ES451 Field Visit 2 ICHWTSDF Report

1. Describe the visit in 200-400 words

Ans: We went to the Integrated Common Hazardous Waste Treatment Storage & Disposal Facility (ICHWTSDF) at Taloja, Navi Mumbai, operated by Re Sustainability in the name of Mumbai Waste Management Ltd. Upon reaching there, our phones were collected at the entry gate itself by the security of the facility. Afterwards, we were taken to a room where we were shown a presentation of the salient features of the facility. The presentation started with the definition of hazardous waste, the various ways of treating it, how the facility began, what its clients are, how the waste is collected, treated and disposed of based on its type, how engineered landfills are made and how new clients are onboarded by testing a sample of their waste and determining whether it can be treated with the facility's technology and later testing whether the client is sending the same waste as tested earlier.

After the presentation, we were taken on a tour of the facility on the bus. First, we were shown both a closed and an operating engineered landfill. The operating landfill was covered to prevent the rain from seeping through. There were gas vents for landfill gas collection in the closed landfill. We were also shown the incinerator, which was a rotary kiln type one, which is used to burn the high calorific value waste. The incinerators had primary combustion chamber, secondary combustion chamber and flue gas treatment units for cleaning the exhaust gases before they escaped into the atmosphere. There was also a standby incinerator nearby used in times of maintenance of the first one.

2. Describe the sources and quantity of hazardous waste handled at the ICHWTSDF. What is the purpose of the ICHWTSDF?

Ans: The sources of the hazardous waste for ICHWTSDF include its various clients including Hindustan Petroleum, Mumbai Airport, Reserve Bank of India, IIT Bombay, ICT, Pepsi, Lupin, Bharat Electronics to name a few.

It handles a variety of waste from them, including:

- Biomedical waste - refers to waste generated in healthcare settings, including infectious waste (contaminated with pathogens), sharps waste (needles and sharp objects), pharmaceutical waste, chemical waste, and general healthcare waste.
- Industrial hazardous waste - refers to waste produced by industrial processes that poses a significant risk to human health and the environment. It includes toxic chemicals, heavy metals, and other harmful materials.
- Municipal hazardous waste - refers to hazardous materials and chemicals generated by households and small businesses. This waste can include items like paints, solvents, batteries, and pesticides.
- E-waste - is discarded electronic equipment like computers, smartphones, and appliances.

Mumbai Waste Management Ltd. is a special project of Re Sustainability Limited Group. It was conceived in the year 2002 as a world class ICHWTSDF. It is spread across 100 acres and it houses a Secured Landfill, Waste Treatment facility, Incineration, Environmental laboratory, and waste storage facility.
The nominal capacities are
1. Secured Landfill - 120000 MT/Annum
2. Stabilization/Treatment - 60000 MT/Annum
3. Incineration - 30000 MT/Annum

The primary objective of the ICHWTSDF is to offer a secure and environmentally responsible method for the disposal of hazardous waste. The facility is equipped with several treatment and disposal techniques, including:

- Incineration: This method entails subjecting the waste to high temperatures to destroy it.
- Landfilling: This approach involves securely burying the waste in an engineered landfill.

The ICHWTSDF plays a crucial role in safeguarding the environment and public health in India by offering a safe and eco-friendly means of hazardous waste disposal.

3. Draw and briefly describe the scheme of treatment for the Hazardous Waste.

Ans: Scheme of treatment:

1. **Receiving waste and inspection:** Hazardous waste from various clients is received by truck and containers at the ICHWTSDF. The waste is weighed and fingerprint analysis is done to ensure whether the waste sent has the same composition of the sample tested at the client's site. Clients are charged per unit mass basis.

2. **Segregation and storage:** The waste is segregated on the basis of physical and chemical composition.

3. **Treatment:** There are three main methods of treatment,
    a. Incineration: Incineration System is a technology which is used to destroy organic waste by thermal oxidation of all hazardous and harmful constituents in the waste. The incineration system installed at MWML is designed by M/S ALSTOM power Inc. U.S.A and having thermal Capacity of 5.5 MKcal/hr. It is a rotary kiln type incinerator suitable for all types of waste like solid, liquid and gaseous waste. It has a double combustion chamber with a gas quenching system, an air pollution control system for

particulate matter removal, a dry scrubbing system to absorb the organics, neutralization of acidic fume in the stack for safe exhaust of treated gas and an ID fan to maintain the negative draft throughout the system. It is operated automatically with a PLC & SCDA system and connected with a continuous emission monitoring system.

b. Landfilling: A secured landfill is used to safely and securely bury hazardous waste. Secured Lanfill in MWML are Double Compositive Liner System as per CBCB guidelines. The landfill also has a gas collection system to prevent the escape of toxic gases from the landfill into the atmosphere

c. Physico-chemical treatment processes: Depending on the type of waste, various physico-chemical processes are used to treat it. For instance, lime treatment can be used to precipitate heavy metals from waste. Caustic soda can be used to neutralize waste that contains acids.

   The facility has a well designed state of the art, modern laboratory. It is well equipped with all sophisticated instruments required for the analysis prescribed by governing authorities. The laboratory is recognized by the Ministry of Environment & Forest (MoEF) & is accurated by National Accreditation Board for Testing and Calibration Laboratories (NABL) as per ISO 17025:2005 .The laboratory team is well experienced in analytical and instrumentation techniques.

   The lab carries the comprehensive characterization of waste samples and accordingly prescribes disposal Pathway. Fingerprint analysis of waste samples received for the disposal is carried out meticulously in order to cross check the Comprehensive Analysis records of the particular waste. The lab carries out regular Environmental Monitoring of the facility which includes air, water, soil and noise monitoring. The lab

also has a Microbiology facility to assess microbial contamination in environmental samples. The said set up of the lab is also used for commercial environmental sample analysis.

4. **Disposal:** Depending on the type of waste, it is directly sent to landfill or sent to landfill after treatment or incinerated. The ash from the incinerators and other residues from the treatment processes are disposed of in a secure landfill. Currently, the facility has both closed and operating landfill. The closed landfill has a gas collection system for collecting landfill gas.

4. Mention the different parameters assessed before allowing the waste to enter the facility.

Ans: Three main types of parameters are assessed:

- Physical state: Physical parameters like colour, texture, flashpoint, specific gravity and calorific value are assessed to determine the appropriate treatment and disposal method. Weight is also taken near the gate to determine the exact mass of the waste being delivered.
- Chemical composition: Chemical parameters like pH, NH_3, PO_4, Cyanide, Sulphide, Sulphate and Chloride are also assessed to determine the exact physico-chemical treatment process to be used for treating
- Concentration of hazardous constituents: The concentration of various hazardous constituents are determined to ensure that the waste meets the facility's acceptance criteria.

Other than these factors, the source of a waste is also considered to determine how likely it might have hazardous constituents. For example, waste from hospitals has a higher percentage of hazardous constituents compared to waste from homes.

The ICHWTSDF has a strict set of criteria for accepting waste. It outright rejects the waste if it fails to meet any of the criteria.

5. Any other observation that can improve the existing conditions of the ICHWTSDF.

Ans: Some suggestions to improve the ICHWTSDF:

- Investing more in Research and Development to explore new and more environmentally friendly treatment methods and disposal options
- Incorporating environmentally friendly practices, such as renewable energy sources or sustainable construction materials, to reduce the facility's carbon footprint.