

Work Plan

The following work plan assumes that the various projects will be conducted concurrently, all beginning in the first year that research is authorized, with the relative effort dependent upon staffing and obtaining required equipment.

A. Study the nature of oil shale with emphasis on changes with depth or location of shale and relationship between nature of shale and oil produced. Investigate chemistry involved in conversion of organic material to oil to provide data for improving present conversion processes or devising new ones.

B. Study composition of various shale oils with emphasis on the heavy hydrocarbon fractions about which little information is available. Correlate data with engineering research on the production of shale oil and end products. Develop techniques for separating materials from shale oil for other than fuel uses, emphasizing engineering applications. Apply data on chemistry of shale-oil components and process variables to improve processes. Develop analytical techniques useful in research and process control.

C. Study physical properties and physical chemistry of oil shale to obtain basic engineering data on which improved processes may be developed.

D. Study fundamentals of catalytic, thermal, and chemical treatment of shale oil to devise techniques for improving refinability and properties. Develop techniques for producing a suitable source material for the production of valuable products other than fuel.

E. Study effects of pyrolysis variables (temperature, rate of heating, etc.) on crude shale-oil properties and composition to devise techniques whereby crude shale oil of improved refinability may be produced.

F. Obtain data on physical properties of oil shale and apply such data to devising more efficient crushing techniques.

G. Conduct laboratory and pilot-plant studies to develop an efficient retorting process capable of handling fines as well as larger particles.

H. Conduct laboratory and field studies on spent-shale disposal problems.

Objectives

MINERALS ASSOCIATED WITH OIL SHALE

1. Identify and determine the amounts and characteristics of valuable minerals in Green River formation oil shales on Federal lands in Piceance Creek Basin, Colorado.
2. Develop new processes and determine their technical and economic practicabilities for recovering the alumina and soda (and other minerals that may be discovered during other segments of the program) contents of the specified oil shales.
3. Provide information for determining the geology and reserves of the minerals.
4. Determine the economics of preparing marketable mineral products for oil shale.

Program

A 10-year program is proposed to perform both basic and applied research on:

1. The identity, amounts and properties of valuable minerals in presently available representative samples of oil shales in Piceance Creek Basin through the procurement and analysis of representative core samples of the mineral-containing oil-shale beds that have not been adequately sampled.
2. The metallurgy of extracting and converting the oil-shale minerals to commercial products.
3. The geology and resources of the minerals
4. The economics of recovering the mineral values in oil shale in conjunction with processing the oil shale for its shale-oil value.

The total cost of the research on the identity, amounts, and properties of the valuable minerals over the 10-year period is estimated at \$5.9 million.

Work Plan

A. Identify, estimate the amount, and determine the chemical and physical properties of the minerals occurring in the oil-shale deposits. Fort Piceance Creek Basin, Colorado, this involves the rock matrix minerals, but applies principally to incompletely identified sodium and aluminum minerals such as nahcolite and dawsonite that are large and important potential sources of industrial chemicals. This basic information must first be obtained to initiate other studies