WATER NEEDS AND ISSUES FOR OIL SHALE IN THE WESTERN U.S.

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• Introduction –
  • What and Where is Western Oil Shale
  • How oil shale can play a role in a more secure energy future.
• Current Oil Shale Activities
• Water Requirements
• Politics and Public Opinion
• Realities for Developers
• Recommendations
• What is the National Oil Shale Association (NOSA)?
Oil Shale – What is it?

- Sedimentary deposit that contains solid hydrocarbon Kerogen
- Exists around the world
- Richest and best deposits in the West
- Huge resource that has potential to reduce societal cost of importing foreign petroleum
94% of transportation fuels come from petroleum

All domestic sources and conservation are needed

Decades will be needed to convert to non-fossil fuel alternatives

Oil Shale can play a role in that transition
Oil shale must be heated to from 600 to 900 deg F to recover shale oil and gas. It cannot be pumped directly from the ground like conventional oil and gas.

There are two basic methods for recovery:
- Mining and above ground retorting
- In situ retorting

New and more environmentally benign technologies are being developed for both methods in Colorado and Utah.
Oil shale is mined, crushed and processed through a surface retort.
Oil is upgraded for refining into gasoline, jet and diesel fuel.
Spent shale is disposed in a land fill and/or back into the mine.

Unocal Oil Shale Plant circa 1980’s
Chinese Retort at Maoming circa 1979

Petro-Six Brazilian Retort

World production of shale oil is 17,000 bpd
• Conducts processing in formation at depth
• Heating either by fluid injection or indirect heating
• Production through conventional wells
• Also modified insitu technologies

Shell Freeze Wall in Colorado

EcoShale Process in Utah
Major U.S. Oil Shale Projects

- Colorado and Utah
  - OSEC *
  - EcoShale
  - Enshale
  - Shell Mahogany *
  - Chevron *
  - AMSO *
  - Exxon
  - Paraho (STI)
  - Others

*Holder of BLM R,D&D Leases

Shell Experimental Site - Colorado
Oil Shale Projects (Others)

- Schlumberger
- Quasar Energy LLC
- Percy Kean Clean Technologies
- IEP (Savage Family)
- Mountain West Energy
- PetroProbe
- University of Denver
- Phoenix-Wyoming
- Natural Resources Recovery
- Millennium Synfuels
- Chattanooga Corporation
- CRE Energy
- Global Resources
- Natural Soda/Sentient
- General Synfuels International
Current BLM Oil Shale Activities

- BLM finalized commercial oil shale PEIS and leasing regulations in 2008
- Litigation Pending
- BLM withdrew 2nd round of R,D&D lease offering in Jan 2009 – comments submitted to BLM on renewed R,D&D leasing program
- Oil Shale policies under review by new administration - Fossil energy not a high priority
Oil Shale Water Requirements

- Consumption varies with technology
- Average is 3 bbls water per bbl of upgraded shale oil with a range of 5:1 to less than 1:1
- 3:1 equates to 7000 acre ft/year for 18 million barrels of shale oil produced (or water for 4,000 acres of alfalfa or a municipality of 25,000 people)
- Research is underway to reduce consumption, develop alternate sources, reuse produced water, and study new dam sites
- Ultimate size of an oil shale industry is uncertain at this time and some publicized reports grossly exaggerate the water needs of an industry that will develop incrementally over decades.
Politics and Public Opinion

- Discussion of Western water is a subject that brings out the hackles on many necks especially when there is a perception that agricultural or municipal interests will be harmed.
  - Interstate interests
  - Downstream users on the Colorado River
  - Potential effects of Global Warming
- Example: Recent Shell filings on the Yampa River brought reactions from environmental, political and Colorado eastern slope interests
Shell seeks water for oil shale

Shell Oil’s application to take water from the Yampa River has spurred 22 protest letters from towns, counties, government agencies, businesses and environmental groups concerned about the impact of the proposed 15 billion-gallon water right.

Sources: Colorado Water Court, Division 6; U.S. Geological Survey  
Thomas McKay, The Denver Post
A water war is brewing on the Yampa River
Shell is seeking a conditional water right to take up to 375 cubic feet per sec and a new reservoir covering 1,000 acres and holding 45,000 acre-feet of water
"If we tie up all the available water on the West Slope, what will happen to us on the east slope?" asked Jim Nikkel, assistant manager of the Parker Water and Sewer District.
"Colorado's future is the issue here," said Roger Singer, the Sierra Club's western regional representative. "Do we commit this dwindling resource to energy development?"
Oil shale looms large at key IBCC water meeting in Crested Butte

- The issue has become so politically charged that it blew up on Governor Bill Ritter during testimony on Colorado’s New Energy Economy on Capitol Hill. U.S. Sen. James Inhofe, an Oklahoma Republican, questioned why Ritter wasn’t back home developing the state’s massive oil shale reserves. Ritter later fired back that the industry first needs to prove it can coexist with other water users in the state.

- “We need to recognize that decisions made on oil shale are made on the international oil market, and not water availability,” said Chips Barry, manager of Denver Water. “
Chris Treese, director of external affairs for the Colorado River Water Conservation District in Glenwood Springs, said any oil shale development is likely decades away, despite the proposed rules. He said he hopes that if the oil companies move forward with oil shale production, they can work with the state to ensure that its remaining water supplies are developed responsibly and in a way that would benefit people, the environment and industry.

"Oil shale represents a risk and an opportunity," Treese said. "It's not just industry that will need that new water. But it could present an opportunity to develop water for municipal and environmental uses as well."

…companies already have rights to large amounts of water in the Colorado River Basin and other areas as well.
Excellent summary of oil shale/water issues

Points out faulty assumptions noted by NOSA in WRA report *Water on the Rocks*

- Overstated the number of water rights held by oil shale developers by 74% and reservoir capacity by 187%
- Overstated the water usage requirements
- Failed to cite the benefits of oil shale development
- Like other recent studies the WRA report unnecessarily heightened public anxiety since there is great uncertainty that any industry will develop from the current R,D&D projects
The reality is that water will continue to be an important issue for developers of western unconventional oil and gas resources such as oil shale. Water is scarce in the West and no one will be allowed to misuse this important resource. Therefore research and development will be needed into techniques for reducing consumption, utilizing alternative sources such as oil field brines and non-tributary waters, and investigating new water storage projects that serve multiple users. With proper management there can be enough water for a reasonably sized oil shale industry.
There needs to be continued efforts on the part of developers, elected officials, regulators, and other stakeholders to come up with innovative solutions to minimize use, develop alternate supplies, build new storage reservoirs and work together to reach a balance that assures the highest and best use of water for the betterment of society as a whole.

And recognizes the immense value of oil shale as a domestic energy resource that if developed can reduce the societal cost of importing over 60% of our transportation fuel needs from abroad.
NOSA is a not-for-profit organization that stands for responsible development of oil shale to benefit the long term energy needs of the nation.

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Members include corporations and individuals