

«ÚZLIKSIZ BILIMLENDIRIW SISTEMASINDA ARALIQTAN OQITIWDIŃ INTEGRACIYASI» atamasındaǵı IV Xalıqaralıq ilimiy-teoriyalıq konferenciya

PETROLEUM WASTEWATER TREATMENT

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Abstract: *This article deals with the causes of wasting oil, petroleum wastewater treatment techniques and technologies, 3 techniques of petroleum wastewater treatment.*

Key words: *E&P activities, petroleum wastewater, chemical treatment, neutralization, biological treatment techniques.*

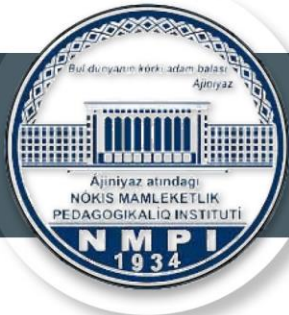
Oily waste causes irreparable harm to the environment. The major sources of aqueous waste from E&P activities are produced water, drilling fluids, cuttings, well treatment chemicals, cooling water, process, wash and drainage water, spills and leakage, and sewerage, sanitary, and domestic wastewater. The volumes of produced wastewater rely on the step of the E&P process. During seismic operations, the volumes of waste are minimal and relate to camp or vessel activities.

Of the existing technologies for treating this waste, thermal processes are the most effective, with enormous energy costs in producing and disposing of the waste produced. Petroleum wastewater treatment techniques and technologies included physical, chemical, and biological treatment processes.

The system of physical treatment is the main stage of treatment that is necessary for removal or separation suspended solids (SS), immiscible liquids, solid particles, suspended solids from oil wastewater using sedimentation, coagulation and flocculation and long-term use secondary processing unit. Most physical treatment techniques are considered as conventional methods.

In API separators or separation tanks, the sedimentation treatment—which separates oil from water—is mechanically accomplished by gravity. Turbidity and organic load reduction were achieved through the use of the coagulation process.

However, due to their complexity, physical processes were not very effective in treating petroleum wastewater; as a result, alternative pretreatment methods may be employed. Chemical treatment involves using a chemical reaction or series of reactions to raise the quality of the water. The chemically treated wastewater is considered the best method to get rid the most pollutants which exist in the petroleum wastewater. The chemical treatment has the capability to reduce the total suspended



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materials and so it decreases the total residual carbon and nitrogen by removing the most organic compounds.

Neutralization is a chemical procedure that is frequently employed in industrial wastewater treatment operations. Neutralization is the process of bringing pH levels back to neutrality by adding an acid or base. Lime is a base, hence it is occasionally used to neutralize acid wastes.

Biological treatment techniques can be classified as aerobic or anaerobic depending on the presence of dissolved oxygen. Unpleasant colors and scents are produced in water in anaerobic systems by the products of chemical and biological reactions. Which is why, the oxygen content of water was crucial to lowering unpleasant colors and odors. Use bacteria as the primary microorganism in the biochemical breakdown of wastewaters to produce stable end products.

The aerobic biological process converts the organic compounds and recalcitrant components in wastewater into CO₂ and water and solid biological products. The aerobic biological process has shown improved COD removal. In addition, it had a higher tolerance to toxic and organic shock loads and lower biomass loss.

Anaerobic biological treatment has an excellent organic removal efficiency and an economical cost. Organic matter is converted into CO₂ and CH₄, and sludge during anaerobic biological treatment.

The treatment of petroleum wastewater is divided into two phases. The first step is pre-treatment, which reduces grease, oil, and suspended contaminants. Second, an advanced treatment step is used to breakdown and reduce contaminants to permissible discharge levels. Apart for physical separation, which is efficient in petroleum wastewater, several innovations in technical techniques for advanced treatment and pre-treatment have occurred in recent years.

Petroleum has mainly negative environmental effects due to its toxicity in nearly all lifestyles. Oil contamination in the air and water could indeed be dangerous and toxic to humans. The existence of petroleum hydrocarbons in water has a variety of effects on the soil environment, including changes in soil physicochemical properties, microbial inhabitants, and plant growth that could result in lower crop yields, oxygen shortages, and harmful impacts on animals and plants. In this work we investigate 3 techniques of petroleum wastewater treatment. In the remediation of petroleum effluent, many traditional and common techniques such as biological, physicochemical and physical, and chemical approaches are employed. Gravity-based separation – flocculation and coagulation, filtration-based separation method, and



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biological process remediation was amongst them. Physical remediation is a main remediation stage that uses sedimentation to remove or separate immiscible liquids, solid particles, suspended solids (SS), and suspended contaminants from petroleum wastewater.

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