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The Occurrence, Availability, and Chemical Quality of Ground Water, Grand Strand Area and Surrounding Parts of Horry and Georgetown Counties, South Carolina

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ABSTRACT

An evaluation of developing water-well and water-quality problems in the coastal aquifer systems of Horry and Georgetown Counties was initiated in 1972.

Geologic cross-sections detail the stratigraphic relationships of sand, clay, and calcareous sandstone and also establish formational boundaries between Tertiary formations and the Peedee, Black Creek, and Middendorf Formations. The most prominent structural feature of the area is the Cape Fear Arch. The Black Creek aquifer system is the most satisfactory source of good-quality water in the two-county area. Usually the water is soft, low in chloride, and iron- and sulfate-free. However, fluoride concentrations are excessive, reaching 5.5 milligrams per liter in some areas.

High concentrations of fluoride occur in hard, calcareous sandstone in the upper third of the Black Creek Formation. Low-fluoride ground water is obtained by screening only sandy formations devoid of the calcareous sandstone.

Salty water in the Black Creek aquifer system is a problem in the North Myrtle Beach-Little River area where connate seawater apparently has not been flushed from the flank of the Cape Fear Arch. However, no problems associated with saltwater encroachment have been observed. Improperly designed and abandoned wells are primarily responsible for saltwater leakage into freshwater sands, which if allowed to continue, will degrade the quality of the freshwater in the aquifers.

Water in the Peedee Formation and Tertiary formations, although low in fluoride and chloride, often contains excessive concentrations of iron, hydrogen sulfide, and sulfate. Treatment would be necessary before this water could be considered for a domestic water supply.

Water in the Middendorf Formation is salty presumably throughout the two-county area.

A typical value of the hydraulic conductivity of Black Creek sand beds is 30 feet per day, but it is less in central and southern Georgetown County. An average value of specific storage of 2.6×10^{-6} per foot has been calculated from pumping tests throughout the area.

Regional water levels are compared with regional water-use totals and show that vast quantities of ground water are added to the Black Creek aquifer system from several possible

sources. However, major aquifers in Horry and Georgetown Counties have been shown to be hydraulically independent during short-term pumping tests.

During the study various types of geophysical logs were run and it was discovered that the induction-resistivity geophysical logging tool measures formation resistivities in the project area with more accuracy than the standard electric-logging tool. The induction tool has certain focusing properties that minimize the possibility of obtaining spurious measurements resulting from adjacent thin beds.

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