

EXECUTIVE SUMMARY

SIRKARI BHYOL -RUPSIABAGAR HEP (120 MW) DISTRICT PITHORAGARH, UTTARAKHAND

Project Proponent:

M/s Uttarakhand Jal Vidyut Nigam Ltd.
Ujjwal, Maharani Bagh, GMS Road
Dehradun

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EIA Consultant:



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1.0 Need for The Project

The need for Sirkari Bhyol-Rupsiabagar, across Goriganga in Munsiyari Tehsil, Pithoragarh District of Uttarakhand, installed capacity 120 MW, in the upper reach of the Sarda Basin, has been considered in context of power shortage in the Northern region in general and in the country as whole.

2.0 Location and Approach

The proposed barrage site on river Goriganga is proposed about 470m downstream of the confluence of River Goriganga with Jaulchidda gad and underground Power House (3X40 MW,) on the right bank of river near village Rupsiabagar. Project site is about 23.8 km from Munsiyari town.

3.0 Project Features

The proposed Hydro Electric Project comprises the following structures:

- 12m high and 80m long concrete barrage with 4 nos. main barrage bays and 1 under sluice bay fitted with 4 radial gates (14.00 m x 9.00 m) for discharging 2501 cumec.
- Two reservoir intakes structures with bell mouth entries located just upstream of the barrage axis on the right bank which leads into 2 nos. of circular shape, 3m diameter feeder tunnels
- Two underground desilting chambers, each 9 m (W) x 12m (H) x 150m (L)
- 4.2m dia. and 1316.3 m long circular shape Head Race Tunnel.
- 8m diameter restricted orifice surge shaft
- A steel lined pressure shaft of 3.4m dia. bifurcating twice into the 2m dia branch units to feed 3 nos. of main units.
- Underground Power House complex of 120 MW (3x40 MW) located on right bank, each with vertical shaft Francis turbine.
- 4.2m diameter tail race tunnel with normal tail water level of EL 1721.50m.
- Annual energy generation 529.12 MU at 90% dependability.
- Construction Period-54 months
- 1000 technician, skilled, semi-skilled and unskilled labour shall be engaged.

4.0 Environment Impact Assessment

M/s. EQMS India Pvt. Ltd, Karkardooma, Delhi, has conducted the Environment Impact study, as per ToR issued by the MoEF&CC vide letter No. J-12011/12/2015-IA-I dated 20-1-2016. The MoEF vide letter No. 12011/12/2015-IA-1(R), dated 17-4-2020, had extended the validity of ToR by one year i.e., by 19.1.2021.

5.0 Existing Status of Environment

5.1 Land use/Land Cover

The dominating classes are snow covered areas (65.29%), dense forest (26.43%), open forest (14.28%), agriculture land (1.21%), settlement (0.88%), and water body (0.91%).

5.2 Land Requirement for Construction of the Project

The total land requirement for Sirkari Bhyol-Rupsiabagar HEP works out to approx. 30 hectares, which is entirely forest land. No private land shall be acquired for the project.

5.3 Archaeological / Historical Monuments/Sensitive Area

No archaeological monument of national importance, Defence Establishments, exists within 10 km from the project.

5.4 Soil Quality

The Soil is sandy loam and its pH ranges from 6.66 to 7.15, thereby indicating the soils are neutral in nature. The organic carbon content of soil varied from 0.69 to 0.85%, thereby implying that soils are medium to high in organic content. Available nitrogen content in the surface soils ranges between 288.2 to 305.6 kg/ha, thereby indicating that soils are low to medium in available nitrogen content. Available phosphorus content ranges between 15.9 to 23.3 kg/ha, thereby indicating that soils are medium to high in available phosphorus content. Available potassium content in the soil ranges between 164.1 to 172.4 kg/ha, thereby is indicating that the soils are medium in potassium content.

5.5 Air and Noise Environment

The pollutants concentration in the air is well below the permissible limit, the maximum concentration of PM₁₀, PM_{2.5}, NO_x and SO₂ was 45.0 µg/m³, 20.6 µg/m³, 10.0 µg/m³ and below 5µg/m³ respectively. There are no industries in the area and the density of vehicular traffic is not alarming. The noise monitoring shows day and night time noise levels are higher at barrage site and near power house site due to flow of river. The noise levels for the rest of stations are within the prescribed limits.

5.6 Water Environment

The pH values of all analysed surface water samples ranged between 7.32 – 8.04 and are within the tolerance limit (6.5-8.5). TDS levels ranged from 50 to 102 mg/l and were well below the tolerance limit of 1500 mg/l. The dissolved oxygen values ranged between 6.9-8.9 mg/l and were within the tolerance limit of 6mg/l. The chlorides level in surface water samples ranged from 6 -14 mg/l and were below the tolerance limit of 600 mg/l. The sulphates level ranged from 2.2 to 5.2 mg/l and were below the tolerance limit of 400 mg/l. The nitrate was not detected in an of samples. The concentration of various heavy metals was below the detectable limits, indicating the suitability of water for meeting domestic requirements. The Total Coliform level was within the limits specified for Class A water.

5.7 Status of Biological Environment

Flora of the Project Area

- During Primary survey, 140 species of the flora under the 68 families were found. Among all these, 22 trees, 28 shrubs and 51 herbs 14 grasses and 3 sedges, 4 ferns, 3 bryophytes, 5 fungi and 4 lichen species
- About 16 economically important plant species were recorded from the study area.
- About 57 important medicinal/ethnobotanical importance plant species were recorded
- One RET species falling under IUCN Red List was recorded/reported from study area.

Fauna

The faunal study for the proposed project was carried out in both the submergence and influence zone of both upstream and downstream

- 22 mammalian species were recorded /reported during the survey of which four belong to Schedule-1 of WPA, 1972.
- 64 bird species were observed /reported during the survey.
- As many as 9 species of herpetofauna were recorded /reported.
- 46 species of butterflies were recorded/reported
- No species of fish were recorded/reported

5.8 Social and Cultural Background of The Area

Demography of Project Affected Villages

As per the Census of India 2011, the total population of the project affected villages comprising of 78 households is 298 of which male and female population is 155 and 143 respectively. The overall sex ratio is 922 females per thousand males. The Literate male and female in the study are 126 and 110 which implies that the literacy rate is 88.39%. The main workers are 124 (71%) and marginal workers are 43 (14.40%) respectively of the total population while the remaining 14.60 % constitute non-workers. No private land shall be acquired from any project affected villages.

6.0 Identification, Prediction and Evaluation of Impacts

6.1 Impacts on the Micro-Climate of the Area

Due to construction activities, there shall be temporary and nominal effect on the ambient temperature and humidity. The operation stage project may not create any impact on the meteorology and climatology of the area. Due to submergence, the increase in water surface area due to creation of reservoir will result in increased evapo-transpiration and humidity.

6.2 Change in Land use / Land Cover

- The land use class of 2.24 ha forest land involved in submergence shall change into waterbody. The change shall be permanent and irreversible. The forest land cover within the submergence area shall reduce due to project during construction.
- The land use class of forest land required for project components and internal roads shall have land use class changed to built-up area.
- The land use class of forest land required for quarry sites shall remain unchanged as the quarry sites shall later on developed with vegetal cover.
- The present land use of private land involved in quarry sites/muck sites shall permanently change into forest land use after completion of the work and creation of vegetal canopy by way of plantation over the spoil tips.
- The land use class forest in respect of forestland required for underground components will not cause any change in the present land use

6.3 Soil Erosion and Siltation

Soil erosion due to excavation of different components of the project, construction of roads will accelerate soil erosion. Soil erosion due to project activities will not exist in the

operation phase as the construction would be completed and landscape restoration work would also be implemented

6.4 Impact on Geology

The intensity of anticipated environmental impact on geology of the area will be weak and extent of anticipated impact will be local. No impact is anticipated on the geology of the area during the operation phase.

6.5 Impact on Hydrology

Since, the quantity of the water abstracted from the river for non-consumptive use of power generation is again returned from tail race to the system without any consumption, there shall not be any remarkable change in hydrological cycle in context to the project absolutely.

6.6 Environmental Degradation due to Labour Immigration

During the construction phase congregation of approximately 1000 workers is likely to take place in the project area, which will increase pressure on land and water resource. Conflict between the migrants and the local population may occur for employment. Labour engaged in construction activity will also move away once the project work is completed; therefore, no additional impact is expected.

6.7 Impacts on Air Environment

Temporary changes in air quality during construction phase are expected due to emission of hydrocarbons from vehicles and gases from blasting operations. The predicted ground level concentration in air for PM₁₀ due to fugitive dust emissions from construction activities at the barrage complex and nearest settlement Bogdyar has been found to be 3.42 µg/m³ and 0.02 µg/m³ respectively, while the resultant concentration shall be 44.42 µg/m³ and 41.02 µg/m³ which is within the limits. Due to increased transportation during construction phase at 25 m, predicted concentration for PM10 is 8.6 µg/m³, which reduces to 5.4µg/m³, 2.4 µg/m³ and 1.0 µg/m³ at 50m, 150m and 500m respectively. Thus, the impact on the pollutant level (PM10) due to increased traffic due to transportation of mineral shall be minimal. The increased GLC in respect of NO_x were insignificant being 0.12 µg/m³ up to 25m and 0.11 µg/m³ up to 50m and 0.10 µg/m³ up to 1km.

6.8 Impacts on Noise Environment

Temporary increase in noise levels are expected during construction phase only. The maximum noise level of 59 dB(A) gets attenuated to 33 dB(A), 27 dB(A) and 21 dB(A) about 300m, 600m and 1200 m respectively from the point source (Barrage site).

6.9 Impacts due to Ground Vibration and Air-overpressures

Due to blasting, the resulting PPV shall be 0.76 mm/sec at Bogudiyar village which shall be considerably lower than the limiting values 5.0 mm/sec for excitation frequency less than 8 Hz, in case of temporary structures. Predicted air over pressure due to blasting at Bogudiyar shall be 91.3 dB(A).

6.10 Impacts on Water Environment

During the construction phase, the river water on d/s of barrage is supposed to catch considerable amount of sediment from the surface and underground works for which the water coming out from such area will be dislodged of sediment in the silt trapping tanks before being released to river.

The discharge coming out of batching and crushing plants would also bring considerable sediments in water due to washing of plants and aggregate material. In the operation phase

of the proposed project the water environment in general will not deteriorate as the water will be continuously used for power generation and will be released simultaneously.

Problems due to eutrophication are not anticipated in the proposed project. For downstream usages of river course will have a minimum environmental flow released d/s of barrage.

6.11 Impact due to Acidification of Reservoir

There will be no acidification of reservoir due to the alkaline nature of the river water at dam site and upstream having pH vary between as 7.32 to 8.04.

6.12 Impacts on Flora

It is evident from the study that from the submergence and influence zone of the proposed project none of tree species, shrub, herb or any climber or grass species are either vulnerable or endangered. Interestingly the vegetation composition of the submergence zone is also widely distributed in the influence zone in abundance and there will be no significant loss to the habitat. However, any loss of riverine vegetation during the project activity period will be restored in the reservoir periphery in due course of time.

The floral abundance of the project area in post construction phase will increase by many folds as the plantation under catchment area treatment, reservoir rim treatment, green belt, restoration and landscaping will be completed.

6.13 Impacts on Fauna

As the project activity is not going to submerge all the major habitats, there is little concern for these niche birds. There will be no alteration to the existing habitat of endangered and threatened species. There is also no wildlife sanctuary, national park and biosphere reserve near the project area. As the project is having its submergence mostly along the river valley, the project is not likely to be a threat to any of the recorded butterfly species. Increase in temporary stress levels of wildlife during construction phase due to noise, human interference and reduction in present habitat. Threat due to poaching might increase. Due to reservoir creation, there will be improvement in the habitat for mainly water birds, reptiles, mammals, amphibians and plankton and Improvement in food chain of some reptiles, birds and carnivorous mammals due to creation of reservoir and increase in humidity level. The butterfly diversity in the area would be enhanced, as scrub habitat around the submergence will receive substantial amount of moisture, which will help in natural regeneration of forest canopy.

6.14 Summary of Positive and Negative Impacts

The positive impacts are:

- Additional annual generation of 529.12 MU of energy in a 90 % dependable year
- Neither any private land shall be acquired nor any person shall be displaced.
- Employment opportunities
- Benefits to economy and commerce.
- Access to improved infrastructure facilities.
- Recreation and tourism potential
- Improvement in environment through implementation of CAT, Compensatory Afforestation, Green belt Development and different other plans.

The negative impacts are:

- The change of river status from riverine to lacustrine regime
- The loss of forest due to construction of barrage, reservoir and appurtenant works
- Disturbance to the fauna of the study area during construction
- Pressure on the existing provincial / state road will increase.

7.0 Impact Management

To ameliorate the negative effects of the project construction and overall improvement of the environment following management plans are formulated for implementation concurrent to the project construction. The cost of the management plans is shown in **Table -1**.

Table -1: Summary of Total Cost Estimate of EMP

S. N.	Plans	Cost (Rs. Lakh)	Capital cost (Rs lakh)	Annual recurring cost (Rs lakh)
1.	Catchment Area Treatment Plan	595.00	555.00	10.00
2.	Compensatory Afforestation Scheme	719.00	699.00	5.00
3.	Wildlife and Bio-diversity Management plan	95.00	35.00	15.00
4.	Resettlement & Rehabilitation Plan	0.00	0.00	0.00
5.	Green Belt Development Plan	16.00	8.00	2.00
6.	Reservoir Rim Treatment Plan	165.00	165.00	0.00
7.	Fisheries Management Plan	0.00	0.00	0.00
8.	Muck Management Plan	885.00	825.00	15.00
9.	Restoration Plan for Quarry Sites	70.00	54.00	4.00
10.	Disaster Management Plan	25.00	23.00	0.50
11.	Water, Air and Noise Management Plan	36.00	20.00	4.00
12.	Public Health Delivery Plan	137.00	9.00	32.00
13.	Labour Management Plan	55.00	13.00	10.50
14.	Sanitation & Solid Waste Management Plan	175.00	125.00	12.50
15.	CER Plan	880.00	820.00	15.00
16.	Environmental Safeguards During Const.	80.00	50.00	7.50
17.	Energy Conservation Measures	50.00	18.00	8.00
18.	Environmental Monitoring Plan	85.00	16.00	17.25
Grand Total		4068.00	3435.00	158.25