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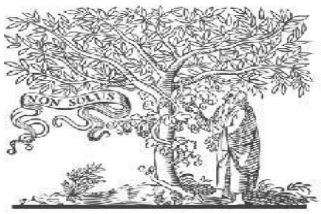

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A PROJECT REPORT ON INTEGRATED SOLID WASTE MANAGEMENT

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Abstract:
In few decades, managing solid wastes has been one of the burning problems in front of Hyderabad and local authorities. It is a place with increasing population and generates more waste particularly for food and plastic related items. This is due to scarcity of lands for landfill of the municipal solid waste. Not only scarcity of lands it also pollutes whole the environment by dumping and burning the municipal solid waste in the landfills. Judiciously handling the environmental issues like solid waste management has become necessary for sustainable development of the society. Thus, conversion of municipal solid waste to Energy and Resources (electricity production, fertilizers production, leachate treatment and extraction of methane gas) is the best approach to reduce space and environment and public health related problems. This has to be managed by technologies that prevent pollution and protect the environment and at the same time minimize the cost through recovery of energy. Energy recovery in the form of electricity, heat and fuel from the waste using different technologies is possible through a variety of processes, including incineration, gasification, aerobic and anaerobic digestion and treatment of leachate water. This was processed under "Hyderabad Integrated Municipal Solid Waste Management'' at Jawahar Nagar Dumping Yard". The purpose of the study is to assess the current status of solid waste management practices in Hyderabad. Effort has also been taken to explore in depth the solid waste to energy programs currently followed in the Hyderabad.

1.0 Introduction

Over the last few decades rapid growth in urbanization, change in life styles and rise in population has resulted in generation of huge quantity of Municipal Solid Waste (MSW) in Hyderabad. The quantity of MSW generated is much higher than the quantity collected, transported and disposed, leading to pilling up of uncollected waste in streets, public places and drains. Even the collected waste is mostly dumped on the outskirts of towns/cities and has created serious environmental and public health problems. Studies have shown that a high percentage of individuals who live near or on disposal sites are infected by gastrointestinal parasites, worms, and other pathogenic organisms. The insanitary methods adopted for disposal of municipal solid wastes are, therefore, a serious health concern. The poorly maintained landfill sites are causes of surface and groundwater contamination, soil and air pollution in Hyderabad in order to overcome all these problems, the Central Pollution Control Board (CPCB), Telangana State Pollution Control Board (TSPCB) and Greater Hyderabad Municipal Corporation (GHMC) Officials has started Hyderabad Integrated Municipal Solid Waste Management Project (HIMSWMP) at

Jawahar Nagar Dumping Yard. The Jawahar Nagar Dumpsite has two components the capped waste in 130 acres of land and integrated solid waste processing facility constructed from reclaimed land of legacy waste in an area of 200 acres. The capping and integrated solid waste processing plant is operated and maintained by Ramky Enviro Engineers. HiMSW Ltd. is the organization chosen to operate & maintain facilities to manage the Municipal Solid waste for the city of Hyderabad.

Scope of the Work:

- To ensure waste collection from waste generators within GHMC Area, including primary and secondary collection, and transportation of waste up to transfer stations.
- To process MSW as per MSW rules and other applicable regulations and to transport and dispose the residual inert matter at the landfill Site.
- Reclamation and alternative use of existing dump sites: at Jawahar Nagar, Fathullaguda, Shamshiguda, and Gandhamguda.
- Information, Education & Communication (IEC) campaigns with the public and all stakeholders in GHMC Area to inculcate good MSW management practices, including recycling, and segregation.
- Interfacing with existing organized and unorganized waste-collection and management systems to ensure that there is a smooth and harmonious working of the systems.

Objectives of SMW

- The primary goal of solid waste management is reducing and eliminating adverse impacts of waste materials on human health and the environment to support economic development and superior quality of life.
- The purpose of waste ACT is to support sustainable development by promoting the rational use of natural resources, and preventing and combating the hazard and harm to health and the environment arising from wastes.
- To reduce the quantity of solid waste disposed of on land by recovery off materials and energy from solid waste.
- To assess the activity involved for the proposed and determining the type, nature and estimated volume of waste to be generated.

2.0 Collection of Municipal Solid Waste:

Collection of solid waste from home to home and community bins by the municipal garbage trucks. on Collecting regular pre informed timings and scheduling by using announcements by vehicle. Not only from homes, collecting wastes from slaughter houses, fish and meat markets, fruits and vegetables market which are biodegradable in nature, and non-biodegradable waste like plastic is also collected. The waste which is collected by the open garbage trucks is conveyed to the transfer station which is near to that locality. Not only from that particular area, waste collected from all the surrounding areas which comes under that particular transfer station. Storage facilities shall be created and established by taking into account, quantities of wastes generated in a given area and the population densities. A storage facility will be placed that it is accessible to users. By the end of the day the waste which is stored in a transfer station is weighed and transferred to the processing and disposal site [ISWM] by using portable self-compacters [PSC's] which is having a capacity of 20 cubic meter. There are 2500 autos were flagged off under Swachh Telangana programme, the daily garbage

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generation on the city was 3500 tonnes. With improvement in efficient in door-todoor garbage collection, provision of transfer station and dumping yards, the garbage generation has now gone up to 6500 tonnes.

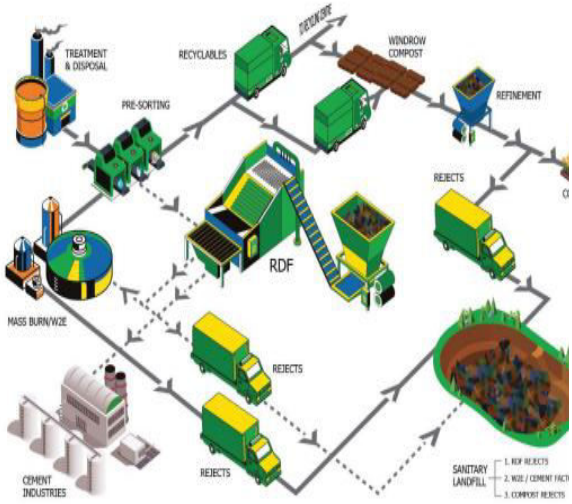

Fig: stages of ISWM.

MONSOON SECTION / COARSE SEGREGATION UNIT:

The compost which is taken from the windrow section is passed through the sieve of size 20mm. The material which is passed through the 20mm screen is considered as a semifinished material and the material which is retained on 20mm screen is considered as a reject. The semi-finished material is now moved to the further process. And the rejects are used in a landfill. This monsoon section is also called as a coarse segregation section. Screened material coming out of the coarse segregation section requires further maturation and moisture control for producing a product that is beneficial for plants and soils. The degree of maturity is determined through either oxygen uptake or CO2 production rate. Mature and high-quality compost should have a C/N ratio of around 20. Compost with either higher or lower C/N ratio is not beneficial to the soil.

Fig: Monsoon Section/Coarse Segregation

3.0 WASTE TO ENERGY:

It aims to solve major environment issues namely pollution caused due to plastic waste accumulation and need for an alternate fuel source. The waste to energy process that is used to convert plastic into fuel is pyrolysis. The conversion of waste matter into various form of fuels that can be used to supply energy is called waste to energy technology. Waste to energy takes non-hazardous waste otherwise destined for landfill, and combusts it. It generating steam for production of electricity. In pre-sorting unit, the rejected waste material which is above 100mm screening is consider as RDF. This waste is carried by lorries or trucks to the tipping hall and dumped. This dumped waste is combustible. Waste to energy is mainly depends on incineration process. In this tipping hall, incineration process is done to make the waste material more combustible by transferring into boiler. In waste to energy the RDF is contains a material like, plastic, clothes, coconut shells which are combustible to produce steam to energy. After the total process of incineration, the scrap metals, bottom ash and fly-ash are the by-products. The scrap metals are now almost systematically extracted from the bottom ash. Metal quality is very high and rising market prices mean good income stream for operators. Reusable bottom ash is a useful construction material and flyash is used for the production of cement in cement industries. Using it offsets the need to extract raw materials, which has

considerable environmental impacts. It is disposed of when no demand exists or if waste contaminated it. In Hyderabad the Central Pollution Control Board (CPCB), Telangana State Pollution Control Board (TSPCB) and Greater Hyderabad Municipal Corporation (GHMC) Officials has started Hyderabad Integrated Municipal Solid Waste Management Project (HIMSWMP) at Jawahar Nagar Dumping Yard which has a waste-to-energy plant. This waste to energy plant has the capacity of 20mw generation of power in the Hyderabad. For the production of 20mw power generation they use 3500 tonnes of 6500 tonnes of garbage waste which is collected in a day in the city.

Waste moisture content: The greater the moisture content, the more fuel is required to destroy the waste. An aqueous waste with a moisture content greater than 95 percent or a sludge waste with less than 15 percent solids content would be considered poor candidates for incineration.

Heating value: Incineration is a thermal destruction process where the waste is degraded to nonputrescible form by the application and maintenance of a source of heat. With no significant heating value, incineration would not be a practical disposal method. Generally, a waste with a heating value less than 1000 Btu/lb as received, such as concrete blocks or stone, is not applicable for incineration. There are instances, however, where an essentially inert material has a relatively small content (or coating) of combustibles and incineration would be a viable option even with a small heating value

Grate Design: A number of different types of grate designs are used in central waste burning facilities. Each grate system manufacturer provides a unique grate feature, attempting to obtain a competitive edge in the marketplace. The grate system manufacturer should be contacted for design and sizing information for a particular grate design. The following listing describes typical grate systems, both generic grate types and grates specific to certain manufacturers.

4.0 FLOWCHART OF LEACHATE TREATMENT:

- In this stage the leachate is collected from the leachate collecting pond through pipes to the grit chamber.
- In grit chamber, the leachate is allowed to remove the oil contaminants by using screeners and suspended particle of size 1mm-20mm are deposited down.
- After removing the oil from leachate, now the leachate is passed to the equilization chamber. Were the thicky water is allowed to be stable for few hours to exposed to the atmosphere to remove the bad smell.
- The leachate is collected from the leachate collected tank through the drains to the pre-treating unit of grit chamber.
- In grit chamber, the leachate is allowed to be undisturbed for removal of oil from the waste water.
- After the removing of oil from the leachate, then it is transferred into the equilization chamber.
- In this equilization chamber, the leachate is exposed to the aeration process to expose to oxygen to remove the odour from the leachate.

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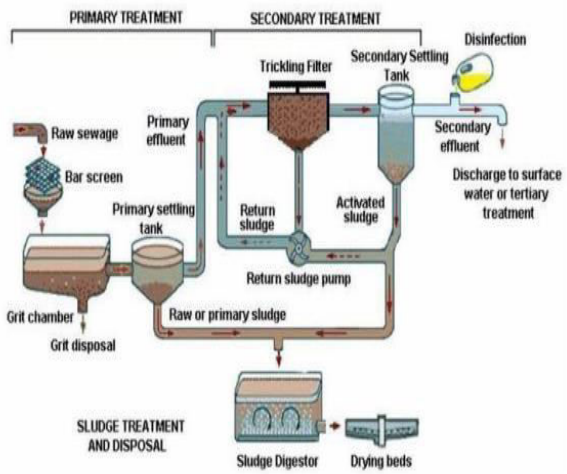

Fig: preliminary treatment of Leachate

ADVANTAGES OF LEACHATE TREATMENT:

- Lower disposal of phosphorous required as a growth factor for anaerobic bacteria.
- Lower excess sludge production.
- Lower energy usage and operation costs.
- Useable biogas production.
- Removal of more than 90% of BOD.
- HIGHER organic loading rates.

RECYCLING OF PLASTIC:

Plastic recycling is the method of gathering waste plastic and reconverting them to new and useful plastic products. The world produces and makes use of more than a trillion pounds of plastic material. Plastic recycling ensures that is massive amount of plastic does not go to waste.

The main aim of recycling: - Recycling reduces the need for extracting, refining processing raw materials all of which. Create air and water pollution. as recycling. Saves it energy it also reduces greenhouse gas emissions, which create air and water pollution. As recycling greenhouse gas an emission, which helps to Tackle climate change. Recycling prevents the emissions of many greenhouse gases and water pollutants, and saves energy. Using recovered material generates less solid waste. Recycling helps to reduce the pollution caused by the extraction and processing of virgin materials.

Importance of plastic recycling: - For every ton of plastic that is recycled, 7.4 cubic yards of land fill spaced is saved. Ensuring we recycling as much plastic as possible will extend the lives our landfill sights, and stop the process many practices of burning plastics to save space, which releases toxic irritants and pollutants into the atmosphere.

Purpose of recycling: - Recycling conserves resources: If used material are not recycled, new products are made by extracting fresh, raw material from the earth, through mining and forestry. Recycling helps conserve important raw materials and protects natural habitats for the future.

Process of recycling:- Recycling, recovery and reprocessing of waste materials for use in new products. The basic phases in recycling are the collection of waste materials, their processing or manufacture into new products, and the purchase of those products, which may then themselves be recycled.

Collection + distribution: - The first step in the mechanical recycling process is the collection of post – consumer materials from homes, businesses, and institutions. This can be done by either local government or private companies, with the latter often a popular option for businesses. Another option is taking plastics to communal collection points such as designated recycling bins or facilities

Sorting & categorizing: - The next step in the plastic recycling process is sorting. There are several different types of plastic (see below), which need to be separated from each other by recyclers. further to that, plastic might be sorted. By other properties such as color, thickness and use.

washing: - washing is a crucial step in the plastic recycling process since it removes

same of the impurities that can impede the operation, or completely ruin a batch of recycled of plastic. The impurities targeted in this step commonly include things such as products such as labels and adhesives as well as dirt and food residue.

Shredding: - The plastic is then fed into shredders, which break it down into much smaller pieces. These smaller pieces, unlike formed plastic products, can be processed in the next stages for reuse. Additionally, the resized plastic pieces can be used for other applications without further processing, such as an additive within asphalt or simply sold as a raw material.

CONCLUSION

- The solid waste has high plastic content, metals and alloys. Our aim is to make this plastic as recyclable and reuse the material to reduce the plastic pollution.
- To dump the solid waste, it took acres of land, by increasing of population generating waste is more to reduce the dumping land reusing of waste methods are important.
- Higher quantity of flammable gas ids generated from the landfills which is used as fuel to make light and heat.
- Using this solid waste generation of electricity is useful to increase the power supply for consumers.
- Leachate is very harmful liquid is having a pH range of 8-8.5.
- The treated leachate water can be utilized for purpose like gardening, washing vehicles and cleaning sheds etc.
- Compost is a manure which is a very natural fertilizer, which helps the fields to grow with little amount of chemicals.
- The flammable gas which is generated is considered as bio gas which is supplied in future to home through a pipe line.

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