs. 5866.77 Crore including IDC. As a preliminary estimate, a construction period of 4.5 years (54 months) from the date of award of civil works package has been estimated for this project.
4. **Salient features:**

Project details:

Name of the Proposal	**Yadaballi Pumped Storage Project**
Location (Including coordinates)	Lower Reservoir: 78°53'26.68"E; 14°11'31.03"N Upper Reservoir: 78°53'15.39"E; 14°12'29.45"N
Inter- state issue involved	No
Seismic zone	Zone-II

Category details:

Category of the project	A
Provisions	
Capacity / Cultural command area (CCA)	1200 MW
Attracts the General Conditions (Yes/No)	No

Electricity generation capacity:

Powerhouse Installed Capacity	1200 MW
Generation of Electricity Annually	2578.67 MU/ 3814.02 MU (1 cycle/ 2 cycle)
No. of Units	6 nos. (4X240 MW+2X120 MW)

ToR/EC Details:

Cost of project	5866.77 Cr.
Total area of Project	195.82 ha
Height of Dam from River Bed (EL)	Lower Dam - 39.0m Upper Dam - 31.0m
Length of Tunnel/Channel	11307m
Details of Submergence area	93.94 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste

Muck Management Details:

No . of proposed disposal area/ (type of land- Forest/Pvt. land)	50ha Non-Forest 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:

Private Land	60.10
Government land/Forest Land	135.72 ha
Submergence area/Reservoir area	93.94 ha
Land required for project components	101.88 ha
Additional information (if any)	Nil

Presence of Environmentally Sensitive areas in the study area

E-Flows for the Project	Not Applicable, as this is Off-Stream C losed Loop Pumped Storage Project (P SP)
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustaining river ecosystem.	No

Forest Land/ Protec ted Area/ Environmental Sen sitivity Zone	**Details of Certificate / letter/ Remarks**
Reserve Forest/Prote cted Forest Land	There is no wildlife protected area in the vicinity of the proposed project. Sri Penusila Na rsimha WLS which is about 23.10 Km from the proposed site is the nearest protected are a from the proposed project.
National Park	
• Wildlife Sanc tuary	

Court casedetails: 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-1	Yetto Apply

Miscellaneous

Particulars	**Details**
Details of consultant	M/s RSEnvirolink Technologies Pvt.Ltd.
Project Benefits	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 willalso benefit the local community by creating employment opportunities and will result in upliftment of livelihood and socio-economic

3.1.3. Deliberations by the committee in previous meetings

N/A

3.1.4. Deliberations by the EAC in current meetings

4.2.3: The EAC during deliberations noted the following:

The EAC deliberated on the information submitted and as presented in the meeting and observed that the proposal is for grant of Terms of Reference (ToR) to the project for Yadaballi Closed Loop Pumped Storage Project of capacity 1200 MW in an area of 195.82 ha at Village Yadaballi, District Annamayya (Andhra Pradesh) by M/s New and Renewable Energy Development Corporation of Andhra Pradesh Ltd. (NREDCAP).

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 during discussion on the project layout of the proposed Yadaballi Closed Loop Pumped Storage Project observed that the proposed project site is very close to another proposed PSP namely Veeraballi Off stream Closed Loop Pumped Storage Project, with a few project components of these two projects are overlapping. The Member Secretary EAC informed that the Ministry has granted Terms of Reference for conducting EIA Study for Veeraballi Off stream Closed Loop Pumped Storage Project in favour of M/s Astha Green Energy Ventures India Pvt Ltd. The EAC was of the view that Project Proponent has not mentioned this fact anywhere in the proposal submitted to the Ministry. It was also noted that the Ministry has received a representation mentioning the same fact about the instant proposal. The committee took a serious note on suppression of the factual information. The committee expressed its displeasure on the performance of the EIA consultant and recommended the Ministry to seek clarification from the project proponent and the consultant followed by necessary action. The EAC strongly advises all project proponents and consultants to be aware of nearby projects in the vicinity of their proposal and do serious homework and to follow a thorough and professional job. Site selection should be done taking various key environmental parameters and not based on their comfort zones or economic considerations alone.

The project consultant informed the EAC that the proposal shall be withdrawn and the proponent shall comeback with a suitable site.

The proposal was therefore ***returned in present form*** *on the above lines.*

3.1.5. Recommendation of EAC

Returned in present form

3.2. Agenda Item No 2:

3.2.1. Details of the proposal

Rayavaram Hydro-Electric Pumped Storage Project (1500 MW) by **NEW AND RENEWABLE ENERGY DEVELOPMENT CORPORATION OF ANDHRA PRADESH LTD (NREDCAP)** located at **ANNAMAYYA,ANDHRA PRADESH**

Proposal For		Fresh ToR	
Proposal No	**File No**	**Submission Date**	**Activity (Schedule Item)**
IA/AP/RIV/452357/2023	J-12011/59/2023-IA.I (R)	15/11/2023	River Valley/Irrigation projects (1(c))

3.2.2. Project Salient Features

4.3.1: The proposal is for grant of Terms of References (TOR) to the project Rayavaram Closed Loop Pumped Storage Project (1500 MW) in an area of 469.71 ha located at village Rayavaram, Mandal T. Sundupalli, District Annamayya, Andhra Pradesh by M/s New and Renewable Energy Development Corporation of Andhra Pradesh Ltd. (NREDCAP).

4.3.2: The Project Proponent and the accredited Consultant M/s Aarvee Associates Architects, Engineers and Consultants Pvt Ltd, Hyderabad, made a detailed presentation on the salient features of the project and informed that:

1. The project is located near Rayavaram village in T. Sundupalli Mandal of Annamayya District, Andhra Pradesh. The geographical coordinate of upper reservoir is at latitude 13°57'22.24"N and longitude 79°3'15.03"E. Similarly, the geographical coordinate of lower reservoir is at latitude 13°56'48.61"N and longitude

79°1’47.27"E.

1. Rayavaram Pumped Storage Project (RPSP) is an Off-Stream Closed Loop Pumped Storage development, proposed with an installed capacity of 1500MW/9135 MWH. The Project comprises of development of upper & lower reservoirs with a gross storage capacity of 13.71 MCM (0.484 TMC) & 11.97 MCM (0.420 TMC) respectively, out of which upper reservoir to be constructed with maximum dam height of 41m (from deepest bed level) to create the desired storage capacity while the lower reservoir will have maximum height of 35 m (from bed level) constructed at the downhill.
2. The onetime filling of the PSP reservoir will be carried out from **Cheyyeru River, which is about 5.0 Kms** from the proposed lower reservoir. The scheme of operation for the project is with 6.09 Hours of peak hour generation per day and 7.23 Hours for pumping back the water to the upper reservoir. Water will be used cyclically for energy storage and discharge. Evaporation losses if any will be recouped periodically.
3. The FRL and MDDL of the upper reservoir is kept at EL 732.00 m & EL 708.00 m respectively with a gross storage of 13.71 MCM (0.484 TMC) and live storage of 10.26 MCM (0.362 TMC). Similarly, the FRL and MDDL of the lower reservoir is kept at EL 353.00 m & EL 336.00 m respectively with a gross storage of 11.96 MCM (0.420 TMC) and live storage of 10.59 MCM (0.374 TMC). The live storage capacity for pumped storage scheme required is 10.26 MCM (0.362 TMC). The proposed project will generate 1500 MW of power by utilizing net rated head of 366.77m. The water from the upper reservoir will be diverted through Powerhouse and TRT to the lower reservoir. The water will be pumped back to the upper reservoir through Lower Intake via TRT-Reversible Turbines-pressure shaft-HRT. The present proposal consists of the following components:

- Upper and Lower Reservoir
- Upper Intake v Headrace Tunnel v
- Surge shaft
- Penstock Tunnel
- Surface Powerhouse v
- Tailrace Tunnel
- TRT outlet and Tailrace Channel

1. **Land requirement:** Total land required for the construction of proposed activities is approximately **469.71 ha in which 302.2 ha** is forest land.
2. **Population affected:** There is no settlement in the entire project area. As such no population is affected by the project. As per information available till date, all the land in the project area is identified as agricultural land, and inaccessible waste land.
3. **Protected/Environmental Sensitive area: Sri Venkateswara National Park WLS about 13 Km from site** is the nearest protected area from the proposed project.
4. **Hydrology/Water availability:** The proposed storage project is being planned by creating new upper & lower reservoirs by constructing dams across a small stream. The upper reservoir and lower reservoir catchment areas are 2.15 sq.km & 4.42 sq.km respectively. The Proposed PSP has upper reservoir and lower reservoir with a gross storage capacity of 13.71 MCM (0.484 TMC) and 11.96 MCM (0.420 TMC) respectively. The live storage of PSP Upper reservoir and lower reservoir are 10.26 MCM (0.362 TMC) and 10.59 MCM (0.374 TMC) respectively. Operational pat tern of PSP has been kept in such a way that 10.26 MCM (0.362 TMC) of water will be utilized for the proposed PSP. The project is a pumped storage scheme and hence, no consumptive utilization of water is required for its operation. The onetime filling of the PSP reservoir with 14.04 MCM (0.54 TMC) will be carried out from the **Cheyyeru River** by constructing a separate pump house near the reservoir.
5. **Cost and Benefits of the Scheme:** The total estimated cost of the project including direct and indirect charges excluding Interest during construction is Rs. 6309.64 Cr. For the installed capacity of 1500MW, the cost per MW of installed capacity works out to be Rs. 4.77 Cr. The project would generate designed energy of 3165.07 MU. Other benefit of this storage project can be in the form of spinning reserve with almost instantaneous start-up from zero to full power supply, supply of reactive energy, primary frequency regulation, voltage regulation etc.
6. **Alternative study:** ALTERNATIVE STUDY FOR SELECTION OF PROJECT SITE: Project Sites/Locations A detailed alternative study for selection of site for both upper and lower reservoir along with WCS alignment has been carried out. The search area considered for the selection of site is about 15.00 km radius (177 Sq. km). Six project sites/locations have been considered for finalization of project location. Based on technical

comparison and its ranking Alternative-3 is selected for further study and Detailed Topographical Survey.

7. **Salient features are as under:**

Project details:

Name of the Proposal	Rayavaram Hydro-Electric Pumped Storage Project
Location (Including coord inates)	The geographical coordinate of upper reservoir is at latitude 13°57'22.24"N and lon gitude 79°3'15.03"E. Lower reservoir latitude 13°56'48.61"N and longitude 79°1'47.27"E.
Inter- state issue involved	No
Seismic zone	As per the seismic zonation map of India, the Project area lies in the seismic zone-I I.

Category details:

Category of the project	Category A
Provisions	Pumped Storage Project
Capacity/ Cultural command area (CCA)	1500 MW
Attracts the General Conditions (Yes/No)	No

Electricity generation capacity:

Powerhouse Installed Capacity	1500 MW
Generation of Electricity Annually	3165.07 MU
No. of Units	7 (5 units of 250 MW Turbines & 2 units of 125 MW turbines)

ToR/EC Details:

Cost of project	total Hard Cost of the project is Rs.630964.00 Lakhs (Rs. 6309.64 Cr).
	Total cost of the project including IDC is Rs 715758 . 00 Lakhs (7157.5 8 Cr)
Total area of Project	469.71 Ha
Height of Dam from Riverbed (EL)	41 m for Upper reservoir and 35 m for Lower reservoir
Length of Tunnel/Channel	3 nos;8 m dia HRT - 933.45 m (L) 7 nos;6.2 m dia TRT - 181.44 m (L)

	3 nos; 5.6 m dia Main Pressure Shaft - 1166.90 m (L) 5 nos; 4.2m dia Branch Pressure Shaft - 87.25 m (L)
Details of Submergence area: Forest Land is falling in the Submergence area of 137 Ha.	
E-Flows for the Project: Stream flow is not disturbed by the project. The proposed project is an off-stream closed l oop project with an installed capacity of lS00MW/9135 MWH.	
Is Projects earlier studies in Cumulative Impact assessment& Carrying Capacit y studies (CIA&CC) for River in which project located. If yes, then a) E-flow with TOR N/A/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)	Low Lying Areas
Muck Management Plan	The huge, excavated material shall be utilized in the construction of embankment dam with processing the excavated material. Moreover, the excavated material from underground works of tunnel and powerhouse will also be utilized for processing of aggregates for concrete. Thus, about total 140 Lakh cum of excavated muck will be safely dumped in the designated muck dumping yard to mitigate the environmental hazard. An area of 140 Ha has been earmarked for the Muck Dumping area.

Land Area Breakup:

Private land	95.89 Ha
Government land/Forest Land	71 Ha/302.82 Ha
Submergence area/Reservoir area	The proposed project is an off stream closed loop project with an installed capacity of 1500MW/9135 MWH. The land required for the proposed upper reservoir and upper intake is 74.43 ha and the land required for the proposed lower reservoir and upper intake is 134.52 ha.
Land required for project components	469.71 Ha

Presence of Environmentally Sensitive areas in the study area

Forest Land/ Protected Area/ Environmental Se	**Yes/**	**Details of Certificate/ letter/ Remarks**

nsitivity Zone	**No**	
Reserve Forest/Protected Forest Land	Yes	Under process Sri Venkateswara National Park WLS is about 13 Km from site is the near est protected area from the proposed project.
National Park	No	
Wildlife Sanctuary	No	

Court case details: Nil

Affidavit/Undertaking details:

Affidavit / Undertaking	the undertaking by NREDCAP is provided along with this document.
Additional information (if any)	**Nil**

Previous EC compliance and necessary approvals:

Particulars	**Letter no. and date**
Certified EC compliance report (if applicable)	**N/A**
Status of Stage- I FC	Under process
Is FRA (2006) done for FC-I	Under process

Miscellaneous

Particulars	**Details**
Detail of c onsultant	M/s Aarvee Associates Architects, Engineers and Consultants Pvt Ltd., Hyderabad
Project Be nefits	The availability of alternative resources provided by developer in the rural areas will reduce the dep endence of the locals on natural resources such as forest. A number of marginal activities and jobs would be available to the locals during construction phase. Developer bringing large scale investment to the area will also invest in local area development and benefit will be reaped by locals. Education, medical, transportation, road network and other infrastructure will improve. With increas ed availability of electricity, small-scale and cottage industries are likely to come up in the area.

3.2.3. Deliberations by the committee in previous meetings

N/A

3.2.4. Deliberations by the EAC in current meetings

4.3.3: The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, KML file, etc**.)** and as per presentation in the meeting, observed that the proposal is for grant of Terms of Reference to the project Rayavaram Closed Loop Pumped Storage Project (1500 MW) in an area of **469.71 ha** located at village Rayavaram, Mandal T. Sundupalli, District Annamayya, Andhra Pradesh by M/s New and Renewable Energy Development Corporation of Andhra Pradesh Ltd. (NREDCAP)

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 also noted that Sri Venkateswara National Park is located about 13 Km from the proposed project site. The proposed project required total land of 469.71 ha in which 302.86 ha is the Forest land for selected site as per option -3 alternative site study.

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 with respect to riverine ecology focus on fishes diversity, fish migration, habitat and aquatic biota due to construction Rayavaram PSP. 2. Explore the possibilities for reducing the Forest land requirement The application for obtaining Stage I FC for 302.86 ha/ of forest land (after rationalising the requirement of forest land) involved in the project shall be submitted. 3. Alternative sites for various components shall be identified in terms of loss of forest area and other environmental aspects. 4. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources **Cheyyeru River** shall be studied. 5. Cumulative Impact of project on carrying capacity and sustainability of Reservoir/ **Cheyyeru River** /nalahs of catchment area / due to tapping of water for filling reservoir 6. 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 7. Action plan for survival of the rivulets located in the study area. 8. Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentionedin 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. 9. 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. 10. 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/ EMPreport. 11. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report. 12. A detailed wildlife conservation plan for Schedule –I species, duly approved by the Chief Wild

	Life Warden, be submitted. 13. 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. 14. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP. 15. 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 16. Development Plan shall be prepared and incorporated in EIA/ EMP report. 17. MoU for water uses for the project shall be signed and approved by concerned authority. 18. Environmental matrix during construction and operational phase needs to be submitted. 19. Matrix formulated on the basis of detailed study and field survey of flora and fauna methodology used shall be mentioned in the EIA report. 20. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State. 21. 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.
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 PPshould 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 Pumped 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. Disposal of muck should be away from Forest area. 2. Details of 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.

3.2.6.2. Standard

1(c)	**River Valley/Irrigation projects**
Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as follows:	
1.	Cropping pattern and Horticultural Practices in the study area.
1.	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.
1.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.
1.	Information (authenticated) on Avi-fauna and wildlife in the study area.
1.	Status of avifauna their resident/ migratory/ passage migrants etc.
1.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
1.	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.
1.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
1.	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.
1.	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.
1.	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.
1.	Conservation status of aquatic fauna.
1.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
1.	Fish and fisheries, their migration and breeding grounds.
1.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplantktons, benthos etc.
1.	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.
1.	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.
1.	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.
1.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
1.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
1.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
1.	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.
1.	Existence of barriers and corridors, if any, for wild animals.
1.	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.
1.	Documentation of butterflies, if any, found in the area.
1.	null
1.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.
1.	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.
1.	Landslide zone or area prone to landslide existing in the study area should be examined.
1.	Presence of important economic mineral deposit, if any.
1.	Justification for location & execution of the project in relation to structural components (dam /barrage height).
1.	Impact of project on geological environment.
1.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD station.
1.	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.
1.	Existing Noise Levels and traffic density in the study area at 5-6 Locations.
1.	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.

1.	(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.
1.	History of the ground water table fluctuation in the study area.
1.	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).
1.	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
1.	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.
1.	Run off, discharge, water availability for the project, sedimentation rate, etc.
1.	Basin characteristics
1.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
1.	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.
1.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
1.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
1.	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.
1.	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.
1.	Sedimentation data available with CWC may be used to find out the loss in storage over the years.
1.	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.
1.	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.
1.	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.
1.	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.
1.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteriodophytes, Bryophytes (all groups).

1.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.
1.	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.
1.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
1.	Economically important species like medicinal plants, timber, fuel wood etc.
1.	Details of endemic species found in the project area.
1.	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.
Description of Environment and Baseline Data	
1.	(ii) Submergence Area.
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:
1.	(i) Catchment area up to the dam/barrage site.
1.	(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.
1.	(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.
Details of the Project and Site	
1.	General introduction about the proposed project.
1.	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.
1.	A map of boundary of the project site giving details of protected areas in the vicinity of 25 km of project location.
1.	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.
1.	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
1.	Demarcation of snow fed and rain fed areas for a realistic estimate of the water availability.
1.	Land details including forests, private and other land.
1.	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.
1.	Geological and Seismo-tectonic details and maps of the area surrounding the proposed project site showing location of dam site and canal sites.
1.	Soil characteristics and map of the project area.
1.	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.
1.	Drainage pattern and map of the river catchment up to the proposed project site.
1.	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.
1.	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.
Environmental Management Plan	
1.	Water, Air and Noise Management Plans to be implemented during construction and post-construction periods.
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.
1.	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.
1.	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.
1.	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.

1.	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.
1.	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.
1.	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.
1.	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.
1.	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.
1.	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.
1.	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.
1.	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.
1.	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.
1.	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.

1.	Labour Management Plan for their Health and Safety.
1.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.
1.	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.
1.	Environmental safeguards during construction activities including Road Construction.
1.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
Impact Prediction and Mitigation Measures	
1.	Changes in land quality including effects of waste disposal
1.	River bank and their stability
1.	Impact due to submergence.
1.	Impact on forests, flora, fauna including wildlife, migratory avi-fauna, rare and endangered species, medicinal plants etc.
1.	Pressure on existing natural resources
1.	Deforestation and disturbance to wildlife, habitat fragmentation and wild animal's migratory corridors
1.	Compensatory afforestation-identification of suitable native tree species for compensatory afforestation and green belt.
1.	Impact on fish migration and habitat degradation due to decreased flow of water
1.	Impact on breeding and nesting grounds of animals and fish.
1.	Impact on local community including demographic profile.
1.	Impact on socio-economic status
1.	Impact on economic status.
1.	Impact on human health due to water / vector borne disease
1.	Impact on increase traffic
1.	Impact on Holy Places and Tourism
1.	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.
1.	Positive and negative impacts likely to be accrued due to the project are listed.
1.	Water pollution from labour colonies/ camps and washing equipment.
1.	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.
1.	Changes in land use / land cover and drainage pattern
1.	Immigration of labour population
1.	Quarrying operation and muck disposal
1.	The adverse impact due to the proposed project should be assessed and effective mitigation steps to abate these impacts should be described.
1.	Changes in ambient and ground level concentrations due to total emissions from point, line and area sources.
1.	Effect on soil, material, vegetation and human health.
1.	Impact of emissions from DG set used for power during the construction, if any, on air environment.
1.	Pollution due to fuel combustion in equipments and vehicles
1.	Fugitive emissions from various sources
1.	Changes in surface and ground water quality
1.	Steps to develop pisci-culture and recreational facilities
1.	Changes in hydraulic regime and downstream flow.
1.	Water pollution due to disposal of sewage
Methodology for Collection of Biodiversity Data	
1.	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).
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).
1.	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.
1.	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.
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.

3.3. Agenda Item No 3:

3.3.1. 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))

3.3.2. Project Salient Features

4.5.1: The proposal is for grant of Terms of References (TOR) to the project Tainsar Pumped Storage Project (675 MW) in an area of 268 ha at Village Gailo & Kailash, District Deogarh, Odisha by M/s Jindal Renewable Power Private Limited

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

1. Tainsar Pumped Storage Project (675 MW) is a self-identified Off Stream closed loop pumped storage project located in Deogarh district in the state of Odisha, India. Upper reservoir is located near Tainsar Village of Deogarh district at Co-ordinates 21°33'0.95"North and 84°39'11.41“ East. Lower reservoir is located near Gailo and Kailash Village of Deogarh district at latitude 21°34'9.91"N and longitude 84°39'32.74"E.
2. 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.
3. To implement the Proposed scheme, JRPPL has carried out Pre-Feasibility Study (PFR) for Tainsar Pumped Storage Hydro Electric Project, 675 MW.
4. Tainsar PSP (675 MW) is a green project in true sense as pumped storage component can support intermittent renewable energy on the grid by absorbing energy when demand is low and supply when demand is high.
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 fall under the Pradhanpat reserved forest.** The nearest wildlife sanctuary is **Usha Kothi,** located at about 43 km from the proposed project site.
6. **Discussion in EAC meeting**: Project was discussed during the 51st Expert Appraisal Committee (River Valley & Hydroelectric Projects) held on **12.09.2023 and additional information was sought as under**:
7. Explore the alternative sites and relocate site to reduce forest area
8. 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.
9. Earlier three alternative project layouts were studied (Alternative-I, II and III). Out of these three Alternatives, project layout as per Alternative-II was selected**.**
10. **In compliance to the observations in Minutes of 51st meeting of** EAC dated 12th Sept,2023, two more sites of upper and lower reservoir have been explored in vicinity of the selected layout. The study is aimed to explore alternative sites for the project so that forest area requirement can be minimized along with the minimal impact on flora and fauna of the area. Alternative sites have been identified with an objective to keep nearly equivalent head as of the selected project layout in the PFR. In this report, five (5) project layout alternatives have been discussed in the subsequent paragraphs which includes three (3) alternative project layouts (Alternative-I, II & III) as submitted in PFR along with two (2) newly studied project layout alternatives (Alternative-IV & Alternative-V). Out of these five 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 112.5 MW/122.5 MW) housed in a pit type of surface powerhouse.
11. **Land requirement: Total 268 ha. In which 155.51 ha is Forest land. The breakup of land are as under:**

S. NO	PROJECT COMPONENT	FOREST LAND (ha)	NON-FOREST LAND (ha)	TOTAL (ha)
1A	Site Office Ur	1	-	1
1B	Site Office Lr	-	1	1
2A	Crushing & Batching Plant Ur	2.25	-	2.25
2B	Crushing & Batching Plant Lr	-	2.25	2.25
3A	Stacking Area And Workshop Ur	1	-	1
3B	Stacking Area And Workshop Lr	-	1	1
4A	Magazine Area Ur	0.25	-	0.25
4B	Magazine Area Lr	-	0.25	0.25

5A	Labour Camps Ur	2	-	2
5B	Labour Camps Lr	-	2	2
6A	Colony Area Ur	2	-	2
6B	Colony Area Lr		2	2
7	Muck Disposal/ Green Belt Area (Ur & Lr)	-	93	93
8	Upper Reservoir	48.81	-	48.81
9	Lower Reservoir	53.52	6.99	60.51
10	Wcs Excluding Dam Area	9.02	-	9.02
11	Power House Complex	8.59	-	8.59
12	Adits	5.07	-	5.07
13,13 A &13B	Approach Roads (Ur & Lr)	5	2	7
14	Pipeline For Filling Lr	17	2	19
	TOTAL	**155.51**	**112.49**	**268**

Salient features of project are as under:

1	**Location**	
	State	Odisha
	District	Deogarh
	Airport	Veer Surendra Sai Airport Jharsuguda -95 km
	Rail Head	Sambalpur Junction - 86 km
	Road Head	Deogarh road, Mumbai-Kolkata Highway, NH-49
	Map reference	Survey of India Toposheet No. F45 M10
2	**Geographical co-ordinates**	**Lower Dam Site**
	Latitude (N)	21°33'0.95"N

	Longitude (E)	84°39'11.41"E
3	**Geographical co-ordinates**	**Upper Reservoir**
	Latitude (N)	21°34'9.91"N
	Longitude (E)	84°39'32.74"E
4	**Hydrology**	
	Tributary/River	Jaraikela river, a tributary of Barhmani river of Odisha
	Catchment Area	30.0 sq. km
	Average Annual Rainfall	1546 mm
	Flood peak (1 in 100 year)	141 cumec
5	**Water Source for filling Lower Reservoir**	
	Length and diameter of pipeline	900 m long, 1.2m diameter
6. Upper Reservoir		
Dam Top Level	El. 645.0 amsl	
Full Reservoir Level	El. 641.0 amsl	
Minimum Drawdown Level	El. 619.5 amsl	
Excavated Bed Level	El. 618.0 amsl	
Submergence Area at FRL	33.83 Ha	
Storage atFRL	7.06 MCM	
Storage atMDDL	0.42 MCM	
Live Storage Capacity	6.64 MCM	
Type	Concrete Faced Rockfill Dam	
Maximum Height	26.0 m	

Weighted average height of dam		16.0 m
Upstream and Downstream Slope		1V: 1.5H
Length of CFRD at top (Peripheral)		1733.0 m
7. Power Intake/Inlet at Upper Reservoir		
Approach Channel Length and Width		100 m long and 69 m wide
Design discharge (Generation/Pumping)		228.72/199.68 cumecs
No and Type of Intake		3 Nos, Diffuser Type Inlet Structure
Invert Level of Intake		El. 609.00 amsl
Top Level		El. 645.0 amsl
Type and size of Gates		3 nos., Vertical lift gate with opening size of 4.5 m (W) x 4.5 m (H) for each Intake
8	**Lower Reservoir**	
	Dam top level	El. 305.00 amsl
	Full Reservoir Level	El. 300.00 amsl
	Minimum Drawdown Level	El. 280.00 amsl
	Submergence Area at FRL	41.51 Hectare
	Storage atFRL	8.40 MCM
	Storage atMDDL	0.71 MCM
	Live Storage Capacity	7.69 MCM
	Type	Concrete Faced Rockfill Dam
	Maximum dam height	29.0 m

	Weighted average dam height	20.0 m
	Upstream and Downstream Slope	1V: 1.5H
	Length of CFRD at top (Peripheral)	1900 m
9	**Power Intake/Outlet at Lower Reservoir**	
	Approach Channel Length and Width	90 m long and 92 m wide
	Design discharge (Generation/Pumping)	228.84/199.71cumecs
	No and Type ofIntake	4 Nos, Diffuser Type Outlet Structure
	Invert Level of Intake	El. 271.0 amsl
	Top Level	El. 305.0 amsl
	Type and size of Gates	4 nos.,Vertical lift gate, 4.5 m (W) x 4.5 m (H) for 2 Nos. of Intake and 3.5 m (W) x 3.5 m (H) for 2 nos of Intake
10	**Main Pressure Shaft**	
	Nos. Diameter and Shape	2 nos. 4.5 m diameter Circular Steel Lined Pressure Shaft having length 1508 m and 1 no. 4.5 m diameter Circular Steel Lined Pressure Shaft having length 1417 m further bifurcate into two smaller unit diameter 3.5m
	Design discharge (Generation/Pumping)	228.84/199.71 cumecs
	Length of Pressure Shaft	1508 m and 1417 m
	Top Horizontal	423 m
	Vertical	249 m
	Bottom Horizontal	836 m
	Unit Pressure Shaft	2 nos. 3.5 m diameter circular steel lined pressure shaft length 91 m and 100 m respectively

11	**Powerhouse Cavern & Transformer Yard**	
	Type	Surface powerhouse
	Size of powerhouse including Service Bay	141 m (L) x 24.6 m (W) x 44.5 m (H)
	Centre Line of Turbine (Main Unit)	El. 244 amsl
	Centre Line of Turbine (Small Unit)	El. 243 amsl
	Service Bay Level	El. 257.5 amsl
	Main Access Tunnel (MAT)	8 m diameter, D-shaped tunnel 718 m long
	Max Net Head	361 m
	Min. Net Head	312.9 m
	Size of Transformer yard	141 m (L) x 16 m (W)
	Pothead Yard Size	80 m (L) x 35 m (W)
	Downstream/Upstream Surge Gallery	Not required
12	**Electro-Mechanical Equipment**	
	Type of Turbine and no. of units	Vertical Reversible Francis, 4 Nos.
	Turbine Centre line Elevation (Main Unit)	El. 244.0 amsl
	Turbine Centre line Elevation (Small Unit)	El.243.0 amsl
	Head Loss (Generation mode)	6.6 m
	Head Loss (Pumping mode)	5.58 m

	Rated Head (Generation mode)	334.1 m
	Rated Head (Pumping mode)	345.15 m
	Unit Discharge, (Main Unit) Pump/Turbine	66.57 cumecs/ 76.28 cumecs
	Unit Discharge, (Small Unit) Pump/Turbine	33.29 cumecs/ 38.14 cumecs
	Daily Hours of Generation	8.1 hours
	Daily Hours of Pumping	9.32 hours
	Installed Capacity (Generation)	2 x 225 MW & 2 x 112.5 MW
	Installed Capacity (Pumping)	2 x 245 MW & 2 x 122.5 MW
	Total Annual Energy (Generation)	1895.7 MU
	Total Annual Energy (Pumping)	2363.4 MU
13	**Tailrace Tunnel**	
	Unit TRT	
	Nos. and Shape	2 nos. Horseshoe Shaped Tunnel (excavation shape), Circular (finished shape)
	Diameter and Length	3.5 m diameter, 148 m long each
	Main TRT	
	Nos. and Shape	2 nos. Horseshoe Shaped Tunnel (excavation shape), Circular (finished shape)
	Diameter and Length	5 m diameter, 143.4 m long each
14	**Project Cost and Tariff**	

	Total Project Cost	INR 3792.17 Crores
	Escalation	INR 140.69 Crores
	Financial Charge	INR 5.74 Crores
	Hard Cost including escalation	INR 3325.36 Crores
	Interest during Construction (IDC)	INR
	Levelized tariff	INR 6.34/ kWh (One cycle generation/pumping (8.1 hrs./9.32 hrs.)
		INR 5.85/kWh (One and half cycle generation/pumping (9.7 hrs./11.16 hrs.)
	Pumping energy cost	INR 2.63/kWh

3.3.3. Deliberations by the committee in previous meetings

Date of EAC 1 :12/09/2023

Deliberations of EAC 1 :

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.*

3.3.4. Deliberations by the EAC in current meetings

4.5.3: 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 for conducting EIA study for proposed construction of Tainsar Pumped Storage Project of capacity 675 MW in 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 earlier proposed land required for the project was 281 ha area involves around **167.10 ha** of forest land for establishment of project and its components. The Upper and Lower reservoir area falls under the Pradhanpat reserved forest. In the 51st EAC meeting, proposal was deferred for want of additional information such as:

1. *Explore the alternative sites and relocate site to reduce forest area, and*
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.*

In compliance of above, project proponent has reduced total land requirement from 281 ha to 268 ha i.e 13 ha in which 11.59 ha Forest land has been reduced from 167.10 ha to 155.59ha).

The EAC was of the view that the project site is located in high canopy forest area, destruction of the same may affect the local biodiversity and productivity of the ecosystem. The PP should restrict its forest land requirement to 30% of the total land requirement.

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. Explore the alternative site analysis to reduce Forest land requirement up to 30% of the total land requirement. 2. Impact assessment on the fish diversity and aquatic biota on the hydrological alteration at the water drawing sources Jaraikela stream. 3. Stage I FC for 155.59 ha of forest land involved in the project shall be submitted prior to grant of EC. 4. Collect detailed information on types of Forest/canopy of forest / tentative nos. of tree felling etc. and duly certified from Forest Department. 5. 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 6. Alternative sites forvarious components shall be identified in terms ofloss of forest area and other environmental aspects. Explore to minimize forest land. 7. Action plan for ensuring the sustainability of Jaraikela stream due to pumping of water for the proposed lower reservoir. 8. Action plan for survival of the rivulets located in the study area. 9. Impact zone decided prior to base line data generation and accordingly, sampling location shall be finalized. Baseline data as mentionedin 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/ EMPreport. 12. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report. 13. A detailed wildlife conservation plan for Schedule –I species, duly approved by the Chief Wild Life Warden, be submitted. 14. 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. 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. institutions/ Indian Council of Agriculture Research (ICAR)and accordingly a detailed Water Shed Development Plan shall be prepared and incorporated in EIA/ EMP report. 17. MoU for water uses for the project shall be signed and approved by concerned authority. 18. Environmental matrix during construction and operational phase needs to be submitted. 19. Matrix formulated on the basis of detailed study and field survey of flora and fauna methodology used shall be mentioned in the EIA report. 20. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State. 21. 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. 22. Site specific ecological study w.r.t riverine ecology focusing on fishes diversity and aquatic biota due to construction of project be submitted.
Miscellaneous**	
1.	1. Pre-DPR Chapters viz. Layout Mapand 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 PPshould submit the original test reports and certificates of the labs which will analyse the samples. 5. Arial viewvideo 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/ EMPreport. 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.

3.3.6.2. Standard

1(c)	**River Valley/Irrigation projects**
Components of the EIA Study: Various aspects to be studied and provided in the EIA/EMP report are as follows:	
1.	Cropping pattern and Horticultural Practices in the study area.
1.	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.
1.	Documentation of fauna plankton (phyto and zooplankton), periphyton, benthos and fish should be done and analysed.
1.	Information (authenticated) on Avi-fauna and wildlife in the study area.
1.	Status of avifauna their resident/ migratory/ passage migrants etc.
1.	Documentation of demographic, Ethnographic, Economic Structure and development profile of the area.
1.	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.
1.	Collection of information on sensitive habitat of historical, cultural and religious and ecological importance.
1.	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.
1.	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.
1.	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.
1.	Conservation status of aquatic fauna.
1.	Fish diversity composition and maximum length & weight of the measured populations to be studies for estimation of environmental flow.
1.	Fish and fisheries, their migration and breeding grounds.
1.	Documentation of aquatic fauna like macro-invertebrates, zooplankton, phytoplantktons, benthos etc.

1.	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.
1.	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.
1.	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.
1.	Information on the dependence of the local people on minor forest produce and their cattle grazing rights in the forest land.
1.	Information on Agricultural Practices, Cultural and aesthetic sites, Infrastructure facilities etc.
1.	Collection of primary data on agricultural activity, crop and their productivity and irrigation facilities components.
1.	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.
1.	Existence of barriers and corridors, if any, for wild animals.
1.	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.
1.	Documentation of butterflies, if any, found in the area.
1.	null
1.	Physical geography, Topography, Regional Geological aspects and structure of the Catchment.
1.	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.
1.	Landslide zone or area prone to landslide existing in the study area should be examined.
1.	Presence of important economic mineral deposit, if any.
1.	Justification for location & execution of the project in relation to structural components (dam /barrage height).
1.	Impact of project on geological environment.
1.	Meteorology (viz. Temperature, Relative humidity, wind speed/direction etc.) to be collected from nearest IMD station.
1.	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.
1.	Existing Noise Levels and traffic density in the study area at 5-6 Locations.

1.	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.
1.	(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.
1.	History of the ground water table fluctuation in the study area.
1.	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).
1.	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
1.	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.
1.	Run off, discharge, water availability for the project, sedimentation rate, etc.
1.	Basin characteristics
1.	Catastrophic events like cloud bursts and flash floods, if any, should be documented.
1.	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.
1.	Set up a G&D monitoring station and a few rain gauge stations in the catchment area for collecting data during the investigation.
1.	Flow series, 10 daily with 90%, 75% and 50% dependable years discharges.
1.	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.
1.	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.
1.	Sedimentation data available with CWC may be used to find out the loss in storage over the years.
1.	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.
1.	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.
1.	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.

1.	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.
1.	Documentation of all plant species i.e. Angiosperm, Gymnosperm, Pteriodophytes, Bryophytes (all groups).
1.	General vegetation profile and floral diversity covering all groups of flora including lichens and orchids. A species wise list may be provided.
1.	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.
1.	Existence of National park, Sanctuary, Biosphere Reserve etc in the study area, if any, should be detailed.
1.	Economically important species like medicinal plants, timber, fuel wood etc.
1.	Details of endemic species found in the project area.
1.	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.
Description of Environment and Baseline Data	
1.	(ii) Submergence Area.
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:
1.	(i) Catchment area up to the dam/barrage site.
1.	(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.
1.	(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.
Details of the Project and Site	
1.	General introduction about the proposed project.
1.	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.

1.	A map of boundary of the project site giving details of protected areas in the vicinity of 25 km of project location.
1.	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.
1.	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
1.	Demarcation of snow fed and rain fed areas for a realistic estimate of the water availability.
1.	Land details including forests, private and other land.
1.	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.
1.	Geological and Seismo-tectonic details and maps of the area surrounding the proposed project site showing location of dam site and canal sites.
1.	Soil characteristics and map of the project area.
1.	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.
1.	Drainage pattern and map of the river catchment up to the proposed project site.
1.	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.
1.	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.
Environmental Management Plan	
1.	Water, Air and Noise Management Plans to be implemented during construction and post-construction periods.
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.
1.	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.
1.	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.

1.	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.
1.	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.
1.	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.
1.	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.
1.	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.
1.	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.
1.	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.
1.	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.
1.	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.
1.	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.

1.	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.
1.	Labour Management Plan for their Health and Safety.
1.	Sanitation and Solid waste management plan for domestic waste from colonies and labour camps etc.
1.	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.
1.	Environmental safeguards during construction activities including Road Construction.
1.	A summary of Cost Estimates for all the plans, cost for implementing all the Environmental Management Plans.
Impact Prediction and Mitigation Measures	
1.	Changes in land quality including effects of waste disposal
1.	River bank and their stability
1.	Impact due to submergence.
1.	Impact on forests, flora, fauna including wildlife, migratory avi-fauna, rare and endangered species, medicinal plants etc.
1.	Pressure on existing natural resources
1.	Deforestation and disturbance to wildlife, habitat fragmentation and wild animal's migratory corridors
1.	Compensatory afforestation-identification of suitable native tree species for compensatory afforestation and green belt.
1.	Impact on fish migration and habitat degradation due to decreased flow of water
1.	Impact on breeding and nesting grounds of animals and fish.
1.	Impact on local community including demographic profile.
1.	Impact on socio-economic status
1.	Impact on economic status.
1.	Impact on human health due to water / vector borne disease
1.	Impact on increase traffic
1.	Impact on Holy Places and Tourism
1.	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.
1.	Positive and negative impacts likely to be accrued due to the project are listed.

1.	Water pollution from labour colonies/ camps and washing equipment.
1.	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.
1.	Changes in land use / land cover and drainage pattern
1.	Immigration of labour population
1.	Quarrying operation and muck disposal
1.	The adverse impact due to the proposed project should be assessed and effective mitigation steps to abate these impacts should be described.
1.	Changes in ambient and ground level concentrations due to total emissions from point, line and area sources.
1.	Effect on soil, material, vegetation and human health.
1.	Impact of emissions from DG set used for power during the construction, if any, on air environment.
1.	Pollution due to fuel combustion in equipments and vehicles
1.	Fugitive emissions from various sources
1.	Changes in surface and ground water quality
1.	Steps to develop pisci-culture and recreational facilities
1.	Changes in hydraulic regime and downstream flow.
1.	Water pollution due to disposal of sewage
Methodology for Collection of Biodiversity Data	
1.	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).
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).
1.	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.
1.	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.
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.

4. Any Other Item(s)

N/A

5. List of Attendees

Sr. No.	Name	Designation	Email ID	Remarks
1	Prof. G. J. Chakrapani	Chairman	cha**********@gmail.com	
2	Shri Ajay Kumar Lal	Member	akl****@gmail.com	
3	Dr Mukesh Sharma	Member (EAC)	muk***@iitk.ac.in	
4	Dr Uday Kumar R Y	Member (EAC)	uda********@yahoo.com	
5	Dr J A Johnson	Member (EAC)	jaj@wii.gov.in	
6	Dr. J V Tyagi	Member	jvt******@gmail.com	
7	Shri Kartik Sapre	Member	kar********@gmail.com	
8	Shri Sharvan Kumar	Member	krs******@nic.in	

9	Shri Alok Paul Kalsi	Member	jaj@wii.gov.in	Absent
10	Dr. A.K. Sahoo	Member	ami***@gmail.com	
11	Yogendra Pal Singh	Scientist E	yog*******@nic.in	

MINUTES OF THE 4th MEETING OF THE EXPERT APPRAISAL COMMITTEE FOR RIVER VALLEY AND HYDROELECTRIC PROJECTS HELD ON 24TH NOVEMBER, 2023 FROM 11:00 AM – 05:30 PM ON ONLINE MODE.

The 4th 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 **24th November,** 2023 through online mode, under the Chairmanship of Prof. G. J. Chakrapani. The Members present in the meeting are as listed in **Annexure**.

Agenda Item No. 4.1:

The minutes of the 3rd EAC meeting held on 10th November, 2023 were confirmed.

Agenda Item No. 4.2

Yadaballi Closed Loop Pumped Storage Project of capacity 1200 MW at Village Yadaballi, District Annamayya (Andhra Pradesh) by M/s New and Renewable Energy Development Corporation of Andhra Pradesh Ltd. (NREDCAP) – Terms of References (ToR) – reg.

[Proposal No. IA/AP/RIV/451968/2023; F. No. J-12011/58/2023-IA.I (R)

4.2.1: The proposal is for grant of terms of references (ToR) to the project for Yadaballi Closed Loop Pumped Storage Project of capacity 1200 MW in an area of 195.82 ha at Village Yadaballi, District Annamayya (Andhra Pradesh) by M/s New and Renewable Energy Development Corporation of Andhra Pradesh Ltd. (NREDCAP).

4.2.2: The project proponent and the accredited Consultant /s. RS Envirolink Technologies Pvt made a detailed presentation on the salient features of the project and informed that:

i. The proposed Yadaballi PSP (1200 MW) is envisaged as an Off Stream Closed Loop PSP in Annamayya district, Andhra Pradesh. Both the Upper and the Lower reservoirs are artificial reservoirs.
ii. The proposed lower reservoir site is located on the left bank of **Mandavi river, near village Yadaballi, at about 30 km away from nearest town Rayachoty**. Based on geological data and the topographical setup, the upper and lower reservoirs are proposed by forming a Concrete Face Rockfill Dam (CFRD). The FRL and MDDL of the upper reservoir is kept at EL 816.00 m and EL 792.00 m respectively with a gross storage of 6.59 MCM and a live storage of 6.16 MCM. Similarly, the FRL and MDDL of the lower reservoir is kept at EL 309.00 m & EL 277.00 m respectively with a gross storage of 7.26 MCM and live storage of 6.90 MCM.
iii. **Water sources:** The water required for initial reservoir filling is proposed to be met from **Mandavi River, located in proximity to the lower reservoir site**. The project would require one time filling of reservoir and later would require replenishing the water, lost due to evaporation in order to generate the stipulated energy.
iv. The proposed project envisages following major civil components:

a. **Upper Reservoir**: A Concrete Faced Rock-Fill embankment dam, 2459.04 m long with average height of 31 m from excavated bed level of 790 m for creation of Upper reservoir with gross storage capacity of 6.59 MCM.
b. **Lower Reservoir**: The lower reservoir is proposed by construction of Concrete Faced Rock-Fill dam 1223.8 m long with average height of 39 m from excavated bed level of 275m. The Gross Storage capacity of the Lower reservoir is 7.26 MCM.
c. **Upper Intake**: 5 nos. of diffuser type Intakes are proposed at the upper reservoir comprising 3 nos. of bays in each intake. The same structure also acts as an outlet structure to discharge water into the upper reservoir during pumping.
d. **Buried Penstock/ Steel Lined Pressure Shaft**: 5 nos. of 3.6m dia., having average length of 1492 m circular steel lined buried penstock/ steel lined pressure shaft to feed 4 units of 240 MW and I no. of 3.6m dia., 1423 m long circular steel lined buried penstock/pressure shaft further bifurcated into 2 nos. of 2.7 m dia. unit pressure shaft of 67.14 m & 76.15m length to feed 2 units of 120 MW.
e. **Powerhouse Complex**: It comprises of an underground powerhouse of size 22 m(L) x 24m (W) x 51.4m (H) housing 4 units of 240MW & 2 units of 120MW. A Transformer cum GIS cavern of size 234.6 (L) x 16.00 (W) x 29 (H) to accommodate Transformers and GIS equipment.
f. One no. of 8 m diameter D—shaped, 473.6m long Main Access Tunnel has been proposed to provide access to the Underground powerhouse and a Pothead yard of size 73 m (L) x 30 m (W) is provided.
g. **Tail Race Tunnel**: 2 nos. of 3m diameter & 4 nos. of 4.2 m diameter circular TRT, each having varying length of 145.30m to 180.46 m has been proposed to discharge water from the draft tube to the lower reservoir.
h. **Lower Intake**: 6 nos. of diffuser type Intakes proposed at the lower reservoir comprising 3 nos. of bays having Tail Race Tunnel Diameter 4.2 and 2 nos of bays having Tail Race Tunnel Diameter 3m. The same acts as an inlet structure during pumping to draw water from the lower reservoir.
i. **Water Pipeline**: 125m diameter, 450 m long steel pipeline is proposed from the **Mandavi River** to the lower reservoir for initial reservoir filling and further replenishment.

v. Land requirement: The total land required for the construction of various components and related works for Yadaballi PSP is estimated to be around **195.82 ha, out of which is 60.10 ha is private land and 135.72** ha is forest/govt. land.

vi. Protected/Environmental Sensitive area: Sri Penusila Narsimha WLS is about 23.10 Km from site is the nearest protected area from the proposed project.

vii. Project estimated cost: The estimated project cost is Rs. 5866.77 Crore including IDC. As a preliminary estimate, a construction period of 4.5 years (54 months) from the date of award of civil works package has been estimated for this project.

viii. Salient features:

Project details:

Name of the Proposal	**Yadaballi Pumped Storage Project**

Location (Including coordinates)	Lower Reservoir: 78°53'26.68"E; 14°11'31.03"N Upper Reservoir: 78°53'15.39"E; 14°12'29.45"N
Inter- state issue involved	No
Seismic zone	Zone-II

Category details:

Category of the project	A
Provisions	
Capacity / Cultural command area (CCA)	1200 MW
Attracts the General Conditions (Yes/No)	No

Electricity generation capacity:

Powerhouse Installed Capacity	1200 MW
Generation of Electricity Annually	2578.67 MU/ 3814.02 MU (1 cycle/ 2 cycle)
No. of Units	6 nos. (4X240 MW+2X120 MW)

ToR/EC Details:

Cost of project	5866.77 Cr.
Total area of Project	195.82 ha
Height of Dam from River Bed (EL)	Lower Dam - 39.0m Upper Dam - 31.0m
Length of Tunnel/Channel	11307m
Details of Submergence area	93.94 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction waste

Muck Management Details:

No . of proposed disposal area/ (type of land- Forest/Pvt. land)	50ha Non-Forest 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:

Private Land	60.10

Government land/Forest Land	135.72 ha
Submergence area/Reservoir area	93.94 ha
Land required for project components	101.88 ha
Additional information (if any)	Nil

Presence of Environmentally Sensitive areas in the study area

E-Flows for the Project	Not Applicable, as this is Off-Stream Closed 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 E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustaining river ecosystem.	No

Forest Land/ Protected Area/ Environmental Sensitivity Zone	Details of Certificate / letter/ Remarks
Reserve Forest/Protected Forest Land	There is no wildlife protected area in the vicinity of the proposed project. Sri Penusila Narsimha WLS which is about 23.10 Km from the proposed site is the nearest protected area from the proposed project.
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-1	Yetto Apply

Miscellaneous

Particulars	Details
Details of consultant	M/s RS Envirolink Technologies Pvt. Ltd.
Project Benefits	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

4.2.3: The EAC during deliberations noted the following:

The EAC deliberated on the information submitted and as presented in the meeting and observed that the proposal is for grant of Terms of Reference (ToR) to the project for Yadaballi Closed Loop Pumped Storage Project of capacity 1200 MW in an area of 195.82 ha at Village Yadaballi, District Annamayya (Andhra Pradesh) by M/s New and Renewable Energy Development Corporation of Andhra Pradesh Ltd. (NREDCAP).

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 during discussion on the project layout of the proposed Yadaballi Closed Loop Pumped Storage Project observed that the proposed project site is very close to another proposed PSP namely Veeraballi Off stream Closed Loop Pumped Storage Project, with a few project components of these two projects are overlapping. The Member Secretary EAC informed that the Ministry has granted Terms of Reference for conducting EIA Study for Veeraballi Off stream Closed Loop Pumped Storage Project in favour of M/s Astha Green Energy Ventures India Pvt Ltd. The EAC was of the view that Project Proponent has not mentioned this fact anywhere in the proposal submitted to the Ministry. It was also noted that the Ministry has received a representation mentioning the same fact about the instant

proposal. The committee took a serious note on suppression of the factual information. The committee expressed its displeasure on the performance of the EIA consultant and recommended the Ministry to seek clarification from the project proponent and the consultant followed by necessary action. The EAC strongly advises all project proponents and consultants to be aware of nearby projects in the vicinity of their proposal and do serious homework and to follow a thorough and professional job. Site selection should be done taking various key environmental parameters and not based on their comfort zones or economic considerations alone.

The project consultant informed the EAC that the proposal shall be withdrawn and the proponent shall comeback with a suitable site.

*The proposal was therefore **returned in present form** on the above lines.*

Agenda Item No. 4.3

Rayavaram Closed Loop Pumped Storage Project (1500 MW) in an area of 469.71 ha located at village Rayavaram, Mandal T. Sundupalli, District Annamayya, Andhra Pradesh by M/s New and Renewable Energy Development Corporation of Andhra Pradesh Ltd. (NREDCAP) – Terms of References (TOR) – reg.

[Proposal No. IA/AP/RIV/452357/2023; F. No. J-12011/59/2023-IA.I (R)]

4.3.1: The proposal is for grant of Terms of References (TOR) to the project Rayavaram Closed Loop Pumped Storage Project (1500 MW) in an area of 469.71 ha located at village Rayavaram, Mandal T. Sundupalli, District Annamayya, Andhra Pradesh by M/s New and Renewable Energy Development Corporation of Andhra Pradesh Ltd. (NREDCAP).

4.3.2: The Project Proponent and the accredited Consultant M/s Aarvee Associates Architects, Engineers and Consultants Pvt Ltd, Hyderabad, made a detailed presentation on the salient features of the project and informed that:

i. The project is located near Rayavaram village in T. Sundupalli Mandal of Annamayya District, Andhra Pradesh. The geographical coordinate of upper reservoir is at latitude 13°57’22.24"N and longitude 79°3’15.03"E. Similarly, the geographical coordinate of lower reservoir is at latitude 13°56’48.61"N and longitude 79°1’47.27"E.

ii. Rayavaram Pumped Storage Project (RPSP) is an Off-Stream Closed Loop Pumped Storage development, proposed with an installed capacity of 1500MW/9135 MWH. The Project comprises of development of upper & lower reservoirs with a gross storage capacity of 13.71 MCM (0.484 TMC) & 11.97 MCM (0.420 TMC) respectively, out of which upper reservoir to be constructed with maximum dam height of 41m (from deepest bed level) to create the desired storage capacity while the lower reservoir will have maximum height of 35 m (from bed level) constructed at the downhill.

iii. The onetime filling of the PSP reservoir will be carried out from **Cheyyeru River, which is about 5.0 Kms** from the proposed lower reservoir. The scheme of operation for the project is with 6.09 Hours of peak hour generation per day and 7.23 Hours for pumping back the water to the upper reservoir. Water will be used cyclically for energy storage and discharge. Evaporation losses if any will be recouped periodically.

iv. The FRL and MDDL of the upper reservoir is kept at EL 732.00 m & EL 708.00 m respectively with a gross storage of 13.71 MCM (0.484 TMC) and live storage of 10.26 MCM (0.362 TMC). Similarly, the FRL and MDDL of the lower reservoir is kept at EL 353.00 m & EL 336.00 m respectively with a gross storage of 11.96 MCM (0.420 TMC) and live storage of 10.59 MCM (0.374 TMC). The live storage capacity for pumped storage scheme required is 10.26 MCM (0.362 TMC). The proposed project will generate 1500 MW of power by utilizing net rated head of 366.77m. The water from the upper reservoir will be diverted through Powerhouse and TRT to the lower reservoir. The water will be pumped back to the upper reservoir through Lower Intake via TRT-Reversible Turbines-pressure shaft-HRT. The present proposal consists of the following components:

- Upper and Lower Reservoir
- Upper Intake ϖ Headrace Tunnel ϖ
- Surge shaft
- Penstock Tunnel
- Surface Powerhouse ϖ
- Tailrace Tunnel
- TRT outlet and Tailrace Channel

v. **Land requirement:** Total land required for the construction of proposed activities is approximately **469.71 ha in which 302.2 ha** is forest land.

vi. **Population affected:** There is no settlement in the entire project area. As such no population is affected by the project. As per information available till date, all the land in the project area is identified as agricultural land, and inaccessible waste land.

vii. **Protected/Environmental Sensitive area: Sri Venkateswara National Park WLS about 13 Km from site** is the nearest protected area from the proposed project.

viii. **Hydrology/Water availability:** The proposed storage project is being planned by creating new upper & lower reservoirs by constructing dams across a small stream. The upper reservoir and lower reservoir catchment areas are 2.15 sq.km & 4.42 sq.km respectively. The Proposed PSP has upper reservoir and lower reservoir with a gross storage capacity of 13.71 MCM (0.484 TMC) and 11.96 MCM (0.420 TMC) respectively. The live storage of PSP Upper reservoir and lower reservoir are 10.26 MCM (0.362 TMC) and 10.59 MCM (0.374 TMC) respectively. Operational pat tern of PSP has been kept in such a way that 10.26 MCM (0.362 TMC) of water will be utilized for the proposed PSP. The project is a pumped storage scheme and hence, no consumptive utilization of water is required for its operation. The onetime filling of the PSP reservoir with 14.04 MCM (0.54 TMC) will be carried out from the **Cheyyeru River** by constructing a separate pump house near the reservoir.

ix. **Cost and Benefits of the Scheme:** The total estimated cost of the project including direct and indirect charges excluding Interest during construction is Rs. 6309.64 Cr. For the installed capacity of 1500MW, the cost per MW of installed capacity works out to be Rs. 4.77 Cr. The project would generate designed energy of 3165.07 MU. Other benefit of this storage project can be in the form of spinning reserve with almost instantaneous start-up from zero to full power supply, supply of reactive energy, primary frequency regulation, voltage regulation etc.

x. **Alternative study:** ALTERNATIVE STUDY FOR SELECTION OF PROJECT SITE: Project Sites/Locations A detailed alternative study for selection of site for both upper and lower reservoir along with WCS alignment has been carried out. The search area considered for the selection of site is about 15.00 km radius (177 Sq. km). Six project

sites/locations have been considered for finalization of project location. Based on technical comparison and its ranking Alternative-3 is selected for further study and Detailed Topographical Survey.

xi. **Salient features are as under:**

Project details:

Name of the Proposal	Rayavaram Hydro-Electric Pumped Storage Project
Location (Including coordinates)	The geographical coordinate of upper reservoir is at latitude 13°57'22.24"N and longitude 79°3'15.03"E. Lower reservoir latitude 13°56'48.61"N and longitude 79°1'47.27"E.
Inter- state issue involved	No
Seismic zone	As per the seismic zonation map of India, the Project area lies in the seismic zone-II.

Category details:

Category of the project	Category A
Provisions	Pumped Storage Project
Capacity/ Cultural command area (CCA)	1500 MW
Attracts the General Conditions (Yes/No)	No

Electricity generation capacity:

Powerhouse Installed Capacity	1500 MW
Generation of Electricity Annually	3165.07 MU
No. of Units	7 (5 units of 250 MW Turbines & 2 units of 125 MW turbines)

ToR/EC Details:

Cost of project	total Hard Cost of the project is Rs.630964.00 Lakhs (Rs. 6309.64 Cr).
	Total cost of the project including IDC is Rs 715758 . 00 Lakhs (7157.58 Cr)
Total area of Project	469.71 Ha
Height of Dam from Riverbed (EL)	41 m for Upper reservoir and 35 m for Lower reservoir
Length of Tunnel/Channel	3 nos;8 m dia HRT - 933.45 m (L) 7 nos;6.2 m dia TRT - 181.44 m (L) 3 nos; 5.6 m dia Main Pressure Shaft - 1166.90 m (L) 5 nos; 4.2m dia Branch Pressure Shaft - 87.25 m (L)
Details of Submergence area: Forest Land is falling in the Submergence area of 137 Ha.	

E-Flows for the Project: Stream flow is not disturbed by the project. The proposed project is an off-stream closed loop project with an installed capacity of IS00MW/9135 MWH.	
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 N/A/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)	Low Lying Areas
Muck Management Plan	The huge, excavated material shall be utilized in the construction of embankment dam with processing the excavated material. Moreover, the excavated material from underground works of tunnel and powerhouse will also be utilized for processing of aggregates for concrete. Thus, about total 140 Lakh cum of excavated muck will be safely dumped in the designated muck dumping yard to mitigate the environmental hazard. An area of 140 Ha has been earmarked for the Muck Dumping area.

Land Area Breakup:

Private land	95.89 Ha
Government land/Forest Land	71 Ha/302.82 Ha
Submergence area/Reservoir area	The proposed project is an off stream closed loop project with an installed capacity of 1500MW/9135 MWH. The land required for the proposed upper reservoir and upper intake is 74.43 ha and the land required for the proposed lower reservoir and upper intake is 134.52 ha.
Land required for project components	469.71 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	Under process Sri Venkateswara National Park WLS is about 13 Km from site is the nearest protected area from the proposed project.
National Park	No	
Wildlife Sanctuary	No	

Court case details: Nil

Affidavit/Undertaking details:

Affidavit / Undertaking	the undertaking by NREDCAP is provided along with this document.
Additional information (if any)	**Nil**

Previous EC compliance and necessary approvals:

Particulars	Letter no. and date
Certified EC compliance report (if applicable)	**N/A**
Status of Stage- I FC	Under process
Is FRA (2006) done for FC-I	Under process

Miscellaneous

Particulars	Details
Detail of consultant	M/s Aarvee Associates Architects, Engineers and Consultants Pvt Ltd., Hyderabad
Project Benefits	The availability of alternative resources provided by developer in the rural areas will reduce the dependence of the locals on natural resources such as forest. A number of marginal activities and jobs would be available to the locals during construction phase. Developer bringing large scale investment to the area will also invest in local area development and benefit will be reaped by locals. Education, medical, transportation, road network and other infrastructure will improve. With increased availability of electricity, small-scale and cottage industries are likely to come up in the area.

4.3.3: The EAC during deliberations noted the following:

The EAC deliberated on the information submitted (Form 1, PFR, KML file, etc**.)** and as per presentation in the meeting, observed that the proposal is for grant of Terms of Reference to the project Rayavaram Closed Loop Pumped Storage Project (1500 MW) in an area of **469.71 ha** located at village Rayavaram, Mandal T. Sundupalli, District Annamayya, Andhra Pradesh by M/s New and Renewable Energy Development Corporation of Andhra Pradesh Ltd. (NREDCAP)

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 also noted that Sri Venkateswara National Park is located about 13 Km from the proposed project site. The proposed project required total land of 469.71 ha in which 302.86 ha is the Forest land for selected site as per option -3 alternative site study.

4.3.4: The EAC after detailed deliberation on the information submitted and as presented during the meeting **recommended** for grant of specific ToR for to the project Rayavaram Closed Loop Pumped Storage Project (1500 MW) in an area of 469.71 ha located at village Rayavaram, Mandal T. Sundupalli, District Annamayya, Andhra Pradesh by M/s New and Renewable Energy Development Corporation of Andhra Pradesh Ltd. (NREDCAP) 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 with respect to riverine ecology focus on fishes diversity, fish migration, habitat and aquatic biota due to construction Rayavaram PSP.
ii. Explore the possibilities for reducing the Forest land requirement The application for obtaining Stage I FC for 302.86 ha/ of forest land (after rationalising the requirement of forest land) involved in the project shall be submitted.
iii. Alternative sites for various components shall be identified in terms of loss of forest area and other environmental aspects.
iv. Impact assessment on the fish diversity based on the hydrological alteration at the water drawing sources **Cheyyeru River** shall be studied.
v. Cumulative Impact of project on carrying capacity and sustainability of Reservoir/ **Cheyyeru River** /nalahs of catchment area / due to tapping of water for filling reservoir
vi. 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
vii. Action plan for survival of the rivulets located in the study area.
viii. 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.
ix. 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.
x. 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.
xi. A detailed reclamation/ restoration plan of quarrying site/sites be incorporated in the EIA/EMP report.
xii. A detailed wildlife conservation plan for Schedule –I species, duly approved by the Chief Wild Life Warden, be submitted.
xiii. 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.

xiv. Reservoir/ River banks protection plan all along the submergence need to be prepared and incorporated in EIA/ EMP.
xv. 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
xvi. 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.
xviii. Environmental matrix during construction and operational phase needs to be submitted.
xix. Matrix formulated on the basis of detailed study and field survey of flora and fauna methodology used shall be mentioned in the EIA report.
xx. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.
xxi. 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.

[B] Socio-economic Study

xxii. Declaration by the project proponent by way of affidavit that "No" Inter-state issue/ policy issue is involved with any State in the project.
xxiii. 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.
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.
xxv. Tentative no. of project affected families shall be identified and accordingly appropriate Rehabilitation & Resettlement plan shall be prepared.
xxvi. 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. Disposal of muck should be away from Forest area.
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 Pumped storage projects shall be used for preparation of EIA/ EMP reports.

Agenda Item No. 4.4

Phata Byung Hydro Electric Project (76 MW) in an area of 23.323 Ha, located at Village Sitapur, Tehsil Okhimath, District Rudraprayag (Uttarakhand) by M/s Lanco Mandakini Hydro Energy Private Limited – Terms of Reference (TOR) - reg.

[Proposal No. IA/UK/RIV/409698/2023; F. No. J-12011/64/2007-IA.I]

4.4.1: The proposal is for grant of Terms of References (TOR) to the project Phata Byuong Hydro Electric Project (76 MW) in an area of **23.323 Ha, located** at Village Sitapur, Tehsil Okhimath, District Rudraprayag (Uttarakhand) by M/s Lanco Mandakini Hydro Energy Private Limited

4.4.2: M/s. R.S. Envirolinks Technologies Pt Ltd made a detailed presentation on the salient features of the project and informed that:

i. The project proposal was considered by the Expert Appraisal Committee (Hydro River Valley Sector) in its 42nd meeting held during 23.02.2023 for grant of Terms of Reference(ToR).
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. Ministry had issued EC earlier vide letter no. J-12011/64/2007-IA-I dated 18.02.2008 to the existing project Phata Byung HEP (76MW) in favour of M/s Lanco Hydro Energies Pvt Ltd.
iv. The estimated project cost is Rs. 466 Crs (excluding IDC as per NCLT order dated 23rd March 2023). The cost is being further reviewed during site investigations. Total capital cost earmarked towards environmental pollution control measures is Rs 20.26 Crs and the Recurring cost (operation and maintenance) will be about Rs 2.2 Crs per annum.
v. There is one (1) wildlife sanctuary (KMDS), within 10 km distance from the project site. River/ water body Mandakini is flowing at a distance of average 2 km from North to South-East direction.
vi. Total Employment will be 100 persons as direct and 600 persons indirectly.
vii. Public Hearing for the proposed project has been conducted by the State Pollution Control Board on 10.10.2007. The main issues raised during the public hearing are related to rehabilitation, employment, impact on forest and local area development.
viii. Details of Certified compliance report submitted by IRO, MoEF&CC. IRO had visited the site on 16th March 2023 and submitted Certified compliance report (CCR) on 5th April 2023. Accordingly, project proponent had submitted ADS reply on 22nd May 2023.

ix. Lanco Mandakini Hydro Energy Private Limited ("LMHEPL") is developing 76 MW Phata Byung Hydro Electric Project in Uttarakhand on river Mandakini. It is run-of-the river scheme to harness hydropower potential of river Mandakini in the state of Uttarakhand. The project is approachable by road (200 kms along NH 109) from Rishikesh via Srinagar and Rudraprayag.

x. Department of Energy, Govt. of Uttarakhand accorded DPR clearance in the year of 2007 for an installed capacity of 76 MW (2 X 38 MW).

xi. **Environment and forest clearance were given during the year 2008**. The project has been entrusted to M/s Lanco Infratech Ltd. on EPC contract basis during the year 2008.

xii. **During 14th - 17th June 2013, Uttarakhand** and adjoining areas received very heavy rainfall (~375% more than the normal levels). Resulting cloudburst caused heavy floods in Rudraprayag district of Uttarakhand (where the project is located), resulting in huge losses of life and property. Significant loss and damage that occurred at Phata Project site is listed below:

a) The Dam structure (which was already raised to its full height) was severely damaged
b) The entire reservoir area was completely filled with debris
c) All major project equipment, machinery and other installations at site along the river have been either washed away or damaged beyond repairable condition
d) Most of the construction material has been completely washed away
e) Approach roads and internal project roads have been washed away with practically no access to some of the project components
f) Post the restart of works after the devastation of Uttarakhand Floods, LMHEPL has achieved overall physical work progress of 74%. All the construction activities at Phata Byung Project site from July 2017 is on hold as our EPC contractor M/s Lanco Infratech Ltd.(LITL) has been referred to NCLT under IBC (Insolvency and Bankruptcy Code) 2016 and subsequently under Liquidation process since 2018.
g) Further, the project company LMHEPL was also referred to the Corporate Insolvency Resolution Process ("CIRP") under the Insolvency and Bankruptcy Code, 2016 on 11th June 2020 by the lenders and after almost 2 years of CIRP process the financial creditors approved the Resolution Plan submitted by Statkraft IH Holding AS, Norway by a majority of 100% on February 25, 2022. The Resolution Professional (RP) filed the application for approval of the Resolution Plan before the Hon'ble NCLT, Allahabad Bench.
h) The Hon'ble NCLT has approved the Resolution plan of Statkraft IH Holding AS, Norway on 23rd March 2023.
i) The project proponent i.e. Statkraft IH Holding AS, Norway has applied for Denovo Environmental Clearance and the same was considered in the 42nd EAC meeting dated 23/02/2023. The EAC recommended for conducting a site visit by Sub - committee of the EAC before giving any recommendation on the proposal. It was also recommended that PP should obtain Compliance status report from the concerned regional office of the Ministry. As per the MoM of the 42nd EAC meeting, the officials from Regional MoEFCC-Dehradun visited the site on 16th Mar 2023 and submitted the Certified Compliance Report (CCR) on 05th April 23. However, the visit of EAC sub-committee is yet to be conducted.
j) The work overall, 74% of the project has been completed (including 99% excavation works completed).

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

Project details:

Name of the Proposal	Phata Byung Hydro Electric Project (76 MW) (De novo EC application)
Location (Including coordinates)	Dam site: 79^0 00' 28''E 30^o 37' 35''N Power house site: 79^o 04' 05''E 30^o 33' 40''N
Inter- state issue involved	No
Seismic zone	V

Category details:

Category of the project	A
Provisions	Project is 76 MW but becomes Category A due to general conditions applicability (within 10 km of Kedarnath WLS)
Capacity / Cultural command area (CCA)	76 MW
Attracts the General Conditions (Yes/No)	Yes
Additional information (if any)	

Electricity generation capacity:

Powerhouse Installed Capacity	76MW
Generation of Electricity Annually	Annual energy generation in 90% dependable year: 340 GWh
No. of Units	Two generating units of 38 MW each
Additional information (if any)	

ToR/EC Details:

Cost of project	466 Crs (Total)
Total area of Project	23.323 ha
Height of Dam from River Bed (EL)	26 m
Length of Tunnel/Channel	9.32 km
Details of Submergence area	1 ha
Types of Waste and quantity of generation during construction/ Operation	Muck from excavation, solid waste from labour colony and construction areas
E-Flows for the Project	MoWR Gazette dated 9th Oct 2018 shall be followed.
Is Projects earlier studies in Cumulative Impact assessment & Carrying Capacity studies (CIA&CC) for River in which project located. If yes, then E-flow with TOR /Recommendation by EAC as per CIA&CC study of River Basin. If not the E-Flows maintain criteria for sustaining river ecosystem.	Several basin level assessments have been undertaken by reputed institutes and expert bodies during 2012-2018 period – WII report (2012), EBI report (2014), HNB Garwal University (2014), AHEC report (2011 and 2015), EB II report (2018) to name a few. E-flow recommendations shall accordingly be applicable.

Muck Management Details:

No. of proposed disposal area/(type of land-Forest/Pvt. land)	Present case is a de-novo EC application where 74% work has already been completed (99% of HRT excavation completed). 9 muck disposal sites were proposed initially, however only 4 have been utilized so far.
Muck Management Plan	Will be prepared in EIA/EMP. Muck will be disposed off at designated sites in a controlled manner to protect environment.
Monitoring mechanism for Muck Disposal	Will be provided in EIA/EMP report

Land Area Breakup:

Private land	2.032 Ha
Government land/Forest Land	21.291 ha
Submergence area/Reservoir area	1 Ha
Land required for project components	23.323 ha
Additional information (if any)	-

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	-	A letter was issued by Chief Wildlife Warden – Uttarakhand on 01/12/2007
National Park	-	
Wildlife Sanctuary	Kedarnath Wildlife Sanctuary within 10 km	

Court case details:

Court Case	NIL
Additional information (if any)	

Affidavit/Undertaking details: Enclosed

Previous EC compliance and necessary approvals:

Particulars	**Letter no. and date**
Certified EC compliance report (if applicable)	1. Present case is a de-novo EC application where 74% work has already been completed. 2. Six monthly compliance reports were submitted regularly during the progress of the works. 3. Post IRO Official visit on 16th March'23 and as per the CCR (Certified Compliance Report), we submitted our

	compliance as ADS through letter dated 22nd May'23 to the MoEF&CC Delhi & IRO Dehradun
Status of Stage- I FC	Already in place
Is FRA (2006) done for FC-I	NA

Miscellaneous

Particulars	**Details**
Details of consultant	M/s R S Envirolink Technologies Pvt. Ltd. (RSET) (NABET Accredited Consultant Organization) Cellular : (+91) 9810136853
Status of other statutory clearances	Present case is a de-novo EC application where 74% work has already been completed and Forest clearance is already in place.
R&R details	No R&R, as present case is a de-novo EC application and R&R was completed earlier.

4.4.3: 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 Phata Byung Hydro Electric Project (76 MW) in an area of 23.323 Ha, located at Village Sitapur, Tehsil Okhimath, District Rudraprayag (Uttarakhand) by M/s Lanco Mandakini Hydro Energy 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.

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

i. Obtain certification from the State Forest Department stating that none of the component of the project including the submergence area of the dam falls within the eco-sensitive zone of the Kedarnath Wildlife Sanctuary or any other Wildlife Sanctuary.
ii. Submit data on catastrophic events observed in the region after grant of earlier environmental clearance to the instant project.
iii. Point-wise implementation status/action plan on the observations of the IRO, MoEF&CC report regarding conservation measures for Schedule -I wildlife species to be submitted duly certified by the IRO, MoEF&CC.
iv. Project Authorities are required to provide the details of commitments made during public hearing and the actions taken to fulfil the same along with budget allocations/expenditures towards activities.

Agenda Item No. 4.5

Tainsar Pumped Storage Project (675 MW) in an area of 268 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)]

4.5.1: The proposal is for grant of Terms of References (TOR) to the project Tainsar Pumped Storage Project (675 MW) in an area of 268 ha at Village Gailo & Kailash, District Deogarh, Odisha by M/s Jindal Renewable Power Private Limited

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

i. Tainsar Pumped Storage Project (675 MW) is a self-identified Off Stream closed loop pumped storage project located in Deogarh district in the state of Odisha, India. Upper reservoir is located near Tainsar Village of Deogarh district at Co-ordinates 21°33'0.95"North and 84°39'11.41“ East. Lower reservoir is located near Gailo and Kailash Village of Deogarh district at latitude 21°34'9.91"N and longitude 84°39'32.74"E.
ii. 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.
iii. To implement the Proposed scheme, JRPPL has carried out Pre-Feasibility Study (PFR) for Tainsar Pumped Storage Hydro Electric Project, 675 MW.
iv. Tainsar PSP (675 MW) is a green project in true sense as pumped storage component can support intermittent renewable energy on the grid by absorbing energy when demand is low and supply when demand is high.
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 fall under the Pradhanpat reserved forest.** The nearest wildlife sanctuary is **Usha Kothi,** located at about 43 km from the proposed project site.
vi. **Discussion in EAC meeting**: Project was discussed during the 51st Expert Appraisal Committee (River Valley & Hydroelectric Projects) held on **12.09.2023 and additional information was sought as under**:
vii. Explore the alternative sites and relocate site to reduce forest area
viii. 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.
ix. Earlier three alternative project layouts were studied (Alternative-I, II and III). Out of these three Alternatives, project layout as per Alternative-II was selected**.**
x. **In compliance to the observations in Minutes of 51st meeting of** EAC dated 12th Sept,2023, two more sites of upper and lower reservoir have been explored in vicinity of the selected layout. The study is aimed to explore alternative sites for the project so that forest area requirement can be minimized along with the minimal impact on flora

and fauna of the area. Alternative sites have been identified with an objective to keep nearly equivalent head as of the selected project layout in the PFR. In this report, five (5) project layout alternatives have been discussed in the subsequent paragraphs which includes three (3) alternative project layouts (Alternative-I, II & III) as submitted in PFR along with two (2) newly studied project layout alternatives (Alternative-IV & Alternative-V). Out of these five 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 112.5 MW/122.5 MW) housed in a pit type of surface powerhouse.

xi. **Land requirement: Total 268 ha. In which 155.51 ha is Forest land. The breakup of land are as under:**

S. NO	PROJECT COMPONENT	FOREST LAND (ha)	NON-FOREST LAND (ha)	TOTAL (ha)
1A	Site Office Ur	1	-	1
1B	Site Office Lr	-	1	1
2A	Crushing & Batching Plant Ur	2.25	-	2.25
2B	Crushing & Batching Plant Lr	-	2.25	2.25
3A	Stacking Area And Workshop Ur	1	-	1
3B	Stacking Area And Workshop Lr	-	1	1
4A	Magazine Area Ur	0.25	-	0.25
4B	Magazine Area Lr	-	0.25	0.25
5A	Labour Camps Ur	2	-	2
5B	Labour Camps Lr	-	2	2
6A	Colony Area Ur	2	-	2
6B	Colony Area Lr		2	2
7	Muck Disposal/ Green Belt Area (Ur & Lr)	-	93	93
8	Upper Reservoir	48.81	-	48.81
9	Lower Reservoir	53.52	6.99	60.51
10	Wcs Excluding Dam Area	9.02	-	9.02
11	Power House Complex	8.59	-	8.59
12	Adits	5.07	-	5.07
13,13A &13B	Approach Roads (Ur & Lr)	5	2	7
14	Pipeline For Filling Lr	17	2	19
	TOTAL	**155.51**	**112.49**	**268**

Salient features of project are as under:

1	**Location**	
	State	Odisha
	District	Deogarh

	Airport	Veer Surendra Sai Airport Jharsuguda -95 km
	Rail Head	Sambalpur Junction - 86 km
	Road Head	Deogarh road, Mumbai-Kolkata Highway, NH-49
	Map reference	Survey of India Toposheet No. F45 M10
2	**Geographical co-ordinates**	**Lower Dam Site**
	Latitude (N)	21°33'0.95"N
	Longitude (E)	84°39'11.41"E
3	**Geographical co-ordinates**	**Upper Reservoir**
	Latitude (N)	21°34'9.91"N
	Longitude (E)	84°39'32.74"E
4	**Hydrology**	
	Tributary/River	Jaraikela river, a tributary of Barhmani river of Odisha
	Catchment Area	30.0 sq. km
	Average Annual Rainfall	1546 mm
	Flood peak (1 in 100 year)	141 cumec
5	**Water Source for filling Lower Reservoir**	
	Length and diameter of pipeline	900 m long, 1.2m diameter
6. Upper Reservoir		
Dam Top Level	El. 645.0 amsl	
Full Reservoir Level	El. 641.0 amsl	
Minimum Drawdown Level	El. 619.5 amsl	
Excavated Bed Level	El. 618.0 amsl	
Submergence Area at FRL	33.83 Ha	
Storage at FRL	7.06 MCM	
Storage at MDDL	0.42 MCM	
Live Storage Capacity	6.64 MCM	
Type	Concrete Faced Rockfill Dam	
Maximum Height	26.0 m	
Weighted average height of dam	16.0 m	
Upstream and Downstream Slope	1V: 1.5H	
Length of CFRD at top (Peripheral)	1733.0 m	
7. Power Intake/Inlet at Upper Reservoir		
Approach Channel Length and Width	100 m long and 69 m wide	
Design discharge (Generation/Pumping)	228.72/199.68 cumecs	
No and Type of Intake	3 Nos, Diffuser Type Inlet Structure	
Invert Level of Intake	El. 609.00 amsl	

Top Level		El. 645.0 amsl
Type and size of Gates		3 nos., Vertical lift gate with opening size of 4.5 m (W) x 4.5 m (H) for each Intake
8	**Lower Reservoir**	
	Dam top level	El. 305.00 amsl
	Full Reservoir Level	El. 300.00 amsl
	Minimum Drawdown Level	El. 280.00 amsl
	Submergence Area at FRL	41.51 Hectare
	Storage at FRL	8.40 MCM
	Storage at MDDL	0.71 MCM
	Live Storage Capacity	7.69 MCM
	Type	Concrete Faced Rockfill Dam
	Maximum dam height	29.0 m
	Weighted average dam height	20.0 m
	Upstream and Downstream Slope	1V: 1.5H
	Length of CFRD at top (Peripheral)	1900 m
9	**Power Intake/Outlet at Lower Reservoir**	
	Approach Channel Length and Width	90 m long and 92 m wide
	Design discharge (Generation/Pumping)	228.84/199.71 cumecs
	No and Type of Intake	4 Nos, Diffuser Type Outlet Structure
	Invert Level of Intake	El. 271.0 amsl
	Top Level	El. 305.0 amsl
	Type and size of Gates	4 nos., Vertical lift gate, 4.5 m (W) x 4.5 m (H) for 2 Nos. of Intake and 3.5 m (W) x 3.5 m (H) for 2 nos of Intake
10	**Main Pressure Shaft**	
	Nos. Diameter and Shape	2 nos. 4.5 m diameter Circular Steel Lined Pressure Shaft having length 1508 m and 1 no. 4.5 m diameter Circular Steel Lined Pressure Shaft having length 1417 m further bifurcate

		into two smaller unit diameter 3.5m
	Design discharge (Generation/Pumping)	228.84/199.71 cumecs
	Length of Pressure Shaft	1508 m and 1417 m
	Top Horizontal	423 m
	Vertical	249 m
	Bottom Horizontal	836 m
	Unit Pressure Shaft	2 nos. 3.5 m diameter circular steel lined pressure shaft length 91 m and 100 m respectively
11	**Powerhouse Cavern & Transformer Yard**	
	Type	Surface powerhouse
	Size of powerhouse including Service Bay	141 m (L) x 24.6 m (W) x 44.5 m (H)
	Centre Line of Turbine (Main Unit)	El. 244 amsl
	Centre Line of Turbine (Small Unit)	El. 243 amsl
	Service Bay Level	El. 257.5 amsl
	Main Access Tunnel (MAT)	8 m diameter, D-shaped tunnel 718 m long
	Max Net Head	361 m
	Min. Net Head	312.9 m
	Size of Transformer yard	141 m (L) x 16 m (W)
	Pothead Yard Size	80 m (L) x 35 m (W)
	Downstream/Upstream Surge Gallery	Not required
12	**Electro-Mechanical Equipment**	
	Type of Turbine and no. of units	Vertical Reversible Francis, 4 Nos.
	Turbine Centre line Elevation (Main Unit)	El. 244.0 amsl
	Turbine Centre line Elevation (Small Unit)	El.243.0 amsl
	Head Loss (Generation mode)	6.6 m
	Head Loss (Pumping mode)	5.58 m
	Rated Head (Generation mode)	334.1 m
	Rated Head (Pumping mode)	345.15 m
	Unit Discharge, (Main Unit) Pump/Turbine	66.57 cumecs/ 76.28 cumecs
	Unit Discharge, (Small Unit) Pump/Turbine	33.29 cumecs/ 38.14 cumecs

	Daily Hours of Generation	8.1 hours
	Daily Hours of Pumping	9.32 hours
	Installed Capacity (Generation)	2 x 225 MW & 2 x 112.5 MW
	Installed Capacity (Pumping)	2 x 245 MW & 2 x 122.5 MW
	Total Annual Energy (Generation)	1895.7 MU
	Total Annual Energy (Pumping)	2363.4 MU
13	**Tailrace Tunnel**	
	Unit TRT	
	Nos. and Shape	2 nos. Horseshoe Shaped Tunnel (excavation shape), Circular (finished shape)
	Diameter and Length	3.5 m diameter, 148 m long each
	Main TRT	
	Nos. and Shape	2 nos. Horseshoe Shaped Tunnel (excavation shape), Circular (finished shape)
	Diameter and Length	5 m diameter, 143.4 m long each
14	**Project Cost and Tariff**	
	Total Project Cost	INR 3792.17 Crores
	Escalation	INR 140.69 Crores
	Financial Charge	INR 5.74 Crores
	Hard Cost including escalation	INR 3325.36 Crores
	Interest during Construction (IDC)	INR
	Levelized tariff	INR 6.34/ kWh (One cycle generation/pumping (8.1 hrs./9.32 hrs.)
		INR 5.85/kWh (One and half cycle generation/pumping (9.7 hrs./11.16 hrs.)
	Pumping energy cost	INR 2.63/kWh

4.5.3: 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 for conducting EIA study for proposed construction of Tainsar Pumped Storage Project of capacity 675 MW in 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 earlier proposed land required for the project was 281 ha area involves around **167.10 ha** of forest land for establishment of project and its components. The Upper and Lower reservoir area falls under the Pradhanpat reserved forest. In the 51st EAC meeting, proposal was deferred for want of additional information such as:

i. Explore the alternative sites and relocate site to reduce forest area, and

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.

In compliance of above, project proponent has reduced total land requirement from 281 ha to 268 ha i.e 13 ha in which 11.59 ha Forest land has been reduced from 167.10 ha to 155.59ha).

The EAC was of the view that the project site is located in high canopy forest area, destruction of the same may affect the local biodiversity and productivity of the ecosystem. The PP should restrict its forest land requirement to 30% of the total land requirement.

4.5.4: The EAC after detailed deliberation on the information submitted and as presented during the meeting **recommended** for grant of Specific ToR for preparation of EIA/EMP to for grant of terms of reference to the project for Tainsar Pumped Storage Project of capacity 675 MW in at Village Gailo & Kailash, District Deogarh, Odisha by M/s Jindal Renewable 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. Explore the alternative site analysis to reduce Forest land requirement up to 30% of the total land requirement.
ii. Impact assessment on the fish diversity and aquatic biota on the hydrological alteration at the water drawing sources Jaraikela stream.
iii. Stage I FC for 155.59 ha of forest land involved in the project shall be submitted prior to grant of EC.
iv. Collect detailed information on types of Forest/canopy of forest / tentative nos. of tree felling etc. and duly certified from Forest Department.
v. 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
vi. Alternative sites for various components shall be identified in terms of loss of forest area and other environmental aspects. Explore to minimize forest land.
vii. Action plan for ensuring the sustainability of Jaraikela stream due to pumping of water for the proposed lower reservoir.
viii. Action plan for survival of the rivulets located in the study area.
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. 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.
xviii. Environmental matrix during construction and operational phase needs to be submitted.
xix. Matrix formulated on the basis of detailed study and field survey of flora and fauna methodology used shall be mentioned in the EIA report.
xx. Endemic plant and animal species found in the area concerned shall be provided instead listing entire endemic species found in the State.
xxi. 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. Site specific ecological study w.r.t riverine ecology focusing on fishes diversity and aquatic biota due to construction of project be submitted.

[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

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

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

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

[D] Miscellaneous.

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

xxxii. 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.

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

xxxiv. 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.

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

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

xxxvii. 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

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The meeting ended with vote of thanks to and from the Chair.

Annexure

ATTENDANCE

S. No.	Name	Role	Attendance
1.	Prof. G. J. Chakrapani	**Chairman**	P
2.	Dr. Udaykumar R. Y.	Member	P
3.	Dr. Mukesh Sharma	Member	P
4.	Dr. J V Tyagi	Member	P
5.	Shri Kartik Sapre	Member	P
6.	Shri Ajay Kumar Lal	Member	P
7.	Shri Sharvan Kumar	Representative of CEA	P
8.	Shri Alok Paul Kalsi	Representative of CWC	A
9.	Dr. J A Johnson	Representative of WII	P
10.	Dr. A.K. Sahoo	Representative of CIFRI	P
11.	Shri Yogendra Pal Singh	Member Secretary	P

APPROVAL OF THECHAIRMAN

----- Forwarded Message -----
From: govind chakrapani <govind.chakrapani@es.iitr.ac.in>
To: Yogendra Pal Singh <yogendra78@nic.in>
Sent: Sat, 16 Dec 2023 21:16:42 +0530 (IST)
Subject: Re: draft MOM of the 4th EAC (RV&HEP) meeting held on 24.11.2023-reg.

Approved.

-----Original Message-----

From: Yogendra <yogendra78@nic.in>
To: govind <govind.chakrapani@es.iitr.ac.in>
Date: Saturday, 16 December 2023 8:43 PM IST
Subject: Fwd: draft MOM of the 4th EAC (RV&HEP) meeting held on 24.11.2023-reg.

Dear Sir, The corrections suggested by you and other EAC members have been incorporated. The corrected draft MOM of the EAC meeting is attached herewith for your approval please.