

Risk Management in Petroleum and Petrochemical: An Introduction

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Abstract- In this paper we are presenting risk management in petroleum and petrochemical. Only the risk manager who is capable of understanding these complex interaction will be able to lead an organization towards a safer and more profitable future. Some previous modern safety research has shown that the interaction between human technical and organizational factor determine the performance of a company not only in term of quality cost and delivery time but also in term of safety. The petroleum and petrochemical industry's need safety organization to be the first responsible for any accident accrue in the industry which it can be called safety organization of chemical plants (SOCP). The (SOCP) has to do all the investigation for the industry to make the industry working on safety without any problem which can be supported by the government and allow the organization to provide safety license for all the chemical plants. Despite how sophisticated technical solution and risk mitigation measure have become the human factor remains unpredictable as ever. Recognizing this irrevocable truth is therefore the first step in creating successful risk managements strategies especially if one consider that, the term human factor is not limited to the short coming of misguided, individuals, it includes entire organization and in particular the members in charge.

Index Terms- Fuel, Production, SOCP, Oil, Chemical.

I. INTRODUCTION

In the case of the deep-water explosion and its subsequent oil spill, eleven offshore workers lost their lives and cleaning the coastal areas in the gulf of Mexico will take decades and require billions of dollars. Furthermore independent accident investigation have identified and disclosed various organizational shortcoming as the root cause of the these accidents. Although the public debate about petrochemicals and petroleum risk management often

lacks a sense of objectivity and disregards. The industry's considerable safety achievements over the past few decades, it must be acknowledged that the petroleum and petrochemical risk managements offer room for improvement especially in the incorporation of human interaction into decision making process.

Only the risk manager who is capable of understanding these complex interaction will be able to lead an organization towards a safer and more profitable future. Modern safety research has shown that the interaction between human technical and organizational factor determine the performance of a company not only in term of quality cost and delivery time but also in term of safety. Environmental change and vitality security are the primary thought processes in utilizing sustainable power source assets [1]. Biodiesel is elective fuel which can be characterized as ethyl or methyl ester got from vegetable oil or creature fats which can be utilized in diesel motor without or little alterations to diesel motors [2]. Vegetable oils are potential feedstock for biodiesel generation [3]. Utilizing vegetable oils for generation of biodiesel decreases nourishment security and exorbitant too [4], [5]. Cost of waste cooking oil is lower than that of vegetable oils and diesel fuel [6].

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The highly universal quest and pressurized demand for pollution prevention and accounting for environmental considerations makes sustainability an important objective function. Therefore, in my

project sustainability is quantified by environmental risk and safety indices and increasing profit represented by safety management process for the chemicals plants. So the safety management is assumed that the overall chemical industry has to utilize its available resources in an optimal environmental way.

II. PRODUCTION PETROLEUM AND PETROCHEMICAL INDUSTRY

Petroleum is the most valuable feedstock for both fuels and chemicals. It is clear that, the value of the products from a barrel of oil is far more than the selling price of a barrel, even considering the cost of manufacturing. For example, 120 litres of naphtha, weighing 84 kg, will yield:

- 20 kg of ethylene, enough for 25 shirts and 20 plastic buckets, or 160 m of a garden hose;
- 13 kg of propylene, enough for 21 sweaters.
- 22 kg of cracked gasoline, enough for 220 nylon slips or 520 panty hoses.
- 8 kg of butylene, enough for one car tire or 13 bicycle tires.
- 16 kg of gas, enough for 17 days for a household.
- 5 kg of cracked heavy oil.

Very wide ranges of chemicals are manufactured from oil and gas. These consist of synthesis resins and plastics, textile fibres, rubber, industrial chemicals, agricultural chemicals, solvents, pesticides, and detergents. Chemicals can be standard chemicals such as ammonia, acetone, glycerol, etc., or specialty chemical such as plastics, detergents, sulfates, pesticides, etc. Due to the complex nature of the petrochemical industry, especially the multiple methods of producing chemicals, the petrochemical industry is cross-linked and can be visualized as a network of chemical processes connecting basic feedstock chemicals to the desired final products.

The selection of the chemical process route in the network is the key decision for preliminary stages of chemical plant design and development. In the past, economics were the most important criteria in choosing the chemical process routes. Safety and environmental risk have now become important considerations since the earlier the environmental

friendliness of a proposed chemical process plant is considered the better.

This is because the impact upon the final plant design depends on the decision made in the initial stages and the changes are easier and consequently the cost is less. An environmental hazard is potential to cause harm to the environment. Chemical plants are usually environmentally hazardous because they typically contain large inventories of Ecotoxic chemicals in addition to the emissions and releases from the chemical process. The hazard to the environment due to a chemical has been defined as a function of two elements.

The damage that the chemical could cause to the environment following.

- Loss of contaminant that is the effect of chemical.
- The quantity of chemical involved that is the exposure of the chemical.

The required outcome of this approach is continual improvement in environmental management and sustainability by health and safety instructions. The establishment of the environmental management systems has a long detailed program, but it always starts by setting the policy and planning. By setting the environmental policy, the aspects of the environmental concerns and problems will be of a clear firm. Previous definition of environmental hazard will help to develop a control strategy for the negative sides of the environmental aspects and will help to clearly define the required objectives and target of the planned environmental system. Next, planning can be accomplished, based on a clear understanding of the environmental problem and using the available solution strategies and tools. In our case, we will use economics, provide specific safety management of chemical plants and environmental risk assessment concepts for planning

III. TYPE OF RISK MANAGEMENT IN ALL OIL AND GAS INDUSTRY

There are a lot of potential risks. The most prominent are safety risks. Risks associated with oil radioactive measuring devices are not among the leaders. Safeties, environmental and economic risks (often associated with reliability) are probably the most important risks. The risk of fire is probably the most common potentially catastrophic safety risk, the

release of extremely hazardous material like HF is a low probability safety risk with extremely high potential consequences. Preventing oil spills, leaks both minor and major containing them when they inevitably happen is also an important consideration. The risk of operators tripping or falling etc is a significant problem and there are also a large number of relatively minor safety risks like bumping heads on low piping, tripping hazards etc.

Three common types of risk management in all oil and gas industry:

1. Economic risk
2. political risk
3. environment risk

IV. ALTERNATIVES DIESEL FUEL

Huge amount of used lubricating oils from automotive source and non-automotive source are disposed of harmful waste into the environment. Automotive used oil is generated from the transport sectors when oil loses its effectiveness. During operation oil after a time of use degrade the fresh lubricant component. Used lubricant oil is any petroleum-based or synthetic oil that has become unsuitable for the use to which it was initially assigned (FirasAwaja et al.,2006). They are composed of toxic chemicals such as heavy metals from the additives, wear and tear of engine parts together with water, combustion, products, light hydrocarbons, mono-aromatic and poly-aromatic compounds, resinous material, carbon black and unused base oil. Many methods for the disposal of this hazardous waste are practice since the closure of BF and shelly recycling plant. Dumping in the ground, pouring into sewers, road oiling, and burning of used oil as fuel are some of the methods of waste oil disposal. Approved methods by Environmental Management Act include reprocessing, minimization at source, re-refining or regeneration and combustion. This hazardous waste oil needs proper management to maximize the amount of used oil recovered by recycling to make it useful as value added product and to minimize the quality of oil being improperly disposed of and to reduce the waste oils environmental pollution from waste oil. The principal source of contamination during oil use is the chemical breakdown of additives and the subsequent interaction among the resultant components to

produce corrosive acids and other undesired substances. This used lubricating oil has higher values of ash, carbon residue, asphaltenic material like, aldehydes, alcohols, phenolic compounds, acidic compounds, non- stable product of hydrocarbons poly-condensation (poly-nuclear aromatics, gums, water and other dirty materials) which are built during the course of lubricating inside the engine.Wang et al [Fiedler H 2004].

Sulfuric Acid plus Bleaching Earth and the Propane Extraction plus Sulfuric Acid and Bleaching Earth. Both these process generate significant amounts of residues, such as sludge from sedimentation, acid tars, filter cake from bleaching earth and waste waters, which contained high concentration heavy metals [Durrani et al 2011,12] or sulfuric acid (in the range of 17% w/w) [Durrani et al 2009]. The basic principle remains the same and utilizes many of the following basic steps:

- Removal water and solid particles by setting/evaporation.
- Sulfuric acid treatment to remove gums, greases.
- Alkaline treatment to neutralize acid.
- Water washing to remove “soap”.
- Clay contacting to bleach the oil and adsorb impurities.
- Striping to drive off moisture and volatile oils.
- Filtering to remove clay and other solids.
- Blending to specification.

Therefore the conversion of used engine oil to diesel fuel and other by-products become a preferred option in terms of conserving resources and also minimization of waste and environmental degradation.

V. IMPACT OF CRUDE OIL ON MARINE ANIMALS

The actual impact of HC exposure on marine animals is more complex than simple bioassay tests reveal. Oil at subsurface concentrations can significantly alter the behavior and development of marine organisms. These effects, however, are difficult to quantify. The problem of determining subsurface toxicity is further compounded because different species have different reactions and there is mixed effect when multiple toxins are present.

Behavior changes from exposure to HC are primarily those involving motility, while in higher organisms, changes affect avoidance, burrowing, feeding, and reproductive activities. Exposure to HC can adversely affect the development of organisms in some species at small concentration. Some species show no long-lasting damage, while other species can suffer long-term damage at an oiled site. The impact of HC exposure also depends on whether the HC is dissolved or dispersed as suspended droplets.

The most common impact of crude oil on birds is by direct contact, oil coats their feathers, causing them to lose their water-repellence and thermal insulation. The birds then sink and drown or die of hypothermia. Oil can also be ingested by the birds during preening of oiled plumage. Although this oil becomes distributed throughout the body, there is no evidence that ingested oil is a primary cause of death amongst birds.

The effect of oil on marine mammals is highly variable. Fur-insulated mammals lose their ability to thermally regulate their temperature as their oil-contaminated to lose its insulating capacity. The loss of thermal insulation creates a higher metabolic activity to regulate body temperature, which results in fat and muscular energy reserves being rapidly exhausted. This can result in the animal's death by hypothermia. Many species show no avoidance response to oiled areas. Chronic contact of marine mammals with oil may also result in skin and eye lesions.

VI. CONCLUSION

The paper given a brief introduction on Risk Management in Petroleum and Petrochemical. Working out of reaction risks in the petrochemical industry and, Study results is carried out with information approach, which supposes the industries follow the instruction which is provided by (SOCP) accordance with risks signals. Therefore, most important risk factors are: high ecological disaster level due to production accidents, financial threats, modernization, quality of the workforce, political factor, sanctions on invest and technological support from foreign partners, territorial unevenness of hydrocarbon distribution, midterm tendencies for the hydrocarbon replacement, thus forming new alternative industry. These risks are evaluated

based on different criteria aimed to identify the sources and measures which should be taken.

Risk management occurs everywhere in the financial world. It occurs when an investor buys low-risk government bonds over riskier corporate bonds, when a fund manager hedges his currency exposure with currency derivatives, and when a bank performs a credit check on an individual before issuing a personal line of credit. Stockbrokers use financial instruments like options and futures, and money managers use strategies like portfolio and investment diversification to mitigate or effectively manage risk.

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