CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

Petition No. 87/MP/2014

Coram:
Shri Gireesh B. Pradhan, Chairperson
Shri M. Deena Dayalan, Member
Shri A.K.Singhal, Member

Date of Hearing : **29.5.2014**
Date of Order : 19.6.2014

In the matter of

Petition seeking the Commission`s permission to allow extension of the period for injection of infirm power for testing including full load testing of Unit-IV (660 MW) of Barh STPP (Stage-II, 2X660 MW), beyond six months from initial synchronization.

And
In the matter of

NTPC Limited,
NTPC Bhawan,Core-7, Scope Complex,
7, Institutional Area, Lodhi Road, New Delhi-110 003. **...Petitioner**

Vs

Power System Operation Corporation Ltd.
B-9, Qutab Institutional Area,
Katwaria Sarai, New Delhi-110 016 …..**Respondent**

Parties present:

Shri Ajay Dua, NTPC
Shri A.S.Pandey, NTPC
Shri S.K.P. Singh, NTPC
Ms. Joyti Prasad, POSOCO
Ms. Aliba Zaidi, POSOCO

ORDER

This petition has been filed by the petitioner, NTPC Ltd. under Clause (7) of Regulation 8 of the Central Electricity Regulatory Commission (Grant of

connectivity, Long-term Access and Medium-term Open access in inter-state transmission and related matters) Regulations, 2009 and Central Electricity Regulatory Commission (Unscheduled interchange charges and related matters) Regulations, 2012 with the following prayers:

> "(a) Allow the petitioner extension of time for injection of infirm power for testing including full load testing by the Barh Unit# IV, beyond six months up to 21.8.2014; and
>
> (b) Pass any other order as it may deem fit in the circumstances above."

2. The first unit (Unit-IV) of Barh Super Thermal Power Station, Stage-II (660 MW) (Project) has already been test synchronized on 22.11.2013 after clearance from the ERLDC. The Unit-IV attained full load on 30.11.2013 with designated fuel firing after making ready all necessary systems for sustained operation. The Unit-IV was expected to be declared on commercial operation by March, 2014. However, due to multiple failure in the weld joint of Boiler tubes, Unit-IV could not be declared under commercial operation and the generating station continues to inject infirm power due to non-declaration of commercial operation.

3. The petitioner in this petition, while praying for extension of time for testing and full load testing and consequent injection of infirm power, has mainly submitted as under:

(a) There have been repetitive failure of T23 grade tube weld joints of the membrane panels of the roof and floor and first passes rear hanger

tubes of the U #4 Boiler. The T23 grade tube material weld joints have shown peculiar behavior of cracking which was found when boiler was cooled down after operation at rated temperatures and pressure, which has been a surprise to the OEM i.e. M/s ALSTOM. The cracks in the weld joints of T23 developed when the boiler cooled after unit shut down after operation. The situation has been further aggravated due to increase in number of T23 joints because of insertion of spool pieces for repair of each of the failed joints resulting in increase in the number of T23 weld joints.

(b) The Boiler of Unit-IV is the first super critical 660 MW boiler indigenously manufactured and supplied by BHEL in technological collaboration with ALSTOM. A wide range of alloy steels such as T12, T22, T23 and T91 have been used in manufacturing of pressure part components to meet the technical requirement of super critical boiler operating with domestic coal having high ash content. Among all the different grades of alloy steel used, T23 material is relatively new. Approximately, 3500 number of T23 tube weld joints were introduced for field welding (joints done at site). BHEL was to establish the welding and post weld heat treatment process at site condition to deal with peculiar metallurgy of this material. as the T23 tube joints have never been used before in BHEL boilers.

(c) During welding of joints (T23 tubes] at site, Radiography Test (RT) and Post Weld Heat Treatment (PWHT) process, a number of problems were faced and accordingly, welding procedure/ PWHT procedures were reviewed and revised after number of discussions/ deliberations between NTPC, BHEL and ALSTOM to overcome the weld joint failures/ leakage problems. The petitioner has enumerated the summary of T23 joints repair as under:

SN	Ckt. No.	Original Scope **(Joints)**	December 2013		December 2013 to April, 2014							
			HyT		RT Failure	PWHT Failure		HyT	HyT	Visual	HyT	HT
			3/12	24/12		High hardness	Cut due to water	30/3	12/4	21/4	24/4	25/4
1	S03-S04	204	21	26	18	21	34	6	1	0	1	0
2	S04-S05	204	15	25	31	4	39	5	0	0	0	0
3	S07-S08	108	0	20	33	0	0	1	0	0	0	0
4	S08-S08TO	108	0	2	38	2	0	2	0	0	0	0
TOTAL		**624**	**36**	**73**	**120**	**27**	**73**	**14**	**1**	**0**	**1**	**0**
5	Hanger	**136**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**2**	**2**	**103***

* Defective joints welding under progress.

(d) After conducting extensive repairs of T 23 joints over a period of three months i.e December 2013 to March 2013, petitioner-company proceeded to declare unit on commercial operation w.e.f. 28.3.2014 at 00.00 hrs and informed ERLDC/beneficiaries accordingly. The Unit-IV was synchronized on 26.3.2014 but was forced to be taken under shutdown on 28.3.2014 for attending T23 tube leakages.

(e) After repair of failed joints, Unit-IV of the project was again synchronized on 8.4.2014. However, due to boiler tube leakage in T23 tube of Hanger tubes, it was forced to shut down. Subsequently, Unit was again synchronized on 15.4.2014 but due to leakage of Hanger Tubes, once again it was taken under shutdown. Due to repeated failure of weld joints of new material T23 used for Boiler tubes, unit could not achieve COD.

(f) After inspection and analysis, hardness test of all joints of Hanger Tubes were proposed to be carried out to avoid repeated failures and to run unit on sustained operation. On carrying out the hardness test, it was observed that in 103 joints out of 136 joints, hardness value were beyond the permissible limit. Alstom/BHEL decided to cut and weld all the Hanger Tube joints as per modified welding procedure/ PWHT procedures. All other essential systems associated such as TG and Auxiliaries, Boiler and Auxiliaries, Coal Receipt and Handling System, Cooling Water System, etc. are ready for sustained and stable full load operation. The petitioner has submitted that a further period of three months for injection of infirm power is required for trial operation to stablize the Unit-IV of the project.

5. POSOCO in its reply dated 2.4.2014 has submitted that it has no objection to extension of time for testing of the Unit-IV. However, POSOCO has proposed the following to facilitate testing and commissioning of new units and has requested to issue necessary direction in this regard:

(a) All the generating stations likely to inject power should be asked by RLDCs to submit their testing programme.

(b) Testing of generators may be allowed by RLDCs in a planned manner keeping grid security in view.

(c) Generating stations with more than one unit should be asked to reduce generation in existing units so that new unit can be tested.

6. During the course of hearing, the representatives of the petitioner and POSOCO reiterated their submissions made in the petition and reply. The representative of the petitioner submitted that though in the petition NTPC has requested for extension of time up to 21.8.2014 but there is need of further one month time and requested to grant extension of time up to 30.9.2014 for test including full load of testing for Unit-IV.

7. We have considered the prayer of the petitioner. The petitioner has filed the present petition under Clause (7) of Regulation 8 of the Connectivity Regulations, which provides as under:

> "(7) Notwithstanding anything contained in clause(6) of this regulation and any provision with regard to sale of infirm power in the PPA, a unit of a generating station, including a captive generating plant which has been granted connectivity to the grid shall be allowed to inject infirm power into the grid during testing including full load testing before its COD for a period not exceeding six months from the date of first synchronization after obtaining prior permission of the concerned Regional Load Despatch Centre:

Provided that the Commission may allow extension of the period of testing including full load testing, and consequent injection of infirm power by the unit, beyond six months, in exceptional circumstances on an application made by the generating company at least two months in advance of completion of six month period:

Provided further that the concerned Regional Load Despatch Centre while granting such permission shall keep the grid security in view:

Provided also that the onus of proving that the injection of infirm power from the unit(s) of the generating station is for the purpose of testing and commissioning shall lie with the generating company and the respective RLDC shall seek such information on each occasion of injection of power before COD. For this, the generator shall provide RLDC sufficient details of the specific testing and commissioning activity, its duration and intended injection etc.

Provided also that the infirm power so injected shall be treated as Unscheduled Interchange of the unit(s) of the generating station and the generator shall be paid for such injection of infirm power in accordance with the provisions of the Central Electricity Regulatory Commission (Unscheduled Regulations, 2009 as amended from time to time."

8. Regulation 8 (7) of the Connectivity Regulations, as amended on 21.3.2012, provides that a generating company which has been granted connectivity to the grid shall be allowed to inject infirm power into the grid during testing including full load testing before the COD for a period not exceeding 6 months from the date of first synchronization after obtaining the prior approval of the concerned RLDC. It is noted that synchronization of Unit-IV of the project has taken place on 22.11.2013. However, commercial operation of the unit has not been declared for various reasons.

9. It is observed that the main reason for delay in COD of Unit-IV is due to multiple failure in welds joints of Boiler tubes and resultant leakages in the tubes. There have been repetitive failure of T23 grade tube weld joints of membrane panels of roof and floor and first passes rear Hanger tubes of Unit-IV Boiler. The situation has further aggravated due to increase in number of T23 joints because of insertion of spool pieces for repair of each of the failed joints resulting in increase in number of T23 weld joints. On inspection and analysis, it was decided to carry out hardness test of all joints of Hanger tubes to avoid repeated failures so that the unit can run on sustained basis. After carrying out the hardness test, it was observed that in 103 joints out of 136 joints, hardness value were beyond the permissible limit and OEM Alstom/BHEL decided to cut and weld all the Hanger tube joints as per modified welding procedure/ PWHT procedures.

10. It appears from the submissions of the petitioner that the problem of multiple-failure in weld joints of Boiler Hanger tubes were unforeseen problems as T23 material was used by BHEL for the first time in Boiler for 660 MW Super Critical Units, and the nature of behavior of T23 material at high pressure/ temperature for super critical boiler was not well proven in India. However, it is not clear as to why the T23 material opted for boiler tubes when the same was a relatively new material. Taking into consideration the problems faced by the petitioner, we allow extension of time for injection of infirm power into the grid for

the purpose of commissioning test including full load test of Unit-IV upto 30.9.2014 or actual date of commercial operation, whichever is earlier. It is clarified that the extension of time as allowed in this order shall not automatically entitle the petitioner for IDC/IEDC for delay in declaration of COD which shall be considered on merit at the time of determination of tariff of the unit/generating station.

11. The petition is disposed of in terms of the above.

Sd/-	**sd/-**	**sd/-**
(A.K.Singhal)	**(M Deena Dayalan)**	**(Gireesh B.Pradhan)**
Member	**Member**	**Chairperson**