

## **Steps Towards Proper Ground Water Management and Utilization Schemes Assessment of the Sustainable Yield of the Dammam Brackish and Low Salinity Water Aquifer at Central Kuwait, Case Study**

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### **ABSTRACT**

Al-Abdaliyah field is considered as one of productive groundwater fields in the State of Kuwait, which is being utilized by Kuwait Oil Company (KOC) since 1945 for de-salters wash water, firefighting systems, irrigation and other industrial applications. The current production of this field is about 29,575 m<sup>3</sup>/d (6.5 MIGD) and the Kuwait Oil Company KOC plans to increase this rate up to 82,000 m<sup>3</sup>/d (18 MIGD) to meet its future low salinity water demands. KOC shall determine the groundwater potential for this field. It was found that the field with its present area (about 60 km<sup>2</sup>) is not capable to produce the needed quantity of groundwater and increasing the production to more than 54,500 m<sup>3</sup>/d will lower the groundwater level in the aquifer to critical levels which could led to lose the field as a whole and the water salinity may increase rendering this water unsuitable for industrial applications. Accordingly, the KOC conducted a study to develop Al-Abdaliyah field to meet the KOC future demands by increasing the fields' area to about 360 km<sup>2</sup>. This study aims was to evaluate the potential of the new Al-Abdaliyah well field (360 km<sup>2</sup>), locate sufficient number of pumping wells, and develop comprehensive rehabilitation plans for the existing operating wells all in order to increase the abstraction to the required quantity while preserving the groundwater quality and its water levels. In order to achieve this, 4 exploratory wells recommended to be drilled at different depths in the Dammam Aquifer (Al-Abdaliyah field) to explore the mechanism that controls the increase of water salinity and contamination under different pumping schemes. The results obtained from fieldwork were fed to a numerical model (SUTRA) which had been developed specially for this purpose of pumping brackish water from saline aquifers. The project was successfully completed and the following deliverables were achieved: Assessment of the sustainable utilization of brackish water in the project area. The location of new wells to meet KOC future water demand. Development of rehabilitation and maintenance plans for all existing wells. Simulation of the movements of brackish/saline water under operational conditions. **KEYWORDS** Dammam Brackish water, saline aquifers, solute transport modelling, SUTRA, Rehabilitation/Pumping of wells