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Preliminary Hydrologic Evaluation of the North Horn Mountain Coal-Resource Area, Utah

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Abstract

North Horn Mountain is part of a deeply dissected plateau in central Utah which is characterized by deep, narrow, steep-walled canyons with local relief of more than 1,000 feet. Geologic units exposed in the North Horn Mountain area range in age from Late Cretaceous to Holocene and contain two mineable seams of Cretaceous coal. The area is in the drainage basin of the San Rafael River, in the Colorado River Basin. Runoff from the mountain is ephemeral. This runoff to the San Rafael River is by way of Cottonwood and Ferron Creeks and represents less than 10 percent of their average annual runoff. Probable peak discharges (100-year flood) for the ephemeral streams draining North Horn Mountain are estimated to range from 200 to 380 cubic feet per second. The chemical quality of surface water in the area is good. The water is generally of a calcium magnesium bicarbonate type with average dissolved solids less than 500 milligrams per liter. Annual sediment yield in most of the area ranges from 0.1 to 0.2 acre-foot per square mile but locally is as high as 1.0 acre-foot per square mile. Most of the sediment is eroded during cloudbursts. Most of the ground water above the coal on North Horn Mountain probably is in perched aquifers. These aquifers support the flow of small seeps and springs. In some areas, the regional water table appears to extend upward into the coal. The principal source of recharge is precipitation that probably moves to aquifers along faults, joints, or fractures. This movement is apparently quite rapid. The dissolved-solids concentrations of ground water in the North Horn Mountain area range from less than 500 to about 1,000 milligrams per liter. Coal mining on North Horn Mountain should have minor effects on the quantity and quality of surface water. The maximum predicted decrease in the annual flow of Ferron and Cottonwood Creeks is less than 4 percent. The sediment loads of affected streams could be significantly increased if construction were to take place during the summer cloudburst season. Subsidence, which usually follows underground coal mining, could create rock fractures

through which a perched aquifer might be drained, thus depleting the flow of seeps or springs fed by that aquifer. It is considered unlikely that the mining will adversely affect the chemical quality of the ground water.

Comments

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