

भारत सरकार
विद्युत मंत्रालय
केंद्रीय विद्युत प्राधिकरण
(जल विद्युत स्कंध)



एनएचपीसी लिमिटेड द्वारा निष्पादित अरुणाचल
प्रदेश/असम में सुबनसिरी लोअर पनबिजली परियोजना
(8x250=2000 मेगावाट) के दौरे की रिपोर्ट।

(विद्युत अधिनियम, 2003 के तहत के.वि.प्रा. के दायित्व की पूर्ति में)

जल विद्युत् परियोजना प्रबोधन प्रभाग
नई दिल्ली
अक्टूबर 2021

Tour Report of Subansiri Lower Hydro Electric Project (8x250=2000 MW) in Arunachal Pradesh/ Assam being executed by NHPC Ltd.

Shri Faraz, Deputy Director, HPM Division, CEA visited Subansiri Lower Hydro Electric Project (8x250=2000 MW) in Arunachal Pradesh/ Assam being executed by NHPC Ltd. on 27th September 2021 to review the physical progress of various works of the project. Discussions were held with officials/ engineers on various aspects of the on-going works, problem areas and measures being taken to accelerate the pace of works with the aim of timely commissioning of the projects as per schedule. The status of works and critical areas/ activities observed during the visit are as under:

1.0 Project Details

The Subansiri Lower Hydro Electric Project situated in Lower Subansiri District (now Kamle District)/ Dhemaji District of Arunachal Pradesh/ Assam is being executed by NHPC Ltd. The project is designed as Run-of-River (with diurnal storage) facility on the River Subansiri/ Brahmaputra. The Techno-Economic Clearance for the project was accorded on 13.01.2003 by CEA at the cost of Rs 6608.68 crores (12/ 2002 PL) with expected commissioning date September 2010. The installed capacity of the project is 2000 MW (8x250 MW). A copy of the Techno-Economic Clearance, with salient features of the HEP at its Annex-III, is attached with this Note. Further, a copy of the layout plan of the Subansiri Lower HEP is also attached for kind reference.

An expenditure of Rs 14,354 crores have been incurred till August 2021. The revised cost of the project is Rs 19,992.43 crores (01/2020 PL). The project got delayed due to various reasons like agitation by local people, proceedings in the Hon'ble NGT, etc.

2.0 Award of Works

Dam Works: M/s BGS-SGS-SOMA JV

Power House Complex: M/s Patel Engineering vide LOA dated 01.09.2020

Hydro-mechanical works: M/s Texmaco Rail & Engineering Ltd., Kolkata

Electro-mechanical Works: Ms GE Ltd.

3.0 Commissioning Program

The project was originally scheduled to be completed by September 2010 but commissioning could not be achieved as per the original schedule due to various reasons, the major of them were: initial delay in start of project due to delay in transfer of Forest Land, agitation by some section of stakeholders of Assam raising issues of safety of Dam and its downstream impact, proceedings in the Hon'ble NGT, etc. The signing of MoA with Govt. of Assam was done on 23.08.2019 and the works were resumed w.e.f. 15.10.2019. Now, as per project authorities, two units (Unit#1 and Unit#2 both of capacity 250 MW each) are scheduled to be commissioned by August 2022 and overall commissioning of the project is scheduled by August 2023.

4.0 Current Status of Works

Civil Works

Dam Concreting is 71% completed (Concrete poured for 14.73 Lakh cum of 20.70 Lakh cum). Intake concreting is 97% achieved (2.70 Lakh cum out of total 2.79 Lakh cum). For Head Race Tunnel, Heading Excavation progress is 99% overall (Completed for HRT-1, 3, 6, 7 & 8; 96% completed for HRT-2), Benching Excavation – 87% overall (Completed for HRT-1, 3, 4, 6 & 8; 52% completed for HRT-2), Overt Lining – 67% overall (96% completed for HRT-1 and 43% completed for HRT-2) and Invert Lining – 40% overall (55% completed for HRT-1 and 15% completed for HRT-2). Surge Tunnel: Heading Excavation has been 88% achieved overall (Completed for ST-6; 94% completed for ST-1 and 95% completed for ST-2) and Benching Excavation – 34% overall (51% completed for ST-1 and 60% completed for ST-2). Pressure Shaft: Excavation is 93% complete and erection of Pressure Shaft Liner has been 20% achieved overall (52% completed for Lane-1 and 47% completed for Lane-2). Power House (Civil works) for Unit #1 are 95% complete and 92% for Unit#2. GIS Building and other associated civil works in Power House for commissioning of 2 Units (Unit#1 and Unit#2) are 40% complete.

E&M Works

About 97% of equipment have been supplied at site which includes all OSD consignments. All 28 nos. transformers have reached at site. 8 no. GSU transformers have been shifted to Powerhouse. Erection of EOT crane rail in Power House (for Unit -1&2) completed. Erection work of Unit-1 is in progress (Stator and Rotor assembly is in progress). The status as under:

- Unit #1: 26% completed.
- Unit #2: 20% completed.
- Other associated E&M works w.r.t commissioning of two Units in Aug 2022 are under progress.



PIC-I



PIC-II

HM Works

About 90 % of Equipment has been supplied. Erection is under progress and status is as under:

- Diversion Tunnel: 98%, completed.
- Intake Gate: 85% completed.



PIC-III

- Pressure Shaft liner: 20 % completed.
- Spillway Radial Gates: installation of 1st stage EP is under progress.

5.0 Deviation in the design of the project

The CEA communicated its acceptance of the recommendations of the various appraising groups (CEA/ CWC/ GSI/ CSMRS) on the Memorandum of Changes from approved DPR for the Subansiri Lower HEP on 11.12.2017. No further design changes were incorporated afterwards.

6.0 Power Evacuation Arrangement

The power generated by Subansiri Lower HEP will be evacuated through four nos. of 400kV HVAC transmission lines (Double Circuit) of approximately 180 km length each from Subansiri Lower HEP to Biswanath Chariali, Assam with main HVDC substation at Biswanath Chariali, Assam which are under construction by PGCIL. It was informed that PGCIL has informed that, keeping in view of the commissioning of 2 units of Subansiri Lower HEP (Unit # 1 and Unit # 2) in August 2022 (scheduled), PGCIL is targeting to complete one transmission line (double circuit) by July 2022 for evacuation of power generated from the two units (2x250MW). The balance transmission lines shall be completed before the commissioning of balance six units (6x250MW whose commissioning is scheduled in August 2023).

7.0 Issues and Critical Areas

As informed, during the last week of August 2021, heavy rainfall in the Subansiri Lower catchment area resulted in gradual increase in the river discharge of Subansiri Lower. On 26th August 2021, the river water of more than 10,000 Cumecs overflowed Dam blocks and continued till 01st September 2021. The water level started receding after 2nd September onwards. Due to prolonged continuous overflowing of river water, work progress at all fronts of Dam was stopped. A significant quantity of heavy wooden logs, trash and other waste

materials came with river water into the all spillway blocks of Dam has resulted into damages to the work fronts of Dam like bending of reinforcement, damaging of pier concrete, damaging of precast slab of aerator shaft etc. In addition to this, a dent has also been observed in the shaft of Rotec crane-2 installed in Spillway block-6 (There are a total of three Tower Cranes (TC) with capacities TC-1: 30 MT, TC-2: 30 MT and TC-5: 11 MT). Till 27.09.2021, five no of bays have been restored successfully. The estimated period of complete restoration worked out to 35 days for the remaining four bays. The work had completely stopped for a period of 11 days (26th August 2021 - 5th Sep'2021) and partial hindrance of about 17 days (6th Sep'21 - 10th Oct'21). This shall result in overall delay in handing over of the bay to HM contractor for Radial Gate erection. NHPC submitted that all efforts are being made to handover the front to HM contractor by 25th October 2021. Further, NHPC assured that the loss of time due to above hindrance shall be made up in due course and it will not result in delay of the overall commissioning of the project.



PIC-IV



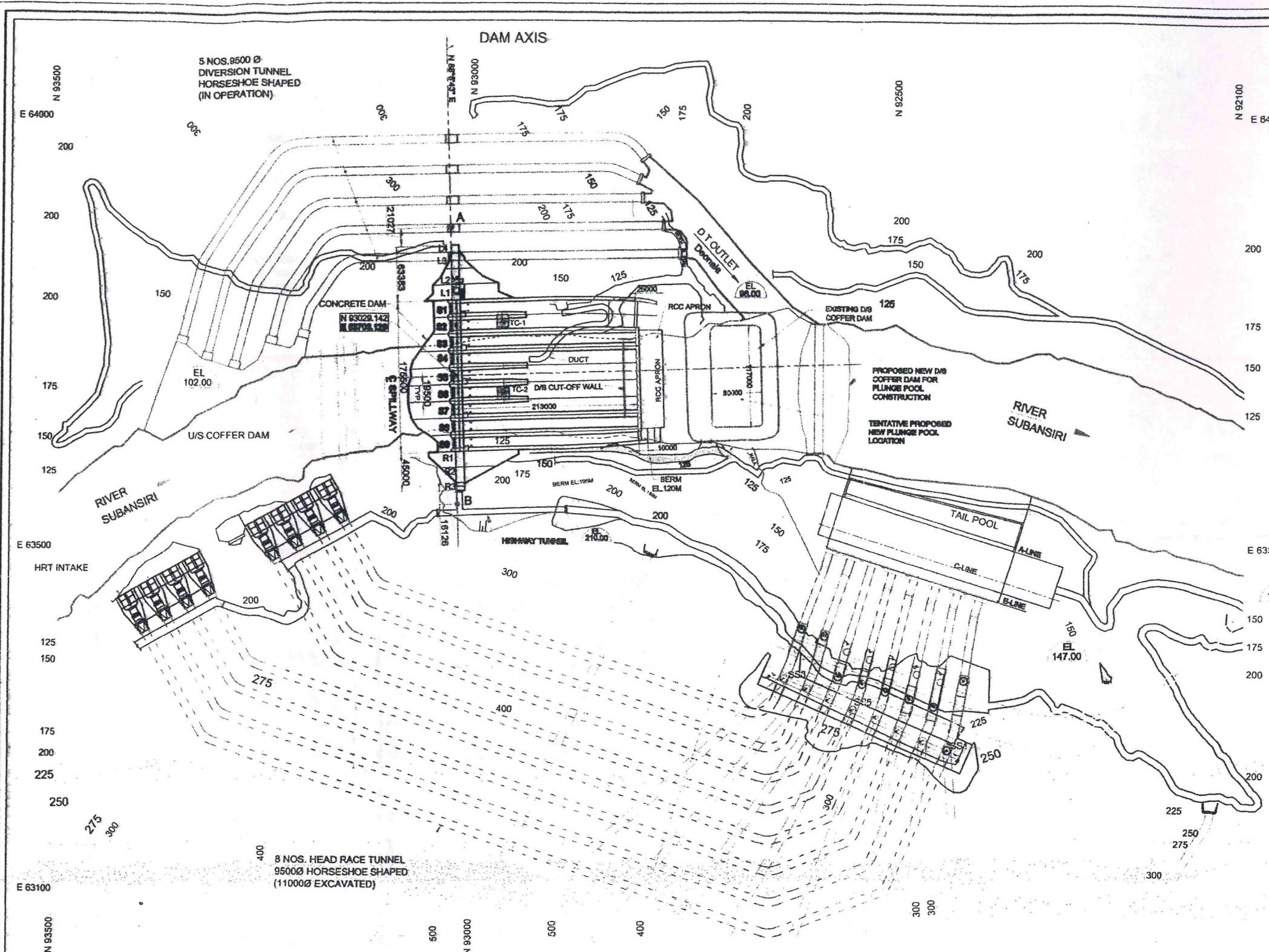
PIC-V

Executive Director, Lower Subansiri HEP informed that there are no technical obstacles in the project and the work is in full swing. Further, the law & order issues crop up sometimes regarding which assistance of the District Administration is sought; the District Administration is prompt and responsive in such matters. The only major issue remains the pendency of the signing of PPA with Govt. of Delhi regarding 113 MW of power generated.

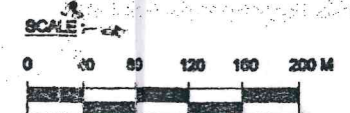
8.0 Likely Commissioning of Units

As informed by the project authorities, two units (Unit # 1 and Unit # 2 each of 250 MW) are scheduled to be commissioned in August 2022 and the remaining six units (Unit # 3-8 each of 250 MW) are scheduled to be commissioned in August 2023. Keeping in view of the progress made till date regarding Units # 1-2 and the assurance by NHPC that most of the associated remaining work shall be completed by the end of the coming lean season (Winter Season 2021-22), the commissioning date though optimistic, requires concerted efforts by NHPC for commissioning at least two units in the year 2022. The schedule for commissioning of the two units (Units#1 and Unit#2 each of 250 MW) is enclosed.

Regarding the balance six units (Units # 3-8 each of 250 MW), the work on which is in progress simultaneously, NHPC would be required to strictly adhere to the timelines it has framed for itself as the project is of national importance and there has already been a significant delay from its original commissioning date; however, this appears to be a challenging task.



- NOTE :-**
1. ALL DIMENSIONS ARE IN MILLIMETRE, GRID VALUES AND ELEVATIONS IN METRE.
 2. THE LAYOUT HAS BEEN MODIFIED AS PER THE RECOMMENDATIONS OF DAM DESIGN REVIEW PANEL & HYDRAULIC MODEL STUDIES.
 3. THE PRESENT LAYOUT PLAN IS SHOWN ON TOPOGRAPHICAL SURVEY AS RECEIVED FROM PROJECT VIDE LETTER NO. JH/SLP/2013/2081 DATED 08-07-2013 & NHSLP/2013/Comp-FSD/1 DATED 03.10.2013.



 एन एच पी सी लिमिटेड (एन एच पी सी लिमिटेड) NHPC Limited (A GOVT. OF INDIA ENTERPRISE)	
सुबनसिरी लोअर जलविद्युत परियोजना SUBANSIRI LOWER HYDROELECTRIC PROJECT	
DAM GENERAL ARRANGEMENT MODIFIED LAYOUT PLAN	
17.07.2014 01 04.10.2013 05 DATE NO.	SPILLWAY PLAN MODIFIED AS PER HYDRAULIC MODEL STUDIES ISSUED FOR COMMENTS REVISION OR ISSUES
BY: CH. APP. DATE: OCT. 2013	SUBMITTED: 04.10.2013 REVIEWED: 04.10.2013 APPROVED: 04.10.2013 DRG. NO.: NHSLP/2013/2081 41 GA 188 01

MODIFIED LAYOUT PLAN

DRG. NO. NHSLP/2013/2081-41-GA-188-01

**Subansiri Lower H.E. Project
Salient Features**

Particulars	As per DPR of NHPC
1. Location	
State	Arunachal Pradesh/Assam
District	Lower Subansiri/ Dhemaji District
2. Hydrology	
Catchment Area (Sq. Km)	34900
Design Flood (Cumec)	37500
3. Reservoir	
Full reservoir level (m)/ Storage (Mcum)	205.0/ 1365
Minimum reservoir level (m)/ Storage (Mcum)	190.0/ 923
Minimum draw down level (m)/ Storage (Mcum)	181/ 720
4. Diversion tunnel	
Number/ Size (m)	5/ 9.5 dia horse shoe
Length (m)	From 485 to 640
Diversion capacity (Cub. m/ Second)	4550
5. Dam	
Type	Concrete gravity dam
Top Elevation of dam (m)	210
Height of dam above river bed level (m)	116
Height of dam above deepest Foundation Level (m)	133
6. Spillway	
Design flood (Cumec)	37500
Crest Level	EL 150 meters
7. Intake	
Invert Level (m)	160
No. & Size	8 Numbers/ 7.3 m X 9.5 m
8. Head race Tunnel	
Number	8 on left bank
Size & shape	9.5 m dia horse shoe
Length (m)	Left bank: 225 to 390
Design discharge (Cumec)	322.4
9. Pressure Shaft	
Number	8/ Circular steel lined
Diameter/ Height (m)	8/ 68.25 Vertical + 48 m horizontal
10. Power House	
Type/ Capacity	Underground/ 8X250 = 2000 MW
Power House Cavern (m)	24 X 62.4X 337
Transformer cum MIV Cavern (m)	15 X 42 X 327

ES

Gross Head/ Design head (m)	91/ 86
Diameter of MIV	7 Meter
11. Surge Chamber Cum Draft Tube gate Cavern	
Size (m)	15 X 62.5 X 249 (Compartmented into 8 Nos.)
Draft tube opening (m)	12 X 10 incl. an intermediate pier of 2 m width
12. Tail race tunnel	
Shape/ Length/ Diameter	Horse Shoe/ 450 to 780 m length/ 9.5 m dia
13. Switchyard	
Size & location	100 m X 300 m at EL 190 m
14. Access Tunnel	
Size and Total Length	8 m D shaped Length 2422 m 5m X 7.5 m D shaped- 343 m length 9m X 10 m D shaped- 300 m length
15. Design Energy (Gwh)	
Subansiri Lower (Alone)	7421.59
Subansiri Lower with regulated releases from Subansiri Upper and Subansiri Middle	7722.90

GL