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Effect of Hazardous Waste Associated with Oil and Gas Projects in Onshore Region

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Abstract: ***Oil and gas projects within coastal region generate the large quantities of waste which are potentially very hazardous to the environment, micro organisms and human beings. Wastes can be generated from pipeline linking the platform to the shore, drilling of oil and gas wells, offshore platforms, building plants and usage of equipment. It deteriorates the environmental quality such as air, water and noise in the surrounding area belongs to the port and harbor and creates pollution from disposal of waste from both point sources and non point sources. It affects the lots of biological matter settles at the seafloor. During oil and gas projects, hazardous waste may release through the leaks and spills during transfer and storage and also by maintenance activities. The purpose of this paper is to provide an overview of environmental issues due to disposal of waste from oil and gas projects and to determine the effectiveness of measures to mitigate adverse effects on the environment. Findings were obtained from the interaction with experts working in these projects and secondary source of information. This paper concludes that recommended control measures can minimize the hazardous waste in oil and gas projects as per the guidelines of environmental aspects.***

Keywords: Hazardous waste; Onshore region; Oil and Gas Projects; Environmental issue; Human factors; Economic status;

1. Introduction

Earth is covered with 73% of water and 27% with land surface. Rather than all other place shore only covers both water surface and land surface. Due to development of urbanization, onshore becomes drastically damaged by air pollution, water pollution, etc. and generates hazardous waste in the form of solid, liquid and gas by industrial sectors. Hazardous waste not only affects the environment but also it shares the effect on socio economic status of the surrounding area. Activities related to oil and gas projects are complex in nature and wastes which are generated through these projects are potentially very hazardous to the environment, micro organisms and human beings. Wastes can be generated from pipeline linking the platform to the shore, drilling of oil and gas wells, offshore platforms, building plants and usage of equipment. No proper waste management plans and polices are followed by industries in order to control the hazardous waste.

This paper aims to provide an overview of environmental issues due to disposal of waste from oil and gas projects and to determine the effectiveness of measures to mitigate adverse effects on the environment. Findings were obtained from the interaction with experts working in these projects and secondary source of information. This paper concludes that recommended control measures can minimize the hazardous waste in oil and gas projects as per the guidelines of environmental aspects.

2. Oil and Gas Projects

Oil and gas projects can be in both onshore as terrestrial and offshore as marine areas. Sometimes it can be in combination of both onshore and offshore occurs in a different scaling. These projects are mainly used for the creation of petroleum products, natural gas and some other products by degradation of organic substance. Oil and gas project sector is a long term process and is divided into two different activities as upstream and downstream. Upstream activities includes mainly as exploration activities namely seismic surveying and drilling operations. Oil development and production comes under the upstream activities. Downstream activities consist of operation process, transfer of oil and gas through the pipelines and distribute the substances into petrol, lubricants, fuel oil. Each activities produces different kinds of waste could have significant adverse impact on the environment, social and economic conditions.

3. Hazardous Waste from Oil and Gas Projects

Waste is defined as any substance as solid, liquid or gas which can be removed from the useable materials. Hazardous waste which means that waste having organic or inorganic substances that gives very toxicity to the health and environment.

Oil and gas projects within coastal region generate the large quantities of waste which are potentially very hazardous to the environment, micro organisms and human beings. Wastes can be generated from pipeline linking the platform to the shore, drilling of oil and gas wells, offshore platforms, building plants and usage of equipment. It deteriorates the environmental quality such as air, water and noise in the surrounding area belongs to the port and harbor and creates pollution from disposal of waste from both point sources and non point sources. It affects the lots of biological matter settles at the seafloor. During oil and gas projects, hazardous waste may release through the leaks and spills during transfer and storage and also by maintenance activities.

4. Need for Study

The purpose of this study is to find out the activities which generate hazardous waste in oil and gas projects and its level of impact on environment and also to find its effect on socio economic status of surrounding area.

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5. Research Methodology

5.1 Data collection

Data's were collected through discussion with experts working in the environmental officers under the division of environment. The discussion gives a brief description about the activities which generates hazardous waste from oil and gas projects. Fig 1 shows the solution methodology for this study.

5.2 Findings through discussion

The activities which generate hazardous waste through oil and gas projects were identified by discussion with experts. Hazardous waste were classified depend upon the materials as corrosive materials, explosive materials, oxidizing materials, toxic materials, unstable materials and radioactive materials. These waste materials generate from oil and gas projects depend upon activities as shown in table 1.

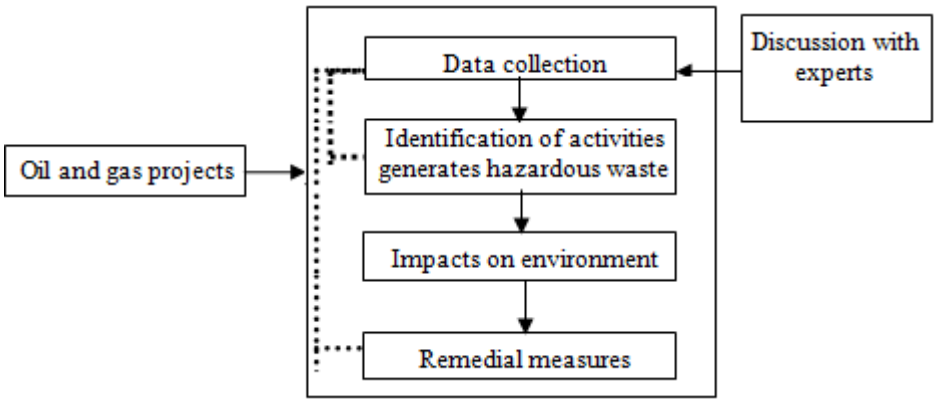


Figure 1: Solution methodology

Table 1: Hazardous waste material generated from oil and gas projects

Activities	Hazardous waste
Exploration	Cans, Tins, Juice boxes, Plastic bottles, release of volatile gases
Drilling operation	Mostly domestic waste, Mud, Wood ,Food waste, oil spillages
Construction	Construction Material waste
Separation and compression	Sulphur production, accidental spills
Operation or production	Contaminated packages, Non-recyclable plastics, Aluminium cans, Food tins, Polyethylene, Car batteries, Paper and Cardboard, Electric cable

6. Hazardous waste effects on environment

Oil and gas exploration and production activities have serious impacts to the environment due to the waste generation. Impacts having several types as health effects to the humans, socio economic impacts, marine impacts, terrestrial related to the landside activities impacts.

6.1 Effects on human factor

Due to the increase of risks, major explosions and oil leakages have an impact to the community which damages the economic status of the people. Oil spills leads to the health hazards to the humans as spread of diseases, skin problems and respiratory problems. Relocation of settlements and leakages of gas pose a threat to the community. Peoples living in the surrounding area whose water supply also contaminated due to the drilling operations and also water shortage occurs in some cases that cause an impact on indigeneous people as children, old people and differently abled persons.

6.2 Effects on socio- economic

Exploration and production activities place a major role in socio economic damages. Changing of land use patterns leads to damaging agriculture, fishing etc. waste dumped in the landfills and create pollution to the environment, exploitation of natural resources. Aesthetic value could be decreasing. Due to environmental changes people affected from some socio cultural activities as Employment opportunities, income disputes. Conflicts between development and production cause damage to the historical resources, natural resources, historic site and archeological site.

6.3 Effects on atmosphere

Emissions from the oil and gas exploration and production depend upon the source and nature contributes to the atmospheric impacts. Production process pose a major risk for the climate change from sea level rise, water availability and weather conditions. From the refining process green house gases have been emitted cause a long term impact as ozone depletion and exploitation of finite fossil resources. Separation process involves concentration of sulphur leads to the pungent odor in surrounding areas.

6.4 Effects on marine ecology

Aquatic flora and fauna can be affected by activities involved in oil and gas projects mainly as excavation and drilling operations. Corals, seaweeds and their marine biodiversity can be highly affected by offshore operations. Water production is a primary effluent for ecological impacts, oil bases liquids has very toxicity and damage to the environment and human health. Soil conditions may damage due to the leakages of oils. Vegetation removal

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leads to erosion and siltation may have impact an ecological diversity and vulnerable to predators.

7. Suggestions to Mitigate Hazardous Waste

From this study, it is observed that due to the lack of proper maintenance and inexperienced peoples working in waste management plan (WMP), wastes are generated in the oil and gas projects. In order to reduce such waste, skilled labours should be allowed to work with waste management plan and there should be a thorough study on hazardous waste and its effects on environment. The range of hazardous is massive if the area is polluting with oil and gas hazard. Following remedial measures can be applied to mitigate the adverse effect on environment:

- Reduce the waste creation at hazardous condition
- Disposal of unavoidable wastes safely
- Proper maintenance on WMP
- Awareness program on environmental protection in compliance with regulations
- Try to reduce the generation of waste
- Use production of goods in proper way which is low capacity of waste generation
- Systematic approach to management of health safety and environmental issues
- Adequate handling on WMP

8. Summary

Oil and gas projects within coastal region generate the large quantities of waste which are potentially very hazardous to the environment, micro organisms and human beings. This paper provides an overview of environmental issues due to disposal of waste from oil and gas projects and to determine the effectiveness of measures to mitigate adverse effects on the environment.. This paper concludes that recommended control measures can minimize the hazardous waste in oil and gas projects as per the guidelines of environmental aspects.

References

[1] Fatima Zohra Kiboub, Trondheim., June 2011 "*Oil and Gas Production Waste*" , Norwegian University of Science and Technology.
[2] Michelle Bamberger, Robert Oswald E., 2012 "*Impacts of gas drilling on human and animal health*", New Solutions vol (22) (1) 51-77.
[3] Pervez Alam and Kafeel Ahmade., 2013 "*Impacts of Solid Waste on Health and Environment*", Special Issue of International Journal of Sustainable Development and Green Economics ISSN No 2315 – 4721 V-2 I- 1.
[4] Andrea de L. Oliveira , Alexander Turra., 2015 "*Solid Waste Management in Coastal Cities*", Journal of Integrated Coastal Zone Management, 15 (4): 453-465.
[5] Johor Bahru ., 2003 "*Hazards at Construction Sites*", Proceedings of 5th Asia- Pacific structural Engineering and Construction Conference.

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