

# **Annexure-1**

## Annual Report on Technical Performance of Kulhal 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 Kulhal 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, 2016-17, 2017-18 (up to 30.09.2017)
- Expected in FY 2017-18 & 2018-19.

### 1.2 Power Station Description

**1.2.1** The Kulhal Power Station with an installed capacity of 30 MW (3X10 MW) is located downstream of the Asan Barrage at a distance of 4.0 km on the power channel which takes off from the Asan Barrage. The Power Station was commissioned in the year 1975. The surface Power Station comprising 3 units of 10 MW each with Kaplan turbines is located on the power channel which terminates in 39.2 m wide and 6.9 m deep fore bay. There are three 30 m long and 4.5 m dia. steel lined penstocks, one for each unit. In case of tripping of machines full discharge gets bye-passed through a 21m wide gated bye pass channel. The water from the tail race flows towards Khara Power Station in UP. The Kulhal Power Station is a low head scheme located on power channel with a design head of 18 m and design discharge of 198 cum.

**1.2.2** There are three generating units having vertical Kaplan turbine directly coupled with synchronous generator. The turbine output is 10.4 MW for a rated net head

of 18 m. The generators are designed for a nominal output of 11.1 MVA with lagging power factor of 0.9 and class “B” insulation.

**1.2.3** This Power Station was commissioned in the year 1975. The power station has been under operation for past 40 years

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

### **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)	153.91	178.52	156.11	139.39	122.31	130.79	140.98
Auxiliary Cons. (%)	0.2%	2.43%	2.45%	2.46%	2.61%	2.31%	2.27%
Transformation/ other losses and consumption (%)	0.5 %						
Net Saleable Energy (MU)	152.83	174.18	152.28	135.96	119.11	127.77	137.78

**1.3.2** From the above table it is evident that gross generation in FY 2016-17 is less than the design energy & same is expected for FY 2017-18 too due to closure of Dakpathar, Asan Barage & Power Channel from 16.03.2017 to 30.04.2017 for works under DRIP.

**1.3.4** The auxiliary and transformation losses in FY 2016-17 are more than the normative level. For FY 2017-18 & FY 2018-19, these are also expected to be more than the normative level. In this regard for investigating the reasons for higher AUX an energy audit was conducted through M/s PCRA (Power Conservation Research Organisation), New Delhi, a Government of India undertaking company. The firm submitted the report on energy guzzlers and transformation losses. The study



observed that auxiliary losses were near to Norms but transformations losses were on higher side.


#### 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 from the FY 2013-14. The petitioner has started computing this factor as per the provisions of the above regulations from FY 2013-14

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 (%)	65 , 65	77.98	74.91	73.29	71.61	69.05	73.95
	67.14						
Planned Outages (Hrs)	NA	2505	2543	2998	2552	3478	2520
Forced Outages (Hrs)	NA	85	9	0	159	672	277

**PAFM:** Kulhal Hydro Power Station achieved the normative plant availability factor determined by the Hon'ble Commission for the FY 2016-17 and is expected to achieve it in FY 2017-18 & 2018-19 as well. A closure of power station was taken on account of DRIP works at Dakpathar barrage and the power channel from 16.03.17 to 30.04.17 which affects the generation and PAFM in FY 2016-17 & 2017-18. Therefore it is requested that actual PAFM achieved may be allowed during the period from 16.03.17 to 30.04.17 to petitioner for recovery of capacity.

  
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The Petitioner does not seek any deviation in NAPAF for the current control period from the norms as determined by Hon'ble Commission in its order.

**Table3: Actual & Expected PAFM (%)**

Actual PAF from 2013-14 to Sept. 2017-18 and anticipated from October 2017 to March 2018														
Sl.No.	Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Average
1	2013-14	65.79	74.61	70.27	99.08	97.78	99.50	93.23	73.07	59.45	62.91	67.14	72.88	77.98
2	2014-15	72.84	81.21	89.46	96.05	94.62	84.87	66.97	58.97	58.69	60.75	64.86	69.57	74.91
3	2015-16	81.01	83.27	81.91	95.51	97.51	84.26	60.59	63.00	59.77	60.31	57.53	54.79	73.29
4	2016-17	59.75	68.33	77.10	93.77	93.45	93.71	79.70	67.14	61.51	54.03	67.14	43.64	71.61
5	2017-18	11.11	66.24	66.22	68.71	100.00	99.56	79.70	67.14	61.51	54.03	67.14	87.28	69.05
6	2018-19	69.85	66.24	66.22	68.71	100.00	99.56	79.70	67.14	61.51	54.03	67.14	87.28	73.95

**1.4.2 Planned Outages:** Planned outages on account of annual/capital maintenance in FY 2015-16 are actual. The Petitioner shall continue to lay emphasis on preventive and planned maintenance of machines for the year 2016-17 and onwards too for better power station availability.

**Table 4: Planned Outages**

FY	Unit	From	To	No. Of Day	Outage Type
2018-19	Unit 1	15-11-2018	19-12-2018	35	AM
	Unit 2	25-12-2018	28-01-2019	35	AM
	Unit 3	03-02-2019	09-03-2019	35	AM

**AM- Annual Maintenance, CM-Capital Maintenance**


  
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