

**Identifying water quality sampling stations in Al-Khobar water distribution system,
Kingdom of Saudi Arabia**

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Arab Gulf Journal of Scientific Research

Vol. 22, Issue.3, 2004

Abstract: Water quality monitoring of the distribution system is important in controlling and ensuring that safe water will be delivered to the consumers' taps. The Safe Drinking Water Act requires that water quality in a water distribution network be sampled at locations which are representative of the whole network system. Presently, no guidelines exist describing how these sampling locations are identified. In this paper, a methodology based on Genetic Algorithm (GA) is introduced and applied to a real water distribution network. A prior step before applying the developed method is to simulate the flow within the distribution system. For this purpose, a hydraulic simulation model called EPANET was used. Once the simulation of the water distribution system is performed, the developed GA method is then applied to identify locations of water quality sampling stations for the water distribution network of Al-Khobar City in the Eastern Province of the Kingdom of Saudi Arabia. Final results indicate that the selected water quality monitoring stations identified by the developed model are mostly located in areas within the city where water consumption is very high. The results obtained are compared with the current practice of identifying water sample locations and show more confidence over the current practice.