Annexure-1

Annual Report on Technical Performance of Khatima 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, 2011 & UERC (Terms and Conditions for determination of Multi Year Tariff) Regulations, 2015 is providing information with regard to the operational performance related to technical parameters of Khatima Hydro Power Station.

1.1.2 The operational parameters considered are:

(a) Gross generation

(b) AUX (Auxiliary consumption and Transformation losses)

(c) Plant Availability factor (PAF)

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

- Actual in FY 2013-14, 2014-15, 2015-16, 2017-18 (up to 30.09.2017)
- Expected in FY 2017-18 & 2018-19.

1.2 Power Station Description

1.2.1 Khatima Power Station, with an Installed Capacity of 41.4 MW (3X13.8 MW) is situated at Lohiahead (Khatima), District Udham Singh Nagar of Uttarakhand. Khatima hydro power Station is an irrigation canal based project. The project is located at a distance of about 6 km from Khatima town and connected by road. Meter Gauge rail connection is also available up to Khatima town.

1.2.2 The Sharda Canal / Power Channel draws water from river Sharda through Banbasa Barrage located at a distance of about 16 km upstream of the Power Station at Banbasa near Tanakpur. The Power Station units were commissioned in 1955 & 1956. Three English Electric make generating units of 13.8 MW capacity each had been installed, totalling to aggregate capacity of 41.4 MW. Power generated from Kaplan turbines at 11 kV is stepped up to 132 kV via three phase 17.5 MVA transformers. The generated power is evacuated through 2 nos. 132 kV feeders to 132 kV Dohna substation

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(Bareilly) and 3 nos. 33 kV feeders (one through 40 MVA, 132/33 kV transformer and other 2 nos. feeders through 20 MVA, 132 / 33 kV transformer) to Diesel PH, industrial supply and Tanakpur Project of NHPC respectively.

1.2.3 Due to long operation of about 60 years, the operating efficiency of the machines had gone down considerably. Power generation capacity of generating units got reduced and the condition of their auxiliaries, instruments, protective relays & control equipment deteriorated to such an extent that the combined output of the Power Station was restricted to about 25-28 MW against the rated capacity of 41.4 MW. So the power station had been taken for Renovation, Modernisation and Up-gradation (RMU). All three machines have been renovated. All three machines have been renovated as mentioned below:

- RMU of Unit 1 started on 01/10/2012 and completed 27/05/2015.
- RMU of Unit 2 started on 22/06/2015 and completed on 21/05/2016
- RMU of Unit 3 started on 02/11/2015 and completed on 25/09/2016.

1.2.4 Salient features of the Power Station are provided in form F 2.3 of this petition.

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1.3 Energy Generation

1.3.1 Actual/Expected/Projected energy generation in FY 2013-14, FY 2014-15, FY 2015-16, FY 2016-17, FY 2017-18 & FY 2018-19 is given in the table below:

Table -1: Actual, Expected & Projected Energy

Particulars	Norms	2013-14 (A)	2014-15 (A)	2015-16 (A)	2016-17 (A)	2017-18 (E)	2018-19 (P)
Design Energy/ Actual Generation (MU)	194.05	114.77	45.172	120.58	179.82	222.48	209.00
	235.59						
Auxiliary Cons. (%)	0.2%	1.08%	1.1%	1.5%	1.41%	1.30%	1.21%
	0.5%						
Transformation/ other losses and consumption (%)	0.5 % (Tr. losses)						
Net Saleable Energy (MU)	192.69	113.53	44.68	118.77	177.28	219.58	206.47
	233.23						

1.3.2 Design Energy of Khatima HEP has been revised by Hon'ble Commission to 235.59 MUs after RMU. In this regard it is respectfully submitted that Khatima HEP cannot generated its full design energy in the months of June, July, August, September and October due to following reasons:

a) The discharge in the Sharda Canal is controlled by U.P. Irrigation Department from Banbasa barrage and TRC level goes high in case of increased discharge which is pre-dominant if the Nagla Escape channel is closed. This decreases the head thereby decreasing the generation.

Consequently the power house runs at around 40 MW during high discharge period due to above mentioned constraints. So, daily generation of 960 MWh is possible without considering any outage. Considering 95% availability(allowing 5% forced outage), the daily generation figure comes out to 912 MWh, so, generation of

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approximately 27.36 MU is achiveable in the month of June, July, August and September provided there is no flood.

b) Normally canal closure is also taken by U.P.I.D. in the months of Oct, Nov or Dec for about 20 days or so. . Therefore, it will be appropriate to consider the generation of October as 10 MUs.

Month	Generation Projections as per DPR	Possible Generation (MU)
June	30	27.36
July	30	27.36
August	30	27.36
Sep.	30	27.36
Oct.	30	10

In view of above, it is respectfully submitted that Hon'ble Commission may revise the design energy for the tariff purpose.

1.3.3 The auxiliary and transformation losses in FY 2016-17 were more than the normative level. The auxiliary and transformation losses in FY 2017-18 & FY 2018-19 are expected near to normative level.

1.4 Plant Availability Factor

1.4.1 The recovery of the Annual Fixed Charges is dependent on the Plant Availability achieved by the Power Station. 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 for Determination of tariff) Regulations, 2011 & 2015. The petitioner has started computing this factor as per the provisions of the above regulations from FY 2013-14.

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Table 2: Plant Availability Factor

Particulars	Norms	2013-14 (A)	2014-15 (A)	2015-16 (A)	2016-17 (A)	2017-18 (E)	2018-19 (P)
NAPAF / PAFM (%)	47.21, 69.30 / 69.30	52.31	15.36	37.12	55.73	67.58	67.58
Planned Outages (Hrs)	NA	8140	9019	11914	6400	975	2184
Forced Outages (Hrs)	NA	2251	436	1855	218	860	860

Table-3 : Average PAFM

Actual PAF from 2013-14 to Sept. 2017-18 and anticipated from October 2017 to March 2019														
Sl.No.	Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Average
1	2013-14	62.15	74.87	68.96	68.69	74.04	71.15	53.91	4.20	42.08	37.08	33.62	36.96	52.31
2	2014-15	24.32	32.33	39.04	30.48	39.67	0.00	0.00	0.00	0.00	0.00	0.00	18.48	15.36
3	2015-16	21.49	41.31	53.23	45.71	51.32	32.84	36.49	18.24	35.47	36.41	36.49	36.49	37.12
4	2016-17	37.38	62.15	70.95	66.07	71.64	90.81	41.59	34.78	52.34	52.57	45.00	43.47	55.73
5	2017-18	62.08	72.46	77.70	73.09	90.15	100.64	91.79	33.00	52.34	52.57	52.57	52.57	67.58
6	2018-19	62.08	72.46	77.70	73.09	90.15	100.64	91.79	33.00	52.34	52.57	52.57	52.57	67.58

1.4.2 The Khatima Power Station is likely to achieve the normative plant availability factor for the FY 2017-18 & FY 2018-19.

1.4.3 **The Petitioner does not seek any deviation in NAPAF for the FY 2017-18 & 2018-19 from the norms as determined by Hon'ble Commission in its order.**

1.5 Planned Outages: Planned outages on account of annual/capital maintenance in FY 2018-19 are given below. The Petitioner shall continue to lay emphasis on preventive and planned maintenance of machines for the year 2017-18 and onwards too for better power station availability.

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Table 4: Planned Outages

FY	Unit	From	To	No. Of Day	Outage Type
2018-19	Unit 1	26-10-2018	24-11-2018	30	AM
	Unit 2	05-12-2018	04-01-2019	31	AM
	Unit 3	16-01-2019	14-02-2019	30	AM

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