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Report finds oil shale could impact Colorado's water

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The U.S. Government Accountability Office (GAO) recently found that oil shale development in Western Colorado could impact the water quality in rivers in the region.

“Impacts from oil shale development to water resources could result from disturbing the ground surface during the construction of roads and production facilities, withdrawing water from streams and aquifers for oil shale operations, underground mining and extraction, and discharging waste waters from oil shale operations,” states the GAO report, which was released in October.

The report was prepared at the request of the U.S. House Science Committee, according to Mark Gaffigan, the GAO director of natural resources and environment.

“With oil shale, there is a lot of uncertainty,” Gaffigan said, especially as the technology needed to turn rock into oil is expensive and complicated.

But if oil shale production does ever begin in earnest, the report estimates that it will take about an average of three to five barrels (42 gallons) of water to produce one barrel of oil from oil shale, depending on how it is done. In some cases, it could take up to 12 barrels of water for every barrel of oil produced.

“Oil shale development could have significant impacts on the quality and quantity of water resources, but the magnitude of these impacts is unknown because technologies are years from being commercially proven, the size of a future oil shale industry is uncertain, and knowledge of current water conditions and groundwater flow is limited,” the report found. “In the absence of effective mitigation measures, water resources could be impacted from ground disturbances caused by the construction of roads and production facilities, withdrawing water from streams and aquifers for oil shale production, underground mining and extraction; and discharging waters produced from or used in operations.”

It takes water to extract and process the oil shale, water to upgrade the oil shale so it can be transported to a refinery, water to reclaim mine sites, water to generate electricity for the extraction process, and water to meet the residential needs of a growing workforce in the oil shale industry.

“Water for most of these activities is likely to come from nearby streams and rivers because it is more easily accessible and less costly to obtain than groundwater,” the report states. “Withdrawing water from streams and rivers would decrease flows downstream and could temporarily degrade downstream water quality by depositing sediment within the stream channels as flows decrease.”

The White, Yampa, and Colorado rivers could all be affected by oil shale production, either by serving as the source for water or as the catch-all for polluted surface and ground water.

“Water is likely to come initially from surface sources immediately adjacent to development, such as the White River and its tributaries that flow through the heart of oil shale country in Colorado and Utah,” the GAO found. “Shell owns three conditional water rights for a combined diversion of about 600 cubic feet per second from the White River and one of its tributaries, and has conditional rights for the combined storage of about 145,000 acre-feet in two proposed nearby reservoirs.”

And the White River may not have enough water for the oil shale industry.

“Shell recently applied — but subsequently withdrew the application — for conditional rights to divert up to 375 cubic feet per second from the Yampa River for storage in a proposed reservoir that would measure up to 45,000 acre-feet for future oil shale development,” the report notes.

The GAO also found that ExxonMobil owns “conditional storage capacities of over 161,000 acre-feet on 17 proposed reservoirs in the area.”

And if there is not enough water in the White and the Yampa, the Colorado River is just south of the Western Colorado's oil shale epicenter.

“At least one company has considered obtaining surface water from the even-more-distant Colorado River, about 30 to 50 miles to the south of the research, demonstration, and development leases where oil shale companies already hold considerable water rights,” the report states, noting that the costs of transporting and pumping water from the Colorado River would be higher than using water from the White and the Yampa rivers.

And it says that some experts think the Green River could be a source of water for oil shale development in eastern Utah.

ExxonMobil and Shell have been buying up water rights in the region.

The GAO sites a study by Western Resource Advocates and reports that “ExxonMobil Corp. has acquired full or partial ownership in absolute water rights on 31 irrigation ditches from which the average amount of water diverted per year has exceeded 9,000 acre-feet.” Those water rights are also considered very senior water rights.

The GAO report recommends that the Department of Interior “establish comprehensive baseline conditions for water resources” in oil shale country, that it produce a model of groundwater movement in the region, and that it coordinate water research with the Department of Energy.

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