

Ministry of Electricity and water

Remediation of Contaminated Groundwater in Raudhatain & Umm Al-Aish Aquifers projects

Project overview:-

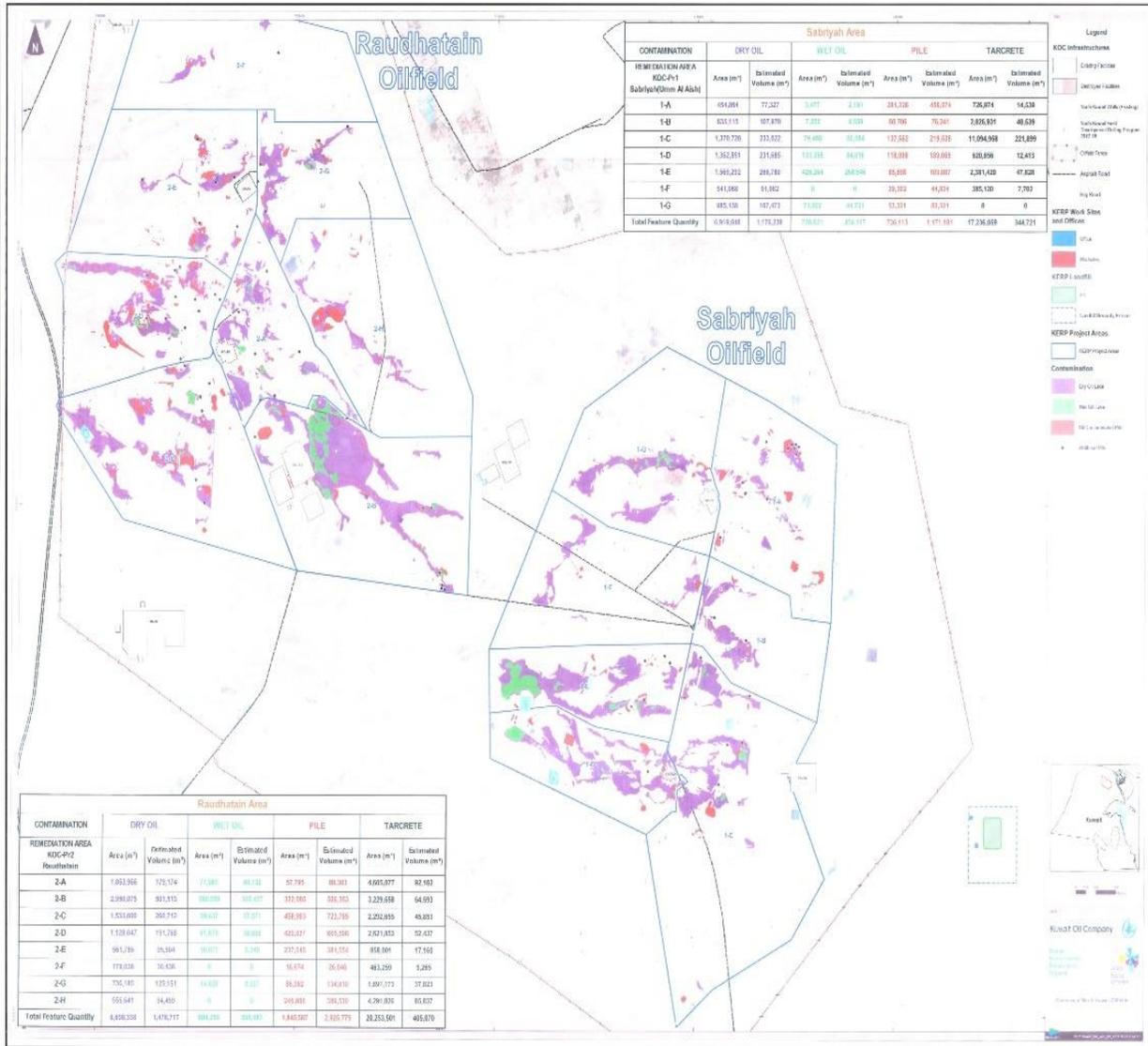
Raudhatain and umm Al- Aish groundwater were contaminated with petroleum hydrocarbon and seawater which was used to extinguish the oil wells fires during Iraqi invasion of Kuwait in 1990.

The United Nations Compensation Commission (UNCC) awarded a total of 41,531,463/- US (\$) for remediation of the contaminated groundwater resources in State of Kuwait.

Kuwait National Focal Point (KNFP) for Environmental Projects is the Kuwait Governmental entity responsible for overseeing the implementation of UNCC funded remediation activities. Ministry of Electricity and Water (MEW) is the stakeholder responsible for implementation of the water remediation projects.

MEW scope of work is to remediate 15 million cubic meter of fresh water aquifers in Raudhatain and Umm Al-Aish over a period of 15 years.





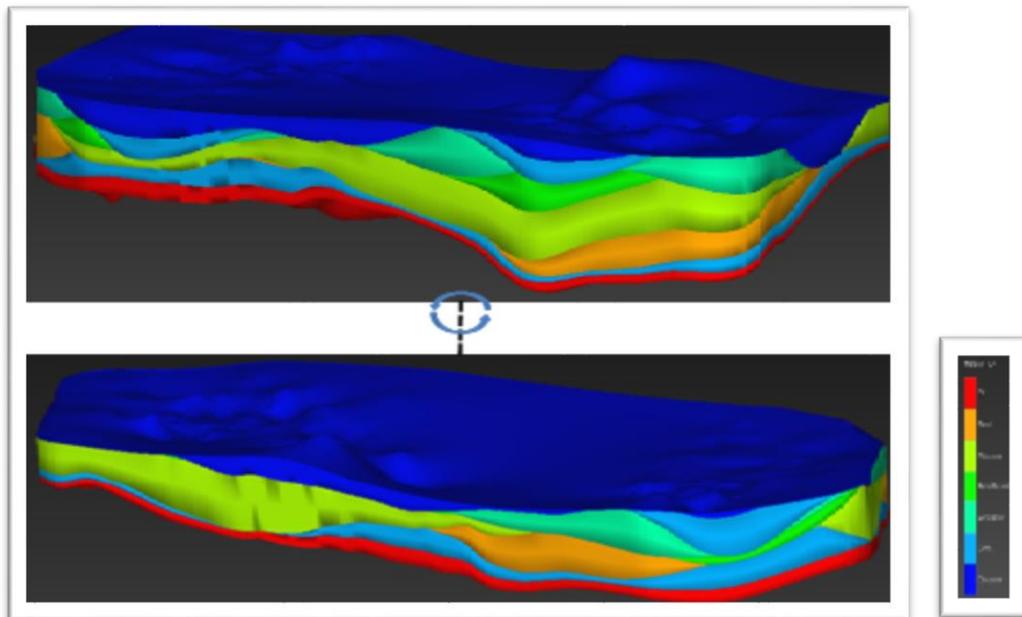
map of the polluted area in Raudhatain & Umm Al-Aish

First: completed projects

1 - Development of Conceptual and Mathematical Models:-

A mathematical model was developed to determine the percentage of pollution in groundwater in Raudhatain&Umm-Al Aish Aquifers to find the most appropriate methods to remediate pollution in groundwater.

This project has been completed in December 2014.



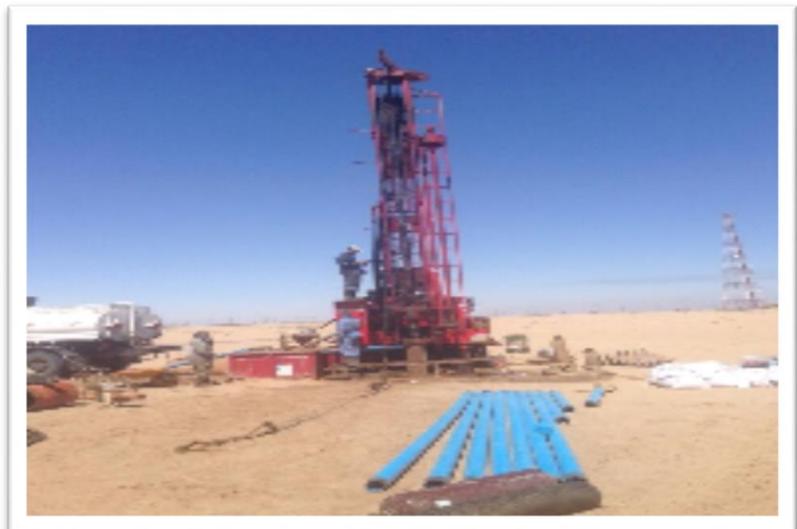
Conceptual
Model –
Geological Layers
of Raudhatain
and Umm Al-Aish
Fresh Water
Aquifers

2 - Drilling 18 New Monitoring Wells:-

In this project 18 new wells were drilled as a monitoring groundwater wells at Raudhatain and Umm Al-Aish (north Kuwait) for collecting representative groundwater samples periodically to determine the intensity of groundwater contamination and change in the properties to select the best method for remediation.

This project has been completed in July 2015.

Drilling monitoring wells in
Raudhatain and Umm
Al-Aish.



3 - Geotechnical Investigation works and soil sampling at North Kuwait:-

In this project boreholes were drilled to maximum depth of 40m below the natural ground level to collect soil samples using a special sampling tools and procedure to avoid contaminates during the sampling process for measuring hydrocarbon concentration in the affected area.

This project was completed in August 2017.

4 - Laboratory analysis of soil sampels from Umm Al-Aish & Raudhatain wells:-

This project included Hydrocarbons analysis, Chemical analysis and Radiation analysis of soil samples which were collected from the affected area in North Kuwait.

This project was completed in December 2017.

Second: projects in progress

1 - Monitoring the Quality of Groundwater Remediation for (4years)

This stage includes seasonal collection and analysis of groundwater samples (before and after rainy season), Inserting and simulating the collected data in the mathematical model to determine what are the changes in groundwater quality.

First and second round of the first year, and the first and second round of the second year have been completed and work is on going in the first round of the third year.



Collecting
water
sample by
bailing

Third: up coming projects

1- Pilot project studies:-

(1) Assessment of the effects of source zones removal: -

This study includes removal of the pollution sources such as contaminated surface, oil pits and oil lakes effects on the contaminated groundwater.

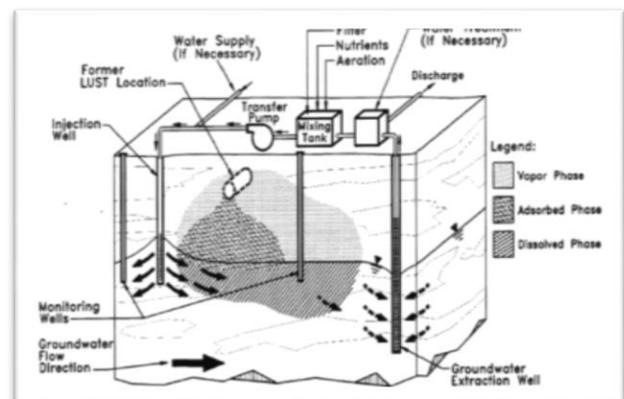


(2) pilot scale assessment of pump-treat-re inject jointly with in-situ Remediation:-

This study includes Extraction of polluted groundwater, then treat at the surface utilizing reverse osmosis followed by reinjection of the treated water through injection well.

In-situ remediation, which involves injection of an oxidizing agent, will be used in parallel to the pump –treat-re-inject method.

Contaminated groundwater
remediation procedure pump-
treat-reinject and in situ
remediation



2- Full Scale Remediation

This stage includes remediation of 15 million cubic meter over a period of 15 years, using the best feasible remediation options based on pilot projects studies.