

Natural Purification by Sediments of Wadi Hanifah Water System, Riyadh

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ABSTRACT

This report investigates the chemical and bacterial characteristics of stream water, groundwater and the sediments both within and outside of Wadi Hanifah course.

An integrated geophysical techniques, seismic refraction, resistivity image, and VES were carried out. Water bearing-zones occur in two aquifers, shallow contaminated water at 10 m depth in alluvial deposits and the deep of fresh water aquifer at depth of about 100 m in fractured limestone. The interface between the contaminated water (sanitary water) and fresh water marked out horizontally at 100 m distance from the main channel and vertically at 20 m depth.

Chemical results indicate that the wadi stream contains relatively low concentrations of the trace elements, but has unacceptable high bacteriological pollution, due to the fact that effluents feeding the stream are mainly residential. Sediments were identified as a sinks for phosphate and trace elements as their concentrations in stream water and sediments were significantly correlated.

A sewage treatment plant provides the dominant point source input for phosphate and also a reduction in phosphate concentrations along the wadi stream, away from the plant. This improvement in water quality is due to the high degree of self-purification resulting from a combination of ponds and natural purification processes.

Although groundwater samples were high in TDS, and the quality of samples was found to be generally good. Heavy metals were present in very low percentages and the samples were also free of phosphates. However, groundwater in Wadi Hanifah has problems caused by the high volumes of sewage water percolating into the ground. Most dwellings in Riyadh city are still using septic tanks, which allow sewage water to be recharged directly into the groundwater. Generally speaking, at the present the water in Wadi Hanifah is unsuitable for any commercial or developmental use. If the Wadi Hanifah is to be used as a source of water supply and irrigation, then specific improvements will have to be made, such the utilization of solar radiation for water purification and the creation of wetlands specially managed to act as natural filters for water purification.