नॉर्थ ईस्टर्न इलेक्ट्रिक पावर कॉरपोरेशन लिमिटेड
NORTH EASTERN ELECTRIC POWER CORPORATION LIMITED
(भारत सरकार का उद्यम) / (A GOVERNMENT OF INDIA ENTERPRISE)
A wholly owned subsidiary of NTPC Ltd.
OFFICE OF THE HEAD OF POWER STATION
ISO 9001, 14001 & OHSAS 18001
PARE HYDRO POWER STATION, DOIMUKH, ARUNACHAL PRADESH (PIN -791112)
e-mail: hoppare@neepco.co.in

No. NEEPCO/PHEP/HOP/T-47/ 2025-26/ 391 Date: 28/11/2025

To,

The Head of office,
Integrated Regional Office, Guwahati,
Ministry of Environment, Forests & Climate Change,
4th Floor, Housefed Building
G.S. Road, Rukmini Gaon, Guwahati- 781022.

Sub: Six Monthly Environmental Compliance Reports of Pare Hydro Power Station (110 MW), Arunachal Pradesh.

Ref: i) MoEF, GOI, Environmental Clearance (EC) Letter No. J-12011/12/2006-IA-1 dated 13.09.2006.
ii) IRO/GHY/MISC/FC/2021/74 dated 09.02.2021.

Sir,

With reference to the above, enclosed please find herewith the six monthly Environmental compliance report both in hard copy and soft copy (in e- mail) on the Environmental Clearance (EC) stipulations for the period from 1st April 2025 to 30th Sep'2025 in respect of Pare Hydro Power Station (PHPS), Arunachal Pradesh for information and further needful.

The input of the above is being e-mailed to the following e-mail ID:

i) ***iro.guwahati-mefcc@gov.in***

Encl.: As above.

Yours faithfully,
28/11/25

(Sania Ngurang)
Head of Power Station
PHPS, NEEPCO Ltd., Doimukh, (Ar.P)

Memo No. NEEPCO/PHEP/HOP/T-47/ 2025-26/ 392- 393 Date: 28/11/2025

Copy to:

1. The Member Secretary, Arunachal Pradesh State Pollution Control Board (APSPCB), Paryavaran Bhawan, Yupia Road, Pappu Hill, Naharlagun, Arunachal Pradesh for kind information.
2. The Conservator of Forests (M&E), Department of Environment & Forests, Govt. of Arunachal Pradesh, Itanagar for kind information.

28/11/25

Head of Power Station
PHPS, NEEPCO Ltd., Doimukh, (Ar.P)

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e-mail: hoppare@neepco.co.in

NIO:

Memo No. NEEPCO/PHEP/HOP/T-47/2025-26/ 394-396 Date: 28/11/2025

Copy to:

1. The Director (Technical), NEEPCO Ltd., Shillong for kind appraisal.
2. The Executive Director, Projects (Hydro), NEEPCO Ltd., Guwahati, for kind information.
3. The i/c Environmental Cell, NEEPCO Ltd. Shillong, for information and requested to do the needful for uploading the compliance report in NEEPCO's official website.

28/11/25

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PHPS, NEEPCO Ltd., Doimukh, (Ar.P)

REPORT ON MONITORING THE IMPLEMENTATION OF ENVIRONMENTAL SAFEGUARD OF PARE H.E.PROJECT (110 MW), ARUNACHAL PRADESH

For the Period of 1st April 2025 to 30th September 2025.

Monitoring Report (Part-I)

(Data sheet)

1.	**Project Type: River-Valley/Mining/ Industry/Thermal/ Nuclear/Other (Specify)**	River Valley
2.	**Name of the Project**	Pare H.E. Project.
3.	**Clearance letter (s) OM No. and Date**	No. J-12011/12/2006-IA-1, Dated 13/9/06 No. J-12011/12/2006-IA-1, Dated 19/9/06
4.	**Locations:**	
	a) District(s)	Papum Pare.
	b) State (s)	Arunachal Pradesh.
	c) Latitudes/Longitudes	**Dam site**: Latitude (N) 27°14'13" Longitude (E) 93°48'56"
		Power House site: Latitude (N) 27°12'46" Longitude (E) 93°48'30"
5.	**Address of Correspondence:**	
	a) Address of Concerned Project Chief Engineer. (With Pin Code & Telephone/Telex/Fax Nos.)	Head of Power Station, Pare Hydro Power Station, NEEPCO Ltd, Doimukh, Arunachal Pradesh, Pin Code – 791 112 E-mail : pare_project@rediffmail.com
	b) Address of Executive Project Engineer/Manager (With Pin Code & Telephone/Telex/fax Nos.)	----Do----
6.	**Salient Features:**	
	a) Of the Project	As enclosed in ANNEXURE-I
	b) Of the Environmental Management Plans	As enclosed in ANNEXURE-II
7.	**Break-up of the Project Area (Forest & Non-Forest):**	
	a) Submergence area (Forest & Non-Forest)	111.6 Ha at FRL.
	b) Others	86.88 Ha.

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8.	Break-up of the Project affected population with enumeration of those losing houses/dwelling units only, agricultural land only, both dwelling units and agricultural land and land less labours/artisans:	
	Both land and house	3 Nos.
	Only Home	35 Nos.
	Only Land	233 Nos.
	Other immovable Properties	6 Nos.
	Total	**277 Nos.**
	a) SC, ST/Adivasis	277 PAFs
	b) Others	Nil
9.	**Financial Details**	
	a) Project cost as originally planned and subsequent revised estimates and the years of price reference	Rs 573.99 Cr at June'07 PL including IDC & FC as per CCEA Clearance. Revised cost estimate at May 2018 PL – Rs 1754.81 Crs including IDC & FC - not yet approved.
	b) Allocation made for Environmental Management Plans, with item-wise and years –wise break-up	As per ANNEXURE-II
	c) Benefit cost ratio/internal rate of return and the year of assessment	---------
	d) Whether (c) includes the cost of Environmental management as shown in (b) above.	Yes
	e) Actual expenditure incurred on the Project so far.	Rs 1895.74Cr as on 31.03.2024.
	f) Actual expenditure incurred on the Environmental Management plans so far.	Rs 21.84 Cr as on 31.03.2022.
10.	**Forest land Requirement:**	
	a) The status of approval for a diversion of forest land for non forestry use.	(i) Final notification for diversion of 35.17 ha of forest land was accorded on 13th July, 2009 by the Conservator of Forests (Cons) & Nodal Officer (FC), Govt. of Arunachal Pradesh, Itanagar vide letter No. FOR. 10-48/Cons/2006/20714-18.

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		(ii) Final approval for diversion of 3.439 ha of forest land was accorded by the Chief Conservator of Forests (Cons) & Nodal Officer (FC), Govt. of Arunachal Pradesh, Itanagar vide letter NO.FOR. 242/CONS/2009/ 13547-49 dated 9th August, 2010. (iii) Final approval for diversion of 6.431, 4.8735 and 3.674 Ha of forest land for construction of LILO lines was accorded by the PCCF (P&D), Env & Forest, Govt. of Arunachal Pradesh, Itanagar vide letter NO.FOR. 520/CONS/2013/1613-17 dated 16.11.2015,NO.FOR.537/CONS/2013/1618-22 dated 16.11.2015 and NO.FOR. 542/CONS/2013/1623-27dated 16.11.2015 respectively.
	b) The status of compensatory afforestation, if any	An amount of Rs 155.63 Lakh has already been paid to State Forest Dept. Govt. of Arunachal Pradesh for implementation of the Compensatory afforestation plan for conversion of forest land acquired for construction of Project, 33 KV line and LILO lines.
	c) The status of clear felling	The standing trees in the reservoir area were cleared by the State Forest Department, Govt. of Arunachal Pradesh before impounding of reservoir.
	d) Comments on the viability & sustainability of compensatory afforestation programme in the light of actual field experience so far.	Compensatory afforestation is viable as per field experienced in the Catchment Area.
11.	The status of clear felling in non-forest areas (such as submergence area of reservoir, approach roads), if any, with quantitative information.	The trees from reservoir area have been cleared by State Forest Department before impounding of Reservoir.
12.	**Status of Construction:**	
	a) Date of commencement (actual and/or planned)	31.08.2009.
	b) Date of completion (actual and /or planned)	**Commissioned on** i) 1st Unit- 28th May 2018. ii) 2nd Unit- 21st May 2018.
13.	**Reasons for the delay if the project is yet to start.**	The Project has been commissioned.

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14.	**Date of Site Visits:**	
	a) The dates on which the project was monitored by the regional office on previous occasions, if any	13th Feburary, 2012, by Mr. S.C. Katiyar, Joint Director, MoEF, Shillong. 25th April, 2012, by Dr. H. Tynsong, Scientist C, MoEF, Shillong. 14th December 2016, by Dr. H. Tynsong, Scientist C, MoEF, Shillong. 3-4th December 2019, by Dr. H. Tynsong, Scientist C, MoEF, Shillong 7-8th December 2022, by Dr. Hemen Hazarika, Scientist 'D' / Head of Office of MoEF&CC, Integrated Regional Office, Guwahati
	b) Date of site visit for this monitoring report	As above in Sl.No. 14(a)
15.	**Details of correspondence with Project authorities for obtaining action plans, information & status of compliance to safeguards.**	The status of compliance of the conditions stipulated by MoEF while granting environment clearance to the project is stated in PART-II.

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PART-II
PARE H.E.PROJECT (110 MW), ARUNACHAL PRADESH
ENVIRONMENTAL CLEARANCE LETTER NO. J-12011/12/2006-IA-1 DATED 13.09.2006

Part-A Specific conditions:

Sl. No.	Stipulations	Status of compliance
i)	*Lagerstromia minuticarpa* is a rare and endangered species in the area. Measure for conservation and propagation of the same as proposed in the EMP (Section 6.6) should be followed in toto.	Implemented through Forest Department, Govt. of Arunachal Pradesh. As informed by DFO Sagalee Division, Around 1.5 Ha of land has been planted by *Lagerstromia minuticarpa and total no of sapling planted is 2000 nos.*
ii)	Catchments Area Treatment Plan as has been proposed should be completed in five years.	The matter was taken up with the Principal Chief Conservator of Forests cum Principal Secretary, Department of Environment & Forests, Govt. of Arunachal Pradesh. As per instruction of the Department, an amount of Rs 10.83 Cr has been released to Compensatory Afforestation Fund (CAF-Arunachal- CA-1601) of Govt. of Arunachal Pradesh, Department of Environment & Forests for implementation of the Scheme. The Forest Deptt, Govt. of Arunachal Pradesh have executed some Afforestation, Social Forestry, Nursery Development, Vegetative Fencing, Pasture development and Engineering Measures (construction of sausage wall & catch water drain) etc.
iii)	Clearance from National Committee of Seismic Design Parameters (NCSDP) of CWC should be obtained.	Accorded in the 21st meeting held in New Delhi on 08.09.2009 and communicated vide letter No.2/2/2009/FE&SA/696 dated 02.12.2009 by CWC, Govt. of India.
iv)	Malaria is major water borne disease in the area. Though the flow of the river is very fast, but due to unforeseen situation the flow of the river may slow down at certain points due to construction activities. Occurrence of stagnant pools/slow moving water channels during construction and operation of the project providing breeding source for mosquito and other parasites. The river should be properly channelized so that no small pools poodles are allowed to be formed. Even after taking precaution, due to unforeseen situations, breeding of mosquito and resulting malaria or mosquito borne diseases can increase. If such situation arises, it will be the responsibility of the project authorities to take all corrective steps i.e. residual insecticidal spray in all the project impact area and	All precautionary measures have been taken to control the mosquito borne diseases. No cases of malaria have been reported in the project area till date.

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	surrounding 3km area, keeping the flight range of mosquitoes in consideration.	
v)	277 families (all are tribal) from three villages would be affected. Out of that only three families are likely to lose both land and houses and others are losing either only land or houses. Affected families should be rehabilitated and resettled in consultation with state government.	Full compensation to all the 277 families has already been paid amounting to Rs 16.408 Cr. for their loss of land, house, agriculture, horticulture and plantation etc. The Govt. of Arunachal Pradesh had constituted the R&R Committee for implementation of R&R Plan of Pare H.E. Project. The Committee consists of the following members. 1. Representative from Sopo, Jampa and Hoz Village, 2. Project affected people, 3. Women representative, 4. NGO representative, 5. Representative of D.C and 6. Head of Project, Pare H.E. Project. • Necessary payment amounting to Rs 2.56 Cr has been released by NEEPCO to the District Authority towards land and other assets compensation for implementation of R&R scheme and subsequently, the land has been acquired and handed over to NEEPCO by the District Administration on 1st June, 2012. • NEEPCO has already released fund to the Deputy Commissioner, Papum Pare District (Administrator for R&R) for implementation of R&R Scheme for the PAFs on the notified and acquired land at Sopo Village under Doimukh circle. Total expenditure for R&R including land is Rs 18.21 Cr. • The R&R scheme has been completed in all respect and the rehabilitation cottages have been allotted to the eligible PAFs by the Deputy Commissioner Papum Pare district on 28th October 2015 vide allotment order No. DC/PP/NEEPCO/PC/2015/9280.
vi)	A monitoring committee should be constituted which must include representatives of project affected persons from SC/ST category and a woman beneficiary.	Representatives of project affected persons from SC/ST category and a woman beneficiary was included in the R&R implementation committee.
vii)	All the assurances /commitments given by the project authority in the public hearing must be honoured in letter and spirit.	NEEPCO honoured the assurance/ commitments given in the Public Hearing. NEEPCO extended all possible help to the project affected families. • Employments have been given to some of the families of affected people.

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		• NEEPCO has already recruited 32 nos. of local tribal people against the C&D categories job. • Offering scholarships to the eligible candidates from the affected families. • All works (except of the specialised jobs) are awarded to local contractors. • Conducted Capacity Building training programmes for Unemployed Educated Youths. • 50 numbers of candidates from PAFs are given vocational training at ITI and they have been appointed in NEEPCO on contract basis. • Cluster development livelihood project – Mushroom cultivation for 50 numbers of families residing in the vicinity of the project has been implemented by NEEPCO under CSR & S scheme. • Entrepreneurship cum skill development programme for food processing & bakery for 25numbers Women of pare project affected area, Papum Pare Dist Arunachal Pradesh • Entrepreneurship cum skill development programme in decorative bamboo carving LED Bulb and lights technician for 25 numbers men of pare project affected area, Papum Pare Dist. ,Arunachal Pradesh
viii)	Forest clearance should be obtained for acquiring forest land & submitted.	Forest clearance has already been obtained vide letter no. FOR. 10-48/Cons/2006/20714-18 dated 13.07.2009 and NO.FOR. 242/CONS/2009/13547-49 dated 09.08.2010. The following payments have been released to Forest Deptt. a) Compensatory Afforestation (CA)- Rs 155.23 lakh b) NPV- Rs 398.23 lakh c) Royalty against timber- Rs 97.88 lakh.
ix)	During the lean season 10.52 cumecs water flow is available in the river. 10% of the available water should be released downstream of the dam for sustenance of aquatic life.	Design provisions have been kept in the concrete gravity Dam structure to release the adequate water in the downstream of dam during lean season. 10% of available discharge is released during lean season for sustenance of aquatic life in the downstream area.
x)	Any other clearance from any other organization if required should be obtained.	Already complied.

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Part-B: General conditions

Sl. No.	Stipulations	Status of compliance
i)	Adequate free fuel arrangement should made for the labour force engaged in the construction work at project cost so that indiscriminate felling of trees is prevented.	Complied. The LPG is used by the workers engaged in the project works.
ii)	Fuel depot may be opened at the site to provide the fuel (kerosene/LPG). Medical facilities as well as recreational facilities should also be provided to the labourers.	Gas distributor is available at Doimukh which is around 8-10 km from project site; as such no separate fuel depot is opened. The major contractors provided/providing required fuel, medical facilities as well as recreational facilities to the labourers. NEEPCO has medical & recreational facilities for all the employees.
iii)	All the labourers to be engaged for construction works should be thoroughly examined by health personnel and adequately treated before issuing them work permit.	NEEPCO is providing medical facilities to all employees through the project dispensary. Periodical health cheek-up camps are being organized at project site by experienced Doctor available in the Project. The package contractors also provided/providing medical facilities to the labourers as and when required.
iv)	Restoration of construction area including dumping site of excavated materials should be ensured by levelling, filling up of burrow pits, landscaping etc. The area should be properly treated with suitable plantation.	Already done.
v)	Financial provision should be made in the total budget of the project for implementation of the above suggested safeguard measures.	Financial provision amounting to Rs 23.31 Cr. has been kept for Environment & Ecology (Annexure-III).
vi)	A multi disciplinary committee should be constituted with representatives from various disciplines of forestry, ecology, wildlife, soil conservation, NGO etc. to oversee the effective implementation of the suggested safeguard measures.	Multi-Disciplinary Committee has been constituted with representatives from various disciplines of forestry, ecology, wildlife, soil conservation, NGO etc. on 28.07.2010. Scientist from MoEF, NERO, Shillong also regularly visited the Project site to oversee the effective implementation of the suggested safeguard measures. Expert environmentalists engaged by project financier KfW, Germany also visited project to suggest and oversee the effective implementation of the environmental safeguard measures.
vii)	Six monthly monitoring reports should be submitted to the ministry and its regional office, Shillong, for review.	Six monthly monitoring reports are being submitted on time.

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ANNEXURE-I

SALIENT FEATURES OF PARE H.E. PROJECT (110 MW), ARUNACHAL PRADESH

NAME OF PROJECT		PARE H E PROJECT (110 MW)	
1.	**Location**		
	State	Arunachal Pradesh	
	District	Papum Pare	
	Village		
	Powerhouse	Sopo	
	Dam Site	Jampa	
	Access		
	Airport	North Lakhimpur, - around 55 km	
	Rail Head	Upiya/Naharlagun - around 20 km	
	Road Head	Arunachal Transhighway upto Project site.	
	Geographical co-ordinates		
		Dam Site	Power House
	Latitude (N)	27° 14' 13"	27° 12' 46"
	Longitude (E)	93° 48' 56"	93° 48' 30"
	Elevation (msl)		
	Map reference	Survey of India Topo-Sheets: 83E/3, 83E/4, 83E/7, 83E/8, 83E/11, 83E/12, 83E/15, 83E/16	
2.	**Meteorology**		
	Average Rainfall	3800 mm	
	Atmospheric Temperature		
	Average Maximum Temp.	31.8^0 C	
	Average Minimum Temp.	16.1^0 C	
3.	**Hydrology at Intake**		
	Catchment Area	824 sq. km .	
	Flood flow (PMF)	5000 Cumec	
4.	**Reservoir**		
	Maximum Water Level	246.215 MSL	
	Full Reservoir Level	245.15 MSL	
	Minimum Drawdown Level	240.00 MSL	
	Water Spread at FRL	111.6 Hectare	
	Gross Storage area at FRL	19.425 MCM	
5.	**Dam**		
	Type of Dam	Concrete Gravity Dam	

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	Length of Dam	134.275 m
	Overflow	49.2 m
	Non-overflow	85.075 m
	Width at the Top of Dam	8 m
	Top Elevation of Dam	248.00 m
	Deepest Foundation Level of Dam	185.00 m
	River Bed Level (average)	200m MSL
	Upstream Slope	0.1:1 from El 235 for NOF Blocks 0.4:1 from EL 211.408 for OF Blocks
	Downstream Slope	0.8:1 from El 240.50
6.	**Spillway**	
	Capacity	5000 Cumec (PMF)
	No. of Gates	3
	Size of Gates	10.4 m(W) x14 m (H)
	Crest Level	216 m
	Height of breast wall.	18 m
7a.	**Headrace Tunnel**	
	Diameter	7.5 m
	Length	2828 m
	Design flow	185 cumecs
	Size & Shape	7.5 m dia Modified horseshoe shaped
	Invert Level at Intake	El. 225.25 m
	Invert Level at Surge Shaft	El. 206.0 m
	Adit Details	Two Nos. of Adit. Adit-I- 113.0 m long & 7.5 m dia and Adit-II- 83.0 m long and 7.5 m dia.
7b.	**Diversion Tunnel**	
	Size & Shape	8 m dia. horseshoe shaped
	Length	335.0 m (Boring length- 265.0 m, Transition length- 7 m and cut & cover – 63 m)
	Discharge	430 Cumecs
	Invert Level at Tunnel Inlet	197 m
	Invert level at Tunnel outlet	196 m
8.	**Surge Shaft**	
	Type	Restricted Orifice, Non-Overflow
	Diameter and Height	18 m dia. 59 m Height (from El 214 to 273m)
	Orifice Diameter	2.9 m
9.	**Pressure Shaft**	
	Diameter	6.40 m
	Length	254.0 m

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	Bifurcated (penstock) Diameter	4.5 m
10.	**Power House**	
	Type	Surface
	Design Head	67.36 m (net)
	Size of Power House	68 m long, 31 m wide
	Type of Turbine	Vertical Francis
	Installed Capacity	110 MW
	Turbine Floor Level	El. 169.50m
	Upper Generator Floor Level	El. 178.00 m
	Lower Generator Floor Level	El 173 m
	Service Bay Level	El. 181.65 m
	Tail Water Level (with one unit running)	El. 168.95 m
	Tail Water Level (at Full Load)	El. 169.82 m
11.	**Tailrace Channel**	
	Details	Open Channel 30.32 m wide, 53 m long
12.	**Electro-mechanical**	
	Turbine	
	No. and Type	2 nos. Vertical Francis, rated at 55 MW
	Speed	187.5 rpm
	Inlet Valve	Butterfly type with lattice structure (diameter 4.5 meters)
	Generator	
	Out put	55 MW rated output plus 10% continuous overload
	Power factor	0.9 lagging
	Speed	187.5 rpm
	Voltage	11 kV
13.	**Power**	
	Design discharge	185 cumecs
	Rated net head at Design Discharge	67.36 m
	Installed Capacity	2 X 55 MW = 110 MW
	Annual generation in 90% Dep. Year	512.74 MU
	Annual generation in 90% Dep. Year at 95% Plant availability	506.42 MU
	Annual saleable energy	441.2 MU
14.	**Switchyard**	
	Type	Outdoor

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	Size	99 m X 72 m
	No. of Bays	8 nos. of 132 kV Bays (2 nos. of GT Bays, 1 no. each of station Transformer and Bus Coupler bay and 4 nos. of line bays)
15.	**Power Evacuation**	LILO of existing 132 kV Ranagnadi H.E Project – Nirjuli single circuit line at Pare Project LILO of 132 kV RHEP Itanagar.
16.	**Costs**	
	Project Cost	Rs 573.99 Cr. at June' 07 PL (including IDC of Rs 67.66 Cr. & Financing Charges of Rs 0.40 Cr.) as per CCEA Clearance. Total completion cost of the project amounting to Rs 1656.74 Cr including IDC&FC of Rs 238.04 Cr for calculation of energy tariff
	Cost per MW	Rs 5.22 Cr. (Original) , Rs 15.06 Crs (Revised)
17.	**Generation Cost and Tariff**	
	Tariff in First year with 14% Return on Equity	**Original** Rs 2.38/ KWH (Original) , **Revised**- ---.
	Levelised Tariff	**Original** - Rs 2.01/ KWH (Original), **Revised**- Rs 5.37/KWH (Provisional).

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SALIENT FEATURES OF ENVIRONMENTAL MANAGEMENT PLAN

The EIA/EMP studies for Pare H.E. Project have been carried out by M/s Water and Power Consultancy Services (India) Ltd. (WAPCOS) a Govt. of India undertaking Enterprise under ministry of water Resources (MOWR).

An amount of Rs 23.30 Cr has been kept for Environment and Ecology.

1. ENVIRONMENTAL MANAGEMENT PLAN

Environmental Management Plan (EMP) enumerating, sort of measures to be adopted to minimize the adverse impacts are as follows:

Facilities in Labour Camps

Solid Waste Management

Adequate facilities for collection conveyance and disposal of municipal waste generated from labour camps were developed. This work was executed in project construction stage by package contractor under guidance of NEEPCO.

Provision of water supply

The water for drinking purpose is collected from the rivers or streams flowing upstream of the labour camps. The water is stored in tanks and supplied for use. The septic tanks were placed far away from water resources. The settlements of the population in the area was also placed far away from the drinking water sources.

Sanitation facilities

Adequate toilets and septic tanks were constructed so that there is no adverse impact due to sewage generation from labour camps.

Provision for Free Fuel Distribution

It was made mandatory for the contractor to provide community kitchen facilities to its labour. The fuel used for cooking in these kitchens shall be LPG or Kerosene.

Landscaping and Restoration of Construction Areas

Landscaping and Restoration of Construction Areas done.

Compensatory Afforestation

The total forest land to be acquired for the project is 198.48 ha and out of which about 163.31 ha is the Private/non forest land and 35.17 Ha is Forest land. Compensatory afforestation is proposed in lieu of acquisition of forest land as per Forest Conservation Act (1980). It is proposed to afforest the degraded forest patches of double the amount of forest land i.e. 70.50 ha. An amount of Rs 155.63 lakh has been released for compensatory afforestation for USF land acquisition to Forest Department, Govt. of Arunachal Pradesh for compensatory afforestation schemes .

Bio-Diversity Conservation Plan

Conservation plan for Threatened species

One rare species (*Lagestroemia minuticarpa*) is observed in the project area. As informed by DFO, Sagalee Division, Afforestation for an area of 1.5 ha total 2000 trees has been planted for conservation of this species. Afforestation works in various areas in the catchment has also been done to conserve the species. The Scheme is executed through Forest Department, Govt. of Arunachal Pradesh.

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Maintenance of Water Quality

The effluent thus generated in the tunnel contains high suspended solids and hence, a settling tank for removal of the suspended impurities was constructed during project construction stage. Necessary arrangement has been made for treatment of effluent from colony before disposal.

Public Health Delivery System

Development of medical facilities

Necessary medical facilities are provided by the contractors for the workers engaged in the project area as per instruction and contract clause.

Control of air pollution

It was made mandatory for the contractor involved in crushing activities to install cyclone in the crusher. The fine aggregates staked after crushing needs to be staked till the time it is consumed. These stakes were regularly sprayed with water to prevent the entrainment of fugitive emissions which were followed fully during construction stage of project.

Stabilization of Quarry and Muck Disposal Sites

Already stabilised by the contractors as per provision of contract clause.

Sustenance of Riverine Fisheries

Provision of minimum flow

In order to avoid possible loss of aquatic life a minimum flow of about 1.05 cumecs are released during dry season as per Environmental clearance.

An amount of Rs 95.0 Lakh has been released to DFDO, State Fishery Department, Govt. of Arunachal Pradesh, for sustenance to Riverine fishery in Pare River.

Green Belt Development

To develop greenbelt around the perimeter of various project appurtenances, selected stretches along the reservoir periphery, etc. Afforestation works for an area of 35 ha of land has been as a part of Greenbelt Development Plan through State Forest Department, Govt. of Arunachal Pradesh.

Control Measure for Jhum Cultivation

Jhumming caters the basic requirement of tribes living in this area. Horticulture as an alternative and subsidiary occupation may be desirable and feasible, provided there is an adequate organization to cater to the production and marketing needs.

Establishment of an Environmental Management Cell

Environmental Management Cell (EMC) look after the implementation of environmental mitigatory measures.

2. CATCHMENT AREA TREATMENT

Total catchment area of Pare H.E. Project is 82400 Ha. An amount of Rs 1083.04 Lakh has been released to State Forest Department for implementation of CAT Plan. The following Engineering and Biological measures have been suggested for the catchment area treatment.

1. **Engineering measures**
   a) Sausage wall
   b) Catch water drain

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2. Biological measures

a) Development of nurseries.
b) Plantation/Afforestation
c) Pasture development
d) Social forestry
e) Vegetative fencing.

As per clause No. 2 (Part-A Specific conditions) of Environmental clearance, the catchment area treatment should be completed within five years. The plan is reproduced below.

Sl. No	Item of work	unit	1st Year	2nd Year	3rd year	4th Year	5th year
1. Engineering Measures							
a	Sausage Wall	No.	10	10	10	11	-
b	Step Drain	No.	8	8	8	8	-
2. Biological measures							
a	Afforestation (1600 trees/ Ha)	Ha	75	75	76.1	-	-
b	Afforestation (800 trees/Ha)	Ha	500	500	500	500	498.5
c	Social forestry	Ha	100	100	100	42	-
d	Pasture Development	Ha	1000	1000	1000	1000	987
e	Nursery Development	No.	10	10	5	-	-
f	Vegetative fencing	Km	3	3	3	1	-

As the catchment area treatment plan fall under the stipulation of forest clearance, therefore their implementations fall under the purview of State Forest Department. The project authority has to provide the necessary funds for the same.

As per Forest Conservation Act (FCA), 1980, a multi-disciplinary monitoring committee has to be formed for monitoring the implementation of the same.

3. DAM BREAK ANALYSIS AND DISASTER MANAGEMENT PLAN

3.1 Dam Break Analysis

The National Weather Service's DAMBRK model developed by Dr. D.L. Fread has been used in the study. This model simulates the failure of a dam, computes the resultant outflow hydrograph and also simulates movement of the dam break flood wave through the downstream river valley.

The settlements falling within inundation area are Boka, Chipute, Midpu and Lekha which will be affected partially. Secondly, these falls within 25 km downstream of the proposed dam and time taken by peak flood to reach there is about five hours. Hence it does not leave any possibility of any evacuation. Preventive actions and emergency preparedness are the only solution.

3.2 Disaster Management Plan (DMP)

The DMP is briefly described in the following paragraphs: A provision of Rs 42.50 lakh has been kept for implementation of this plan.

Surveillance

For the Project, rigorous and effective dam safety surveillance and monitoring programme, encompassing rapid analysis and interpretation of instrumentation and observation data along with periodic inspection and safety reviews and evaluation needs to be developed.

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Such programmes will have to be implemented during the following five critical phases in the life cycle of a dam:

1. Design and Investigation Phase
2. Construction Phase
3. First Reservoir Filling
4. Early Operation Period
5. Operation and Maintenance Phase

Preparation of Inundation Map

An inundation map depicts the downstream areas vulnerable to inundation by the flood generated in the event of dam break. The map so prepared serves as a guide for deciding the vulnerable areas where Emergency Action Plan (EAP) is to be executed.

Emergency Action Plan (EAP)

EAP shall present warning and notification procedures to follow during the monsoon season in case of failure or potential failure of the dam. The objective is to provide timely warning to nearby residents and alert key personnel responsible for taking action in case of emergency.

Preventive Action

Once the likelihood of an emergency situation is suspected, action has to be initiated to prevent a failure. The point at which each situation reaches an emergency status shall be specified and at that stage the vigilance and surveillance shall be upgraded both in respect of time and level. At this stage a thorough inspection of the dam should be carried out to locate any visible sign(s) of distress.

Engineers responsible for preventive action should identify sources of equipment needed for repair, materials, labour and expertise for use during an emergency.

Communication System

An efficient communication system and a downstream warning system are absolutely essential for the success of an emergency preparedness plan. The difference between a high flood and a dam-break situation must be made clear to the downstream population. Siren has been installed in the d/s areas to warn the people about the release of water from dam/Power house.

Evacuation Plans

Emergency Action Plan includes evacuation plans and procedures for implementation based on local needs. These could be:

- Demarcation/prioritisation of areas to be evacuated.
- Notification procedures and evacuation instructions.
- Safe routes, transport and traffic control.
- Safe areas/shelters.

Functions and responsibilities of members of evacuation team

Any precarious situation during floods will be communicated either by an alert situation or by an alert situation followed by a warning situation. An alert situation would indicate that although failure or flooding is not imminent, a more serious situation could occur unless conditions improve. A warning situation would indicate that flooding is imminent as a result of an impending failure of the dam. It would normally include an order for evacuation of delineated inundation areas.

Evacuation Team:

It will comprise of following official/Representative:

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i. D.M. /his Nominated officer (To peacefully relocate the people to places at higher elevation with state administration)
ii. Engineer in charge of the Project (Team Leader)
iii. S.P./Nominated Police Officer (To maintain law & order)
iv. C.M.O. of the area (To tackle morbidity of affected people)
v. Sarpanch/Affected Village Representative to execute the resettlement operation with the aid of state machinery & project proponents.
vi. Sub committees at village level.

The Engineer-in-charge will be responsible for the entire operation including prompt determination of the flood situation time to time. Once the red alert is declared the whole state machinery will come into swing and will start evacuating people in the inundation areas delineated in the Inundation maps. For successful execution, annually Demo exercise will be done. DM is to monitor the entire operation.

Public Awareness for Disaster Mitigation

In addition, guidelines that have to be followed by the inhabitants of flood prone areas, in the event of a flood resulting from dam failure, which form part of public awareness for disaster mitigation may also include following :

i. Listen to the radio for advance information and advice.
ii. Disconnect all electrical appliances and move all valuable personal and household goods beyond the reach of flood water, if one is warned or if one suspects that flood waters may enter the house.
iii. Move vehicles, farm animals and movable goods to the higher place nearby
iv. Keep sources of water pollution i.e. Insecticides out of the reach of water.
v. Turn off electricity and gas one has to leave the house.
vi. Lock all outside doors and windows if one has to leave the house.
vii. Do not enter flood waters.
viii. Never wander around a flood area

Notifications

Notifications would include communication of either an alert situation or an alert situation followed by a warning situation. An alert situation would indicate that although failure or flooding is not imminent, a more serious situation could occur unless conditions improve. A warning situation would indicate that flooding is imminent as a result of an impending failure of the dam. It would normally include an order for evacuation of delineated inundation areas.

Notification Procedures

Copies of the EAP that also includes the above described inundation map are displayed at prominent locations, in the rooms and locations of the personnel named in the notification chart. For a regular watch on the flood level situation, it is necessary that the flood cells be manned by two or more people so that an alternative person is available for notification round the clock. For speedy and unhindered communication, a wireless system is a preferable mode of communication. Telephones may be kept for back up, wherever available. It is also preferred that all the flood cells, if more than one, are tuned in the same wireless channel. It will ensure communication from the dam site to the control rooms. The communication can be established by messenger service in the absence of such modes of communication.

4. ENVIRONMENTAL MONITORING PROGRAMME

Environmental Monitoring Programme for the project construction and operation phase has been suggested and a provision of Rs49.50 lakh has been kept for this purpose.

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5. REHABILITATION AND RESETTLEMENT PLAN

The R&R Plan for the displaced project affected families has been formulated as per provision and guide lines of existing National policy on R&R-2007 (NPRR-2007) formulated by the department of land resources, Ministry of Rural Department, Govt of India and R&R policy-2008 formulated by Govt. of Arunachal Pradesh. The scheme has been executed through Deputy Commissioner, Papum Pare District in consultation with the R&R Committee formed by Govt. of Arunachal Pradesh. The necessary fund amounting to Rs 18.21 Cr was released to Deputy Commisioner, Papum Pare District as per state R&R policy for execution of the scheme. The R&R scheme has been completed in all respect and the rehabilitation cottages have been allotted to the eligible PAFs by the Deputy Commissioner Papum Pare district on 28th October 2015 vide allotment order No. DC/PP/NEEPCO/PC/2015/9280.

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ANNEXURE-III

X-ENVIRONMENT & ECOLOGY

Estimated Cost

Sl. No.	Description	Amount as proposed in EIA Report	Approved Amount	Provisioned in the RCE
		Rs in Lakh	Rs in Lakh	
1	Solid waste collection and disposal system	42.30	20.00	0.00
2	Sanitary facilities in labour camps	26.30	17.25	0.00
3	Fuel distribution to labours during construction	37.35	37.35	0.00
4	Landscaping and Restoration of construction area	4.00	4.00	4.00
5	Bio-diversity conservation	53.30	25.40	48.26
6	Maintenance of water quality	9.00	9.00	0.00
7	Public health/Health delivery system	116.20	62.92	25.0
8	Stabilization of quarry & muck disposal sites **(unit rate of boulder collection modified from Rs 800/cum to Rs 387.50 per cum as per analysis of rate)**	815.84	396.06	0.00
9	Sustenance of riverine fisheries	95.00	95.00	95.0
10	Greenbelt development **(provision already made under M-Plantation & K-Buildings)**	13.70	0.00	0.00
11	Control measures for Jhum cultivation	1.20	1.20	1.20
12	Rehabilitation & Resettlement Plan **(Rs 384.75 Lakh considered under 'B' Land)**	0.00	0.00	0.00
13	Catchment Area Treatment Plan (CAT) **(Rate revised)**	1416.30	1083.04	1083.00
14	Disaster Management Plan (DMP)	42.50	42.50	80.75
15	O& M Cost @ Rs 14.70 lakh per year for 4 years with 10% escalation every year **(Provision modified being on higher side)**	140.20	68.23	68.23
16	Implementing monitoring programmes @ Rs 9.9 lakh/yr for 5 years	49.50	49.50	49.50
17	Treatment of effluent for septic tank @ Rs 4 lakh/yr for 4 years **(Provision modified being on higher side as well as duplicate)**	33.60	16.00	0.00
18	Compensatory Afforestation for USF land acquisition **(contingency modified to 3%)**	27.43	21.58	155.63
19	NPV on USF Land	142.79	142.79	398.23
20	Anti Erosion works in d/s of PH	0.00	0.00	124.01
21	Cleaning of Reservoir vegetation before impounding	0.00	0.00	197.77
	Total	**3066.51**	**2091.82**	**2330.57**

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