Saligao Solid Waste Plant Review Assignment

The right to a clean and healthy environment is fundamentally guaranteed to the citizens of India under article 21 of the Indian Constitution. It is of late that the Central Government, as well as the state governments, has begun to realise that there is a huge amount of work that needs to be done in order to maintain it. One such case, where the authorities took a step forward in this direction, is in the state of Goa.

Goa, the pearl of the east, blessed with abundant natural beauty, attracts more than a thousand visitors every day, to its small land. Due to the humongous number of tourists visiting this beautiful state of beaches, the amount of waste produced in this otherwise scarcely populated region is huge, and its proper disposal is a huge challenge. This waste menace causes an acute problem in the scientific, sustainable and safe management of landfills. It has been a long struggle for the governments to find a way to dispose of its large municipal solid waste (MSW).

The then chief minister, Manohar Parikar, thus, constituted a team of committed individuals who visited several sites in India and abroad searching for better methods of waste disposal. They toured around the globe to find the one practical solution and finally landed up in Italy, where they saw an excellent procedure of segregation, recycling and reusing of waste.

After much thought, the Government of Goa decided that the work should be given to the Hindustan Waste Treatment Pvt. Ltd. in collaboration with SPW formed by SFC Environmental Technologies Pvt. Ltd. The work was supervised by a team of highly skilled and experienced engineers headed by Padma Shri, Dr Kali with members from Neeri, IIT Mumbai, and BITS Pilani, K.K. Birla Goa Campus.

The construction site that had been decided for the new plant was an existing landfill, which needed to be corrected before the commencement of the actual construction. The team at SFC set themselves not just to build this plant, but to provide a solution for management of India’s MSW.

The 50,000 tonnes of waste dumped earlier was screened and separated into refuse-derived fuel (RDF) and compost. The work was done using vibratory belts and other heavy machinery to which the waste was fed in a record 45 days. The RDF was sent to a cement company, to assist in industrial growth, and the compost was used in greenbelt development. This can be taken as one perfect example of how industrial growth can be synchronized with the development of a sustainable environment.

Even while the remediation of the old site was in progress, the construction of the new sanitary cells had begun at a rapid pace. The whole task was supervised by a set
of qualified and trained engineers to ensure the maximum level of quality possible. The installation of machinery was done under the supervision of trained technicians, who flew in from equipment manufacturers from Italy and Germany. It took 15 months of hard work, to make India’s first integrated solid waste development plant, completely compliant with SWM 2016 rules, ready for operations. The whole process is described in detail in the following paragraphs.

The waste is carried into the plant by trucks from Panchayats and weighed before being put on the tipping floor. It is then taken to the conveyor belt by the front loader and fed to a bag opener. The bags are automatically opened and the contents are carried by a conveyor to the mechanical roller screen where large-sized recyclables are screened and transferred on the sorting line. The waste is then treated under very high pressure in a furnace. More than 95% of the organics along with moisture is removed from the pulp from the mixed waste.

This pulp is then pumped into the dry thermophilic fermenter from where methane is extracted. The H2S gas is then removed from the biogas by chemical scrubbing process and the pure biogas fed to two engines, with the potential to generate 7 Megawatt-hours per day.

The excess gas is flared off the digested sludge from the digester. The remaining pulp is then taken to a screw press where it is dewatered and the fibres are fed into an in-vessel composter that converts it into compost. The dry remainder from this step is then further taken through a permanent magnet to remove ferrous metal followed by flip flow screen and a wind sifter for separating the grit and the RDF.

The RDF is used for co-processing by cement companies and the grit is used for filling up low-lying areas or disposed into the scientific landfill. All effluents from the plant including flushing, flow washing and sewage are taken to an equalization tank. Suspended solids are settled in the Clary flocculator. The pH is corrected and the effluent is taken to a membrane bioreactor for biological oxidation of organic contaminants using microbes. Once the organics have been removed, the effluent is pumped into a reverse osmosis unit for removal of dissolved solids.

The clean and treated permeate is then used for gardening, floor cleaning, toilet flushing and other non-portable functions. All that remains at the end of the process is the grit which is less than 10 per cent of the waste received originally. This is put into a scientific landfill that is built and lined with bentonite, HDPE and geotextile covers.

Safety is of paramount importance here, and it is well taken care of at the Hindustan waste-treatment. The complete plant is monitored and operated from a central control room via a plc scada based system. The engineer on watch also has a
complete visual on key areas of the plant through a series of cameras. The plant is also equipped with all necessary safety features that include a full-fledged firefighting system and an emergency quick response vehicle. Key personnel are trained in the use of the safety equipment.

The odour levels are kept under control by effective use of large volume ventilation fans that draw the air from the process area and pass it through a biofilter before it is released to the atmosphere. The ambient air inside the sorting station is kept clean and cool by using air filter and cooling systems. Health and hygiene of the employees are also given due priority and special efforts have been made to integrate these features into the design of the project.

In the short span that these operations have occurred, there is already a noticeable change in the surrounding natural environment. Hindustan waste treatment is truly a step ahead in achieving the “Swachh Bharat” goal.