

REPORT
Bhabha Atomic Research Centre (BARC) Visit

Dated: 01st March 2019.

Venue: BARC

Time: 08:00 AM to 05:30 PM

To commemorate the momentous event of Sir C. V. Raman's discovery of Raman effect, who won the Nobel Prize in Physics in 1930, **National Science day (NSD)** is celebrated every year in India on 28th February. We, Ms. Kartiki Bhawe (HoD FE), Mr. Jithin Issac and Mr. Sameer Hadkar along with 19 students from 2nd year EXTC, visited BARC where the day was celebrated under the theme **“Nuclear Reactor Technology”**.

Various other schools and colleges participated for NSD in BARC. At 8.15 am there was division of participating institutes into four different groups according to the colour code. DBIT was assigned **Red group**. The Red bus (numbered 13) proceeded towards the TSH building where we deposited our bags along with our mobile phone and other valuables. We were asked to be seated in a seminar room where we were instructed about **Do's and Dont's**. This was followed by breakfast and finally at around 9.30 am we again boarded the bus to start our day's events.

As we entered the North gate of BARC, on our way to the auditorium we saw the lotus pond, fuel processing plant, waste immobilization plant, physics chemistry building, helipad, power substation, Vande-graff generator, 800m long building, supercomputer building, **Dhruv and Cyrus Reactors** and emergency coolant water tanker.

In the Central Complex Auditorium at 9.45 am, seven short videos were played on various topics like Cyrus reactor, forest in BARC, gamma radiation for food technology, Dhruv reactor for hospital facilities, cancer treatment, biogas technology as “Nisarguna Plants” and finally Swaccha Bharat song was played.

The formal function began at 10.25 am where **Prof. Y. S. Rana**. He briefed us about Raman effect, about Sir C. V. Raman and his work and also about the various applications of nuclear technology. Followed by this at 10:45 am, there was a talk by eminent Nuclear Professional **Prof. M. Ramamoorthy** on **“Research and its applications”**. He started his talk by briefing about the process of nuclear technology, Sir C. V. Raman, Dr. Homi Bhabha, Dr. Vikram Sarabhai and the history of nuclear physics. He explained about the first reactor **Apsara**, and its working. This was followed by **Cirus (first in Asia), Dhruv and Kamini Reactors**. He then mentioned about the new reactor '**Apsara U**' and its specifications. He concluded his talk explaining the various applications of nuclear technology in the field of pneumatic cancer treatment, neutron radiography, crystal structure study, fuel cyclic program, irradiation at high flux in food industry and radioisotope production.

At 11.45 am Prof Y. S. Rana and his team conducted a **quiz** for each group (according to the colour) was asked four questions. This was followed by a **skit on Swaccha Bharat** which highlighted the importance of nuclear energy in keeping the environment clean and away from pollution. This skit cleared the myths about the usage of nuclear energy and highlighted that it is a clean energy resource.

At 12.30 pm we proceeded towards the **exhibition** where we could interact with the people working in BARC. Here we saw some models of Kamini Reactor, design and development, Microelectronics and Instrumentation, Computer based simulator and Materials used for nuclear energy production. **Kalpakkam Mini-KAMINI** is a 30 KW tank-type research reactor that burns U-233/ Aluminium alloy fuel. This was well explained to the students by one of the officers. We also

had a chance to look at the **flower exhibition** displayed which had the exotic variety of roses grown in BARC campus.

After having lunch at around 2.30 pm headed towards the **Dhruv reactor where Mr. Joshi** initially explained us about the reactor with the help of a model. We then entered the reactor to see its various parts which was one of the best part of the visit. We understood that neutron scattering experiments are performed for study of materials. Sir also explained about (a) safety measures taken, (b) device containing CaSO_4 to measure the radioactivity (radiation) dosage that the operators are exposed with.

At 3.00 pm we were taken to the “**Simulator Laboratory**” where we understood that fault is purposely introduced into the system and the operator is asked to repair the fault. This helps the operator to have practice in case of an emergency and react accordingly. At 3.30 pm we went to the “**Division of Remote handling and Robotics**” where we could see neuro-navigation and stereostatic surgery suite, mobile robots for mapping of radiation field, automatic direct fuel transfer system, autonomous unloading of randomly oriented pellets, Bhabhatron for cancer treatment, Force reflecting telerobot and Automated Heavy Water Reactor (AHWR) mox fuel fabrication in shielded facility. Also Quad-bot-helicopter/ drone to detect radioactivity (even at low level) was much related to EXTC students.

Finally at 4.30 pm we saw the irradiation done food packaging system from where we proceeded for a group photograph at 5.00 pm. We came back to the TSH building at 5.15 pm where we were given a bag containing food packets, a gift mug and an infosheet. They also handed over to us our certificates and finally we departed at 5.45 pm.



Overall the visit was very informative which helped us know the advancements that BARC has made in the field of nuclear reactor science and engineering. We could learn the Societal benefits drawn from the reactors and the safety measures incorporated at each stage. We could also interact with few engineers working in different fields which helped inculcate a scientific temper among us. This inspired us a lot. We would really like to thank BARC for such a wonderful, well planned and organized visit for DBIT.