

## Investigation of Produced and Ground Water Contamination of Al Wahat Area South-Eastern Part of Sirt Basin, Libya

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**Abstract :** Study area is threatened by numerous petroleum activities. The most important risk is associated with dramatic dangers of misuse and oil and gas pollutions, such as significant volumes of produced water, which refers to waste water generated during the production of oil and natural gas and disposed on the surface surrounded oil and gas fields. This work concerns the impact of oil exploration and production activities on the physical and environment fate of the area, focusing on the investigation and observation of crude oil migration as toxic fluid. Its penetration in groundwater resulted from the produced water impacted by oilfield operations disposed to the earth surface in Al Wahat area. Describing the areal distribution of the dominant groundwater quality constituents has been conducted to identify the major hydro-geochemical processes that affect the quality of water and to evaluate the relations between rock types and groundwater flow to the quality and geochemistry of water in Post-Eocene aquifer. The chemical and physical characteristics of produced water, where it is produced, and its potential impacts on the environment and on oil and gas operations have been discussed. Field work survey was conducted to identify and locate a large number of monitoring wells previously drilled throughout the study area. Groundwater samples were systematically collected in order to detect the fate of spills resulting from the various activities at the oil fields in the study area. Spatial distribution maps of the water quality parameters were built using Kriging methods of interpolation in ArcMap software. Thematic maps were generated using GIS and remote sensing techniques, which were applied to include all these data layers as an active database for the area for the purpose of identifying hot spots and prioritizing locations based on their environmental conditions as well as for monitoring plans.

**Keywords :** Sirt Basin, produced water, Al Wahat area, Ground water

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