

REPORT - Kakrapar Nuclear Power Plant

Nuclear Power Corporation of India Limited (NPCIL)
(Government of India Enterprise)
Kakrapar Gujarat Site

Place of visit: Mandvi Taluka - Surat District - Gujarat state

Units: Kakrapar Atomic power Station (KAPS) - 1 & 2 of 220 MWe
Kakrapar Atomic power Project (KAPP) - 3 & 4 of 700 MWe

Date of visit: 21 June 2022 / 9 am to 04:30 pm / Training Centre, Turbine building, Control room and Construction site.

Attendees: Bharat Bhandary, Amit Rakte, Buddhipriya Chavan, Deepak Bhilare, Dr. Vinod Gokarna, Hrishikesh Pednekar, John Jeraud, Kishore Badgujar, Royal D'souza, Sandeep Sabnis, Sanjay Turembekar, Sunil Chatur, Tayyabali Sayyed and Sameer Hadkar.



Vyara Platform

After getting down on the Vyara station at around 7 am we reached the guest house around 8 am where Mr. Sandeep Dasgupta helped us with the room stay facilities. He had arranged for the transport from the guest house to the site. We started at 9 am and reached the main gate at 9:30 am. The security check took around an hour, where we deposited our aadhar cards, followed by breakfast at 10:40 am. No digital gadget is allowed inside the campus, so photographs could not be captured.

We were in the 'Session Training Centre' at 11 am where we were introduced to Officer R. B. Patil by Dasgupta Sir. Patil Sir has experience in most of the sections of the power plant. His work profile included operation, training, vigilance, social awareness, holding exhibitions etc.

The discussion started by introducing ourselves followed by Patil Sir explaining to us the importance of our subject field in the various departments of nuclear energy. He highlighted a few points like data monitoring, microprocessor based requirement, maintenance of neutron flux, requirement for safe shut down of the reactor, communication exchange tower, technical bulletin department etc. According to him there are around 900 systems and a master computer and there is a requirement in each and every field of education.



Mr. R. B. Patil sir giving orientation at Session Training Centre

Around 11:30 am he elaborated on the following few general points :

- Why Nuclear energy
- Percentage share of nuclear energy w.r.t the total energy generation
- About Tarapore power plant
- Land area requirement
- Safety norms
- Mock drills for the people in the surrounding area
- Why Pokhran took place

Later he briefed us about the technical aspect of the nuclear reactor

- Power generated by the reactors
- Testing of channels
- Life assessment of the reactor
- Commercially distributing the energy (giving it to the Grid)
- Leak Valves
- How to keep the core cool
- Back up systems during a natural calamity emergency like tsunami

Around 11:45 am we proceeded to a room where models of the reactors were kept. Here he explained to us the map of the land area occupied by the whole power plant project followed by the construction and the working of the nuclear reactor. The points were as follows:

- Tapi river and the dams constructed
- Radiation dosage
- Import of technology

- Local vendors
- Non ionic versus ionic radiation
- Mining of uranium and thorium
- Preparation of pellets and the pressure it can handle
- Insertion and ejection of the bundle
- Bundle dimensions and weight
- Calandria and number of rods it contain for 220 MWe and 700 MWe
- Cost of energy per 100 units
- Records maintained by BARC
- Use of radioactive waste
- 123 agreement for peaceful cooperation
- Light water and heavy water
- Design of building w.r.t the size of the reactor walls
- Use of air locks
- Nuclear waste
- Use of lead to reduce the the radiation effect
- Number of departments under Department of Atomic Energy (DAE)



Group photo outside the “Session Training Centre”

Around 12:15 pm on our way to the Reactor and the Turbine building, our group photograph was taken by an official member. It was a long walk to the turbine room. Here we were provided with a safety helmet and as the turbines make loud noise we were given ear plugs to wear. We could hardly discuss anything here on the turbine floor due to the noise level being very high. However here we could see that the running turbines were generating a total output of 222.2 MWe with 15.65 KV of voltage at 49.95 Hz frequency. The turbines are manufactured by Bharat Heavy Electrical Limited (BHEL).



Group Photo outside the Nuclear Reactor Building

At 01:30 pm we were into the Main Control room where the complete reactor process is monitored and maintained for various parameters. It has well designed alarm systems to check for variations if any. As every system was computerised we did not spend much time here and proceeded for lunch.

Around 3 pm, post lunch, we convey our thanks to Patil Sir who had excellently explained the complete mechanism of the nuclear reactor. We proceeded to see the construction site, the actual place where the core is placed, of KAPP 4. Here we were accompanied by Ms.Monica Seth. She took us inside the reactor building where we could see the tubes kept inside the Calandria used to hold the bundles of pellets. Here we had a complete understanding about:

- Principle of Nuclear Reactor
- U-235
- Neutron
- Use of heavy water
- Controlling the chain reaction

After the construction site visit we boarded the bus around 4 pm. We proceeded to the 'Session Training Centre' where we were given a booklet containing information about the project. Finally at the security check we collected our aadhar cards and the bus dropped us back to the guest house around 10 km away.

We would like to thank Dr. Prasanna Nambiar, Principal DBIT, for arranging this official visit. Thanks to Mr. Sandeep Dasgupta for the complete arrangement of visit, internal travel, breakfast, lunch and stay and also for accompanying us the whole day. We also thank Mr. Bharat Bhandary for coordinating with Mr. Sandeep Dasgupta and completing the prior formalities needed. If given an opportunity, one should surely visit the Jaitapur Nuclear Power Plant in Ratnagiri, Maharashtra.