WASTE MANAGEMENT: A CASE STUDY OF OIL AND NATURAL GAS CORPORATION OF INDIA

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Abstract: Waste has been a major environmental issue everywhere since the industrial revolution. Besides the waste we create at home, school and other public places, there are also those from hospitals, industries, farms and other sources. Humans rely so much on material things and they all (almost) end up as waste. Europe creates about over 1.8 billion tonnes of waste each year. This means each person creates about 3.5 tonnes on average. Waste management simply means the collection, transport, processing or disposal, managing and monitoring of waste materials to minimize its consequences on humans and environment. All waste materials, whether they are solid, liquid, gaseous or radioactive and hazardous fall within the remit of waste management. Waste management practices can differ for developed and developing nations, for urban and rural areas, and for residential and industrial producers. Management of non-hazardous waste residential and institutional waste in metropolitan areas is usually the responsibility of local government authorities, while management for non-hazardous commercial and industrial waste is usually the responsibility of the generator subject to local, national or international authorities. There are several methods of managing all the various types of waste. Some of these methods cause additional harm to the environment, but not doing anything is not an option. The present research paper is an attempt to analyze the significant role for waste management by the Oil and Natural Gas Corporation (ONGC).The research questions also examine what ONGC's initiatives taken for waste management and how the ONGC implement their initiatives for the management of waste? And also evaluates impacts of ONGC's actions on the waste management.

Keywords: Waste, management, bioremediation, paper recycling, drilling, landfill, Incineration.

Introduction: Waste has been a major environmental issue everywhere since the industrial revolution. Besides the waste we create at home, school and other public places, there are also those from hospitals, industries, farms and other sources. Humans rely so much on material things and they all (almost) end up as waste. Europe creates about over 1.8 billion tonnes of waste each year. This means each person creates about 3.5 tonnes on average[1].

Waste, or rubbish, trash, junk, garbage, depending on the type of material or the regional terminology, is an unwanted or undesired material or substance. It may consist of the unwanted materials left over from a manufacturing process (industrial, commercial, mining or agricultural operations,) or from community and household activities[2]. Waste are items we (individuals, offices, schools, industries, hospitals) don't need and discard. Sometimes there are things we have that the law requires us to discard because they can be harmful. Waste comes in infinite sizes—some can be as small as an old toothbrush, or as large as the body of a school bus.

Everyone creates waste, although some people are very environmentally conscious and create very little. Likewise, some countries do a very good job creating less waste and managing the rest. Others are pretty horrible and have created huge environmental problems for the people and animals living there[3].

Definition of Waste Management: Waste management simply means the collection, transport, processing or disposal, managing and monitoring of waste materials to minimize its consequences on humans and environment[4]. All waste materials, whether they are solid, liquid, gaseous or radioactive and hazardous fall within the remit of waste management. Waste management practices can differ for developed and developing nations, for urban and rural areas, and for residential and industrial producers. Management of non-hazardous waste residential and institutional waste in metropolitan areas is usually the responsibility of local government authorities, while management for non-hazardous commercial and industrial waste is usually the responsibility of the generator subject to local, national or international authorities[5].

There are several methods of managing all the various types of waste. Some of these methods cause additional harm to the environment, but not doing anything is not an option[6].

Following are very common ways or methods of managing waste:

- Incineration method of waste management
- Sanitary Landfills as waste disposal
- Waste Recycling
- Biological Reprocessing or Composting
- Waste Minimization or Reduction method of Waste management
- Energy Recovery or Waste-to-energy
- Resource Recovery
- Waste handling or Transportation method of waste management

Apart from that, ONGC has also played a very crucial role for waste management. Few methods of managing wastes are said above. ONGC has taken initiatives as policies and measures for waste management. Few methods for managing wastes initiated by ONGC are given below.

Before starting the methods of waste management initiated by ONGC, we starts from brief introduction of ONGC.

Brief Introduction about the Company (ONGC): Oil and Natural Gas Corporation (ONGC) is a public corporation. It is a multinational oil and gas company and state owned corporation of the Government of India. Its headquarter is situated in Tel Bhavan, Dehradun in India. It is one of the largest oil and gas exploration and production (E&P) companies of the world. It is one of the only seven *Maharatna* status companies of India. It has been recognized as the *world's No.3 in Global E&P companies.* ONGC's vision is to be a global leader in integrated energy business through sustainable growth, knowledge excellence and exemplary governance practices. It is the only Indian energy major in *Fortune's Most Admired List 2012*[7].

ONGC: Policies and Measures for Waste Management

1. Bioremediation: Accidental oil spillages and the tank bottom sludge generated during the routine operations has threatened to the environment. ONGC, hence, decided to look for environmental friendly options for the disposal and treatment. The corporation explored the biotechnological option i.e. bioremediation in which the aboriginal bacteria's are isolated, enriched and harnessed on mass scale for application in the field[8]**.** ONGC has been one of the pioneers to apply bioremediation technology to treat oily wastes originated from oil industry[9]**.** As an innovative solution, bio-remediation technology has been extensively and effectively used for treating oil infected soil within installations. ONGC has associated with *The Energy and Resources Institute (TERI)* for implementation of this technology and *Oil zappers technology* developed by them has been applied for bio-remediation oil infected soil and oily sludge[10]**.** ONGC has carried out research and pilot projects to develop suitable microbial consortia which can effectively reduce hydrocarbon content from oily waste and render the waste completely non-hazardous. Besides this, ONGC has also embarked upon the Microbial Enhanced Oil Recovery (MEOR) in which the use of bulk chemicals in conventional secondary recovery technologies, is reduced to very great extent, thereby this technology will reduce the carbon foot prints to great extent in future[11]. Approximately, 64,453 MT of soil polluted by oil, oily sludge has been successfully treated at various work centres of ONGC so far through bio-remediation[12]. 25,000 MT of oily waste treated using bioremediation during 2011-12.

Figure No.1. Application of Bioremediation

Source: ONGC. (2009). Global Compact Annual Communication on Progress.

Figure No. 2. Before Bioremediation

Source: ONGC. (2009). *Global Compact Annual Communication on Progress.*

Figure No. 3. After Bioremediation

Source: ONGC. (2009). *Global Compact Annual Communication on Progress.*

2. Management of Drilling Waste in Oil and Natural Gas Corporation: Drill cuttings and a little amount of drilling liquor discharged along with drill cuttings are the key wastes generated at the drill sites. To come up with an environment friendly solution to the waste drill cutting disposal, ONGC has undertaken an Research and Development (R&D) project to study the viability of applying drill cuttings in construction of approach roads to operational sites. The Central Road Research Institute (CRRI), New Delhi was engaged to carry out the study[13]. The findings of the study will be helpful to resolve the

problem of disposal of drill cuttings in secured landfills which is cost intensive and occupies the precious land for all the times to come[14]. Drill cutting samples from Ankleshwar were studied and it emerged that drill cuttings can be used as sub-grade material in making roads without harming the environment. The result was communicated to the Ministry of Environment and Forest (MoEF) officials who in turn recommended carrying out one more study involving a completely different geological location. Accordingly, CRRI has been engaged to carry out a similar study for drill cuttings from Assam region. The studies on drill cuttings from the Assam region, and this study is in progress[15].

3. **Waste-to-Energy**: ONGC has initiated a project in which organic waste will be collected from ONGC's residential colony at NOIDA and digested anaerobically to produce biogas[16]. An Enhanced Acidification and Methanation Plant have been inaugurated at the ONGC colony, Noida. The plant can handle kitchen and organic wastes up to 100 kg per day and can generates 5 kg of biogas which is being used to run the kitchen of the guest house[17]. The biogas, thus, produced will be utilized for cooking activities. Thus, load on municipal solid waste sites is minimized and clean energy is derived out of waste[18].

4. **Paper Recycling:** Recycling is processing used materials (waste) into new, useful products. This is done to reduce the use of raw materials that would have been used. Recycling also uses less energy and great way of controlling air, water and land pollution. Effective recycling starts with household (or the place where the waste was created) [19]. Recycling is beneficial in many ways. It helps and protects the environment, conserves natural resources, saves energy and also creates jobs[20]. ONGC has played a very significant role for paper recycling. So it has taken initiative to recycle waste papers from its offices to recycle through credible organizations. So far the corporation has been able to ensure more than 60,000 kg of paper is recycled[21].

Conclusion: ONGC has played an important role for waste management. But, it is not satisfactory because it neither implements a lot of methods nor covers all the areas in the country. Although, NGO and the government of our country has been making good initiatives for waste management. But, it is not good enough. So, ONGC is doing an appreciable work by adopting few methods for waste management.

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