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WHITE RIVER SHALE PROJECT

Welcomes You to
Oil Shale Tracts U-a and U-b
Uintah County, Utah



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What is Oil Shale?

Oil shale is a fine-grained sedimentary rock containing visible organic matter that has the property of yielding substantial amounts of oil when heated in a closed retort to a temperature of above 900°F. The organic matter is derived from the remains of plant and animal life that accumulated in the bottoms of stagnant bodies of water. The partially decayed remains of these organisms mixed with clay and sand, forming a muddy substance. As younger sediments accumulated above, the weight of the overlying materials compressed the organic rich mixture into hard shale.

Where is Oil Shale Found?

The most significant deposits of oil shale in the United States are found in Colorado, Utah and Wyoming. These deposits are part of the sedimentary materials that accumulated in the bottoms of two large lakes (Lake Gosiute and Lake Uinta) that existed during the Eocene Epoch of the Tertiary Period. The calcareous muds of the ancient lake bottoms lithified into marlstone and the organic substance took the form of kerogen, a rubbery solid. These oil shale deposits are part of the Green River Formation of Eocene Age. The Green River Formation encompasses approximately 17,000 square miles in the adjoining corners of Colorado, Wyoming and Utah.

Tracts U-a and U-b are located in the Uintah Basin of the Green River Formation. The Uintah Basin is estimated to contain approximately 0.32 trillion barrels of oil. Tracts U-a and U-b are in the eastern part of the Basin, where the most important known deposits of the Basin are located. These deposits occur in a 400 foot thick sequence above and below the Mahogany Marker.



Why Oil Shale?

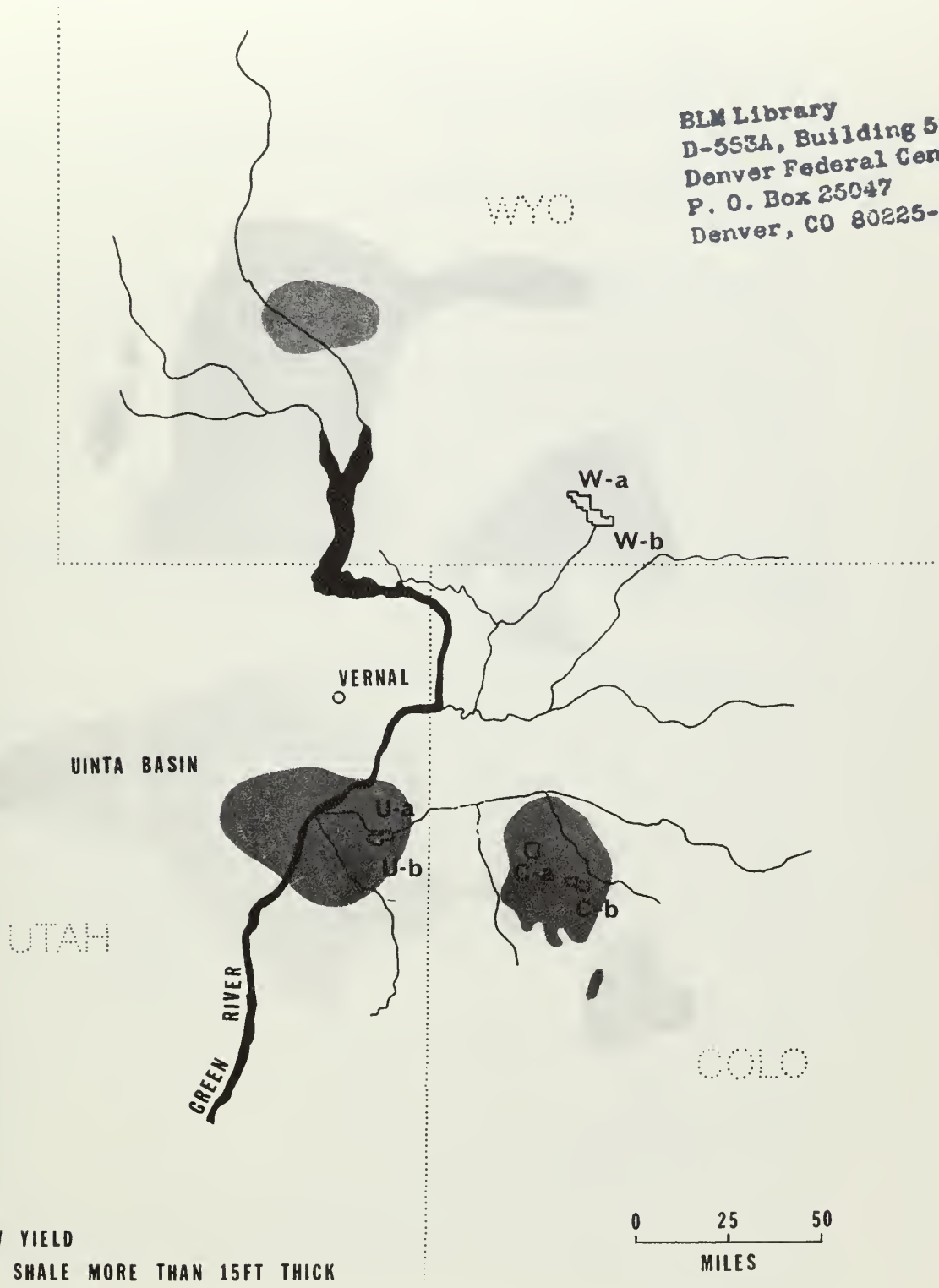
There are tremendous quantities of oil shale in the United State, particularly in the Green River Formation of Colorado, Utah and Wyoming. It is estimated that this region contains 1.8 trillion barrels of oil in oil shale that yields an average of 15 or more gallons per ton. The potential resources are more than double the proven reserves of petroleum in the country. As conventional fuels increase in cost and decrease in supply, development of these vast oil shale resources could provide the additional sources needed to supply future energy needs.

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Location of Major Oil Shale Reserves

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Denver Federal Center
P. O. Box 25047
Denver, CO 80225-0047



WHITE RIVER SHALE PROJECT

Background

In late 1973, Secretary of Interior, Rodgers Morton, announced the Federal Prototype Oil Shale Program and its objectives:

- Provide a new source of energy by stimulating the development of commercial oil shale technology by private industry
- Ensure the environmental integrity of the area and develop restoration techniques
- Permit an equitable return to all parties
- Develop federal management expertise in the supervision of oil shale development

Phillips Petroleum and Sun Oil Company responded to the program and were awarded Utah Tract U-a in June 1974 for a bonus bid of 75.6 million dollars. White River Oil Corporation, owned equally by Sohio Petroleum Company (now Sohio Natural Resources Company), Sun Oil Company (now Sunoco Energy Development Company or Sunedco), and Phillips Petroleum Company, was awarded Utah Tract U-b in June 1974 for a bonus bid of 45.1 million dollars. Sohio Natural Resources Company now owns the U-b lease. The two tracts are contiguous and the total land area of the tracts is 10,240 acres. It is estimated that the two tracts have a recoverable reserve of over 700 million barrels of oil.

The White River Shale Project (WRSP) was formed in 1974 by Sun, Sohio, and Phillips to plan and implement development activities on U-a and U-b. To accomplish these tasks, WRSP has used leading consultants and contractors.

Environmental Studies

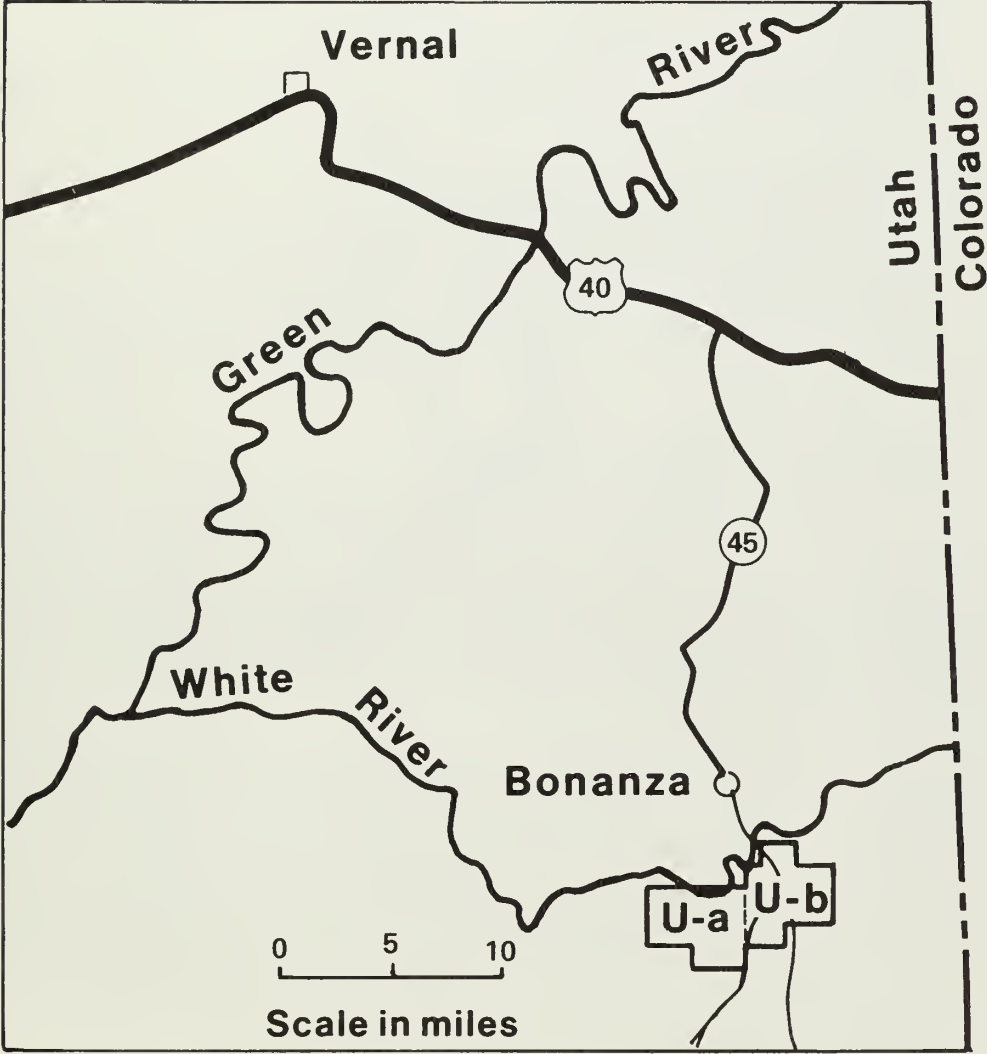
The Oil Shale Lease Environmental Stipulations required that "The Lessee shall compile data to determine the conditions existing prior to any development operations under the lease and shall, except as provided, conduct a monitoring program before, during, and subsequent to development operations." The purpose of the baseline study was to define the existing environmental setting and to provide a record of changes from conditions existing prior to development. These monitoring activities will extend throughout the life of the project and through the reclamation period in order to obtain continuous environmental information.

The Environmental Baseline Monitoring Program included monitoring activities in the following disciplines:

- Surface Water
- Ground Water
- Geology and Soils
- Air Resources
- Biological Resources
- Historic and Scientific Investigations

The results of the Environmental Baseline Monitoring Program (1974 through 1976) were published by the White River Shale Project in a Final Environmental Baseline Report. The program was extensive and cost WRSP 7.5 million dollars. Continued emphasis is placed on environmental monitoring and results of ongoing studies are published annually.

WRSP Location



Revegetation Studies

To guarantee that Tracts U-a and U-b will be returned to present productivity, WRSP initiated an extensive Revegetation Program conducted by Utah State University. This study began in 1974 and was completed at the end of 1978. A final report entitled "Revegetation Studies for Disturbed Areas and Processed Shale Disposal Sites" has been published. WRSP feels that a sound foundation has been formed for the successful revegetation of processed shale disposal areas and sites disturbed by shale oil operations. Work continues on confirming several findings of the studies and reports are issued annually covering the continued efforts.

Exploration

In the exploration program, WRSP drilled and cored 18 holes in addition to the 7 nomination core holes previously drilled. The purpose of the program was to:

- Evaluate the oil shale resource
- Obtain material for rock mechanic tests
- Evaluate aquifers and geological features
- Evaluate other minerals of value in the oil shale section

Results and conclusions from this program showed:

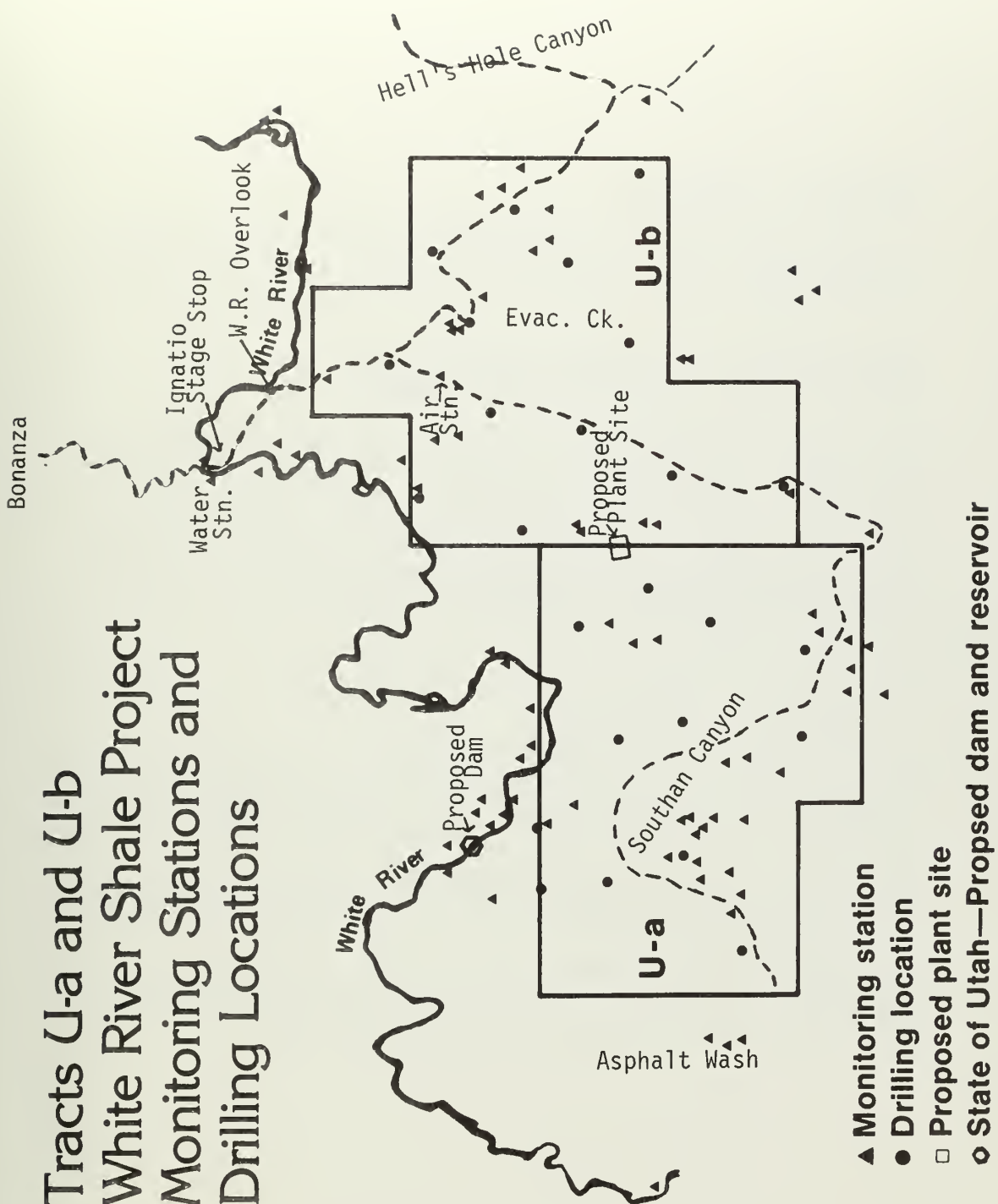
- The oil shale resource exists in commercial quantities
- No other minerals of value are present, including nacholite and dawsonite
- No significant faulting or fracturing exist
- From a mining standpoint, the oil shale zone is structurally sound and dry
- The only aquifer present is 400 feet above the mineable oil shale zone

Engineering Studies

Engineering studies began with a preliminary assessment of the cost of a 100,000 BPD oil shale facility so that we could understand the magnitude of oil shale development. This was followed by evaluation of all retorting systems that were developed to at least the pilot plant stage. Comparison of major studies of mining, engineering, and shale oil processing led to an engineering evaluation of all the available options of mining, retorting, and processing oil shale. Studies of the utilities required, processed shale management, and environmental impact mitigation were also carried out.

From these studies WRSP prepared the Detailed Development Plan required by the lease terms. This Detailed Development Plan includes the various phases of development necessary to reach commercial production and, ultimately, abandonment of the leases. White River's plans are to use underground "room and pillar" mining of the shale rock with above-ground retorting. While the route to commercialization may require some modification during the commercial phase, WRSP expects, economics permitting, to produce 100,000 barrels of shale oil per day from 160,000 tons of shale rock. It was estimated in 1975 that the facilities for producing 100,000 barrels per day of upgraded shale oil would cost the companies over 1.6 billion dollars.

Tracts U-a and U-b White River Shale Project Monitoring Stations and Drilling Locations



- ▲ Monitoring station
- Drilling location
- Proposed plant site
- State of Utah—Proposed dam and reservoir

Water Supply

The State of Utah has led efforts to locate a dam on the White River near Tracts U-a and U-b. The project would serve the Ute Indians, the Uintah Basin, and the oil shale industry.

Socio-Economic Studies

One of the major concerns in any remote area is the influx of people caused by a major project. WRSP has conducted comprehensive baseline and impact analyses of this problem. The Bureau of Land Management has also sponsored studies of the socioeconomic impact of oil shale development in the area. These studies plus work by many state and local groups have laid a good foundation for ensuring minimum adverse impact as a result of developing the U-a and U-b leases. Also important are the strong interest, cooperation, and support received from these Utah community planning groups.

Program Status

During the environmental baseline monitoring study, it was determined that several air quality parameters equaled or exceeded Federal limitations based on the sampling techniques being used, and a one year lease suspension was requested and granted for both tracts on November 1, 1976.

Later, on May 31, 1977, the lease terms of U-a and U-b were suspended by court order pending resolution of "clouds" on the title which jeopardize WRSP's ability to move forward with development.

During this period, environmental and engineering studies have continued, and it is hopeful that title to Tracts U-a and U-b will be cleared so that the White River Shale Project can move ahead under a firm lease to the property.

Notes:



Thank You
for your interest,
WHITE RIVER SHALE PROJECT

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Project
oil shale

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