CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

Petition No. 158/MP/2014

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

Date of Hearing : 05.8.2014
Date of Order : 22 .8.2014

In the matter of

Petition seeking Commission`s permission to maintain status quo for injection of infirm power in Southern Grid till declaration of COD of Unit-I of Kudankulam Nuclear Power Project or 22.10.2014, whichever is earlier.

And
In the matter of

Nuclear Power Corporation of India Ltd.,
Nabhikiya Urja Bhawan,
Anushaktinagar, Mumbai-400 094 **...Petitioner**

Vs

1. The Member Secretary
   Southern Regional Power Committee,
   29, Race Course Cross Road, Bangalore-560 009

2. General Manager (Commercial)
   Power Grid Corporation of India Limited,
   Southern Regional Transmission System-II
   Pragati Mahalakshmi, South Block (2nd and 3rd Floor)
   No. 62, 3rd Cross MEI Road, Industrial Suburb
   Yashwantpura, Bangalore-560 022

3. Executive Director
   Power System Operation Corporation (POSOCO) SRLDC
   29, Race Course Road, Bangalore-560 009

4. The Chief Engineer (Planning)
   T.N. Generation and Distribution Corporation Ltd.

6th Floor, Eastern Wing, 144 Anna Salai, Chennci-600 002

5. The Chief Engineer/Corporate Planning TRAC
   Kerala State Electricity Board,
   8th Floor, Vidyuthi Bhawanam,
   Pattom, Thiruvananthpuram-695 004

6. Director (Commercial)
   State Power Purchase Co ordination Committee
   Power Company of Karnataka Ltd.
   Kaveri Bhawan, Bangalore-560 009

7. The Superintending Engineer
   Puducherry Electricity Department
   137, NSC Bose Road, Puducherry-605001

8. Chief Engineer (Commercial)
   A.P. Power Coordination Committee
   Vidyut Soudh, Khairatabad
   Hyderabad-500 082 ..**Respondents**

Parties present:

Shri Sandeep Sarwate, NPCIL
Shri S.Mulklalwap, NPCIL
Shri S.S Barpanda, POSOCO
Ms. Jyoti Prasad, POSOCO
Ms. Abiha Zaidi, POSOCO
Shri S.Vallinayagam, Advocate, TANGEDCO

ORDER

This petition has been filed by the petitioner, Nuclear Power Corporation of India 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) Permit injection of infirm power into the grid from KKNPP-1 till declaration of COD of KKNPP-1 or 22.10.2014, whichever is earlier;

(b) Pass such order (s) as deemed fit by the Hon`ble Commission."

2. Kudankulam Nuclear Power Project ('the project') of the petitioner is located at Kudankulam, Tirunevelveli District in the State of Tamil Nadu and is being implemented in two stages consisting of Unit-I and Unit-II of 1000 MW each. The project is being set up with the technical cooperation of Russian Federation which is based on WER-1000 type of reactors. The first unit of the project was test synchronized on 22.10.2013 and since then it has been injecting infirm power into the grid.

3. Petition No.72/MP/2014 was earlier filed by the petitioner seeking permission of the Commission for injection of infirm power till declaration of the commercial operation of the project or 22.7.2014 whichever was earlier. The Commission vide order dated 12.5.2014 allowed the petitioner to inject infirm power into the grid for testing including full load testing till 22.7.2014. The present petition has been filed for extension of time beyond 22.7.2014 i.e up to 22.10.2014 for injection of infirm power during testing including full load testing.

Submission of the petitioner

4. The petitioner in this petition has submitted that Unit-I of project was test synchronized on 22.10.2013 and since then it is injecting infirm power into the grid. The project is First of its Kind (FOK) units being commissioned in India.

Numerous commissioning tests are to be performed at various stages of commissioning of the unit to evaluate the system responses to various transients. The test results are to be evaluated internally and submitted to regulatory authority i. e . Atomic Energy Regulatory Board (AERB) for review. The consent for proceeding to the next stage of commissioning is obtained from regulatory authorities. This is a repetitive process till AERB grants permission for continuous operation of the unit at 100% full power before declaration of COD. The petitioner has further submitted as under:

(a) Before declaration of COD of the project, commissioning activities of the project are divided into three main phases, namely Phases, A, B and C. Phases A and B commissioning activities which mainly focus on individual equipment and system commissioning are completed. The commissioning activities of Phase-C comprises of three stages, namely Phases CI, C2 and C3 focus on evaluation of system performance to various transients against acceptance criteria.

(b) The commissioning activities of Phase C I comprise raising of reactor power up to 50% of Full Power (FP), synchronization of the generator with the grid, and carrying out various tests pertaining to reactor systems, secondary feed water and turbine generator systems, with the generator in synchronism with the grid. After successful completions of the tests, test reports and application seeking clearances for conduct of next phase of commissioning activities are submitted to AERB for review and consent.

(c) Phase C 2 encompasses reactor power raise to 75% of full power and carrying out various tests of reactor and turbine generator systems with the generator in synchronism with the grid. After successful completions of the Phase C 2 tests, test reports and application seeking clearances for conduct of next phase of commissioning activities are submitted to AERB for review and consent.

(d) In Phase C3 commissioning program, reactor power is raised in steps, first up to 90% and then to 100%. In this Phase also, various tests are carried out on reactor and turbine generator systems, with the generator in synchronism with the grid.

(e) During each stage, tests are carried out on the reactor systems as well as turbine and feed water supply systems. The petitioner has enumerated the test schedule of various phases as under:

S.No.	Activity	Start date	End date
1.	Phase C1	15.8.2013	3.1.2014
2.	Phase C2	24.1.2014	30.4.2014
3.	Phase C3	5.5.2014	Expected to be completed by third week of July-2014
4.	Mandatory requirement of conduct of Containment Integrated Leak Rate Test (ILRT)	This activity is likely to be started in the fourth week of July, 2014 and will be requiring approximately 30 days for completion.	

(f) During the commissioning tests, there are requirements of fine tuning of various controllers both on reactor, and on secondary feed water systems

for which consultation with suppliers, designers at NPCIL headquarter is required to address the identified system behavior related issues from time to time. The tests are repeated till the desired acceptable results are obtained.

(g) The tests of Phases A and B have been completed before synchronization. Unit-I of the project was synchronized with grid on 22.10.2013. Subsequently, all tests of Phase C1 were carried out and were completed on 3.1.2014. On 24.1.2014, clearance from AERB was obtained to carry out Phase C2 activities which were started on 24.1.2014. The petitioner has submitted that the following transients and dynamic tests are conducted:

(i) Testing of reactor characteristics;

(ii) Testing of loss of power to the station;

(iii) Turbine trip test;

(iv) Test of turbine partial load changes; and

(v) Testing of tripping of one feed water pump.

(h) Since number of tests involve electrical load connection or disconnection of the project from the grid, permission of SRLDC was required to be taken for conduct of tests. On number of times as per the request of SRLDC, tests involving load changes were postponed to accommodate the grid exigencies requirements. Certain deficiencies

were found during testing which needed shutdown of the reactor to rectify and repeat the tests.

(i) The test result of Phase C 2 was submitted to AERB for review and seeking clearances to conduct next phase of commissioning activities i.e. Phase C3 tests. After satisfactory review, AERB accorded clearance to conduct set of Phase C3 commissioning tests with following stipulations:

(a) Conduct Phase C3 test at 90% power level and submission of the results for review and clearance for conduct of Phase C3 tests at 100% power level.

(b) Conduct Phase C3 test at 100% power level and stable operation of unit for a period of seven days and submission of test results for review and granting permission for continuous operation of Unit.

(j) After obtaining clearance from AERB on 1.5.2014, power was raised to 90% FP. Tests of Phase C3 at 90% power level were started on 5.5.2014. The next stage i.e. Phase C-3 activities started after 101 days from the start of Phase C-2. The petitioner has submitted that the following major tests were carried out during 90% FP stage:

(a) Testing of reactor characteristics;
(b) Gross load rejection test; and
(c) System response to various simulated transients.

5. The petitioner has submitted that after completion of 90% FP test, tests reports were submitted to AERB. Subsequent to satisfactory review by AERB, clearance was obtained on 20.5.2014 for power raise beyond 90% FP up to 100% FP for conduct of Phase-C3 commissioning tests at 100% power level. On 7.6.2014, power was raised to 1000 MW. During the course of conducting of Phase C-3 tests, unit tripped on three occasions on disturbances in secondary side during the tests-preparation/test. Fine tuning of secondary side controllers were also carried out. Phase C3 commissioning test at 100% power level could be started on 20.6.2014. The petitioner has submitted that the following transients and dynamic tests are conducted:

(a) Testing of reactor characteristics;

(b) System Response to tripping of one reactor coolant pump and two reactor coolant pumps;

(c) Passive heat removal system (PHRS) performance;

(d) System response to one of Turbine Driven Feed Pump switched off;

(e) Net Load Rejection Test (NLRT);

(f) Response of Reactor Automatic Power Controller to various disturbances; and

(g) All the dynamic tests involving power changes are done in close coordination with SLRDC. Clearance from Southern grid/SLRDC is given based on the overall power situation and tests are normally planned accordingly.

6. The petitioner has submitted that tests of Phase C-3 are near completion and expected to be completed in third week of July 2014 after completing the following tests.

(a) Steam Generator separation test.

(b) Dynamic test program of power unit in the mode of reactor emergency protection actuation by manual push button from control room.

7. The petitioner has submitted that the following activities are scheduled to be completed before continuous power operation at 100 % FP:

(a) Demonstration of continuous operation of the unit for 7 days at 90 % FP.

(b) Submitting of Phase C-3 tests reports to AERB for review and obtaining permission for continuous operation at 100% FP.

(c) Unit cold shutdown for Containment Integrated Leak Rate Test (ILRT) as per AERB stipulation. Other maintenance activities, surveillance tests will also be taken up along with it.

(d) Start of the reactor and reaching 100 % FP.

8. The petitioner has submitted that though it was estimated that all the tests would be completed by 22.7.2014, however, due to non-completion of activities/tests as enumerated at para 7 above, the operation of the unit at 100%

FP has been delayed and as a result the COD of the unit could not be declared by 22.7.2014. The petitioner has, therefore, submitted that it may take another two months to complete the above activities and testing program and the process of reviewing by AREB before granting permission for continuous operation at 100% FP. Considering any eventualities such as system behaviour and rectification of deficiencies, the petitioner has sought permission for further 3 months to inject infirm power into the grid for testing including full load testing till 22.10.2014 or COD, whichever is earlier.

9. During the course of hearing of the petition on 5.8.2014, the representative of the Power System Operation Corporation Limited (POSOCO) submitted that POSOCO has no objection to grant extension of time for injection of infirm power into the grid and in fact, POSOCO is facilitating in performing all the tests by providing system support to Kundankulam Nuclear Power Station.

Analysis

10. We have considered the prayer of the petitioner. The petition has been filed 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."

11. The petitioner has submitted that the following tests, which were expected to be completed by 22.7.2014 before operating the Unit at 100% Full Power (FP), have been delayed:

(a) Demonstration of continuous operation of the unit for 7 days at 90% FP.

(b) Submitting of phase C-3 tests reports to AERB for review and obtaining permission for continuous operation at 100% FP.

(c) Unit cold shutdown for Containment Integrated Leak Rate Test (ILRT) as per AERB stipulation, other maintenance activities and surveillance tests.

(d) Start of the reactor and reaching 100 % FP.

12. The petitioner has submitted that since the above tests were delayed, the COD of the Unit-I of the project could not be declared by 22.7.2014. The petitioner has submitted that it envisages that the testing, reviewing of test results by AERB, etc., would take about two more months from 22.7.2014 and to keep a cushion time for any unexpected eventuality, another one month has been envisaged before declaring COD by 22.10.2014.

13. It is noticed that the Commission in its order dated 12.5.2014 had allowed time upto 22.7.2014 for injection of infirm power to complete the rectification work and full load testing, etc. We appreciate the fact that in nuclear Power Projects, all the tests should be performed as per laid down commissioning procedures and safety codes so that the safety of equipments and personnel and protection of environment is ensured before putting the Unit under Commercial Operation on sustained basis. Considering the factors in totality and the circumstances as submitted by the petitioner, the petitioner is allowed to inject infirm power into the grid for testing including full load testing till declaration of COD or 22.10.2014, whichever is earlier. We expect the petitioner to take all efforts to ensure the commercial operation of Unit-1 of the project by this date.

14. With the above, the Petition No. 158/MP/2014 is disposed of.

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