Mukesh Patel School of Technology Management and Engineering.

A Report on

Industrial Visit to
Bhabha Atomic Research Centre,
Department of Atomic Energy,
Trombay, Mumbai.

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In early March of 2018, the Department of Chemical Engineering had planned an industrial visit for all the students of the MBA-Tech Chemical Engineering course to visit one of the country's jewels, the Bhabha Atomic Research Centre in Trombay Mumbai. Probably being one of India's most secure industrial facilities having numerous layers of securities, it is the center of India's nuclear and allied industrial research for human development and defense activities. Visiting the Bhabha Atomic Research Centre was a once in a lifetime opportunity for both faculties as well as students, an opportunity that could not be missed.

We departed from our college premises punctually at 8:30am, and after a fourty five minute drive, we reached the Main North gate of Anushakti Nagar, The DAE Township. The police checked our documentation and our bus, within a few minutes we were at the North Main entrance of the facility. We were greeted by our Respected Head of Department Dr. Usha Ghosh (BARC, Alumnus) who had already finished the entry formalities and was waiting along with our guides, Officers from the Public Relations Office and security persons.

After leaving all our electronics and digital devices behind in our bus, we were put onto the bus belonging to the Department of Atomic Energy that would take us in. No photography was allowed.

A short stop for tea and biscuits was taken where a briefing was given, we then drove to the central complex building auditorium for a short film on the history, activities and milestones achieved by the Bhabha Atomic Research Centre in the fields of Nuclear Power, Defense, Agriculture, Food Processing and Medicine etc.

Dhruva Reactor:

We arrived at a massive cube shaped building surrounded by gardens and neighbored by the beautiful dome of the CIRUS reactor. Little did the students know what awaited them behind the thick metal doors.

Greeted at the lobby by numerous security and scientific officers we were given a briefing on the power of nuclear energy and the schematics of the DHRUVA test reactor. Being divided into two batches and taken down a corridor having a view to the massive control room of the reactor, we passed through an airlock having one feet thick lead/steel doors and walked into the massive reactor hall dominated by a central structure. Yes we had walked into an active nuclear reactor. The glory of the structure was overwhelming. We could hear all the Geiger Counters around the superstructure beep due to radiation emitted which was within the safe limits. We were told on how the DHRUVA reactor led to the innovation of new indigenous types of technology in nuclear Power generation as well as generation of Plutonium for defense purposes. We witnessed the huge fueling machine that removed and installed uranium fuel rods and cooling rods mounted above the reactor. The assembly bottles and fueling process was also shown to us.

It was truly an awe inspiring experience to be able to witness an in operation Nuclear Reactor first hand and be able be inside the reactor chamber hall.

Food Irradiation and Process Laboratory:

Located a minutes' drive from the DHRUVA reactor building on the other side of the massive Modular Laboratory building is the Food Irradiation Process Laboratory.

Known for their major milestones in the fields of Food Preservation, Science and Safety as well as food borne disease research the food irradiation process laboratories is one of BARC's Major Departments.

Upon entering a beautiful courtyard we were greeted by Dr. S.K Ghosh, Head of FIPLY along with Dr. Satyendra Gautam (Head of Food Sciences and Safety), Dr. Bhaskar Sanyal and Mr. Ram, the irradiation engineer.

There was a detailed exhibit upon the activities and milestones achieved by the department. We were shown samples of Irradiated food vs Samples of Plain packed food and seed materials and the benefits of irradiation were clearly visible.

Litchi could be preserved for more than 45 days post irradiation compared to its normal shelf like of 4-7 days.

Developments in the Indigenous manufacturing process of Xanthan Gum, a valued and highly stable emulsion stabilizer (Part of research was carried out by the MBA Tech, Chemical Students in their TIP 2016-17).

We were then taken to the Package Irradiator, a large room where food materials on trays were irradiated by a Gamma radiation source (Cobalt, 60).

The lights were turned off and just in the pool below us a blue glow was seen. This was the Cerenkov radiation from the immersed source. A truly breathtaking site.

ANUPAM Supercomputer:

Post lunch at the Goll Cafeteria we were shown the ANUPAM Supercomputer.

Anupam is a series of supercomputers designed and developed by Bhabha Atomic Research Centre (BARC) for their internal usages. It is mainly used for molecular dynamical simulations, reactor physics, theoretical physics, computational chemistry, computational fluid dynamics, and finite element analysis.

We were shown the detailed rendering of a tsunami, if it were the originate in Indonesia and spread across the Indian Ocean using the power of finite element analysis and also a live satellite image of Mumbai taken in real time, processed and displayed. This showed the massive 150 Tera FLOPS power of the Anupam AGGRA computer.

Conclusion:

After a truly memorable experience at Bhabha Atomic Research Centre, we would like to thank all the scientific, security and officers from the Scientific Information Resource Division for dedicating their valuable time to us and making arrangements with perfection.

We are also thankful to the management of the NMIMS University for making all the arrangements for transportation and breakfast for the students. I would like to

acknowledge Prof. Prawal sir for coordinating with 2nd year to 5th year MBA-Tech chemical students for the planning of this awesome educational trip.