

## Oil and Gas Industrial and Ecosystem Mechanical Impacts of Environment

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### Abstract

Oil and gas from deuterons pollutant due to its hydrocarbon materials and toxic substances such as hydrogen sulfide and consist of organic compounds containing hydrogen and carbon and some parts non-carbon such as nitrogen sulfur oxygen and some small quantities of metals such as vanadium which organic compounds containing hydrogen and carbon where emit these gases when evaporation or degrade oil spill and these materials and gases threaten the ecological system the problem of pollution oil industries include pollution air by escalating gas such as hydrogen sulfide toxic as well as the oil spill on soil which contributes wind and flood water in a quantum population and agricultural projects special during irrigation and spill oil mean change in its chemical or quality of the components environment so distorting equilibrium in systems environment different water production processes associated with the oil that is produced in large quantities is also known that the production of barrels of oil offset producing four barrels of water.

The estimated production quantities of this water in most fields of Libya for example around 4,000,000 barrels per day almost a big problem as these waters are not taken to exploit only a few of them in the injections are exposed to the air which leads to the evaporation of deadly gases ones such as hydrogen sulfide and carbon dioxide and other gases and exploiting some of this water injection in large quantities may cause harm to the environment by groundwater contamination due to concomitant injections for engineering studies include hydrological and geological and that injections accompanied by compressions strength large create new depression may contribute to the ancient after cracks found in the region.

This process also earthquake movements may occur for plate movement on the edge of the continents because of the increased pressure on the layers of the earth which causes its human wrought in Environment, and carry out a study:

1. Study of the geological environment to see the possibility of cracks and fractures and the possibility of earthquake activity.
2. Hydrological studies surface water and agricultural projects and groundwater.
3. Carry out drainage water associated with oil scientific methods.

I hope to my God that this study will contribute to whatever is simple to learn influence the oil and gas industrial on environment regulations that give life.

**Keywords:** Pollution; Desertification; Water pollution; Oil reservoir

### Introduction

Environment is a system dynamically complex includes and elements are intertwined and multiple where development of knowledge and information related to this system significantly in recent decade especially with its association largely being important dimension of sustainable of environment science he finishes mean basic to refer to the study of nature organic physical and chemical surrounding the living organism the ecosystem in nature and accordingly represents the result of a balance between elements with the factors and forces that interact with each other to balance occurs and imbalance in the ecosystem [1].

The oil and its derivatives-risk vehicles and high toxicity due to the decomposition of oil molecules to many toxic to all living organisms and oil begins harm since it relates to air [2].

### Objective study

This study aims to find out the reasons for pollution real caused oil and gas industry in the world such as gases climatic contamination of soil groundwater surface injection process oil well without doing a study technological to develop geological area to be injection as well as the problem of water associated with petroleum diffusion H<sub>2</sub>S.

Since this study aims real possible use techniques reduce water the spread of visible pollution due to oil and gas industry and oil companies' event to contribute to the process of treatment the causes of environment pollution.

### Oil and gas pollution environmental

Is launching elements or compounds or mixtures of gas liquid or solid source of oil to the elements of the environment, which includes surface water and underground air, soil, causing a change in the presence of these elements and distributed damage oil pollution on all forms of life and human organisms sea and land plants and leads ultimately to death and extinction of millions of living organisms and marine of all genera and species and to disable most shipping services and the destruction of tourism through plants fish and destroys forest in addition to the destruction of the human diet [3,4].

The production oil combustion carbon monoxide dioxide sulfur, nitrogen oxides, hydrogen sulfide hydrocarbons and combustible sodium chloride salts and calcium and potassium salts that contain a special crude oil which contains the gases emitted by evaporation and

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fast-spreading oil pollutants from oil tankers and refineries and oil spills on soil and drilling fluids and associated water, this means that the refineries consume large amounts of water which is known into the sea rivers and oil where a major polluter of the environment and the investment exposure sea oil wells contaminated by leakage in both captain and production and if oil prices top concern of the world due to its location in the daily economy on the one hand and the decisions about consumption of hazardous emissions threaten the natural and human environment on the other [5-8].

That frequent consumption of fuel increases the temperature and climate caused by melting snow spoke harmful changes varied agricultural systems and threatens to soil erosion and forest extinction and damage types of crape and thus threaten human life [9].

The problem of pollution is the most important problems facing the oil industry has become in the world as a result of the oil companies polluting the environmental by increasing the proportion of special emissions of carbon dioxide in the atmosphere and there are many other ways including the occurrence of thoughts, desertification of large tracts of land the spread of infections, diseases in the world and also extinction of many organisms and disasters and the loss of some agricultural crops and occurrence of marine pollution (Figure 1).

### Priorities for combating oil pollution

1. Maintain
2. Environmental protection
3. Resources protection and economic vitality

### The most important problem that pollution in the oil industry

The pollution of sea water and rivers and soil in oil and petroleum products from the most dangerous pollutants in our time of its adverse effect on human and economic environment.

### Sources of oil pollution are divided into four groups

1. **Unintentional pollution:** Includes accidents tankers and oil pipelines explosion that occasionally occur during drilling

operations for the extraction of oil or stages of production transportation refining storage marketing and even get rid of emissions and waste.

2. **Intentional contamination:** Includes oil accidents as a result of wars in addition to empty the water balance of the ships.
3. **Pollution caused by negligence:** This group is close to 80% of the world's oil pollution occurs as a result of errors during process to extract the oil and injection wells.
4. **Natural pollution:** That natural sources of energy is a group of materials and energy in the environment include oil coal, shale a non-renewable sources and exposed to drain company resorted to producing technological world and the production process raising on the environment and human and food reports indicate that oil operations are responsible for most global carbon dioxide ,making it one of the largest sources of environmental pollution as transportation which estimated the worlds one billion car that roam the planet and burn fuel high octane pumped 100,000.000 of tons  $CO_2$  carbon dioxide in the most sensitive part our atmosphere and the total is synthesized annually for 6.000.000 cars and aviation cause 13% of air pollution while its share of the pollution of the universe in general amounts to 3% (Figures 2 and 3).

### Impact of oil operation and environmental

Impact climate

Impact subsurface

Impact surface

**Impact petroleum climate:** The air pollution is subjected atmosphere of chemicals or particles physical or biological compounds cause damage to humans and organisms natural environment and the atmosphere is a system of natural gas reactants and complex, which is necessary to support life on earth and drained the ozone Layer of the most serious air and the most dangerous things in that threaten life earth environmental regulation [10].

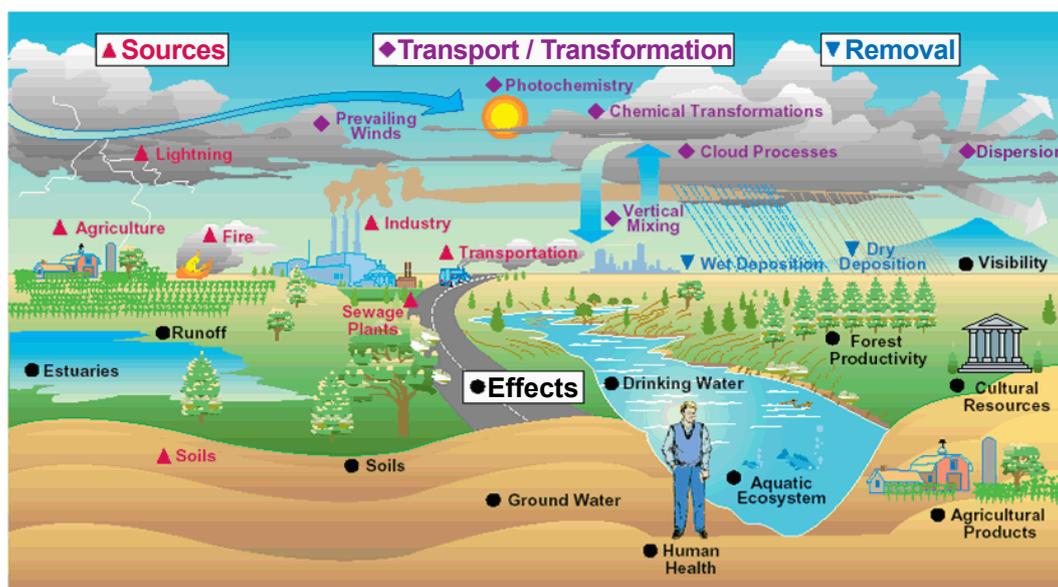


Figure 1: Operation environmental systems.



Figure 2: Sea water pollution.



Figure 3: Associate water oil in pet.

That the material associated with the oil which includes hydrocarbon materials and water threatening agricultural areas and human dangers of contamination of food and water and therefore diseases, the most important oil and petrochemical pollutants to climate sulfur dioxide-hydrogen sulfide gas –gases nitrogen oxides –carbon dioxide particles and volatile solid particles suspended [11].

**Subsurface petroleum pollution:** Is considered one of the most important source used by man even in countries that have large rivers the water table are those waters that saturation layer beneath the soil pores or rock crevices which underneath to form a loop water, and to fall unit the top layer is saturated with water and then up to the water underground the rock pores and cracks related to each other and store water in a complex geological layers which may be confined to a layer of clay or is confined to a layer of sand and moving water in the region strongly hydraulic into the area of low-lying and speed of up to 3 cm per year and is working porosity and permeability important to move the water ,but factor permeability which depends on the cracks and fractures the huge up to 100 km has been water pollution through these spaces and exposed r=this water pollution in many ways as a result of human activity such as oil spills on the surface of the soil fragile special leaks cracks (Figure 4).

### Groundwater contamination

1. Pollution caused by natural dissolution of the composition of rocks, minerals underground rocks as well as analyzes the components of the aquifer and radon 222 and is highly soluble and radionuclide's resulting from the decomposition of environment and granite and sedimentary rocks which produces radioactive material.
2. Oil pipelines
3. Industrial pollution caused by industrials activity.

### Injection wells of oil causes environmental pollution

Pressure is the class main force driving the oil towards the oil wells

and consists this pressure geostatic which exposed him granules and affects the spaces rock and the values of this pressure on porosity rock and thick and the quality of geological layers top of layer and increases usually increased depth and during the period of investment goes down the pressure with time leading to lower oil reservoirs productivity this decline varies from one according to the strength of the reservoir [12].

The pushing system with water more regulations effective and the process is done when it gets a drop in pressure class which leads to the movement of water in the saturated depends worker oil yield in the pushing system water in the regions oil reservoir regularly in reservoirs heterogeneous in terms of characteristics of storage but in the fact that reservoirs is in permeability high where up quickly bottoms producing wells and increasing proportions of water in these wells (Figure 5).

### Characteristics of the water injection process

1. The class raise the pressure of the reservoir
2. Higher levels of fluid static, dynamic
3. Raise worker displacement
4. Improve the conditions of the reservoir.
5. Disposal of produced water with oil, but may cause damage in the case of the presence of cracks

### Impact surface

Although human need for water and survival correlation water but did not improve the handling of water as a result of oil activities near

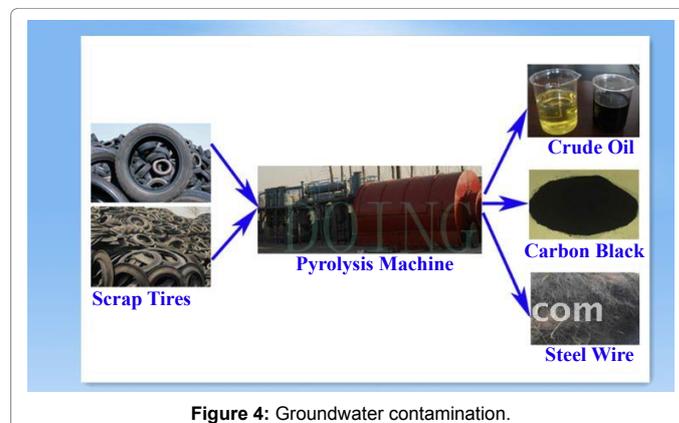


Figure 4: Groundwater contamination.

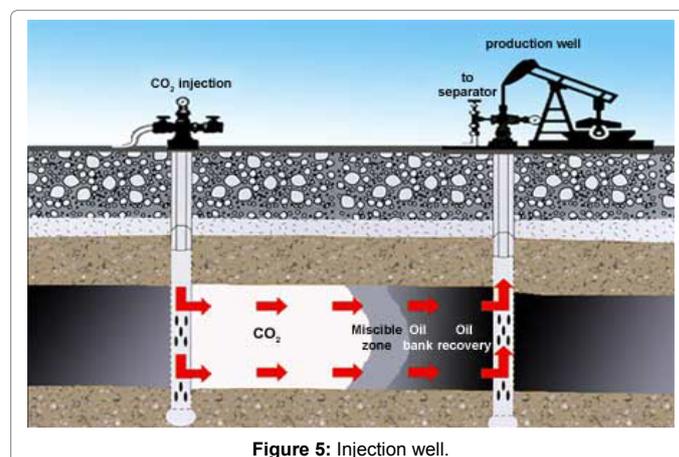


Figure 5: Injection well.

water sources, raising the concentration pollutants in the water, which reduced the physical, chemical properties.

### The Main sources of pollution which affects the aquatic environment

1. Pollution physicist they change the temperature salinity and increased suspended solids and all that increases the rate of evaporation and transpiration.
2. Chemical pollution ,which change the shape of the water and increase the proportion of toxic metals such as barium cadmium lead mercury but non-toxic metals such as calcium, magnesium sodium, lead to disease.
3. Biological contamination, it increases micro-organisms causing diseases such bacteria, viruses parasites
4. Radioactive contamination is unclear reactors, all contaminated affect routes on surface water and irrigation operations because of transportation and shelf.

Marine pollution ,is a sea of risks that threaten marine life that what caused the oil spill is the result of the development and maintenance of facilities for loading and unloading on the beach than be caused by the same means of transport whether that serves the oil refinery or pipelines that the density oil its less than the density of water is floating on the surface component insulating layer between the water and the air and this layer spread over a large area of the surface of the water where prevent this layer gas exchange between the air and water which affects spigot soluble oxygen in sea water which affects the balance gas and stops the spread of oil on the water surface on the nature of the oil and the prevailing winds waves and ocean currents and strength the complicated sometimes the weather will turn crude oil leaking from the process of cleaning oil tanks crude oil leaking from the process of cleaning oil tanks and tankers to the emulsion becomes water more viscous and pollution four times the volume of crude oil, depending on the characteristics of the water ,also extends oil output to oil spills to the bottom of the sea after flying material plane remains heavy suspended matter insoluble substances and passage of time [13]. The wind is working to transfer oil spill which threatens beaches and marine life species which threatens. The human diet particular those that depend on the sea for food.

### Petroleum pollution for soil

Is soil strong cohesive and dense consists of materials grainy or closed with small amounts of clay Silt and salt which is working on the coherence of these granules each other when the arrival of water to these materials in the soil become crumble and weaken contaminated soil usually the result of different processes during the exploration drilling and production example during currency drilling is used drilling fluids due to drilling gore technical side wells to collect drilling fluids and materials hydrocarbon excess and this drilling may take technical conditions urgent not seep into the groundwater and this fluid is usually mixed with soil and are transported by wind torrential (Figure 6).

### Soil contamination

Soil contamination is divided into,

1. Soil contamination Balnviac and flammable materials.
2. Soil pollution factories manufacturing residues such as oil

refineries refining which contain mud accumulated in the tanks and pipes.

3. Contamination radioactive Balnviac.

### Pollution agriculture project

Acid rain can accept trees and destroy leaves of plants and can sneak out of the soil. Making it unsuitable for the purposes of feeding housing and hole ozone allows passage of ultraviolet radiation from the sun to enter the ground causing damage to trees and ozone prevents plants from breathing and may delay the process of photosynthesis (Figure 7).

### Properties how the interaction of spilled oil and Gas

1. Spreading
2. Erosion
3. Evaporation
4. Disassembly-natural decomposition
5. Melting
6. Oxidation
7. Deposition
8. Bacterial decomposition

### Sources of oil pollution

1. Natural sources (leaks from the ground).
2. Industrial sources (accidents, oil tankers, unloading loading, packing, oil injection wells)

### Factors affecting pollution control

1. The quality and quantity of oil spilled.
2. Weather conditions Where spill oil.
3. Requirements plant.



Figure 6: Soil pollution.



Figure 7: Marine oil spill.

## Environment protection and control of oil and gas pollution

### Mechanical treatment

1. Rubber barriers to protect water.
2. Prevent the oil from spreading.
3. Change the direction of the oil spill.
4. Scraped oil.

### Chemical treatment

1. Chemical pollution can be controlled by a biological solution using bacteria, so that it can be converted oil spills into very fine droplets easily.
2. Spray types of solvents and detergents to oil spills and oil emulsion converter in water and dissolves it.
3. Bio mediator used to accelerate the decomposition process bacteria adding and increasing the proportion of nutrients such as Nitrogen ,phosphorus and increase Nitrogen is necessary to increase the number of bacteria to do the decomposition process.

### Burning the oil slick site soy

Is the removal of the oil from the surface of the water that collects oil and gas his fire-resistant. Barriers were burned spots.

### Basics of environmental protection oil and gas

1. The nature and characteristics of the oil pollution.
2. Knowledge of contamination at all stages of exploration.
3. Knowledge of control and pollution control.
4. Prevention of occupation risks of the oil industry and health.
5. Prevention of pollution environmental pollution and oil pollution in water air and soil.

### Ways combat oil and gas pollution

1. Bioremediation methods.
2. Way flooding barriers.
3. Way chemical spray types of chemical.
4. Physical treatment methods.
5. Specialized solvent washing methods.
6. Treatment oil environmental specifications.
7. Leaked oil absorption material in the areas of oil fields which are separated from the water and contaminated materials, cleaned and processed and filtered material was sent to oil tanks.
8. Use of the separation process by centrifugation to separate and recycle water contaminated thanks and global environmental specifications.

## Conclusion

The problem of environmental exposure to notify the oil and gas industry has become one of the most important problems dogging states as especially oil producing ecosystem processes carried out by some companies imbalance in this system causing problems not solved mostly and should work to establish an environmental management

through specialization to solve these problems which have become superficial and underground problems. The production processes and research and exploration of oil and gas has become threatening the world the dangers material carried by the hydrocarbon materials as well as the production process which are accompanied by such drilling fluid materials and water associated with oil during the production process that have become threatening the ecosystem.

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