OIL SHALE AND WATER

Fact Sheet

WHY IS WATER USE IN OIL SHALE IMPORTANT? Water is a precious commodity in the west where a bulk of the U.S. oil shale deposits are found. There are many demands upon the water in the oil shale region - principally the Colorado River and its tributaries.

HOW IS WATER USED IN PRODUCING SHALE OIL? Water is necessary for producing shale oil. The amount and quality varies with technology. Typical uses include process cooling, reclamation, dust control and the municipal needs for oil shale workers and supporting businesses.

HOW MUCH WATER IS NEEDED? Direct consumptive water requirements range from 1 to 3 barrels of water per barrel of shale oil produced (B/B) depending upon the shale oil recovery technology being employed. NOSA determined the average usage at 1.7 B/B as detailed below

Shale Oil Production Barrels/day	Shale Oil Production Barrels/year	Water Required acre-ft/day	Water Required acre-ft/year
5,000	1,800,000	1.1	400
50,000	18,000,000	11	4,000
500,000	180,000,000	110	40,000

In addition to the direct requirements for water, there may be additional requirements resulting from the increased population and associated businesses that will develop as a result of an oil shale industry. It will depend upon the level of infrastructure that will already exist to accommodate a new industry and the labor intensity of the oil shale technology employed. Estimates range from 0 to 10% of the direct requirements given above.

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WHERE WILL THE WATER COME FROM? Water for oil shale projects may come from a variety of sources: ground water wells, surface streams and rivers, water produced from oil shale processing, waste waters from other industries or municipalities, reservoir storage, and/or trans-basin diversion projects.

Water is produced during the processing (retorting) of oil shale that is not indigenous or tributary to local ground water or streams. It amounts to between 4 and 14% of the shale oil produced. Therefore, an average of 10% of the required indigenous water may be saved by treating this water and using it within the project. The use of waste water from other sources is potentially viable for commercial oil shale projects. For instance, the water currently produced from the oil and gas and coal bed methane wells may be treated and used for various uses within an oil shale complex.

HOW WILL WATER BE DELIVERED TO OIL SHALE FACILITIES? Water pipelines, storage and treatment facilities will be required to provide uninterrupted and reliable sources of water to commercial oil shale projects. Due to the arid nature of the west, storage of water during the snow melt period is required to assure a supply during the dry period of the year. These storage facilities will be on and/or off the site of the oil shale project.

HOW DOES OIL SHALE WATER USAGE COMPARE TO OTHER USES? Water usage by oil shale projects compares favorably with other industrial, agricultural, and municipal uses. Below are water usage comparisons for a 50,000 barrel per day oil shale plant to ethanol produced from irrigated corn, electric power generated from coal, irrigated alfalfa, and the typical household in the western U.S.

Oil Shale Plant	Ethanol Project	Electric Power	Agriculture	Domestic
50,000 bbl/day	21,000 bbl/day	400 MW	2,200 acres	14,000 people
4,000 acft/yr	4,000 acft/yr	4,000 acft/yr	4,000 acft/yr	4,000 acft/yr

Note: some of the water usages given above are 100% consumptive and others are less than 100%

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HOW IS WATER MADE AVAILABLE TO USERS? The right to use water from surface streams and rivers is controlled legally within each state. Laws in western and eastern states vary. In the east a riparian doctrine is followed which permits anyone whose land has frontage on a body of water to use that water. Most western states follow a prior appropriation doctrine. Colorado water law is generally looked upon in the west as the water authority and follows the first in time first in right philosophy. This approach placed many senior water rights in the hands of the original pioneer ranchers.

In Colorado, the right to use water can be acquired through acquisition from previous owners. And rights to use water have also been obtained by participation in projects such as the Ruedi reservoir. Groundwater from wells is also controlled by state regulation and applies to all ground water that is tributary to surface waters. It does not apply to non-tributary ground water, sources of saline water produced from most oil and gas wells, or the water produced from retorting of oil shale.

WILL THERE BE ENOUGH WATER AVAILABLE FOR ALL USERS? Yes, there can be enough for all users with proper management of resources and employment of water conserving technologies.

THE BOTTOM LINE

- Water is not the issue that will make or break oil shale development, but misleading information from some groups is leading the public to think it is.
- Water will be used sparingly, and alternate supplies can be used to reduce the amount even further.
- Water used for oil shale development is a beneficial use that will create jobs, spur economic development, and enhance our energy security