

KUDANKULAM NUCLEAR POWER PLANT FAILED IN THE COMMISSIONING TEST SEVEN TIMES AND IS READY FOR DECOMMISSIONING

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Kudankulam keeps on making news. These days, the newsmakers are Gurus who are conducting Yoga Shibir and Satsang in the high-tech campus. These meetings are well-attended as there is not much work in the recently commissioned reactor. The Gurus, quoting from the teachings of the masters from the East remind the modern Prometheans, who brought the energy source of the celestial to the terrestrial, that the entire multiverse is permeated with energy. Some of the new disciples are still disturbed as they have been drawing their salaries without doing any productive work for more than three months and they do not see any end in sight.

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After the hard won battles in the Madras High Court and the Supreme Court of India, the scientists of the Nuclear Power Corporation of India Ltd (NPCIL) under the watchful eyes of the Atomic Energy Regulatory Board (AERB) successfully completed the first act of criticality of the reactor on 15th of July 2013. Then they continued with the physics experiments, operating the reactor at low power level and releasing the steam generated to the atmosphere. In order to conduct the C-Phase commissioning tests, the generator was connected with the southern electricity grid on 22 Oct 2013. As part of the power ascension tests, the plant output was to be raised from 250 MW to 500, 750 and eventually to 1000 MW.

The Commissioning Drills of 1000 MW PWR

AERB's Safety Guide for Commissioning of Pressurised Water Reactor-based Nuclear Power Plants (No. AERB/NPP-PWR/Sg/O-4 C) lists 45 tests to be conducted during the power ascension test. The final test involves operating the reactor non-stop for 100 days at 100% Full Power (1000 MW). As per the initial schedule, the plant was to clear all the tests within six months after the grid connection, around 20th of April 2014. All the seven attempts to clear the final test ended up in failure. The unit has not cleared the last test so far.

On 24th June 2015, the plant was shut for maintenance. The expected date of revival, which has been postponed thrice, is 7th Oct 2015. On 25th September 2015, the Times of India reported that "Kudankulam authorities said they needed to import a component from Russia to restart the unit and would be ready only in December."¹

From the beginning, the officials of the utility, the regulator and the governments were the only sources of information regarding the plant. Since the grid connection, the southern regional load despatch centre (SRLDC) started publishing the data on production and outage of the reactor daily on its website www.srldc.org. The production and outage statistics reported in this article are from SRLDC.

A crude balance sheet of the plant has been made based on the production statistics. It is assumed that the plant will not be revived this year, as reported by the Times of India. During the period 22 Oct 2013 to 31 December 2015 (801 days), the reactor should have worked for 741 days and shut down twice in December 2014 and 2015 for 60 days for refuelling and maintenance. During the 741 days of operation, it should have delivered 15,306 million units of electricity to the grid. It supplied 6462 MU to the grid and sucked in about 433 MU during those un-productive days. The net receipt by the grid was 6028 MW, or a meagre 39.4% of the norm. (See table below).

ELECTRICITY DELIVERED TO GRID SINCE CONNECTION (MU)

Duration	No of days	Total MU				Percent
		Norm	Supplied	Off-days	Net to grid	
Oct-Dec 2013	71	276	276	-30	246	89.1
Jan-Nov 2014	334	7515	2962.9	-201	2761.9	36.8
Jan-Nov 2015	334	7515	3222.5	-202	3020.5	40.2
Total	739	15306	6461.6	-433	6028.6	39.4

Source: Southern Regional Load Dispatch Centre- Data uploaded daily at www.srldc.org

The four decades old generation-I reactors at Rawathbhatta (Rajasthan) and Tarapur (Maharashtra) are performing far better than this brand new, generation-III reactor, certified as the best and safest in the world.

Commercial Operation and License for Normal Operation

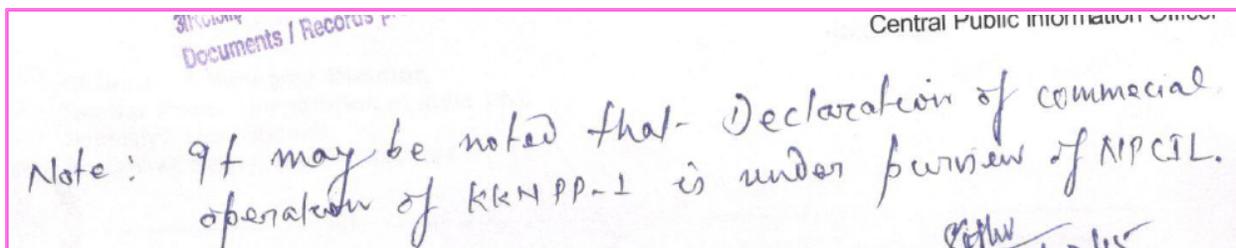
In spite of the repeated failure in clearing the commissioning test and its phenomenal non-performance, the plant has been making news in Mumbai, Delhi and Moscow. On the 31st December 2014, the NPCIL unilaterally declared the commercial operation of the plant. Until that day, the unit had a temporary permit from the Central Electricity Regulatory Commission (CERC) to inject 'infirm power' into the grid. The press release issued on NPCIL stationary, signed by the site director of KKNPP did not mention AERB or any other agency. A day before this, AERB had extended the deadline for completing the final commissioning test till 30 April 2015.

Replies to RTI queries by AERB and NPCIL:

Assuming that the regulator, AERB was in-charge, we sought a clarification on the NPCIL's declaration. Excerpts from their replies are given below:

AERB Safety Guide on "Consenting Process for Nuclear Power Plants and Research Reactor", AERB/NPP&RR/SG/G-1 does not identify any stage of 'commercial commissioning' during commissioning stage of a Nuclear Power Plant. After grant of Clearance for Phase-C3 commissioning at 100% Full Power and fulfilment of pre-requisites as per AERB/NPP&RR/SG/G-1, Utility submits application for obtaining License for Regular Operation of the plant. For KKNPP -1, NPCIL has submitted the said application, which is currently under review by AERB. Meanwhile it may be noted that the declaration of Nuclear Power Plant as 'commercial' is the prerogative of the utility.

On 7th July 2015, the NPCIL also replied that "declaration of commercial operation is the *purview* of NPCIL".



On 8th July 2015, a day after the NPCIL's reply, AERB decided to award licence for regular operation of KKNPP-1. As discussed above, on that day, the reactor was on a long-term maintenance outage after a two-month long instability in its steam generator.

Were the unilateral declaration of commercial operation by the NPCIL and the award of licence to operate without clearing the mandated commissioning test based on safety considerations? Two news items originating from Russia are quoted without comments:

1. 2nd January 2015; Russian News Agency TASS: "The (KKNPP-1) reactor has been commissioned for warranty-period operation. An act on a provisional transfer of power unit No. 1 to operation was signed by the Russian and Indian sides. This means that a year-long period of operation on warranty has begun. Upon the results of these twelve months, the power unit will be fully transferred to the Indian side".²
2. 8th July 2015, Press briefing by The Indian Ambassador in Russia at Ufa: "The Kudankulam 3 and 4 contracts have already been signed. There is a General Framework Agreement which has been signed. There is what is called the Long Cycle Supply of Equipment which is a contract that has been signed. So, it is in the process of implementation. That is what the (Indian) Prime Minister and President Putin noted with satisfaction as progress in the nuclear energy cooperation".³

AERB decided to grant the licence couple of hours ahead of the summit between the Prime Minister and the President.

The Commissioning and the Supreme Court

And did these decisions violate the Supreme Court's directions dated 6th May 2014?

Honorable Justice Dipak Misra observed:

“The AERB as the regulatory authority and the MoEF are obliged to perform their duty that safety measures are adequately taken before the plant *commences its operation* (emphasis added). That is the trust of the people in the authorities which they can ill afford to betray, and it shall not be an exaggeration to state that safety in a case of this nature in any one’s hand has to be placed on the pedestal of “Constitutional Trust”.” (para 229)

And the Bench directed:

1. “The plant should not be *made operational* unless AERB, NPCIL, DAE accord final clearance for commissioning of the plant ensuring the quality of various components and systems because their reliability is of vital importance”⁴. (Emphasis ours)

15. “The AERB, NPCIL, MoEF and TNPCB would oversee each and every aspect of the matter, including the safety of the plant, impact on environment, quality of various components and systems in the plant before commissioning of the plant. A report to that effect be filed before this Court before commissioning of the plant.”

Before jumping into the conclusion that they violated the court order, let us remember that each branch of science has its own dictionary. Based on the dictionary of reactor physics, AERB has published a glossary of technical terms, which has to be accepted by all concerned.

According to the AERB glossary, on 6th of May 2013, the day of the judgment, KKNPP-1 was already operational. The operation commenced on 20th September 2012, when the first fuel assembly was loaded in the reactor pressure vessel. On 31st December 2014, NPCIL simply changed its status to commercial operation. And on 8th July 2015, AERB awarded a license to operate it. Neither of them can be accused of contempt of court or disrespect to the judiciary.

Since they did not commission the plant after the date of judgment, direction No 15 is not operative. From the history of the plant so far, it does appear that the next vital event of the plant will be decommissioning. The history also proves that Kudankulam is the safest nuclear power plant in the world, because it is not going to work.

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- 1 <http://timesofindia.indiatimes.com/city/chennai/Power-cuts-are-back-in-state-as-wind-power-generation-reduces/articleshow/49102167.cms>
- 2 TASS, 02 Jan 2015, Kudankulam-1 transferred to India for warranty-period operation, http://in.rbth.com/economics/2015/01/02/kudankulam-1_transferred_to_india_for_warranty-period_operation_40685.html
- 3 Transcript of Media Briefing by Foreign -Secretary in Ufa on Prime Ministers ongoing visit July 8 2015 _____
<http://mea.gov.in/media-briefings.htm?dtl/25443/>
- 4 K.S.Radhakrihnan & Dipak Misra, 2013 Judgment in CIVIL APPEAL NO. 4440 OF 2013 (Arising out of S.L.P. (C) No.27335 of 2012, p.242) <http://judis.nic.in/supremecourt/chejudis.asp>,