

Annexure-1

Annual Review of Technical Performance of Chilla HEP

1.1 Overview

1.1.1 The petitioner in compliance of the relevant Regulations of UERC (Terms and Conditions for determination of Tariff) Regulations, 2015 & UERC (Terms and Conditions for determination of Multi Year Tariff) Regulations, 2018 is providing information with regard to the operational performance related to technical parameters of Chilla Power House.

The operational parameters considered are:

- (a) Gross generation
- (b) AUX (Auxiliary consumption and Transformation losses)
- (c) Plant Availability factor (PAF)

1.1.2 The information provided in this chapter relates to operational performance:

- Actual in FY 2016-17, 2017-18, 2018-19 (up to 30.09.2018)
- Expected in FY 2018-19 & projected for the control period 2019-20 to 2021-22.

1.2 Power Station Description

1.2.1 Chilla Hydro Power Station with an installed capacity of 144 MW (4x36 MW) is a run of river scheme constructed on river Ganga 5 km upstream of holy town Hardwar and is situated in District Pauri Garhwal of Uttarakhand state. The scheme consists of a 312 m long, 11.5 m high gated diversion barrage at Pashulok, about 4 km downstream of holy town Rishikesh. The river inflows are diverted via head regulator with silt ejector constructed 500 m downstream in the bed of lined power channel, 14.3 km long and 565 cumec capacity, which ends at fore bay of Chilla Power Station where the water is fed to the generating units through 4 nos. 4.6 m dia. and 55 m long steel lined penstocks.

1.2.2 There are four generating units having vertical Kaplan turbines directly coupled with synchronous generator. The turbine output is 36 MW for a rated net head of 32.5 m. The generators are designed for a nominal output of 36 MW with lagging power factor of 0.9 and class "B" insulation.

1.2.3 This Power Station was commissioned in the year 1980-81. Due to operations of machines for past 34 years in highly abrasive silt laden water, efficiency of machines has substantially decreased and availability of machines has been adversely affected in spite of regular and timely maintenance undertaken by Petitioner.

1.2.4 The Technical and other details of the Power Stations are provided in form F2.3 of this petition.

1.3 Energy Generation

1.3.1 Actual/Expected/Projected energy generation in FY 2016-17, FY 2017-18, FY 2018-19 & for the control period from FY 2019-20 to FY 2021-22 is given in the table below:

Table 1: Actual, Expected & Projected Energy

Particulars	Norms	2016-17 (A)	2017-18 (A)	2018-19 (E)	2019-20 (P)	2020-21 (P)	2021-22 (P)
Design Energy/ Actual Generation (MU)	671.29	768.99	812.11	790.00	550.00	650.00	650.00
Auxiliary Cons. (%)	0.50%						
Transformation/ other losses and consumption (%)	0.50%	1.70%	1.74%	1.55%	1.33%	1.20%	1.20%
Net Saleable Energy (MU)	664.58	755.90	798.01	785.17	542.50	643.00	644.00

1.3.2 From the above table it is evident that gross generation is expected less than the design energy during the control period from 2019-20 to 2021-22.

1.3.3 The AUX (auxiliary consumption and transformation losses) has remained on higher side than the normative in FY 2018-19 & during the control period.

1.4 Plant Availability factor

1.4.1 The recovery of the Annual Fixed Charges is dependent on the Plant Availability achieved by the plant. The principle for recovery of fixed charges on the basis of the availability achieved by the plant has been introduced by the Hon'ble Commission by its regulations UERC (Terms and Conditions of tariff), 2015 & 2018. The petitioner has started computing this factor as per the provisions of the above regulations.

1.4.2 Incident of flooding of Chilla Power Station on dated 13.07.2018.

Chilla Power House came under forced outage after the incident of flooding on 13.07.2018. Unit no. 4 of Chilla had tripped on Generator earth fault & Mechanical fault with heavy sound and water came out from top cover at 14.50 hrs on 13.07.18. Level inside power house became 296.60 m with tail race level as 296.80 m. Unit No. 1, 2, 3 & 4 of Chilla were running on 36 MW, 34 MW, 35 MW, 31 MW respectively with a total load of 136 MW just before the incident.

Dewatering of the power house was completed within 3 days of the incident. Unit no. 1 was rolled on 18.07.18 for bearing run and successfully synchronized on the same day with full load. Unit No. 2 and 3 were synchronized on 26.08.2018 and 11.10.2018 respectively.

Assessment of damages of Unit no. 4 has been carried out by M/S BHEL, OEM and order for the restoration work of Machine No 4 has been placed to M/s BHEL.

Due to above incident which was not controllable, Chilla Power station shall not be able to achieve generation and NAPAF targets during the FY 2018-19. Therefore, it is requested kindly to considered relaxation in approved NAPAF.

As restoration works will take approximately 12 months, therefore it is requested kindly to considered relaxation in NAPAF for FY 2019-20 also.

Table 2: Plant Availability Factor

Particulars	Norms	2016-17 (A)	2017-18 (A)	2018-19 (E)	2019-20 (P)	2020-21 (P)	2021-22 (P)
NAPAF/PAFM (%)	74.00%	73.83%	72.80%	53.04%	56.00%	56.00%	44.00%
	74.00%						
Planned Outages (Hrs.)	NA	3,862	5,196	5,808	8,472	7,512	8,712
Forced Outages (Hrs.)	NA	271	90	181	135	158	147

1.4.3 PAFM: The Chilla Power Station is very old HEP & requires more maintenance hence, has to be shut down for longer periods to carry out maintenance. Further, RMU works has also been planned during the control period for Chilla HEP. In view of the above, the Petitioner requests the Hon'ble Commission to kindly consider and approve the NAPAF of Chilla HEP for FY 2018-19 and also for the third control period i.e. from FY 2019-20 to FY 2021-22 as tabulated here above.

Table 3: Average PAFM (%)

Sl. No.	Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Average
1	2013-14	69.19	69.26	79.05	89.22	91.98	83.05	85.37	63.04	62.20	58.42	44.07	51.12	70.50
2	2014-15	63.34	65.03	78.54	79.63	73.52	89.16	75.62	59.88	60.46	67.11	64.18	64.40	70.07
3	2015-16	62.27	69.96	88.45	87.57	83.04	75.57	76.87	32.10	28.69	71.30	71.65	62.61	67.51
4	2016-17	52.61	68.00	87.82	84.40	92.21	76.41	73.22	67.27	67.61	71.16	72.10	73.13	73.83
5	2017-18	73.33	70.47	87.87	90.50	92.65	93.59	82.48	65.97	62.95	55.44	32.47	65.86	72.80
6	2018-19	56.60	62.43	86.27	50.16	28.54	47.22	57.65	57.65	47.50	47.50	47.50	47.50	53.04

1.4.4 Planned Outages: Planned outages on account of annual/capital maintenance in the control period FY 2019-20 to FY 2021-22 are given below. The Petitioner shall continue to lay emphasis on preventive and planned maintenance of machines for better power station availability for the year 2018-19 and onwards too for better power station availability.

Table 4: Planned Outages

FY	Unit No.	Date of Start	Date of Completion	No of Days	Remarks
2019-20	Unit 1	01-12-2019	31-03-2020	121	RMU
	Unit 2	01-04-2019	12-05-2019	41	AM
		01-12-2019	04-01-2020	34	AM
	Unit 3	07-02-2020	13-03-2020	35	AM
2020-21	Unit 4	01-04-2019	30-11-2019	243	Restoration Works
	Unit 1	01-04-2020	30-11-2020	243	RMU
	Unit 2	01-12-2020	31-03-2021	120	RMU
	Unit 3	07-01-2021	13-02-2021	37	AM
2021-22	Unit 4	01-12-2020	04-01-2021	34	AM
	Unit 1	-	-	-	-
	Unit 2	01-04-2021	30-11-2021	243	RMU
	Unit 3	01-12-2021	31-03-2022	120	RMU
	Unit 4	01-12-2021	31-03-2022	120	RMU

AM: Annual Maintenance CM: Capital Maintenance RMU: Renovation, Modernisation and Up-gradation

Chilla HEP


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