

**Central Electricity Regulatory Commission
New Delhi**

Petition No.251/MP/2015

Coram:

Shri Gireesh B. Pradhan, Chairperson

Shri A.K. Singhal, Member

Shri A.S. Bakshi, Member

Dr. M.K. Iyer, Member

Date of Order: 17.4.2017

In the matter of

Application under Regulation 31(6) of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2014 for recoupment of under-recovered energy charges due to shortfall in energy generation for reasons beyond the control of the generating station during the year 2014-15 in respect of Chamera-III Power Station.

And

In the matter of

NHPC Limited
(A Govt. Of India Enterprise)
NHPC Office Complex,
Sector – 33,
Faridabad –121 003

...Petitioner

Vs

1. Punjab State Power Corporation Ltd
The Mall, Patiala – 147001
2. Haryana Power Utilities
(DHBVNL & UHBVNL)
Shakti Bhawan, Sector VI,
Panchkula- 134019
3. BSES Rajdhani Power Ltd
2nd Floor, B Block, Nehru Place,
New Delhi 110019
4. Uttar Pradesh Power Corporation Ltd
Shakti Bhawan, 14, Ashoka Road,
Lucknow – 226001
5. BSES Yamuna Power Ltd
Shakti Kiran Building, Karkardooma,
Delhi – 110092
6. Rajasthan Rajya Vidyut Vitaran Nigam Ltd.,
Vidyut Bhawan, Janpath,
Jaipur – 302005
7. Tata Power Delhi Distribution Ltd
33 kV Sub-station, Hudson Lines,
Kingsway Camp, Delhi – 110009



8. Jaipur Vidyut Vitaran Nigam Ltd.,
Vidyut Bhawan, Janpath,
Jaipur – 302005

9. Jodhpur Vidyut Vitaran Nigam Ltd.
New Power House, Industrial Area,
Jodhpur-342003

10. Ajmer Vidyut Vitaran Nigam Ltd
Old Power House,
Hatthi Bhatta, Jaipur Road,
Ajmer-305001(Rajasthan)

11. Uttrakhand Power Corporation Ltd
Urja Bhawan, Kanwali Road,
Dehradun- 248001

12. Himachal Pradesh State Electricity Board Ltd
Vidyut Bhawan, Kumar House
Shimla – 171004

13. Power Department
Union Territory of Chandigarh,
Engineering Department, UT Secretariat,
Sector 9D, Chandigarh - 160009

14. Power Development Department (J&K)
Government of J&K,
Mini Secretariat, Jammu–180001

...Respondents

Parties present:

Shri A.K. Pandey, NHPC
Shri Naresh Bansal, NHPC
Shri Piyush Kumar, NHPC
Shri S.K. Agarwal, Advocate, Rajasthan Discoms
Shri S.P. Das, Advocate, Rajasthan Discoms
Shri R.B. Sharma, Advocate, BRPL

ORDER

The petitioner, NHPC Ltd has filed this petition seeking the following relief(s):

(a) As explained in proviso-2 of para-XIV of the petition, the Hon'ble Commission may kindly allow the petitioner to review the energy charge rate (ECR) on the basis of reduced generation of 1006.85 MU against design generation of 1108.17 MU as per regulation 31(6)(a) of CERC Tariff Regulations, 2014.

(b) To allow further revision of energy charge rate (ECR) on the basis of AFC determined by the Hon'ble Commission for the FY 2014-15.

(c) Pass such other and further order / orders as are deemed fit and proper in the facts and circumstances of the case

2. Chamera-III Power Station (the generating station) located in the State of Himachal Pradesh comprises of three units of 77 MW each was declared under commercial operation on



4.7.2012. The approved annual Design Energy (DE) of the generating station is 1108.17 MU and keeping in view the provision of auxiliary losses (1.2%), LADF (1%) and Free Power to the home state (12%), the saleable energy is 952.54 MU

3. Before proceeding, we refer to some of the provisions of the CERC (Terms and Conditions of Tariff), Regulations, 2014 (hereinafter "the 2014 Tariff Regulations") which provide for the methodology for computation of energy charges and billing:

"31(4) the energy charge shall be payable by every beneficiary for the total energy scheduled to be supplied to the beneficiary, excluding free energy, if any, during the calendar month, on ex power plant basis, at the computed energy charge rate. Total Energy charge payable to the generating company for a month shall be:

$(\text{Energy charge rate in ₹/ kWh}) \times \{\text{Scheduled energy (ex-bus) for the month in kWh}\} \times (100 - \text{FEHS}) / 100$ "

"31(5) Energy charge rate (ECR) in Rupees per kWh on ex-power plant basis, for a hydro generating station, shall be determined up to three decimal places based on the following formula, subject to the provisions of clause (7):

$$\text{ECR} = \text{AFC} \times 0.5 \times 10 / \{\text{DE} \times (100 - \text{AUX}) \times (100 - \text{FEHS})\}$$

Where,

DE = Annual design energy specified for the hydro generating station, in MWh, subject to the provision in clause (6) below.

FEHS = Free energy for home State, in per cent, as defined in Regulation 42"

"31(6) In case the actual total energy generated by a hydro generating station during a year is less than the design energy for reasons beyond the control of the generating station, the following treatment shall be applied on a rolling basis on an application filed by the generating company:

a) In case the energy shortfall occurs within ten years from the date of commercial operation of a generating station, the ECR for the year following the year of energy shortfall shall be computed based on the formula specified in clause (5) with the modification that the DE for the year shall be considered as equal to the actual energy generated during the year of the shortfall, till the energy charge shortfall of the previous year has been made up, after which normal ECR shall be applicable:

Provided that in case actual generation from a hydro generating station is less than the design energy for a continuous period of 4 years on account of hydrology factor, the generating station shall approach CEA with relevant hydrology data for revision of design energy of the station.

b) In case the energy shortfall occurs after ten years from the date of commercial operation of a generating station, the following shall apply.

Explanation : Suppose the specified annual design energy for the station is DE MWh, and the actual energy generated during the concerned (first) and the following (second) financial years is A1 and A2 MWh respectively, A1 being less than DE. Then, the design energy to be considered in the formula in clause (5) of these regulations for calculating the ECR for the third financial year shall be moderated as $(A1+A2-DE)$ MWh, subject to a maximum of DE MWh and a minimum of A1 MWh.

(c) Actual energy generated (e.g. A1, A2) shall be arrived at by multiplying the net metered energy sent out from the station by $100 / (100 - \text{AUX})$.



“31(7) In case the energy charge rate (ECR) for a hydro generating station, computed as per clause (5) of this regulation exceeds ninety paise per kWh, and the actual saleable energy in a year exceeds $\{DE \times (100 - AUX) \times (100 - FEHS) / 10000\}$ MWh, the Energy charge for the energy in excess of the above shall be billed at ninety paise per kWh only:

Provided that in a year following a year in which total energy generated was less than the design energy for reasons beyond the control of the generating company, the energy charge rate shall be reduced to ninety paise per kWh after the energy charge shortfall of the previous year has been made up.”

Submissions of the petitioner

4. The petitioner in this petition has submitted as under:

(a) The petitioner wishes to highlight the anomalies in Regulation 31(6), 31(4) and 31(5) of the 2014 Tariff Regulations. Regulation 31(6) allows recovery of full energy charges on the basis of actual generation whereas Regulations 31(4) and 31(5) allows billing/accounting on the basis of scheduled energy which is being reflected in Regional Energy Account (REA) issued by Regional Power Committee. It is clear from Regulation 31(7) that when the scheduled generation exceeds the design energy, the benefit of secondary energy is calculated with respect to schedule energy only.

(b) From the combined reading of the above regulations, it is clear that the methodology used for recovery of energy charges as per Regulation 31(4) and 31(5) and benefit of secondary energy as per Regulation 31(7) are based on scheduled energy, whereas the methodology for recovery of shortfall of generation as per Regulation 31(6) is based on actual generation. Hence, Regulation 31(6) is contrary to Regulations 31(4), 31(5) and 31(7) of the 2014 Tariff Regulations. As per existing regulations, energy accounting & billing is made on the basis of 'scheduled energy' strictly in accordance with Regulations 31(4) and 31(5) and benefit of the secondary energy is also passed on to the beneficiaries strictly in accordance with Regulation 31(7). The shortfall in recovery of energy charges (50 % of A.F.C) is being calculated in line with the above guidelines.

c) To have parity in methodology for energy accounting and billing, to pass on the benefit of secondary energy and recovery of shortfall in energy charges, the actual schedule generation should be considered for recovery of energy charges rather than actual generation mentioned in Regulation 31(6) of the 2014 Tariff Regulations. The Commission is requested to allow the adopted methodology of calculation.

d) Under the above methodology, the calculation of shortfall in energy and under recovery of energy charges is as under:



Design Energy (MU)	Actual Schedule Generation (MU)	Shortfall (MU)	Annual Fixed Charges*	Energy Charges to be recovered (crore)	Energy Charges actually recovered (crore)	Under recovery of Energy Charges (crore)
1	2	3=2-1	4	5=50% of 4	6	7=6-5
1108.17	1006.85	(-101.32)	404.52	202.26	183.22	(-)19.04

*AFC allowed by the Commission for 2013-14 vide order dated 23.3.2015 in Petition No. 26/GT/2013 duly grossed up at MAT rate of 2013-14.

e) The under recovery of ₹19.04 crore (corresponding to less generation of 101.32 MU) has been computed for the year 2014-15 based on the tariff approved by the Commission in 2013-14 (in absence of approved tariff for 2014-15) as per Regulation 7 (8)(i) of the 2014 Tariff Regulations. The petition for truing-up of tariff upto 31.03.2014 and tariff petition for 2014-19 of the generating station have already been submitted and tariff order is yet to be issued. Accordingly the under recovered charges mentioned above are subject to change once the AFC for 2014-15 is finalized by the Commission. The petitioner may be permitted to make corresponding adjustment in the under recovered AFC figures and recovery of the same from the beneficiaries as and when the same is finalized by the Commission.

5. Based on the above submissions, the present application has been submitted as the actual schedule generation of the generating station during 2014-15 was less than its design energy for reasons beyond the control of the generating station. The month wise break-up of the actual schedule generation *vis-a-vis* the design energy is tabulated below:

Sl. No.	Month	Design Energy (MU)	Schedule Energy (Ex-Bus)* (MU)	Actual Scheduled Generation (MU)	Actual Generation (MU)(G.T)	Shortfall/ Excess (MU)	Actual PAF (%)
1	2	3	4	5=4 / [1-Aux (%)]	6	7=5-3	8
1	Apr-14	80.53	65.24	66.03	67.06	-14.50	101.22
2	May-14	155.31	136.26	137.92	138.69	-17.39	100.45
3	Jun-14	154.46	163.84	165.83	167.99	11.37	100.34
4	Jul-14	161.89	164.39	166.39	167.86	4.49	97.29
5	Aug-14	163.27	152.20	154.05	154.97	-9.22	101.22
6	Sep-14	119.78	114.63	116.02	117.34	-3.76	101.22
7	Oct-14	78.79	50.84	51.45	52.50	-27.34	100.67
8	Nov-14	52.85	26.65	26.97	27.41	-25.88	100.98
9	Dec-14	38.05	20.65	20.90	22.14	-17.15	77.97
10	Jan-15	30.69	16.06	16.26	17.37	-14.43	69.21
11	Feb-15	24.74	25.36	25.67	26.98	0.93	91.37
12	Mar-15	47.78	58.65	59.36	60.46	11.58	102.53
Total		1108.17	994.76	1006.85	1020.77	-101.32	95.34

*As per REA issued by NRPC.

6. The petitioner has submitted that it is clear from the above submission that the actual shortfall in generation is to the tune of 101.32 MU. Also from the scenario explained above, it is clear that the reasons for shortfall in the generation and corresponding under recovery of energy charges were exclusively beyond the control of the generating station. It has further submitted that Regulation



31(6)(a) provides for recovery of energy charges on account of shortfall in generation within 10 years from the date of commercial operation. The petitioner has stated that as per the methodology specified in the regulation, the under recovered energy charges due to reduced generation during 2014-15 may be permitted to be recovered from the beneficiaries in the year 2015-16. Accordingly, the petitioner has prayed that it may be allowed to revise the energy charges for the year 2015-16 on the basis of actual scheduled generation of 1006.85 MU during 2014-15 against design energy of 1108.17 MU in line with the Regulation 31(6)(a) of the 2014 Tariff Regulations.

7. The matter was heard on 4.2.2016 and the Commission after hearing the parties admitted the petition and directed the petitioner to submit additional information as under:

- (a) *Data of "Average Actual Inflows", as submitted in the petition for the year 2014- 15, certified from CEA/CWC;*
- (b) *Rainfall data for the year 2014-15 reported by Indian Metrological Department for the district in which the plant is situated and for the adjoin districts.*
- (c) *Reconciliation statement of billing for the period 2014-15 clearly indicating the energy scheduled, energy charges billed, the shortfall in recovery of energy charges and any other detail required to arrive at the amount of shortfall as indicated in the petition.*
- (d) *Planned and forced machine outage data certified by CEA/NRLDC and its correlation with energy generation data vizaviz available average inflows during the period of such outage.*

8. Thereafter, the matter was heard on 31.3.2016 and the Commission after directing the petitioner to submit additional information on the following, reserved orders in the petition:

- (a) *The claim of NHPC is based on the "Actual Inflow Data" measured by the petitioner itself at the generating station. Therefore, its certification by C.W.C is one of the conditions to prove that energy shortfall was due to reasons not attributable to the petitioner. The actual data certified by C.W.C be submitted.*
- (b) *Planned and forced outage data (unit-wise and month-wise) during 2014- 15 along with its co-relation with energy generation.*
- (c) *In addition to certification of the outage data by C.E.A., data certified from NRLDC be submitted.*

9. In compliance with the above directions, the petitioner has submitted the additional information vide affidavit dated 9.3.2016, 7.5.2016, 3.6.2016 and 21.12.2016 and has served copies of the same on the respondents. The respondents, UPPCL, discoms of Rajasthan (JVVNL, JdVVNL and AVVNL) and BRPL have filed their replies and the petitioner has submitted its rejoinder to the said replies.



Submissions of Respondents

UPPCL

10. The respondent, UPPCL has submitted that the Energy Sent Out (ESO) from the bus bars of the power house is the energy which is scheduled amongst the beneficiaries. i.e ESO = Energy generated - losses from the generator to the bus bar of the switchyard of the power house. It has therefore submitted that the shortfall in energy generation as submitted by the petitioner is design energy – (energy generated – losses) = design energy – energy generated + losses, which indicates that the petitioner wants to get paid for losses also. The respondent has also submitted that the losses due to auxiliary consumption and FEHS have already been factored in the energy charge rate defined at the outgoing terminal of the bus bar at the sending end of the power house and therefore, the claim of the petitioner to derive shortage of energy generated by deducting the scheduled energy from the designed energy is not justified and is not tenable. It has further submitted that the claim for recovery of electricity charges shown by the petitioner is patently wrong and is liable to be rejected on merits. The respondent has further submitted that the confusion created by the petitioner as regards inconsistency between Regulation 31 (6) and Regulations 31 (4), 31(5) and 31(7) can be cleared if it can be proved that the generating company gets fully paid for the generation using actual energy as per Regulation 31(6) as well as using scheduled energy as per Regulation 31(4). Based on a derivation, the respondent has submitted that there remains absolutely no doubt that Regulation 31(6), Regulation 31(4) and Regulation 31(5) are consistent and the claim of the petitioner for payment of shortfall in billing on the basis of scheduled energy may be denied and may not be allowed.

Discoms of Rajasthan

11. The respondents 8, 9 and 11, discoms of Rajasthan have submitted that Regulation 31(6) envisages two types of situations, namely, one wherein energy shortfall occurs within ten years from the date of commercial operation and another when energy shortfall occurs after ten years. The respondents while pointing out that the reasons must be beyond the control of generating company have submitted that the petitioner in its application has avoided specific reference to those reasons which were beyond their control. They have also submitted that the shortfall in



generation may be due to inefficiency of the generating station and cannot be rewarded, more so when no reasons have been spelt out in the petition in categorical terms.

BRPL

12. The respondent BRPL has submitted that the treatment of ECR is required to be given for the following year of energy shortfall and the petitioner has given the treatment in the ECR in the same year (2014-15) in which the shortfall has been noted and not in the following year. It has further submitted that the contention of the petitioner that the actual scheduled generation should be considered for recovery of energy charges rather than actual generation in terms of Regulation 31 (6) is misleading as there is no contradiction in Regulation 31 (6) and Regulation 31 (4), 31(5) and 31(7) of the 2014 Tariff Regulations. Referring to the judgment of the Tribunal dated 1.7.2014 in Appeal No. 169 of 2013 (GRIDCO v M/s Bhushan Power and Steel Limited & others), the respondent has stated that the Commission has no power to add, substitute or delete any provisions of the Regulation and hence the attempt of the petitioner to substitute actual scheduled generation against actual generation may not be allowed.

Rejoinder of Petitioner

13. The petitioner vide its rejoinder to the replies of the respondents above has mainly submitted that the scheduled energy from bus bar consists of scheduled energy to the beneficiaries including 12% free energy to home state and 1% LADF (if applicable) and does not include auxiliary consumption of the generating station and deviation from schedule energy as per grid requirement. The petitioner has further submitted that the actual scheduled generation is derived by adding normative auxiliary consumption in the scheduled generation to make it comparable with design energy. It has also submitted that the calculation submitted by the respondent, UPPCL is not correct as it has assumed scheduled energy and ESO as same which is not the case as the sent out energy is sum of scheduled energy and deviations. The petitioner has clarified that the formula indicated under Regulation 31(4) of the 2014 Tariff Regulations for recovery of monthly energy charge is based on scheduled energy (ex bus) rather than actual transmitted energy (ex bus) and this formula mainly implies that the shortfall in recovery of energy charge is to be recovered on the basis of scheduled energy rather than the actual transmitted energy (ex bus) as insisted by the



respondent. As regards submissions of the discoms of Rajasthan, the petitioner has clarified that billing as per Regulation 31(4) and ECR calculation as per Regulation 31(5) is on the basis of scheduled energy and secondary energy calculation as per Regulation 31(7) is also after achieving saleable design energy. The petitioner has however submitted that as per Regulation 31(6) shortfall is to be calculated with respect to actual generation which includes schedule as well as deviated energy. The petitioner has further pointed out that the inconsistency in these regulations is also clear from the Statement of Reasons for the 2009 Tariff Regulations. The petitioner has added that the reason for energy shortfall is hydrological failure resulting into less actual inflows and hence the under recovery of energy charges is only due to reasons beyond the control of the generator. As regards the contention of the respondent BRPL, the petitioner has clarified that once the appropriate order is notified, the recovery shall be effected in the year 2015-16 by modifying the ECR of 2015-16 as per Regulation 6(a) of the 2014 Tariff Regulations. It has further submitted that in case shortfall is determined on the basis of actual generation, there will be gap of revenue due to gap in generation between actual and scheduled generation.

Analysis and Decision

14. We have considered the submissions of the petitioner and the respondents. While the petitioner in support of its prayer has submitted that there is inconsistency in Regulation 31(4), 31(5) and 31(7) with Regulation 31(6) of the 2014 Tariff Regulations and shortfall is to be calculated with respect to actual generation which includes scheduled as well as deviated energy as per Regulation 31(6). However, the respondents have submitted that there is no inconsistency in these regulations and the actual scheduled generation should be considered for recovery of energy charges. In our considered view, the modified design energy to be considered for the purpose of recovery of energy charge shortfall during next year has been set as actual generation from the project as the same represents the true/realized energy potential of the actual water inflows during the year of energy shortfall. Moreover, once the extent of energy charge shortfall based on scheduled generation gets determined, the modified design energy for the next year only decides the number of days in which the recovery would get completed. Accordingly, we find no inconsistency in these regulations and therefore, the submission of the petitioner is rejected.



15. The petitioner has also submitted that due to low generation, the generating station could recover only ₹183.22 crore as Energy charges as against the maximum recoverable energy charges of ₹202.26 crore in terms of the annual fixed charges approved by the Commission for the year 2013-14. It has also submitted that in the absence of approved annual fixed charges for the year 2014-15, the charges for 2013-14 are being billed during the period 2014-15. In our view, low generation in comparison to design energy in a hydro- generating station can be attributable to the following reasons:

- i) Low inflows in comparison to the design inflows associated with design year.
- ii) Prolonged planned/forced outage of machines.
- iii) Inefficient operation of the plant which may include low overall efficiency of turbine and generator, high auxiliary power consumption, high losses in water conductor system etc.
- iv) Non-utilization of maximum power potential of actual inflows due to excessive spillage.

Low Inflows

16. The rainfall data issued by the Indian Meteorological Department (IMD) in respect of the Chamba District for the period 2009-13.-. It is noticed that the data indicates low rainfall in comparison to long period averages. Further, the rainfall data for the year 2014 obtained from the website of IMD also indicates to a lower rainfall in comparison to long period averages. As such, the overall indication is towards low inflows during the year 2014-15 in comparison to the design inflows associated with design year. The petitioner was directed to submit the actual inflow data certified by CWC and it is noticed from the letter of CWC dated 9.12.2016 that CWC has not categorically verified the inflow data of the petitioner by pointing out that it does not have its G & D site on river Ravi. However, in the said letter, CWC has pointed out the following:

"However, it is understood that Chamera-II HEP is in operation in the downstream side of the Chamera-III HEP on River Ravi and Catchment areas of Chamera-II and Chamera-III are 2203 sqkm and 2593 sqkm respectively. As the difference of catchment areas of the two projects is around 390 sqkm, the inflow of one of the project can be utilized to estimate the inflows at the other project using general hydrological concepts. Keeping this in view, an effort has been made to check the consistency of inflow series of both the projects based on the inflow data provided by the NHPC for the years 2012-2015. In general it is seen that inflow series of Chamera-III HEP for the years 2014 & 2015 is found to be consistent with the inflows of Chamera-II HEP."



The observation of CWC as above points out that the inflows as furnished by the petitioner for the years 2014 and 2015 in respect of this project (Chamera-III HEP) are consistent with the data reported for the downstream project namely Chamera-II HEP and as such are reliable.

Prolonged planned/ forced outage of machines

17. In order to rule out the prolonged planned/ forced outage of machines and their impact on energy generation and in order to understand whether outage of a machine in anyway affected the energy generation by non- utilization of available water flow, the Commission vide ROP of the hearing dated 31.3.2016 had directed the petitioner to furnish the planned and forced outage data for the year 2014-15 along with its correlation with its energy generation. In response, the petitioner vide affidavit dated 7.5.2016 has submitted that there has been 53 instances of forced outages and planned outages during the year 2014-15. In addition to this, 3 instances of forced/planned outages have been enlisted by NRLDC which includes (i) forced outage of 19 minutes of one Unit (ii) plant outage for one day for reservoir flushing and (iii) unit outage for 58 minutes due to transmission constraints. Accordingly, we have examined 56 cases of planned and forced outages as under:

a) It is noticed that planned outages of individual machines in 42 cases have been carried out during the months of December 2014 and January 2015 which are lean months during which available water inflow can be utilized for energy generation by available machines which are not under planned outage. As such, it is noticed that the planned outage of machines during the lean months had not affected the energy generation and the energy shortfall is purely on account of low inflows. The petitioner has also taken planned outage of one machine (unit-2) on 11.7.2014 for 44 minutes and planned outage of one machine (unit-3) for 51 minutes on 26.7.2014 to cater to the problem of "High Governor Oil Temperature". As the month of July is the high inflow month, any outage will have direct impact on energy generation.

b) In order to estimate energy shortfall due to forced outages and planned outages, calculations have been made and enclosed as **Annexure-I** to this order. Based on the calculations, the results in respect of 56 cases are summarized as under:



Design Energy (MUs) (a)	Maximum possible generation at G.T with available inflows without outages and with use of installed capacity during high inflow period (MUs) (b)	Actual generation (MUs) (c)	Shortfall w.r.t to DE (d)=(a)-(c) (MUs)	Shortfall w.r.t to maximum possible generation (e)=(b)-(c) (MUs)
97.21	76.39	72.22	24.99	4.17

c) The less generation of 4.17 MUs as above as compared to the maximum possible generation with actual inflow can be attributed to planned and forced outages. On overall basis, this represents energy loss of only 0.38% of design energy and the same is ignored. Accordingly, in our view, planned and forced outages had negligible impact on energy shortfall during the year 2014-15. As such, the energy shortfall as compared to the design energy is solely attributable to low inflows.

Inefficient operation of the plant and non-utilization of maximum power potential of actual inflows due to excessive spillage

18. In order to assess maximum possible annual generation with available actual inflows as submitted by the petitioner, calculations have been made and is enclosed as **annexure-2** to this order. The calculations made as above include the scenarios as under:

- (i) Maximum possible generation with 95% machine availability as taken by CEA for deciding design energy of the hydro project.
- (ii) Maximum possible generation with 100% machine availability.
- (iii) Maximum possible generation with 110% machine availability which represents overload capacity of hydro generators.

19. Accordingly, the calculations annexed indicate the following results:

Maximum possible generation at G.T with actual inflows(MUs) against actual generation of 1020.77 MUs at G.T		
with 95% machine availability during high inflow period	with 100% machine availability during high inflow period	with 110% machine availability during high inflow period
999.84	1025.07	1075.52

20. It is clear from the above results that actual generation by the petitioner in 2014-15 i.e 1020.77 MUs is more than maximum possible generation with actual inflows at G.T with 95%



machine availability during high inflow season. The machine availability of 95% has been considered in line with calculation of design energy corresponding to design inflows during 90% dependable year. It is also evident that the petitioner has not utilized the overload capacity during high inflow period. Section 6.5(12) of the Indian Electricity grid Code (IEGC) stipulates that the maximum capacity for the generating station declared for the day shall be equal to the installed capacity including overload capability, if any, minus auxiliary consumption, corrected for the reservoir level. As such in case the petitioner had used the overload capacity during high inflow period, it could have generated 1071.35 MUs (1075.52 - 4.17) after accounting for energy loss of 4.17MUs during planned and forced outages.

21. The petitioner was directed on 3.3.2017 to clarify as to why the available overload capacity of 10% was not used during high inflow period and the petitioner on 6.3.2017 had clarified as under:

"During Monsoon period, Reservoir is maintained at MDDL as per Reservoir Operation Manual to ensure the useful life of reservoir against sedimentation. Operation of generating units when Reservoir is at MDDL and High TRT level limits overload capability.

Further, as per Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 (Clause 5.2 f), Chamera-III is operated under restricted governor mode of operation (RGMO). Therefore, the declaration of the machine for the day is limited to installed capacity to have sufficient margin for RGMO."

22. It is observed from the website of NRLDC that the capacity corresponding to installed capacity is declared by the petitioner for all its generating stations during the high inflow periods leaving the overload capacity for meeting the primary response as per stipulations of IEGC. As such, instead of earning secondary energy benefits, the petitioner has preferred to help the grid in case of grid contingency. Accordingly, we are of the considered view that imposing continuous overload operation during high inflow period would not be correct. It is further observed that actual generation of the generating station of the petitioner in 2014-15 is 1020.77 MUs which is almost equal to 1020.90 MUs (1025.07-4.17) and represents the maximum possible generation with 100% machine availability during high inflow season and reduced by minor energy loss during planned and forced outages. Based on the above deliberations, it can be concluded that the petitioner has completely utilized the energy potential of the available flows during the year and the entire energy shortfall in comparison to



Design Energy is attributable to low inflows in comparison to design year inflows. Accordingly, in terms of Regulation 31(6) (a) & 31 (6)(c) of the 2014 Tariff Regulations, we decide that the design energy for the year 2015-16 is 1025.531 MUs (1013.225/0.988) till energy charge shortfall of ₹19.04 crore for the year 2014-15 is made up by the petitioner. The figure of 1013.225 MUs represents the net metered energy sent out and the shortfall in energy charge is subject to revision based on annual fixed charges to be approved for the year 2014-15.

23. Petition No. 251/MP/2015 is disposed of in terms of above.

-Sd/-
(Dr. M.K. Iyer)
Member

-Sd/-
(A.S.Bakshi)
Member

-Sd/-
(A.K.Singhal)
Member

-Sd/-
(Gireesh B.Pradhan)
Chairperson



Petition No.		251/MP/2015							<u>Annexure-I</u>
Chamera-III		Capacity (3x77 =231 MW)							
Sl.No.	Date	Actual Inflow (cumecs)	Mandatory Release of Water based on latest notification dated 26.11.2011 of Govt. of H.P (cumecs)	Actual Inflow available for Power Generation (cumecs)	Power Potential of Actual Inflow (MW)	Power Potential Restricted to 231 (MW)	Maximum Possible generation based on Power Potential of Actual Inflow available for Power Generation (MUs)	Design Energy (DE) (MUs)	Actual Generation at GT (MUs)
1	11-04-2014	53.73	2.85	50.88	91.84	91.84	2.20	2.81	2.22
2	25-4-2014	69.45	2.85	66.6	120.22	120.22	2.89	3.30	2.91
2A	24-5-2014	116.7	2.85	113.85	205.50	205.50	4.93	5.267	4.84
2B	07-01-2014	265.4	2.85	262.55	473.91	231.00	5.54	5.129	0.03
3	03-07-2014	290.04	2.85	287.19	518.39	231.00	5.54	5.13	5.36
4	07-07-2014	269.41	2.85	266.56	481.15	231.00	5.54	5.13	5.55
5	11-07-2014	316.55	2.85	313.7	566.24	231.00	5.54	5.27	5.59
6	26-7-2014	292.56	2.85	289.71	522.94	231.00	5.54	5.27	5.46
7	13-8-2014	174.22	2.85	171.37	309.33	231.00	5.54	5.27	5.56
8	29-10-2014	33.37	2.85	30.52	55.09	55.09	1.32	2.20	1.35
9	11-11-2014	26	2.85	23.15	41.79	41.79	1.00	1.79	1.02
10	12-02-2014	18.95	2.85	16.1	29.06	29.06	0.70	1.37	0.71
11	12-03-2014	21.49	2.85	18.64	33.65	33.65	0.81	1.37	0.82
12	12-08-2014	20.08	2.85	17.23	31.10	31.10	0.75	1.37	0.76
13	12-09-2014	18.92	2.85	16.07	29.01	29.01	0.70	1.37	0.71
14	12-10-2014	18.86	2.85	16.01	28.90	28.90	0.69	1.37	0.70
15	12-11-2014	18.31	2.85	15.46	27.91	27.91	0.67	1.27	0.68
16	12-12-2014	18.84	2.85	15.99	28.86	28.86	0.69	1.27	0.70
17	13-12-2014	19.35	2.85	16.5	29.78	29.78	0.71	1.27	0.73
18	14-12-2014	17.14	2.85	14.29	25.79	25.79	0.62	1.27	0.63
19	15-12-2014	18.69	2.85	15.84	28.59	28.59	0.69	1.27	0.70
20	16-12-2014	19.27	2.85	16.42	29.64	29.64	0.71	1.27	0.72
21	20-12-2014	18.79	2.85	15.94	28.77	28.77	0.69	1.27	0.70
22	21-12-2014	18.70	2.85	15.85	28.61	28.61	0.69	1.06	0.70
23	22-12-2014	18.89	2.85	16.04	28.95	28.95	0.69	1.06	0.71
24	23-12-2014	19.17	2.85	16.32	29.46	29.46	0.71	1.06	0.72
25	24-12-2014	18.52	2.85	15.67	28.28	28.28	0.68	1.06	0.69
26	25-12-2014	18.81	2.85	15.96	28.81	28.81	0.69	1.06	0.70
27	26-12-2014	19.18	2.85	16.33	29.48	29.48	0.71	1.06	0.72
28	27-12-2014	18.45	2.85	15.6	28.16	28.16	0.68	1.06	0.69
29	28-12-2014	18.47	2.85	15.62	28.19	28.19	0.68	1.06	0.69
30	29-12-2014	19.14	2.85	16.29	29.40	29.40	0.71	1.06	0.72



31	30-12-2014	19.15	2.85	16.3	29.42	29.42	0.71	1.06	0.72
32	31-12-2014	16.05	2.85	13.2	23.83	23.83	0.57	1.06	0.59
33	01-01-2015	17.47	2.85	14.62	26.39	26.39	0.63	1.11	0.65
34	01-02-2015	16.85	2.85	14	25.27	25.27	0.61	1.11	0.62
35	01-03-2015	16.31	2.85	13.46	24.30	24.30	0.58	1.11	0.59
36	01-04-2015	16.06	2.85	13.21	23.84	23.84	0.57	1.11	0.58
37	01-05-2015	15.71	2.85	12.86	23.21	23.21	0.56	1.11	0.56
38	01-06-2015	16.70	2.85	13.85	25.00	25.00	0.60	1.11	0.61
39	01-07-2015	16.59	2.85	13.74	24.80	24.80	0.60	1.11	0.61
40	01-08-2015	16.50	2.85	13.65	24.64	24.64	0.59	1.11	0.60
41	01-09-2015	16.57	2.85	13.72	24.77	24.77	0.59	1.11	0.60
42	01-10-2015	16.43	2.85	13.58	24.51	24.51	0.59	1.11	0.60
43	01-11-2015	15.77	2.85	12.92	23.32	23.32	0.56	0.98	0.57
44	01-12-2015	16.45	2.85	13.6	24.55	24.55	0.59	0.98	0.60
45	13-1-2015	15.91	2.85	13.06	23.57	23.57	0.57	0.98	0.59
46	14-1-2015	16.13	2.85	13.28	23.97	23.97	0.58	0.98	0.58
47	15-1-2015	16.32	2.85	13.47	24.31	24.31	0.58	0.98	0.59
48	16-1-2015	16.07	2.85	13.22	23.86	23.86	0.57	0.98	0.58
49	17-1-2015	16.55	2.85	13.7	24.73	24.73	0.59	0.98	0.60
50	18-1-2015	16.20	2.85	13.35	24.10	24.10	0.58	0.98	0.59
51	19-1-2015	15.38	2.85	12.53	22.62	22.62	0.54	0.98	0.56
52	21-2-2015	31.63	2.85	28.78	51.95	51.95	1.25	0.80	1.27
52C	03-02-2015	37.1	2.85	34.239	61.80	61.80	1.48	0.97	2.52
53	14-3-2015	26.78	2.85	23.93	43.19	43.19	1.04	1.57	1.05
							76.39	97.21	72.22



Chamera-III	Calculation of Design Energy & Actual generation based on actual inflows for the year 2014-15						95%	100%	110%	<u>Annexure-2</u>						
Petition No.	251/MP/2015								219.45	231	254.10					
	Capacity (3*77)	231	MW	Design Head	200	meter										
	Design Discharge	128.1	Cumecs	Overall Efficiency	92%											
	Mandatory release of water based on latest notification dated 26.11.2011 of Govt. of H.P.		2.85 cumecs													
		No. of Days	Average design inflow available for generation (Cumecs)	Power (MW)	Power limited to 95% of 231	DE based on Design flow	Average Actual Inflow (Cumecs)	Average Spillage (Cumecs)	Average Inflows After Mandatory Release	Power generated on Actual Inflows	Power limited to 95% of 231	DE based on Actual Flow & 95% of 231 MW	Power Limited to 100% of 231 MW	DE based on 100% of 231 MW	Power limited to 110% of 231 i.e 254.10 MW	DE based on 110% of 231 MW
April	I	10	44.8	80.87	80.87	19.41	44.9	0.0	42.0	75.87	75.87	18.21	75.87	18.21	75.87	18.21
	II	10	64.9	117.15	117.15	28.12	48.4	0.0	45.6	82.22	82.22	19.73	82.22	19.73	82.22	19.73
	III	10	76.2	137.54	137.54	33.01	68.3	0.0	65.5	118.21	118.21	28.37	118.21	28.37	118.21	28.37
May	I	10	103.2	186.28	186.28	44.71	109.3	0.0	106.5	192.21	192.21	46.13	192.21	46.13	192.21	46.13
	II	10	182.1	328.70	219.45	52.67	93.6	0.0	90.8	163.81	163.81	39.31	163.81	39.31	163.81	39.31
	III	11	162.1	292.60	219.45	57.93	116.7	6.6	113.8	205.49	205.49	54.25	205.49	54.25	205.49	54.25
June	I	10	188.9	340.97	219.45	52.67	220.8	94.6	217.9	393.32	219.45	52.67	231.00	55.44	254.10	60.98
	II	10	132.4	238.99	219.45	52.67	335.9	206.9	333.0	601.13	219.45	52.67	231.00	55.44	254.10	60.98
	III	10	113.4	204.69	204.69	49.13	231.8	103.5	229.0	413.32	219.45	52.67	231.00	55.44	254.10	60.98



July	I	10	118.4	213.72	213.72	51.29	265.4	150.2	262.5	473.90	219.45	52.67	231.00	55.44	254.10	60.98
	II	10	138.6	250.18	219.45	52.67	334.3	207.3	331.5	598.29	219.45	52.67	231.00	55.44	254.10	60.98
	III	11	211.1	381.04	219.45	57.93	286.1	159.4	283.2	511.21	219.45	57.93	231.00	60.98	254.10	67.08
August	I	10	146.3	264.08	219.45	52.67	178.8	52.1	175.9	317.51	219.45	52.67	231.00	55.44	254.10	60.98
	II	10	124.04	223.90	219.45	52.67	141.4	15.2	138.6	250.14	219.45	52.67	231.00	55.44	254.10	60.98
	III	11	135.6	244.76	219.45	57.93	98.4	0.0	95.5	172.45	172.45	45.53	172.45	45.53	172.45	45.53
September	I	10	107.5	194.04	194.04	46.57	218.0	101.3	215.2	388.38	219.45	52.67	231.00	55.44	254.10	60.98
	II	10	90.3	163.00	163.00	39.12	86.9	0.0	84.1	151.80	151.80	36.43	151.80	36.43	151.80	36.43
	III	10	78.7	142.06	142.06	34.09	69.9	0.0	67.0	120.96	120.96	29.03	120.96	29.03	120.96	29.03
October	I	10	68.4	123.46	123.46	29.63	56.4	0.0	53.5	96.58	96.58	23.18	96.58	23.18	96.58	23.18
	II	10	57.6	103.97	103.97	24.95	36.6	0.0	33.7	60.86	60.86	14.61	60.86	14.61	60.86	14.61
	III	11	50.8	91.70	91.70	24.21	32.0	0.0	29.2	52.66	52.66	13.90	52.66	13.90	52.66	13.90
November	I	10	45.4	81.95	81.95	19.67	27.2	0.0	24.4	44.02	44.02	10.56	44.02	10.56	44.02	10.56
	II	10	41.3	74.55	74.55	17.89	23.5	0.0	20.7	37.32	37.32	8.96	37.32	8.96	37.32	8.96
	III	10	35.3	63.72	63.72	15.29	20.1	0.0	17.2	31.12	31.12	7.47	31.12	7.47	31.12	7.47
December	I	10	31.7	57.22	57.22	13.73	19.8	0.0	16.9	30.51	30.51	7.32	30.51	7.32	30.51	7.32
	II	10	29.3	52.89	52.89	12.69	19.0	0.0	16.1	29.14	29.14	6.99	29.14	6.99	29.14	6.99
	III	11	24.4	44.04	44.04	11.63	18.6	0.0	15.7	28.42	28.42	7.50	28.42	7.50	28.42	7.50
January	I	10	25.6	46.21	46.21	11.09	16.5	0.0	13.7	24.67	24.67	5.92	24.67	5.92	24.67	5.92
	II	10	22.7	40.97	40.97	9.83	15.9	0.0	13.1	23.63	23.63	5.67	23.63	5.67	23.63	5.67
	III	11	20.5	37.00	37.00	9.77	14.3	0.0	11.5	20.75	20.75	5.48	20.75	5.48	20.75	5.48



February	I	10	21.1	38.09	38.09	9.14	18.5	0.0	15.7	28.31	28.31	6.79	28.31	6.79	28.31	6.79
	II	10	21.3	38.45	38.45	9.23	19.3	0.0	16.5	29.70	29.70	7.13	29.70	7.13	29.70	7.13
	III	8	18.4	33.21	33.21	6.38	39.1	0.0	36.3	65.48	65.48	12.57	65.48	12.57	65.48	12.57
March	I	10	22.4	40.43	40.43	9.70	37.1	0.0	34.2	61.80	61.80	14.83	61.80	14.83	61.80	14.83
	II	10	36.2	65.34	65.34	15.68	34.7	0.0	31.9	57.56	57.56	13.81	57.56	13.81	57.56	13.81
	III	11	47	84.84	84.84	22.40	67.6	0.0	64.8	116.90	116.90	30.86	116.90	30.86	116.90	30.86
Total						1108.17						999.84		1025.07		1075.52

