FINDING OF NO SIGNIFICANT IMPACT

REMEDIATION OF SUBSURFACE AND GROUNDWATER CONTAMINATION AT THE ROCK SPRINGS IN SITU OIL SHALE RETORT SITE

SWEETWATER COUNTY, WYOMING

AGENCY: U.S. Department of Energy (DOE)

ACTION: Finding of No Significant Impact (FONSI)

SUMMARY: The DOE has prepared an Environmental Assessment (EA), (DOE/EH-1331) to analyze the potential impacts of alternatives for remediating subsurface and groundwater contamination at the Rock Springs *In Situ* Oil Shale Retort Site, located in Sweetwater County, Wyoming. The DOE proposes to use air sparging with bioremediation for test site cleanup.

Based on the analysis in the EA, DOE has determined that the Proposed Action is not a major federal action significantly affecting the quality of the human environment, within the meaning of the National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. 4321 et. seq. Therefore, the preparation of an Environmental Impact Statement is not required and DOE is issuing this FONSI.

COPIES OF THE EA ARE AVAILABLE FROM:

Roy Spears, NEPA Program Manager
United States Department of Energy
Environmental, Safety and Health Division
National Energy Technology Laboratory
3610 Collins Ferry Road, Morgantown, West Virginia 26507-0880
Telephone: 304-285-5460.

FOR FURTHER INFORMATION ON THE DOE NEPA PROCESS, CONTACT:

Carol Borgstrom, Director
Office of NEPA Policy and Assistance
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-0119
202 586-4600 or 1-800 472-2756

BACKGROUND: The DOE Laramie Energy Technology Center (LETC) and its predecessor organizations conducted experimental rock fracturing and *in situ* oil shale retorting tests at a site located approximately 7 miles (mi) (11.3 kilometers) (km) west of Rock Springs, Wyoming between 1965 and 1979. The location of the Rock Springs *in situ* project is shown in Figures 1.1 and 1.2 of the EA. The site occupies an area of about

340 acres (ac) (138 hectares) (ha). Only about 10 percent (35 ac) (14 ha) of the site was used for fracturing, retort testing, or associated activities.

The purpose of this action is to implement the 1998 Site Cleanup Agreement (Agreement) between the State of Wyoming Department of Environmental Quality and the U.S. Department of Energy, Federal Energy Technology Center (FETC), now named the National Energy Technology Laboratory (NETL). That Agreement would ensure that "environmental impacts associated with past and present activities at fossil energy sites are thoroughly investigated and that cleanup and restoration (including groundwater) actions approved by the State of Wyoming are taken to protect the health, safety and welfare, and the environment and waters of the State." The Agreement also established a procedure and framework for monitoring the results of cleanup and restoration actions.

DESCRIPTION OF THE PROPOSED ACTION: The Proposed Action would result in the cleanup of benzene and other contaminants dissolved in the groundwater and would ensure that such contaminants in the Tipton Aquifer do not eventually affect the Wasatch Aquifer. The mass transfer of air by sparging would reduce benzene concentrations in the groundwater through volatilization and transport in the vapor phase to the air, either through vent wells or through rock fractures and porous shallow surface soil. The Proposed Action would also include installation of injection, extraction, vent, and monitoring wells, connecting piping, valves, compressor(s), dryers, flow measurement devices, controls, treatment buildings, and other equipment.

The wells may be connected to the treatment system injection (and extraction) equipment with piping. The piping will be protected from freezing, either with heat tracing or through burial below the frost line depth. Vent wells would release to the atmosphere. Selected wells would be designed to serve as monitoring wells in addition to injection, extraction, and/or vent wells. Groundwater monitoring would take place both during and following groundwater remediation.

The remediation program would be expected to operate for about 5 years. However, remediation would continue until requirements set forth by the Wyoming Department of Environmental Quality (WDEQ) are satisfied. The WDEQ requires the DOE to show that best practicable technologies (BPT) would be used to remediate contaminants of concern in the groundwater.

ENVIRONMENTAL CONSEQUENCES: Environmental consequences associated with both construction and operations of the Proposed Action were considered in the Environmental Assessment (EA). The main issues of concern examined in the EA were whether:

1. Groundwater would act as a source for movement of contaminants off the site.
2. Groundwater remediation would be effective.
3. Remediation activities would result in loss of wildlife, wildlife habitat, and forage for livestock and wildlife grazing.

4. Surface disturbance areas could be returned to pre-test conditions in terms of soil productivity and vegetation.
5. Significant adverse environmental consequences would be expected.

Some buildings, monitoring wells, roads, and utilities already exist on the site. It is estimated that construction of all additional on-site dirt roads and installation of wells, pipelines, compressor stations, and equipment storage areas would disturb approximately 5 ac (2 ha). A total of approximately 60 new process or monitoring wells are planned. Topsoil would be collected and stored during the project and would be reapplied and seeded with a native seed mix approved by the WDEQ upon completing subsurface remediation. Measures such as sediment fences, and erosion control berms would be used as necessary to minimize erosion.

Implementation of the Proposed Action would not affect any surface water bodies. Groundwater contaminants would be degraded by native aerobic bacteria into harmless byproducts of carbon dioxide and water. As a result, groundwater quality at the site would be improved. Groundwater contaminants of concern would be reduced from present levels to concentrations that are acceptable for Class III groundwater, pursuant to the May 1998 Agreement between the State of Wyoming and DOE. The source of offsite groundwater contamination would be remediated, and the migration of groundwater contamination offsite would be eliminated.

Remediation activities would not result in the loss of wildlife or habitat wildlife. Further, no federally designated threatened or endangered plant or animal species are likely present at the Rock Springs site. Reseeding of the site would be expected to enhance the productivity of vegetation species. The Bureau of Land Management has concluded that no adverse impact to special-status plants or wildlife would be anticipated and indicated "initiation of formal consultation was not recommended." The U.S. Fish and Wildlife Service (USFWS) also indicated it would be unlikely that the proposed work would adversely affect any threatened or endangered species, including the black-footed ferret and the Ute ladies'-tresses orchid, nor would the project affect the mountain plover. In addition, the USFWS also noted that the project is also unlikely to result in a violation of the Migratory Bird Treaty Act. There are no jurisdictional wetlands present on the site. Cultural and historical resource investigations conducted since the late 1960s identified four sites that are eligible for inclusion on the National Register of Historic Places; however, none of these cultural resource sites are near any retort test sites and no cultural resource site would be affected by proposed remediation.

The DOE expects that groundwater remediation would be effective and would use BPTs to remediate contaminants of concern in the groundwater. The WDEQ defines BPT as an effective groundwater remediation technology that would minimize adverse impacts to humans, plants, animals and other environmental values. Wyoming statutes indicate the primary restoration goal for groundwater is achieving background water quality, with a secondary standard of Class of Use, if background cannot be achieved through BPT. Groundwater remediation technologies have been selected based on overall effectiveness in reducing contaminant concentrations, permanence of remediation, and ease of implementation.

In 1996, a human health risk assessment was conducted as part of the remedial action alternative study. The risk *assessment* concluded that the site does not currently pose a risk to human health or the environment due to the lack of a complete exposure pathway. The nearest residents are located approximately 2.2 mi (3.5 km) east of the site and do not obtain drinking water from the Tipton Aquifer. The residents of both Rock Springs and Green River obtain potable water from the Green River. River water is treated by the City of Green River and is conveyed by pipeline to Rock Springs. For these reasons, human health effects from potential groundwater contamination pathways are not expected.

ALTERNATIVES CONSIDERED: In addition to the Proposed Action, three alternatives were identified and addressed in the environmental assessment: (1) groundwater pumping and treatment, (2) *in situ* chemical aeration, and (3) No Action.

Groundwater Pumping and Treatment

With Alternative 1, groundwater pumping and treatment would be performed at the same retort test sites as the Proposed Action. Groundwater pumping would be conducted using pumps placed in discrete extraction wells, and treatment would most likely consist of some form of ex-situ aeration (air stripping), followed by discharge to engineered evaporation ponds. Like the Proposed Action, this alternative would address the high-level sources of benzene dissolved in the groundwater. Based on the annual treatment volume, the total area required for evaporation ponds would be about 9 ac (3.6 ha). The evaporation ponds would be constructed with berms and lined with clay or plastic, and a leak detection system would be installed. This alternative would result in an estimated surface disturbance of approximately 14 ac (5.6 ha) or about three times the disturbance associated with the Proposed Action.

***In Situ* Chemical Treatment**

Alternative 2, *in situ* chemical oxidation, is a process of removing benzene and other contaminants by breaking benzene down into components of carbon dioxide and water. It is a generally proven treatment method that can be effective in reducing benzene levels. Chemical oxidation would be performed by injecting oxidant solution (hydrogen peroxide or potassium permanganate) into the groundwater using metering pumps to direct the oxidants into injection wells. Groundwater extraction would also be performed in conjunction with oxidant injection to provide a source of solution water and for hydraulic control. Like the Proposed Action, this alternative would address the high-level sources of benzene dissolved in the groundwater.

Groundwater treatment using chemical oxidation is difficult due to the characteristics of the natural environment at Rock Springs. The process relies on the adequate distribution of the oxidant in the fracture zone. Bench-scale treatability test results suggested inconclusive results reducing benzene due to problems with oxidant dosage, reduction efficiency, and time required for treatment. In addition, test results suggested the required potassium permanganate dosages may form a precipitant, thereby potentially

clogging well screens and the surrounding formation. Finally, the high natural pH and alkalinity of the groundwater limit oxidant effectiveness.

No Action

With the No Action alternative, no remedial actions would be performed to treat the groundwater or subsurface material. Natural degradation processes would be relied upon to eliminate or reduce groundwater contaminant concentrations. Existing treatability study equipment and any surface piping would be removed, and areas that were disturbed during treatability study testing would be seeded with native grasses to restore the native vegetation.

This alternative would implement some form of institutional controls, such as placing a notice on the plat maps located in Cheyenne, Wyoming to notify other parties interested in the property that there is a potential for groundwater contamination. The institutional controls would be identified by the Wyoming State Engineer's Office and the form and substance of such proposed controls must be resolved with the Wyoming DEQ and DEQ.

Groundwater would be periodically sampled to measure contaminant levels and migration patterns. The groundwater-monitoring program would consist of semi-annual sampling of approximately 34 long-term monitoring wells. Monitoring would be continued for a period, agreed to by the Wyoming Land Quality Division (WYLQD) and DOE.

The No Action alternative may not meet the general purpose of the 1993 and 1998 Agreements signed between the State of Wyoming and the DOE. Those Agreements stated that the affected aquifers must be restored to a quality of use consistent with the use for which water was suitable prior to research activities

PUBLIC AVAILABILITY: Information describing the Proposed Action and opportunities to comment was provided to the public by placing a public notice requesting comments on the draft EA in the Rock Spring *Rocket Miner* and the Casper *Star Tribune* newspapers. In addition, copies of the Draft EA were placed in the Sweetwater County public library (Green River), the Wyoming Department of Environmental Quality offices (Lander and Cheyenne), and in the Wyoming State Library (Cheyenne). Four agency comment letters were received during this review period. These comments are briefly summarized below.

On April 19, 2000, the Wyoming Deputy State Historic Preservation Officer (SHPO) noted that the draft environmental assessment included maps that showed the locations of some cultural resource sites The Deputy SHPO noted that the draft environmental assessment included maps that showed the locations of some cultural resource sites. All maps showing cultural resource site locations have since been removed to protect site confidentiality. In the same comment letter, the SHPO also noted that the Union Pacific Railroad and segments of U.S. Highway 30 are historic properties.

The second comment letter was submitted by the State of Wyoming, Office of Federal Land Policy. The Office indicated that it supported the Proposed Action, because it is in keeping with the Fossil Energy Site Cleanup Agreement signed with the State of Wyoming Department of Environmental Quality.

On April 25, 2000, the Wyoming Game and Fish Department commented that the Rock Springs site is located in crucial antelope winter range and that the site is a severe winter relief range for antelope of the Sublette herd. They also indicated that Bitter Creek (on the reach adjacent to the Rock Springs site) supports a number of native and non-native fish species, including the flannelmouth sucker.

The fourth comment, dated May 24, 2000 was also submitted by the Wyoming State Historic Preservation Office. The staff archaeologist recommended that DOE should allow the project to proceed in accordance with Federal and state laws but explained that if any cultural material is discovered during construction, all work must be stopped and notification made to the DOE and SHPO.

The FONSI, and the EA on which it is based, will be distributed to all persons and agencies known to be interested in, or potentially affected by, the Proposed Action. Additional copies of the FONSI and the EA can be obtained from the National Energy Technology Laboratory at the address previously identified.

DETERMINATION

Based upon the information and analysis provided in the Environmental Assessment, DOE has determined that the proposed federal action, to conduct air sparging at the Rock Springs *in situ* oil shale retort site in Sweetwater County, Wyoming, does not constitute a major federal action significantly affecting the quality of the human environment within the meaning of the NEPA. Therefore, an Environmental Impact Statement is not required and DOE is issuing this Finding of No Significant Impact.

ISSUED IN MORGANTOWN, WV, THIS 31 DAY OF JULY 2000.

Rita A. Bajura

Rita A. Bajura
Director
National Energy Technology Laboratory