Hydrology - Water Resources Report 4

Aquifer Storage and Recovery, Myrtle Beach, South Carolina

Phase I: Feasibility Study
A Hydrogeologic Investigation

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ABSTRACT

The Aquifer Storage and Recovery (ASR) concept and its applicability in unconsolidated sediments of the Coastal Plain in South Carolina is being investigated at Myrtle Beach, in Horry County. Two aquifer storage recovery strategies might be feasible. In both strategies, potable water would be injected into the deep, confined Cretaceous aquifers during water-surplus periods, mostly winter months, and would be retrieved in the peak water-demand periods during the following summer. The result would be increased water capacity of the system without necessitating expansion of the surface-water treatment plant.

In Phase I, the subject of this report, substantial hydrogeologic data were collected and analyzed during the coring and construction of a 1,427-foot test hole. Fourteen selected core samples were intensively studied to determine their properties and evaluate their potential as injection zones.

Two of the five unconsolidated formations at the site appear to be suitable for injection: (1) the Cape Fear Formation, and (2) the Black Creek Formation.

The Cape Fear Formation has five sand units that were identified as possible injection zones. Porosity ranged from 10 to 18 percent, clay content from 26 to 34 percent, and the cation-exchange capacity from 5 to 10 milliequivalents per 100 grams. The average hydraulic conductivity was estimated at 70 gpd/ft² (gallons per day per foot squared).

The Black Creek Formation has three units identified as potential injection zones. Generally, the units were better defined and more homogenous than those of other formations underlying the study area. The clay content ranged from a trace to 18 percent and was reported to be glauconite. The cation-exchange capacity values were between .4 and 19 milliequivalents per 100 grams. These aquifers have effective porosities as great as 24 percent, but because of poor sorting the hydraulic conductivity is only about twice that of the Cape Fear.

The hydrologic and geologic data not only suggest that injection and recovery of treated water is feasible at the site, but also that the aquifers of the Black Creek Formation are the most suitable. Geochemical data, collected from the column testing of the core samples identified aerobic oxidation as a probable reaction that may influence the chemical composition of the

recovered water. No evidence was found to support initial concerns regarding clay dispersion or clay swelling, which could make aquifer storage and recovery not feasible.

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