

CHAPTER - 2

PROJECT DESCRIPTION

2.1 GENERAL

Dibang Multipurpose Project (3000 MW) is being conceived on river Dibang which originates from snow covered southern flank of the Himalayas close to Tibet border at an altitude of more than 5000 m. The river emerges from the hills and enters sloping plain area near Nizamghat in Arunachal Pradesh, from where the river flows for a distance of 50 km to meet the river Lohit. The total catchment area of Dibang up to the dam site is 11276 sq km which lies entirely in India.

The project is located in Lower Dibang Valley district of Arunachal Pradesh. The reservoir created due to the project will provide flood moderation benefits in the downstream. The back water in the reservoir will travel up to a length of 43 km in Dibang river and its various tributaries - Airi Pani, Ilu Pani, Imu Pani, Ahi river, Ithun river, Emra river etc. which will facilitate promotion of navigation by connecting inaccessible upstream villages/areas. The project after construction will be one of the biggest projects in terms of generation of hydropower in India.

The project headquarters is proposed to be at Pathar Camp on the right bank of river Dibang approximately 6 km downstream of dam site. The project has a poor connectivity from the railhead and the nearby towns (viz. Tinsukia, Dibrugarh, Pasighat, Itanagar, Tezpur etc.). The project is located about 43 km from Roing which is situated at a distance of 110 km from Tinsukia the nearest railhead. Airport at Mohanbari (Dibrugarh) is further 45 km from Tinsukia. Up-gradation of electricity generating capacity is an urgent national need, to meet the ever increasing power demand. The north-eastern region has huge hydel potential for electricity generation.

2.2 PAST STUDIES

Brahmaputra Board geared up investigation works of Dibang Multipurpose Project in 2001-02 and the Pre-Feasibility Report (PFR) was prepared by them in March, 2002. As per the PFR, the project comprised of a 263 m high rock fill dam at Munli with upstream concrete face. The project was planned to generate 3000 MW hydropower from a surface powerhouse and also for flood moderation at downstream.

Brahmaputra Board continued the survey and investigation works for preparation of Detailed Project Report. During a review meeting held in office of Chairman, Central Water Commission (CWC) on 21.11.02, where representatives from Brahmaputra Board, Ministry of Water Resources (MoWR) and NHPC were present, it was decided that NHPC would take up the work of drilling and drifting required for preparation of Detailed Project Report. Subsequently, Dibang Multipurpose Project was transferred to NHPC by Ministry of Water Resources vide F No. 24/2(D)/2001-ER/4972-77 dt. 20.12.2002 and order was formally issued to NHPC under section 18A of the Electricity (Supply) Act vide Ministry of Power (MoP) letter no. 22/7/2001-DO (NHPC) dt. December 24th, 2002 to establish, operate and maintain the project. In the letter by Ministry of Water Resources it was also decided that Brahmaputra Board will continue to prepare.

Based on the Pre-Feasibility Report, NHPC had undertook detailed survey & investigations. Later on after the joint meeting of senior officials/experts of CWC, Brahmaputra Board and NHPC, project data was reviewed by the above team and the present dam axis was fixed at 460 m downstream of the earlier investigated dam axis and also it was proposed to make the power house underground inside a hill on right bank of River Dibang near the dam, thereby reducing the tunnel length considerably. Subsequently, further investigations were undertaken on the new dam axis and in power house area. In the meantime, work of preparation of Detailed Project Report was also entrusted by Ministry of Water Resources (MoWR) to NHPC including the design of the project independently vide F No-24/4/D/2004- ER/93-97 dated January 7, 2005.

2.3 SALIENT FEATURES

The salient features of the project are given in **Table 2.1**. The Layout plan of the project is presented as Figure-2.1.

TABLE 2.1
Salient Features of the Dibang Multi-purpose Project

1	LOCATION	
	State	Arunachal Pradesh
	District	Lower Dibang Valley
	River	Dibang / Talon
	Dam site location	1.5 km u/s of confluence of Ashu Pani with Dibang
		Latitude : 28° 20' 7" N
		Longitude : 95° 46' 38" E
	Nearest BG rail head	Tinsukia (153 km)
	Nearest airport	Dibrugarh (198 km)
2	HYDROLOGY	
	Catchment area	11276 km ²
	Average annual rainfall	4405 mm
	Probable Maximum Flood (PMF)	26230 cumec
3	RESERVOIR	
	Maximum Water Level (MWL)	EL 548.0 m
	Full Reservoir Level (FRL)	EL 545.0 m
	Min. Draw Down Level (MDDL)	EL 490.0 m
	Gross storage	
	- At MWL	3850.30 Mcum
	- At FRL	3748.21 Mcum
	- At MDDL	1983.89 Mcum
	Live storage at FRL	1764.32 Mcum

	Area under submergence at FRL	40.09 sq. km
	Length of reservoir	43 km
4	DIVERSION TUNNEL	
	Number, diameter and shape	5 Nos. 12 m diameter horseshoe shaped
	Length	1175 m to 1325 m
	Diversion Discharge	8680 cumec
5	COFFER DAMS	
	Height of u/s RCC coffer dam	25 m (Above RBL)
	Height of d/s coffer dam	7 m (Above RBL)
6	DAM	
	Type	Concrete gravity dam
	Top elevation of dam	EL 550.00 m
	Height of dam above deepest foundation level	288 m
	Length of dam at top	816.3 m
6.1	SPILLWAY	
	Design flood	19000 cumec
	Type	Orifice type
	Crest elevation	
	Lower level	EL 455.0 m
	Upper level	EL 500.0 m
	Number & size of spillway opening	
	Lower level	7 Nos. of size 6 m x 8 m
	Upper level	4 Nos. of size 9 m x 12 m
	Energy dissipation	Ski jump
	Length of spillway	154.0 m
6.2	CONSTRUCTION SLUICE	
	Number and size	6 Nos. of size 4 m x 5 m
	Crest Level	EL 300.0 m
7	INTAKE	

	Invert level	EL 465.00 m
	Number and size of gate opening	6 Nos. of size 8.0 m x 9.0 m
8	HEAD RACE TUNNEL	
	Number, diameter and shape	6 Nos. 9.0 m diameter horseshoe shaped
	Length	300 m to 600 m
	Design discharge	237.80 cumec
9	PRESSURE SHAFT	
	Number, diameter and shape	6 Nos. 7.5 m diameter Circular
	Height	184.8 m
10	PENSTOCK	
	Number, diameter and shape	12Nos., 5.2m diameter Circular
11	MIV CAVERN	
	Cavern size	17 m(W) x 26.1 m(H) x 277.8 m(L)
	MIV diameter	3.8 m
12	POWER HOUSE	
	Type	Underground
	Installed capacity	3,000 MW (12 x 250 MW)
	Power House cavern size	24.5 m(W) x 54.8 m(H) x 382.8 m (L)
	Type of turbine	Francis
	Speed of turbine	214.3 rpm
	Net rated head	233 m
	Overall turbine generator efficiency	92%
13	DRAFT TUBE GATE, GIS AND TRANSFORMER CAVERN	
	Cavern size	19 m (W) x 31.5 m (H) x 325 m (L)
	Draft tube gate no. & size	2 Nos. each of 4.5 m x 7.1 m
14	CABLE TUNNEL	
	Number, size & shape	1No., 4.5m(H)X30m(W), D shape
15	TAIL RACE TUNNEL	
	Number, diameter and shape	6 Nos. 9.0 m diameter horseshoe shaped
	Length	320 m to 470 m

	Design discharge	237.80 cumec
	TRT outlet invert level	EL 283.00 m
16	POTHEAD YARD AND GIS	
	Size and elevation	300 m x 100 m at EL 310.0 m
17	POWER GENERATION	
	Installed capacity	3000 MW
	Annual energy generation in 90% dependable year	
	With Flood moderation	11330 MUs
	Without Flood moderation	12210.12 MUs

2.4 BENEFITS OF THE PROJECT

Dibang Project is planned for flood moderation in the downstream, in Arunachal Pradesh as well as Assam along with power generation. 1 in 100 yr and 1 in 25 year return period flood has been considered for flood moderation. In absence of long term observed daily data series, an attempt has been made to work out of flood storage required for effective moderation in the event of occurrence of a 100 year return period flood wave preceded and succeeded by a 25 year flood wave at dam site. Release from the reservoir has been restricted to 3000 cumec, which was considered as the safe carrying capacity of the downstream channel reach by Brahmaputra Board. It is found that the storage of the order of 563 Mcum and 340 Mcum are required for moderation of 100 year and 25 year flood respectively. For the purpose of flood moderation, a capacity of 1243 Mcum will be created by keeping the reservoir at 508 m i.e. 37 m below FRL (545 m).

Further, the back water in the reservoir will travel up to a length of 43 km in Dibang river and its various tributaries which will facilitate promotion of navigation by connecting inaccessible upstream villages/areas. Large work force will be required during peak construction period of the project. Therefore, local population will get enough work and business opportunities. The work experience and expertise gained by the local people enable them to set up commercial establishments, small-scale industries, agro-based

processing units in the project area and outside where the demand for these ventures continuously increases. Due to the construction of the project, good and wide roads in the downstream and project area will be available. The construction of the approach and access roads and bridges enables an easy means for migration, a fast route to market local produce and a facility to tackle emergent situations arising out of ill health, accidents, nature's fury in the form of floods, land slides, avalanches, storms etc. Hospitals, health centre and health care units established by the project which are also available to the people of project affected and downstream areas contribute significantly in minimising the upsurge of many communicable and non-communicable diseases.

Besides, Resettlement and Rehabilitation package, a Community and Social Development Plan (CSDP) has been prepared as a part of Resettlement and Rehabilitation Plan in EMP report of Dibang Multipurpose Project.