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**Data Report: Resource Ratings
of the Rare II Tracts in the
Idaho-Wyoming-Utah
and the Central Appalachian
Thrust Belts**

A. H. Voelker
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REGIONAL AND URBAN STUDIES
ENERGY DIVISION

DATA REPORT; RESOURCE RATINGS OF THE RARE II TRACTS IN THE
IDAHO-WYOMING-UTAH AND THE CENTRAL APPALACHIAN THRUST BELTS

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ABSTRACT

The assessment forms contained in this report constitute the data used in two resource assessments described in *A Systematic Method for Resource Rating with Two Applications to Potential Wilderness Areas* (Voelker et al. 1979). The assessments were performed for two geologic subprovinces containing proposed wilderness areas identified in the Forest Service Roadless Area Review and Evaluation (RARE II) program. The subprovinces studied are the Idaho-Wyoming-Utah thrust belt and the central Appalachians thrust belt.

Each assessment form contains location data, resource ratings, and supporting information for a single tract. A unique dual rating that reflects geologic favorability and certainty of resource occurrence is assigned to each resource category evaluated. Individual ratings are synthesized into an overall tract-importance rating. Ratings created by others are included for comparative purposes wherever available. Supporting information consists of commentary and references that explain and document the ratings listed.

1. INTRODUCTION

This report serves as a companion document to *A Systematic Method for Resource Rating with Two Applications to Potential Wilderness Areas* (Voelker et al., ORNL/TM-6739, 1979), which describes a new method for assessing the resource potential of undeveloped regions. This report contains the data generated by our assessment team as they rated the resource potential of 135 tracts of land identified by the Forest Service as candidates for wilderness designation under the Roadless Area Review and Evaluation (RARE II) Program. We have chosen to publish this voluminous collection of data to permit prospective users of the method to test the validity and reliability of its output. Additionally, because the data is tract specific and represents a relatively complete description of each tract, including ratings, it should be of use to the various groups participating in the current Congressional debate over wilderness designation.

The data are recorded on individual tract assessment forms. Each form contains location

information, resource ratings, and supporting information. A unique dual rating is recorded for each resource reflecting *favorability* of the geologic environment of the tract for significant deposits of the resource and the *certainty* of resource occurrence from actual data. Favorability and certainty are rated between 1 (low) and 4 (high). Thus, a 4/1 rating indicates that the tract is highly favorable for the resource but that no direct evidence has been collected to prove its existence. For precise definitions of each rating level, see the companion report (Voelker et al., 1979).

Using these dual ratings, a set of predetermined criteria, and the supporting data, the assessment team rated the overall importance of each tract in satisfying future resource needs. Criteria were based on such things as the strategic importance and supply of minerals, favorability and certainty, tract size, and other uses of each tract for energy-related activities such as transmission lines or pipelines.

Ratings produced by others are also listed on the form and give the team an additional

piece of information in reaching its conclusions. Supporting information in the form of comments and references acts as additional data to the decision maker but also shows the basis for the rating decision made by the team. The form allows a complete trace of the rating decision.

The two regions shown in Fig. 1 were assessed with the method. Primary interest centered on

the Idaho-Wyoming-Utah thrust belt because of its high potential for oil and gas. The central Appalachians thrust belt was selected as a check on the method because this region has gross geologic similarity to the western region. Assessment forms in this report are grouped by subprovince, and each section is prefaced with a description of the subprovince.

Fig. 1. The Idaho-Wyoming-Utah and the central Appalachian thrust belt study areas.

2. WESTERN SECTION

2.1 Description of the Idaho-Wyoming-Utah Thrust Belt

The Idaho-Wyoming-Utah thrust belt was selected for study because it is considered to be the most controversial of all the areas affected by RARE II. The region has a high potential for energy and mineral resources as well as for wilderness.

The Idaho-Wyoming-Utah thrust belt, as considered in this report, is shown in Fig. 2. It is bounded on the north by the Snake River volcanic plain, on the east by the line projected northward along and beyond the trace of the crest of the Moxa arch, on the south by the North Flank fault of the Unita Mountains, and on the west by the Wasatch fault. The area comprises about 23,700 sq miles, or 15 million acres. The Forest Service has identified 63 RARE II tracts in the area, totaling about 3.1 million acres.

The Idaho-Wyoming-Utah thrust belt consists of a west-thickening wedge of Paleozoic and Mesozoic rocks that were thrust eastward from latest Jurassic to Eocene time. From a regional standpoint, this thrust belt is a small segment of the continent-long Cordilleran thrust and fold belt that stretches from Alaska to Mexico. Although the thrust structures are numerous and quite complex in detail, for the purposes of this report we have divided the thrust belt into four areas, which, from east to west, are:

- (1) *Footwall*, located between the Moxa arch and the trace of the Prospect-Darby thrust,
- (2) *Prospect-Darby thrust sheet*, which extends westward to the trace of the Absaroka thrust,

- (3) *Absaroka thrust sheet*, which is the largest division and extends westward to the trace of the Paris-Bannock thrust, and
- (4) *Paris-Bannock thrust sheet*, which extends westward to the Wasatch fault.

Strictly speaking, the Gros Ventre Mountains and the Grand Tetons are not part of the Idaho-Wyoming-Utah thrust belt, but their mineral resources were nevertheless assessed.

2.2 Explanation of Headings Used on Assessment Form

TRACT NO: Number assigned to Roadless Area by U.S. Forest Service (USFS).

ECOREG: The ecological region in which the tract lies.

WAR: The Wilderness Attribute Rating assigned to the tract by the USFS.

100 N/G: The ratio of new acreage to gross acreage. This ratio is a relative measure of the private land within the tract.

OVERALL RATING (WEIGHTED): The overall energy importance rating of the tract. "Weighted" indicates that criteria in addition to the resource ratings were used to determine the overall rating.

NAMES OF CRITICAL MINERALS PRESENT: In many cases, the symbol for the element or dominant element is shown rather than the name of a specific mineral. For example, P(V,U,F,Zn,Cd,Cr) indicates that the tract contains phosphate rock, which is high in vanadium, uranium, fluorine, zinc, cadmium, and chromium.

Fig. 2. RARE II tracts in the Idaho-Wyoming-Utah thrust belt.

2.3 Assessment Forms for Idaho-Wyoming-
Utah Thrust Belt

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ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04102 TRACT NAME: Gros Ventre ECOREG: 3112 WAR: 24
 NATIONAL FOREST: Bridger-Teton STATE/COUNTY: Wyoming, Teton/Sublette
 ACREAGE (GROSS): 435,320 ACREAGE (NET): 432,600 100 N/G: 99 LATITUDE: 43°25' LONGITUDE: 110°25'

INDIVIDUAL TRACT RESOURCE RATINGS	<u>ORNL</u>	<u>USFS</u>	<u>DOE</u>	<u>USGS</u>	REMARKS
OIL AND GAS	4/4	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	3/1	1	2		SS-type deposits; SE part of tract
COAL	4/4	1	1		Shafts; subbituminous
GEO THERMAL	3/2	1			
CRITICAL MINERALS	4/4	4			
OVERALL RATING (WEIGHTED)	4 ⁺		4		

NAMES OF CRITICAL MINERALS PRESENT: P(V, U, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: Part of the large La Barge hydrocarbon complex with the associated Greater Big Piney Gas Area is located in the central part of the Footwall Belt. Numerous smaller oil and/or gas fields also occur along nearly the entire length of the belt and include a recent major gas discovery in Teton County in a roaded salient extending deep into Rare II tract 4102. Over 200 million barrels of oil and nearly 15 trillion cubic feet of gas have been estimated by the Rocky Mountain Oil and Gas Association for Rare II tracts in this belt. The Permian Phosphoria Formation contains part of the region's large phosphate resources.

GEOLOGY: Footwall Belt of the Jackson-Prospect-Darby fault system (extends eastward to the crest of the Moxa Arch and its northward projection). Surface rocks are largely Tertiary in age, except in the north where the Gros Ventre, West Slope of the Tetons, and several smaller satellite Rare II tracts contain the entire regional stratigraphic sequence from Precambrian through Cenozoic.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A world survey of phosphate deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Love and Others, 1955, Geologic Map of Wyoming: USGS; Glass and Others, 1975, Energy Resources Map of Wyoming: WGS; Sheldon, 1965, USGS Prof. Paper 1313-B; Clabough and others, 1946, USGS Mo. Basin Studies No. 9; USGS, 1964, MR-42; Chidester and Worthington, 1962, USGS MR-31; Love, 1961, USGS Prof. Paper 424-C; Chidester and Shride, 1962, USGS MR-17.

ENERGY AND MINERAL RESOURCE EVALUATION -- RARE II TRACTS

TRACT NO: 04103 TRACT NAME: Munger Mountain ECOREG: 3112 WAR: 16
 NATIONAL FOREST: Bridger-Teton STATE/COUNTY: Wyoming, Teton
 ACREAGE (GROSS): 12,900 ACREAGE (NET): 12,900 100 N/G: 100 LATITUDE: 43°20' LONGITUDE: 110°47'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	4	1		
COAL	4/3	1	1		
GEO THERMAL	3/2	1			
CRITICAL MINERALS	4/2	4			
OVERALL RATING (WEIGHTED)	3		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: The westward part of the La Barge hydrocarbon complex extends beneath the Jackson-Prospect-Darby Fault in the central part of the belt, and several smaller relatively shallow fields occur in the southern part of the belt. The Rocky Mountain Oil and Gas Association estimates that over 800 million barrels of oil and nearly five trillion cubic feet of gas occur in the Rare II tracts or parts thereof in the Jackson-Prospect-Darby thrust belt. Significant phosphate resources along with by-product potential in uranium, vanadium, chromium and other critical minerals occur in this belt. DOE, '4' for hydro-minor conflict.

GEOLOGY: Jackson-Prospect-Darby thrust belt (includes terrain westward to the surface trace of the Absaroka Fault). Surface strata are dominantly Cretaceous through Devonian in age, although locally some Lower Paleozoic rocks are exposed along the Footwall Fault, and some areas are covered by younger Tertiary sediments.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriol, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A world survey of phosphate deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Love and Others, 1955, Geologic Map of Wyoming: USGS; Glass and Others, 1975, Energy Resources Map of Wyoming: WGS; Sheldon, 1965, USGS Prof. Paper 1313-B; Clabough and others, 1946, USGS Mo. Basin Studies No. 9; USGS, 1964, MR-42; Chidester and Worthington, 1962, USGS MR-31; Love, 1961, USGS Prof. Paper 424-C; Chidester and Shride, 1962, USGS MR-17.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04104 TRACT NAME: Monument Ridge Ecoreg: 3112 WAR: 15
 NATIONAL FOREST: Bridger-Teton STATE/COUNTY: Wyoming, Sublette
 ACREAGE (GROSS): 17,380 ACREAGE (NET): 17,380 100 N/G: 100 LATITUDE: 43°11' LONGITUDE: 110°29'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/4	4	4		Stratigraphic and structural traps com- pounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	3/1	1	1		
COAL	4/3	1	1		Subbituminous
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	3/2	4			
OVERALL RATING (WEIGHTED)	4-		4		

NAMES OF CRITICAL MINERALS PRESENT: P(U, V, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: Part of the large La Barge hydrocarbon complex with the associated Greater Big Piney Gas Area is located in the central part of the Footwall Belt. Numerous smaller oil and/or gas fields also occur along nearly the entire length of the belt and include a recent major gas discovery in Teton County in a roaded salient extending deep into Rare II tract 4102. Over 200 million barrels of oil and nearly 15 trillion cubic feet of gas have been estimated by the Rocky Mountain Oil and Gas Association for Rare II tracts in this belt. The Permian Phosphoria Formation contains part of the region's large phosphate resources.

GEOLOGY: Footwall Belt of the Jackson-Prospect-Darby fault system (extends eastward to the crest of the Moxa Arch and its northward projection). Surface rocks are largely Tertiary in age, except in the north where the Gros Ventre, West Slope of the Tetons, and several smaller satellite Rare II tracts contain the entire regional stratigraphic sequence from Precambrian through Cenozoic.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A world survey of phosphate deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Love and Others, 1955, Geologic Map of Wyoming: USGS; Glass and Others, 1975, Energy Resources Map of Wyoming: WGS; Sheldon, 1965, USGS Prof. Paper 1313-B; Clabough and others, 1946, USGS Mo. Basin Studies No. 9; USGS, 1964, MR-42; Chidester and Worthington, 1962, USGS MR-31; Love, 1961, USGS Prof. Paper 424-C; Chidester and Shride, 1962, USGS MR-17.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04105 TRACT NAME: Jenny Creek Ecoreg: 3112 WAR: 16
 NATIONAL FOREST: Bridger-Teton STATE/COUNTY: Wyoming, Sublette
 ACREAGE (GROSS): 11,110 ACREAGE (NET): 11,110 100 N/G: 100 LATITUDE: 43°11' LONGITUDE: 110°21'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/4	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	3/1	1	1		
COAL	4/4	1	1		Subbituminous
GEOHERMAL	2/2	1			
CRITICAL MINERALS	1/3	1			
OVERALL RATING (WEIGHTED)	3-		4		

NAMES OF CRITICAL MINERALS PRESENT:

COMMENTARY AND SUMMARY: Part of the large La Barge hydrocarbon complex with the associated Greater Big Piney Gas Area is located in the central part of the Footwall Belt. Numerous smaller oil and/or gas fields also occur along nearly the entire length of the belt and include a recent major gas discovery in Teton County in a roaded salient extending deep into Rare II tract 4102. Over 200 million barrels of oil and nearly 15 trillion cubic feet of gas have been estimated by the Rocky Mountain Oil and Gas Association for Rare II tracts in this belt. The Permian Phosphoria Formation contains part of the region's large phosphate resources.

GEOLOGY: Footwall Belt of the Jackson-Prospect-Darby fault system (extends eastward to the crest of the Moxa Arch and its northward projection). Surface rocks are largely Tertiary in age, except in the north where the Gros Ventre, West Slope of the Tetons, and several smaller satellite Rare II tracts contain the entire regional stratigraphic sequence from Precambrian through Cenozoic.

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ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04106 TRACT NAME: Gray Back Ecoreg: 3112 WAR: 21
 NATIONAL FOREST: Bridger-Teton STATE/COUNTY: Wyoming, Lincoln/Sublette/Teton
 ACREAGE (GROSS): 271,530 ACREAGE (NET): 271,530 100 N/G: 100 LATITUDE: 43°08' LONGITUDE: 110°44'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	3/1	4	1		
COAL	4/4	4	3		Shafts
GEOHERMAL	3/2	1			
CRITICAL MINERALS	4/3	4			Ti-Cretaceous paleoplacers
OVERALL RATING (WEIGHTED)	4		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr); Ti

COMMENTARY AND SUMMARY: The westward part of the La Barge hydrocarbon complex extends beneath the Jackson-Prospect-Darby Fault in the central part of the belt, and several smaller relatively shallow fields occur in the southern part of the belt. The Rocky Mountain Oil and Gas Association estimates that over 800 million barrels of oil and nearly five trillion cubic feet of gas occur in the Rare II tracts or parts thereof in the Jackson-Prospect-Darby thrust belt. Significant phosphate resources along with by-product potential in uranium, vanadium, chromium and other critical minerals occur in this belt. DOE, '4' for hydro-border conflict.

GEOLOGY: Jackson-Prospect-Darby thrust belt (includes terrain westward to the surface trace of the Absaroka Fault). Surface strata are dominantly Cretaceous through Devonian in age, although locally some Lower Paleozoic rocks are exposed along the Footwall Fault, and some areas are covered by younger Tertiary sediments.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A world survey of phosphate deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Love and Others, 1955, Geologic Map of Wyoming: USGS; Glass and Others, 1975, Energy Resources Map of Wyoming: WGS; Sheldon, 1965, USGS Prof. Paper 1313-B; Clabough and others, 1946, USGS Mo. Basin Studies No. 9; USGS, 1964, MR-42; Chidester and Worthington, 1962, USGS MR-31; Love, 1961, USGS Prof. Paper 424-C; Chidester and Shride, 1962, USGS MR-17.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04107 TRACT NAME: Salt River Range ECOREG: 3112 WAR: 22
 NATIONAL FOREST: Bridger-Teton STATE/COUNTY: Wyoming, Lincoln
 ACREAGE (GROSS): 259,270 ACREAGE (NET): 256,390 100 N/G: 99 LATITUDE: 42°46' LONGITUDE: 110°48'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	4	1		
COAL	4/4	4	3		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	4/3	4			
OVERALL RATING (WEIGHTED)	4		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162). DOE, 2 for hydro-minor conflict.

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A world survey of phosphate deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Love and Others, 1955, Geologic Map of Wyoming: USGS; Glass and Others, 1975, Energy Resources Map of Wyoming: WGS; Sheldon, 1965, USGS Prof. Paper 1313-B; Clabough and others, 1946, USGS Mo. Basin Studies No. 9; USGS, 1964, MR-42; Chidester and Worthington, 1962, USGS MR-31; Love, 1961, USGS Prof. Paper 424-C; Chidester and Shride, 1962, USGS MR-17.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04108 TRACT NAME: Deadman Ecoreg: 3112 WAR: 18
 NATIONAL FOREST: Bridger-Teton STATE/COUNTY: Wyoming, Lincoln
 ACREAGE (GROSS): 6,400 ACREAGE (NET): 6,400 100 N/G: 100 LATITUDE: 42°57' LONGITUDE: 110°40'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	4/4	4	3		
GEO THERMAL	2/2	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	2+		4		

NAMES OF CRITICAL MINERALS PRESENT: P?

COMMENTARY AND SUMMARY: The westward part of the La Barge hydrocarbon complex extends beneath the Jackson-Prospect-Darby Fault in the central part of the belt, and several smaller relatively shallow fields occur in the southern part of the belt. The Rocky Mountain Oil and Gas Association estimates that over 800 million barrels of oil and nearly five trillion cubic feet of gas occur in the Rare II tracts or parts thereof in the Jackson-Prospect-Darby thrust belt. Significant phosphate resources along with by-product potential in uranium, vanadium, chromium and other critical minerals occur in this belt. DOE, 2 for hydro-border conflict.

GEOLOGY: Jackson-Prospect-Darby thrust belt (includes terrain westward to the surface trace of the Absaroka Fault). Surface strata are dominantly Cretaceous through Devonian in age, although locally some Lower Paleozoic rocks are exposed along the Footwall Fault, and some areas are covered by younger Tertiary sediments.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulphur Corp., Ltd., 1964, A world survey of phosphate deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Love and Others, 1955, Geologic Map of Wyoming: USGS; Glass and Others, 1975, Energy Resources Map of Wyoming: WGS; Sheldon, 1965, USGS Prof. Paper 1313-B; Clabough and others, 1946, USGS Mo. Basin Studies No. 9; USGS, 1964, MR-42; Chidester and Worthington, 1962, USGS MR-31; Love, 1961, USGS Prof. Paper 424-C; Chidester and Shride, 1962, USGS MR-17.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04109 TRACT NAME: North Fork Sheep Creek Ecoreg: 3112 WAR: 20
 NATIONAL FOREST: Bridger-Teton STATE/COUNTY: Wyoming, Lincoln
 ACREAGE (GROSS): 20,560 ACREAGE (NET): 20,560 100 N/G: 100 LATITUDE: 42°55' LONGITUDE: 110°42'

INDIVIDUAL TRACT RESOURCE RATINGS	<u>ORNL</u>	<u>USFS</u>	<u>DOE</u>	<u>USGS</u>	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	4	1		
COAL	4/4	4	4		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	3/2	4			Ti-Cretaceous paleoplacers
OVERALL RATING (WEIGHTED)	3-		4		

NAMES OF CRITICAL MINERALS PRESENT: P?; Ti

COMMENTARY AND SUMMARY: The westward part of the La Barge hydrocarbon complex extends beneath the Jackson-Prospect-Darby Fault in the central part of the belt, and several smaller relatively shallow fields occur in the southern part of the belt. The Rocky Mountain Oil and Gas Association estimates that over 800 million barrels of oil and nearly five trillion cubic feet of gas occur in the Rare II tracts or parts thereof in the Jackson-Prospect-Darby thrust belt. Significant phosphate resources along with by-product potential in uranium, vanadium, chromium and other critical minerals occur in this belt. DOE, 2 for hydro-border conflict.

GEOLOGY: Jackson-Prospect-Darby thrust belt (includes terrain westward to the surface trace of the Absaroka Fault). Surface strata are dominantly Cretaceous through Devonian in age, although locally some Lower Paleozoic rocks are exposed along the Footwall Fault, and some areas are covered by younger Tertiary sediments.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pls 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A world survey of phosphate deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Love and Others, 1955, Geologic Map of Wyoming: USGS; Glass and Others, 1975, Energy Resources Map of Wyoming: WGS; Sheldon, 1965, USGS Prof. Paper 1313-B; Clabough and others, 1946, USGS Mo. Basin Studies No. 9; USGS, 1964, MR-42; Chidester and Worthington, 1962, USGS MR-31; Love, 1961, USGS Prof. Paper 424-C; Chidester and Shride, 1962, USGS MR-17.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04110 TRACT NAME: Southern Wyoming Range Ecoreg: 3112 WAR: 20
 NATIONAL FOREST: Bridger-Teton STATE/COUNTY: Wyoming, Lincoln/Sublette
 ACREAGE (GROSS): 90,800 ACREAGE (NET): 90,800 100 N/G: 100 LATITUDE: 42°42' LONGITUDE: 110°38'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/4	4	4		Stratigraphic and structural traps com- pounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/3	1	1		
COAL	4/3	4	3		
GEO THERMAL	2/2	1			
CRITICAL MINERALS	3/3	4			
OVERALL RATING (WEIGHTED)	4-		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, Zn, F, Cd, Cr)

COMMENTARY AND SUMMARY: The westward part of the La Barge hydrocarbon complex extends beneath the Jackson-Prospect-Darby Fault in the central part of the belt, and several smaller relatively shallow fields occur in the southern part of the belt. The Rocky Mountain Oil and Gas Association estimates that over 800 million barrels of oil and nearly five trillion cubic feet of gas occur in the Rare II tracts or parts thereof in the Jackson-Prospect-Darby thrust belt. Significant phosphate resources along with by-product potential in uranium, vanadium, chromium and other critical minerals occur in this belt.

GEOLOGY: Jackson-Prospect-Darby thrust belt (includes terrain westward to the surface trace of the Absaroka Fault). Surface strata are dominantly Cretaceous through Devonian in age, although locally some Lower Paleozoic rocks are exposed along the Footwall Fault, and some areas are covered by younger tertiary sediments.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A world survey of phosphate deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Love and Others, 1955, Geologic Map of Wyoming: USGS; Glass and Others, 1975, Energy Resources Map of Wyoming: WGS; Sheldon, 1965, USGS Prof. Paper 1313-B; Clabough and others, 1946, USGS Mo. Basin Studies No. 9; USGS, 1964, MR-42; Chidester and Worthington, 1962, USGS MR-31; Love, 1961, USGS Prof. Paper 424-C; Chidester and Shride, 1962, USGS MR-17.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04111 TRACT NAME: Gannett Spring Creek Ecoreg: 3112 WAR: 18
 NATIONAL FOREST: Bridger-Teton/Caribou STATE/COUNTY: Wyoming/Idaho, Lincoln/Caribou/Lake
 ACREAGE (GROSS): 66,900 ACREAGE (NET): 66,020 100 N/G: 99 LATITUDE: 42°33' LONGITUDE: 111°00'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	4/3	4	3		
GEOTHERMAL	3/2	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	3+		4		

NAMES OF CRITICAL MINERALS PRESENT:

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162). DOE, moderate corridor R-45 conflict.

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulphur Corp., Ltd., 1964, A world survey of phosphate deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Love and Others, 1955, Geologic Map of Wyoming: USGS; Glass and Others, 1975, Energy Resources Map of Wyoming: WGS; Sheldon, 1965, USGS Prof. Paper 1313-B; Clabough and others, 1946, USGS Mo. Basin Studies No. 9; USGS, 1964, MR-42; Chidester and Worthington, 1962, USGS MR-31; Love, 1961, USGS Prof. Paper 424-C; Chidester and Shride, 1962, USGS MR-17.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04112 TRACT NAME: Commissary Range Ecoreg: 3112 WAR: 21
 NATIONAL FOREST: Bridger-Teton STATE/COUNTY: Wyoming, Lincoln
 ACREAGE (GROSS): 179,920 ACREAGE (NET): 178,180 100 N/G: 99 LATITUDE: 42°20' LONGITUDE: 110°45'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	3/2	1	1		
COAL	4/3	4	3		
GEOHERMAL	2/2	1			
CRITICAL MINERALS	4/4	4			Mo probably associated with phosphate rock
OVERALL RATING (WEIGHTED)	4+		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr); Mo

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162).

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A world survey of phosphate deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Love and Others, 1955, Geologic Map of Wyoming: USGS; Glass and Others, 1975, Energy Resources Map of Wyoming: WGS; Sheldon, 1965, USGS Prof. Paper 1313-B; Clabough and others, 1946, USGS Mo. Basin Studies No. 9; USGS, 1964, MR-42; Chidester and Worthington, 1962, USGS MR-31; Love, 1961, USGS Prof. Paper 424-C; Chidester and Shride, 1962, USGS MR-17.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04113 TRACT NAME: Nugent Park West ECOREG: 3112 WAR: 16
 NATIONAL FOREST: Bidger-Teton STATE/COUNTY: Wyoming, Lincoln
 ACREAGE (GROSS): 7,640 ACREAGE (NET): 7,640 100 N/G: 100 LATITUDE: 42°14' LONGITUDE: 110°49'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/3	4	3		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	2+		4		

NAMES OF CRITICAL MINERALS PRESENT:

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162).

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulphur Corp., Ltd., 1964, A world survey of phosphate deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Love and Others, 1955, Geologic Map of Wyoming: USGS; Glass and Others, 1975, Energy Resources Map of Wyoming: WGS; Sheldon, 1965, USGS Prof. Paper 1313-B; Clabough and others, 1946, USGS Mo. Basin Studies No. 9; USGS, 1964, MR-42; Chidester and Worthington, 1962, USGS MR-31; Love, 1961, USGS Prof. Paper 424-C; Chidester and Shride, 1962, USGS MR-17.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04114 TRACT NAME: Hams Fork Ridge ECOREG: 3112 WAR: 19
 NATIONAL FOREST: Bidger-Teton STATE/COUNTY: Wyoming, Lincoln
 ACREAGE (GROSS): 13,950 ACREAGE (NET): 13,870 100 N/G: 99 LATITUDE: 42°12' LONGITUDE: 110°45'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/4	4	4		Stratigraphic and structural traps com- pounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	3/2	1	1		
COAL	4/1	4	3		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	4/4	4			
OVERALL RATING (WEIGHTED)	4		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162).

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulphur Corp., Ltd., 1964, A world survey of phosphate deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Love and Others, 1955, Geologic Map of Wyoming: USGS; Glass and Others, 1975, Energy Resources Map of Wyoming: WGS; Sheldon, 1965, USGS Prof. Paper 1313-B; Clabough and others, 1946, USGS Mo. Basin Studies No. 9; USGS, 1964, MR-42; Chidester and Worthington, 1962, USGS MR-31; Love, 1961, USGS Prof. Paper 424-C; Chidester and Shride, 1962, USGS MR-17.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04115 TRACT NAME: Bacon Ridge ECOREG: 3112 WAR: 13
 NATIONAL FOREST: Bidger-Teton STATE/COUNTY: Wyoming, Teton/Sublette
 ACREAGE (GROSS): 5,290 ACREAGE (NET): 5,290 100 N/G: 100 LATITUDE: 43°25' LONGITUDE: 110°07'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/4	1	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	2/1	1	NE		
GEO THERMAL	2/2	1			
CRITICAL MINERALS	1/3	1			
OVERALL RATING (WEIGHTED)	3-		3		

NAMES OF CRITICAL MINERALS PRESENT:

COMMENTARY AND SUMMARY: Part of the large La Barge hydrocarbon complex with the associated Greater Big Piney Gas Area is located in the central part of the Footwall Belt. Numerous smaller oil and/or gas fields also occur along nearly the entire length of the belt and include a recent major gas discovery in Teton County in a roaded salient extending deep into Rare II tract 4102. Over 200 million barrels of oil and nearly 15 trillion cubic feet of gas have been estimated by the Rocky Mountain Oil and Gas Association for Rare II tracts in this belt. The Permian Phosphoria Formation contains part of the region's large phosphate resources.

GEOLOGY: Footwall Belt of the Jackson-Prospect-Darby fault system (extends eastward to the crest of the Moxa Arch and its northward projection). Surface rocks are largely Tertiary in age, except in the north where the Gros Ventre, West Slope of the Tetons, and several smaller satellite Rare II tracts contain the entire regional stratigraphic sequence from Precambrian through Cenozoic.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, Of Ten Alternatives-RARE II Lands, Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A world survey of phosphate deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Love and Others, 1955, Geologic Map of Wyoming: USGS; Glass and Others, 1975, Energy Resources Map of Wyoming: WGS; Sheldon, 1965, USGS Prof. Paper 1313-B; Clabough and others, 1946, USGS Mo. Basin Studies No. 9; USGS, 1964, MR-42; Chidester and Worthington, 1962, USGS MR-31; Love, 1961, USGS Prof. Paper 424-C; Chidester and Shride, 1962, USGS MR-17.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04116 TRACT NAME: Gypsum Creek ECOREG: 3112 WAR: 15
 NATIONAL FOREST: Bridger-Teton STATE/COUNTY: Wyoming, Sublette
 ACREAGE (GROSS): 17,300 ACREAGE (NET): 17,300 100 N/G: 100 LATITUDE: 43°19' LONGITUDE: 109°59'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	3/1	1	2		Probable ss-type deposits on small part of tract
COAL	2/1	1	1		
GEO THERMAL	3/2	1			
CRITICAL MINERALS	3/2	4			
OVERALL RATING (WEIGHTED)	2+		3		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: Part of the large La Barge hydrocarbon complex with the associated Greater Big Piney Gas Area is located in the central part of the Footwall Belt. Numerous smaller oil and/or gas fields also occur along nearly the entire length of the belt and include a recent major gas discovery in Teton County in a roaded salient extending deep into Rare II tract 4102. Over 200 million barrels of oil and nearly 15 trillion cubic feet of gas have been estimated by the Rocky Mountain Oil and Gas Association for Rare II tracts in this belt. The Permian Phosphoria Formation contains part of the region's large phosphate resources.

GEOLOGY: Footwall Belt of the Jackson-Prospect-Darby fault system (extends eastward to the crest of the Moxa Arch and its northward projection). Surface rocks are largely Tertiary in age, except in the north where the Gros Ventre, West Slope of the Tetons, and several smaller satellite Rare II tracts contain the entire regional stratigraphic sequence from Precambrian through Cenozoic.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A world survey of phosphate deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Love and Others, 1955, Geologic Map of Wyoming: USGS; Glass and Others, 1975, Energy Resources Map of Wyoming: WGS; Sheldon, 1965, USGS Prof. Paper 1313-B; Clabough and others, 1946, USGS Mo. Basin Studies No. 9; USGS, 1964, MR-42; Chidester and Worthington, 1962, USGS MR-31; Love, 1961, USGS Prof. Paper 424-C; Chidester and Shride, 1962, USGS MR-17.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04151 TRACT NAME: West Mink Ecoreg: 3130 WAR: 16
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Bannock
 ACREAGE (GROSS): 21,100 ACREAGE (NET): 20,280 100 N/G: 96 LATITUDE: 42°46' LONGITUDE: 112°27'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	1	2		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	1+		2		

NAMES OF CRITICAL MINERALS PRESENT: Base and precious metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriol, 1965, AAPG Bull., v. 43; British Sulphur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04152 TRACT NAME: Scout Mountain Ecoreg: 3130 WAR: 17
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Bannock
 ACREAGE (GROSS): 34,480 ACREAGE (NET): 32,300 100 N/G: 94 LATITUDE: 42°41' LONGITUDE: 112°20'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	1	2		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	1+		2		

NAMES OF CRITICAL MINERALS PRESENT: Base and precious metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04153 TRACT NAME: Toponce Ecoreg: 3112 WAR: 18
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Caribou/Bannock
 ACREAGE (GROSS): 17,060 ACREAGE (NET): 17,060 100 N/G: 100 LATITUDE: 42°52' LONGITUDE: 112°07'

INDIVIDUAL TRACT RESOURCE RATINGS	<u>ORNL</u>	<u>USFS</u>	<u>DOE</u>	<u>USGS</u>	REMARKS
OIL AND GAS	4/1	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	1+		3		

NAMES OF CRITICAL MINERALS PRESENT: Base and precious metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. DOE, low corridor R-49 conflict.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04154 TRACT NAME: Bonneville Peak Ecoreg: 3130 WAR: 18
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Bannock/Caribou
 ACREAGE (GROSS): 34,350 ACREAGE (NET): 32,210 100 N/G: 94 LATITUDE: 42°44' LONGITUDE: 112°07'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOOTHERMAL	2/2	1			
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	1+		3		

NAMES OF CRITICAL MINERALS PRESENT: Base and precious metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. DOE, low corridor R-49 conflict.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04155 TRACT NAME: North Pebble Ecoreg: 3112 WAR: 17
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Caribou
 ACREAGE (GROSS): 6,100 ACREAGE (NET): 6,100 100 N/G: 100 LATITUDE: 42°48' LONGITUDE: 112°05'

INDIVIDUAL TRACT RESOURCE RATINGS	<u>QRNL</u>	<u>USFS</u>	<u>DOE</u>	<u>USGS</u>	<u>REMARKS</u>
OIL AND GAS	4/1	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOHERMAL	2/2	1			
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	1*		3		

NAMES OF CRITICAL MINERALS PRESENT: Base and precious metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04156 TRACT NAME: Elkhorn Mountain Ecoreg: 3130 WAR: 18
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Oneida/Bannock
 ACREAGE (GROSS): 45,600 ACREAGE (NET): 45,240 100 N/G: 99 LATITUDE: 42°22' LONGITUDE: 112°18'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOHERMAL	3/2	1			
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	1+		3		

NAMES OF CRITICAL MINERALS PRESENT: Base and precious metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. DOE, high conflict, corridor R-50.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04157 TRACT NAME: Oxford Mountain ECOREG: 3112 WAR: 16
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Oneida/Bannock/Franklin
 ACREAGE (GROSS): 43,100 ACREAGE (NET): 42,480 100 N/G: 99 LATITUDE: 42°15' LONGITUDE: 112°06'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEO THERMAL	3/2	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	1+		3		

NAMES OF CRITICAL MINERALS PRESENT: Base metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. DOE, moderate corridor R-51 conflict.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMNGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulphur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04158 TRACT NAME: Deep Creek Ecoreg: 3130 WAR: 14
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Oneida
 ACREAGE (GROSS): 6,000 ACREAGE (NET): 5,360 100 N/G: 89 LATITUDE: 42°11' LONGITUDE: 112°11'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	1	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	1+		3		

NAMES OF CRITICAL MINERALS PRESENT: Cu — Pb?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. DOE, moderate corridor R-57 conflict.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04159 TRACT NAME: Clarkston Mountain Ecoreg: 3130 WAR: 15
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho/Utah, Oneida/Eldër/Lacne
 ACREAGE (GROSS): 21,900 ACREAGE (NET): 19,120 100 N/G: 87 LATITUDE: 42°03' LONGITUDE: 112°10'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEO THERMAL	2/2	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	1+		3		

NAMES OF CRITICAL MINERALS PRESENT: Base metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04160 TRACT NAME: Pole Creek ECOREG: 3112 WAR: 15
 NATIONAL FOREST: Caribou/Targhee STATE/COUNTY: Idaho, Bonneville
 ACREAGE (GROSS): 8,900 ACREAGE (NET): 8,900 100 N/G: 100 LATITUDE: 43°10' LONGITUDE: 111°22'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/4	4	4		Stratigraphic and structural traps com- pounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOHERMAL	2/2	1			
CRITICAL MINERALS	4/4	1			Mt. Pisgah gold district
OVERALL RATING (WEIGHTED)	3+		4		Small acreage

NAMES OF CRITICAL MINERALS PRESENT:

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162).

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04161 TRACT NAME: Caribou City Ecoreg: 3112 WAR: 22
 NATIONAL FOREST: Caribou/Targhee STATE/COUNTY: Idaho, Bonneville/Caribou
 ACREAGE (GROSS): 93,460 ACREAGE (NET): 92,880 100 N/G: 99 LATITUDE: 43°04' LONGITUDE: 111°12'

INDIVIDUAL TRACT RESOURCE RATINGS	<u>ORNL</u>	<u>USFS</u>	<u>DOE</u>	<u>USGS</u>	REMARKS
OIL AND GAS	4/4	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	4/2	1	1		Teton basin field
GEOHERMAL	2/2	1			
CRITICAL MINERALS	4/4	1			Mt. Pisgah gold district
OVERALL RATING (WEIGHTED)	4		4		

NAMES OF CRITICAL MINERALS PRESENT:

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162).

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04162 TRACT NAME: Stump Creek ECOREG: 3112 WAR: 22
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Caribou
 ACREAGE (GROSS): 103,640 ACREAGE (NET): 103,200 100 N/G: 100 LATITUDE: 42°50' LONGITUDE: 111°11'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	4/2	1	1		Teton basin field
GEOTHERMAL	3+/2	1			
CRITICAL MINERALS	2/1	1			Possible extension of Mt. Pisgah gold-bearing formations
OVERALL RATING (WEIGHTED)	3		4		

NAMES OF CRITICAL MINERALS PRESENT:

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162). DOE, moderate corridor R-45 conflict.

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION -- RARE II TRACTS

TRACT NO: 04163 TRACT NAME: Schmid Peak Ecoreg: 3112 WAR: 17
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Caribou
 ACREAGE (GROSS): 10,920 ACREAGE (NET): 10,830 100 N/G: 99 LATITUDE: 42°45' LONGITUDE: 110°15'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/2	1	1		
COAL	1/3	1	1		
GEO THERMAL	2/2	1			
CRITICAL MINERALS	4/4	4			
OVERALL RATING (WEIGHTED)	3		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162). DOE, moderate corridor R-45 conflict.

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04164 TRACT NAME: Dry Ridge ECOREG: 3112 WAR: 16
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Caribou/Bear Lake
 ACREAGE (GROSS): 27,640 ACREAGE (NET): 27,640 100 N/G: 100 LATITUDE: 42°37' LONGITUDE: 111°15'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/2	1	1		
COAL	1/3	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	4/4	4			
OVERALL RATING (WEIGHTED)	3+		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162).

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04165 TRACT NAME: Huckleberry Basin Ecoreg: 3112 WAR: 20
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Caribou/Bear Lake
 ACREAGE (GROSS): 30,560 ACREAGE (NET): 30,260 100 N/G: 99 LATITUDE: 42°36' LONGITUDE: 111°19'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/2	1	1		
COAL	1/3	1	1		
GEOTHERMAL	3/2	1			
CRITICAL MINERALS	4/4	4			
OVERALL RATING (WEIGHTED)	4		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162). DOE, critical corridor R-46 low acreage conflict.

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS.

TRACT NO: 04166 TRACT NAME: Sage Creek Ecoreg: 3112 WAR: 18
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Caribou
 ACREAGE (GROSS): 17,850 ACREAGE (NET): 17,210 100 N/G: 96 LATITUDE: 42°37' LONGITUDE: 118°88'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps com- pounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/2	1	1		
COAL	1/3	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	4/4	4			
OVERALL RATING (WEIGHTED)	3+		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162). DOE, moderate corridor R-45 conflict.

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04167 TRACT NAME: Meade Peak Ecoreg: 3112 WAR: 21
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Caribou/Bear Lake
 ACREAGE (GROSS): 43,520 ACREAGE (NET): 42,160 100 N/G: 97 LATITUDE: 42°27' LONGITUDE: 111°12'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/3	1	1		
COAL	1/3	1	1		
GEOTHERMAL	3/2	1			
CRITICAL MINERALS	4/4	4			
OVERALL RATING (WEIGHTED)	4		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162). DOE, critical corridor R-46 conflict (low acreage).

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulphur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04168 TRACT NAME: Hell Hole Ecoreg: 3112 WAR: 15
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Bear Lake
 ACREAGE (GROSS): 6,020 ACREAGE (NET): 5,830 100 N/G: 97 LATITUDE: 42°19' LONGITUDE: 111°10'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	3/1	1	1		
COAL	1/4	1	1		
GEO THERMAL	2/2	1			
CRITICAL MINERALS	4/4	1			Copper — red bed type
OVERALL RATING (WEIGHTED)	3+		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr); Cu

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162).

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulphur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04169 TRACT NAME: Telephone Draw ECOREG: 3112 WAR: 18
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Bear Lake
 ACREAGE (GROSS): 5,090 ACREAGE (NET): 5,090 100 N/G: 100 LATITUDE: 42°22' LONGITUDE: 111°08'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps com- pounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	3/1	1	1		
COAL	1/3	1	1		
GEOTHERMAL	3/2	1			
CRITICAL MINERALS	3/2	1			Copper — red bed type
OVERALL RATING (WEIGHTED)	3		4		

NAMES OF CRITICAL MINERALS PRESENT: Cu

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162). DOE, moderate corridor (R-45) conflict.

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04170 TRACT NAME: Red Mountain ECOREG: 3112 WAR: 19
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Bear Lake/Caribou
 ACREAGE (GROSS): 13,800 ACREAGE (NET): 13,800 100 N/G: 100 LATITUDE: 42°27' LONGITUDE: 111°07'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	3/1	1	1		
COAL	1/3	1	1		
GEOTHERMAL	3/2	1			
CRITICAL MINERALS	3/2	1			Copper — red bed type deposits
OVERALL RATING (WEIGHTED)	3 ⁺		4		

NAMES OF CRITICAL MINERALS PRESENT: Cu

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts: 04160, 04161, and 04162). DOE, moderate corridor conflict (R-45).

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION - RARE II TRACTS

TRACT NO: 04171 TRACT NAME: Soda Point ECOREG: 3112 WAR: 19
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Caribou/Bear Lake
 ACREAGE (GROSS): 23,750 ACREAGE (NET): 23,750 100 N/G: 100 LATITUDE: 42°33' LONGITUDE: 111°37'

INDIVIDUAL TRACT RESOURCE RATINGS	<u>ORNI</u>	<u>USFS</u>	<u>DOE</u>	<u>USGS</u>	REMARKS
OIL AND GAS	4/2	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	2-		3		

NAMES OF CRITICAL MINERALS PRESENT: Base and precious metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. DOE, 2 for minor hydro conflict.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RAKE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulphur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04172 TRACT NAME: Sherman Peak ECOREG: 3112 WAR: 19
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Bear Lake
 ACREAGE (GROSS): 14,600 ACREAGE (NET): 14,600 100 N/G: 100 LATITUDE: 42°30' LONGITUDE: 111°32'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	2-		3		

NAMES OF CRITICAL MINERALS PRESENT: Base metals

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. DOE, high conflict R-47 corridor.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04173 TRACT NAME: Stauffer Creek ECOREG: 3112 WAR: 20
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Bear Lake
 ACREAGE (GROSS): 7,860 ACREAGE (NET): 7,860 100 N/G: 100 LATITUDE: 42°26' LONGITUDE: 111°31'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	2-		3		

NAMES OF CRITICAL MINERALS PRESENT: Base metals

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04174 TRACT NAME: Williams Creek ECOREG: 3112 WAR: 19
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Franklin/Bear Lake
 ACREAGE (GROSS): 10,540 ACREAGE (NET): 10,540 100 N/G: 100 LATITUDE: 42°22' LONGITUDE: 111°36'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	3/1	4	1		Tertiary coal?
GEOHERMAL	3/2	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	2		3		

NAMES OF CRITICAL MINERALS PRESENT: Base metals, chiefly Pb

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. DOE, moderate conflict, corridor R-48.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04175 TRACT NAME: Liberty Creek ECOREG: 3112 WAR: 20
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Bear Lake/Franklin
 ACREAGE (GROSS): 16,800 ACREAGE (NET): 16,800 100 N/G: 100 LATITUDE: 42°18' LONGITUDE: 111°33'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/3	1	1		
GEOTHERMAL	3/2	1			Hot springs
CRITICAL MINERALS	2/3	1			
OVERALL RATING (WEIGHTED)	2		3		

NAMES OF CRITICAL MINERALS PRESENT: Metals, chiefly Pb

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. DOE, moderate conflict corridor R-48.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04176 TRACT NAME: Mink Creek ECOREG: 3112 WAR: 20
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Franklin/Bear Lake
 ACREAGE (GROSS): 16,300 ACREAGE (NET): 16,300 100 N/G: 100 LATITUDE: 42°16' LONGITUDE: 111°38'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	2/3	4	1		Tertiary coal
GEOHERMAL	3/2	1			Hot springs
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	2		3		

NAMES OF CRITICAL MINERALS PRESENT: Base metals, chiefly Pb

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. DOE, moderate conflict corridor R-48.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04177 TRACT NAME: Paris Peak ECOREG: 3112 WAR: 17
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Bear Lake
 ACREAGE (GROSS): 9,200 ACREAGE (NET): 9,200 100 N/G: 100 LATITUDE: 42°12' LONGITUDE: 111°32'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/3	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	2/3	1			
OVERALL RATING (WEIGHTED)	2+		3		

NAMES OF CRITICAL MINERALS PRESENT: Metals, chiefly Pb

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. DOE, moderate conflict corridor R=48

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS: RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04178 TRACT NAME: Station Creek Ecoreg: 3112 WAR: 19
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Franklin
 ACREAGE (GROSS): 9,100 ACREAGE (NET): 9,015 100 N/G: 99 LATITUDE: 42°09' LONGITUDE: 111°41'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/2	4	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	2		3		

NAMES OF CRITICAL MINERALS PRESENT: Base metals, chiefly Cu and Pb

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

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ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04179 TRACT NAME: Worm Creek Ecoreg: 3112 WAR: 21
 NATIONAL FOREST: Caribou STATE/COUNTY: Idaho, Bear Lake/Franklin
 ACREAGE (GROSS): 41,800 ACREAGE (NET): 41,565 100 N/G: 99 LATITUDE: 42°07' LONGITUDE: 111°32'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/3	1	1		
GEO THERMAL	2/2	1			
CRITICAL MINERALS	2/3	4			
OVERALL RATING (WEIGHTED)	2+		3		

NAMES OF CRITICAL MINERALS PRESENT: Cu, Pb

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. DOE, moderate conflict corridor R-48.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

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INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	4	3		Stratigraphic and structural traps com- pounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/3	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	2/3	1			
OVERALL RATING (WEIGHTED)	2+		3		

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. DOE, moderate conflict corridor R-48.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

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ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04181 TRACT NAME: Gibson Ecoreg: 3112 WAR: 16
 NATIONAL FOREST: Caribou/Wasatch STATE/COUNTY: Idaho, Franklin/Cache
 ACREAGE (GROSS): 11,401 ACREAGE (NET): 11,401 100 N/G: 100 LATITUDE: 42°00' LONGITUDE: 111°34'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	4	3		Stratigraphic and structural traps com- pounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/3	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	2		3		

NAMES OF CRITICAL MINERALS PRESENT: Base metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

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ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04610 TRACT NAME: West Slope Tetons ECOREG: 3112 WAR: 23
 NATIONAL FOREST: Targhee/Bridger-Teton STATE/COUNTY: Wyoming, Teton
 ACREAGE (GROSS): 177,175 ACREAGE (NET): 177,175 100 N/G: 100 LATITUDE: 43°50' LONGITUDE: 110°50'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1	NE		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	4/4	1			Small talc and asbestos prospects in PE rocks — unevaluated
OVERALL RATING (WEIGHTED)	1		1		

NAMES OF CRITICAL MINERALS PRESENT: P?; tale and asbestos

COMMENTARY AND SUMMARY: Part of the large La Barge hydrocarbon complex with the associated Greater Big Piney Gas Area is located in the central part of the Footwall Belt. Numerous smaller oil and/or gas fields also occur along nearly the entire length of the belt and include a recent major gas discovery in Teton County in a roaded salient extending deep into Rare II tract 4102. Over 200 million barrels of oil and nearly 15 trillion cubic feet of gas have been estimated by the Rocky Mountain Oil and Gas Association for Rare II tracts in this belt. The Permian Phosphoria Formation contains part of the region's large phosphate resources.

GEOLOGY: Footwall Belt of the Jackson-Prospect-Darby fault system (extends eastward to the crest of the Moxa Arch and its northward projection). Surface rocks are largely Tertiary in age, except in the north where the Gros Ventre, West Slope of the Tetons, and several smaller satellite Rare II tracts contain the entire regional stratigraphic sequence from Precambrian through Cenozoic.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppl's.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A world survey of phosphate deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Love and Others, 1955, Geologic Map of Wyoming: USGS; Glass and Others, 1975, Energy Resources Map of Wyoming: WGS; Sheldon, 1965, USGS Prof. Paper 1313-B; Clabough and others, 1946, USGS Mo. Basin Studies No. 9; USGS, 1964, MR-42; Chidester and Worthington, 1962, USGS MR-31; Love, 1961, USGS Prof. Paper 424-C; Chidester and Shride, 1962, USGS MR-17.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04611 TRACT NAME: Garns Mountain Ecoreg: 3112 WAR: 22
 NATIONAL FOREST: Targhee STATE/COUNTY: Idaho, Bonneville/Madison/Teton
 ACREAGE (GROSS): 114,790 ACREAGE (NET): 114,790 100 N/G: 100 LATITUDE: 43°38' LONGITUDE: 111°20'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/4	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	3/2	1	1		Associated with coal
COAL	4/4	4	1		Horseshoe District
GEOHERMAL	2/2	1			
CRITICAL MINERALS	4/4	4			
OVERALL RATING (WEIGHTED)	4+		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: The westward part of the La Barge hydrocarbon complex extends beneath the Jackson-Prospect-Darby Fault in the central part of the belt, and several smaller relatively shallow fields occur in the southern part of the belt. The Rocky Mountain Oil and Gas Association estimates that over 800 million barrels of oil and nearly five trillion cubic feet of gas occur in the Rare II tracts or parts thereof in the Jackson-Prospect-Darby thrust belt. Significant phosphate resources along with by-product potential in uranium, vanadium, chromium and other critical minerals occur in this belt.

GEOLOGY: Jackson-Prospect-Darby thrust belt (includes terrain westward to the surface trace of the Absaroka Fault). Surface strata are dominantly Cretaceous through Devonian in age, although locally some Lower Paleozoic rocks are exposed along the Footwall Fault, and some areas are covered by younger Tertiary sediments.

REFERENCE/CITATION: USFS, 1978, RARE II DES. ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pls. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Uriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04612 TRACT NAME: Moody Creek ECOREG: 3112 WAR: 15
 NATIONAL FOREST: Targhee STATE/COUNTY: Idaho, Madison
 ACREAGE (GROSS): 9,350 ACREAGE (NET): 9,190 100 N/G: 98 LATITUDE: 43°41' LONGITUDE: 111°28'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/4	4	4		Stratigraphic and structural traps com- pounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/3	1	1		
GEO THERMAL	2/2	1			
CRITICAL MINERALS	3/2	1			
OVERALL RATING (WEIGHTED)	3		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: The westward part of the La Barge hydrocarbon complex extends beneath the Jackson-Prospect-Darby Fault in the central part of the belt, and several smaller relatively shallow fields occur in the southern part of the belt. The Rocky Mountain Oil and Gas Association estimates that over 800 million barrels of oil and nearly five trillion cubic feet of gas occur in the Rare II tracts or parts thereof in the Jackson-Prospect-Darby thrust belt. Significant phosphate resources along with by-product potential in uranium, vanadium, chromium and other critical minerals occur in this belt.

GEOLOGY: Jackson-Prospect-Darby thrust belt (includes terrain westward to the surface trace of the Absaroka Fault). Surface strata are dominantly Cretaceous through Devonian in age, although locally some Lower Paleozoic rocks are exposed along the Footwall Fault, and some areas are covered by younger Tertiary sediments.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04613 TRACT NAME: Palisades Ecoreg: 3112 WAR: 21
 NATIONAL FOREST: Targhee/Bridger-Teton STATE/COUNTY: Idaho/Wyoming, Bonneville
 ACREAGE (GROSS): 247,090 ACREAGE (NET): 247,090 100 N/G: 100 LATITUDE: 43°22' LONGITUDE: 111°02'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	4/3	4	3		Associated with coal
COAL	4/4	1	1		Horseshoe District
GEOHERMAL	3/2	1			
CRITICAL MINERALS	4/4	4			
OVERALL RATING (WEIGHTED)	4+		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: The westward part of the La Barge hydrocarbon complex extends beneath the Jackson-Prospect-Darby Fault in the central part of the belt, and several smaller relatively shallow fields occur in the southern part of the belt. The Rocky Mountain Oil and Gas Association estimates that over 800 million barrels of oil and nearly five trillion cubic feet of gas occur in the Rare II tracts or parts thereof in the Jackson-Prospect-Darby thrust belt. Significant phosphate resources along with by-product potential in uranium, vanadium, chromium and other critical minerals occur in this belt.

GEOLOGY: Jackson-Prospect-Darby thrust belt (includes terrain westward to the surface trace of the Absaroka Fault). Surface strata are dominantly Cretaceous through Devonian in age, although locally some Lower Paleozoic rocks are exposed along the Footwall Fault, and some areas are covered by younger Tertiary sediments.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulphur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04614 TRACT NAME: Bald Mountain ECOREG: 3112 WAR: 15
 NATIONAL FOREST: Targhee STATE/COUNTY: Idaho, Bonneville
 ACREAGE (GROSS): 15,480 ACREAGE (NET): 15,480 100 N/G: 100 LATITUDE: 43°25' LONGITUDE: 111°26'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/4	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	3/2	1	1		Associated with coal
COAL	3/2	1	1		Pinecreek District
GEOHERMAL	2/2	1			
CRITICAL MINERALS	4/4	4			
OVERALL RATING (WEIGHTED)	4		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 4160, 4161, and 4162).

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04615 TRACT NAME: Bear Creek ECOREG: 3112 WAR: 18
 NATIONAL FOREST: Targhee STATE/COUNTY: Idaho, Bonneville
 ACREAGE (GROSS): 78,700 ACREAGE (NET): 78,540 100 N/G: 100 LATITUDE: 43°16' LONGITUDE: 111°18'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/4	4	4		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	3/2	1	1		Associated with coal
COAL	3/3	1	1		Teton basin field
GEOTHERMAL	3/2	1			
CRITICAL MINERALS	4/4	4			Mt. Pisgah Au District
OVERALL RATING (WEIGHTED)	4 ⁺		4		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr); Au (Ag)

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162).

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04616 TRACT NAME: Poker Peak ECOREG: 3112 WAR: 15
 NATIONAL FOREST: Targhee STATE/COUNTY: Idaho, Bonneville
 ACREAGE (GROSS): 18,600 ACREAGE (NET): 18,560 100 N/G: 100 LATITUDE: 43°15' LONGITUDE: 111°09'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	4	4		Stratigraphic and structural traps com- pounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	3/1	1	1		
COAL	1/4	1	1		
GEOTHERMAL	3/2	1			
CRITICAL MINERALS	4/1	1			Mt. Pisgah Au District
OVERALL RATING (WEIGHTED)	4		4		

NAMES OF CRITICAL MINERALS PRESENT: Au

COMMENTARY AND SUMMARY: Several major and several lesser oil and/or gas fields are located in the southern part of the Absaroka Belt in Wyoming and Utah. Most production is from Jurassic-Triassic reservoirs, but more recent deeper discoveries are in Upper Paleozoic rocks (Phosphoria) and even more recently in Lower Paleozoic rocks. The Rocky Mountain Oil and Gas Association estimates that Rare II tracts in the Absaroka belt contain nearly 3.3 billion barrels of oil and over 12.5 trillion cubic feet of gas. The major part of the Southeast Idaho phosphate resource is in this thrust belt, with much of it in the Rare II tracts. Not only are the phosphate rock resources important for the phosphorus, but there is a significant near-future potential for vanadium, uranium by-product production. The Mt. Pisgah gold district in Bonneville County may have significant potential for Carlin-type gold deposits (Rare II tracts 04160, 04161, and 04162).

GEOLOGY: Absaroka thrust belt (includes terrain westward to surface trace of the Paris-Bannock thrust complex). Includes (as secondary structures) the Crawford, Meade, Medicine Lodge, Sheep Mountain, Skyline, and many smaller thrust faults. Rocks exposed at the surface include sedimentary rocks from Cambrian to Tertiary in age along with some Tertiary and Quaternary volcanics. Several small igneous intrusions of Tertiary Age have been mapped in the Idaho part of the Absaroka Belt, chiefly in the vicinity of the Mt. Pisgah gold district.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1,2,3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Bond and Others, 1978, Geologic Map of Idaho: IBMG; Ross, C.P., 1941, IBMG Pamph. 57, pt. 111; Mansfield, 1927, USGS Prof. Paper 152; Leonard and Others, 1978, USGS OFR 78-360; USGS, 1964, Mineral and Water Resources of Idaho: 88th U.S. Congress; Vine, 1959, USGS Bull. 1055-1.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04755 TRACT NAME: Farmington ECOREG: 3112 WAR: 21
 NATIONAL FOREST: Wasatch STATE/COUNTY: Utah, Davis
 ACREAGE (GROSS): 12,040 ACREAGE (NET): 12,040 100 N/G: 100 LATITUDE: 40°57' LONGITUDE: 111°50'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1	2		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	4	1		
COAL	1/4	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	2/2	4			
OVERALL RATING (WEIGHTED)	1+		2		

NAMES OF CRITICAL MINERALS PRESENT: Base and precious metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. May be traversed by existing gas pipeline.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt; WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulphur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Stokes and Madsen, 1961, Geologic Map of Utah-Northeast Quarter: USGS; USGS, 1964, Mineral and Water Resources of Utah: 88th U.S. Congress; White, 1962, USGS MR-20.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04756 TRACT NAME: Francis ECOREG: 3112 WAR: 21
 NATIONAL FOREST: Wasatch STATE/COUNTY: Utah, Davis/Morgan
 ACREAGE (GROSS): 17,080 ACREAGE (NET): 15,980 100 N/G: 94 LATITUDE: 41°04' LONGITUDE: 111°52'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1	2		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	1+		2		

NAMES OF CRITICAL MINERALS PRESENT: Base metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. May be traversed by existing gas pipeline.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

REFERENCE/CITATION: USFS, 1978, RARE II DES, ID, UT, and WY Suppls.; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments, of Ten Alternatives-RARE II Lands; Powers, 1977, WGA Gdbk 29; Blackstone, 1978, Tectonic Map of the Overthrust Belt: WGS; RMOGA, 1978, Estimates of Undiscovered Recoverable Hydrocarbon Resources (RARE-II); White and Williams, 1975, USGS Circ. 726; NOAA, 1977, Geothermal Energy Resources of the Western U.S.; USGS, 1945, Min. Res. Mo. Valley Region, Pts. 1, 2, 3; ERDA, 1976, NURE-Prelim. Rpt.; Armstrong and Oriel, 1965, AAPG Bull., v. 43; British Sulfur Corp., Ltd., 1964, A World Survey of Phosphate Deposits: Woodalls Ltd. (Printers), London; Gulbrandsen, 1966, Geochim. Cosmochim. Acta, v. 3, p. 769-778; Brobst and Pratt, 1973, USGS Prof. Paper 820; Worl and Others, 1974, USGS MR-60; Kinkel and Peterson, 1962, USGS MR-13; RMAG, 1972, Geologic Atlas of the Rocky Mountain Region: Denver, CO; Stokes and Madsen, 1961, Geologic Map of Utah-Northeast Quarter: UGMS; USGS, 1964, Mineral and Water Resources of Utah: 88th U.S. Congress; White, 1962, USGS MR-20.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04758 TRACT NAME: Mount Naomi ECOREG: 3112 WAR: 19
 NATIONAL FOREST: Wasatch/Caribou STATE/COUNTY: Utah/Idaho, Cache/Franklin
 ACREAGE (GROSS): 84,000 ACREAGE (NET): 83,800 100 N/G: 100 LATITUDE: 41°54' LONGITUDE: 111°42'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	4	3		Stratigraphic and structural traps com- pounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/2	1	1		
COAL	3/1	4	1		
GEOHERMAL	2/2	1			
CRITICAL MINERALS	2/2	4			
OVERALL RATING (WEIGHTED)	2		3		

NAMES OF CRITICAL MINERALS PRESENT: Base metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

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ENERGY AND MINERAL RESOURCE EVALUATION - RARE II TRACTS

TRACT NO: 04759 TRACT NAME: Mount Logan Ecoreg: 3112 WAR: 16
 NATIONAL FOREST: Wasatch STATE/COUNTY: Utah, Cache
 ACREAGE (GROSS): 42,240 ACREAGE (NET): 41,920 100 N/G: 99 LATITUDE: 41°43' LONGITUDE: 111°43'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEO THERMAL	2/2	1			
CRITICAL MINERALS	2/1	4			
OVERALL RATING (WEIGHTED)	1+		3		

NAMES OF CRITICAL MINERALS PRESENT: Base and precious metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

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ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04760 TRACT NAME: Wellsville Mountain ECOREG: 3112 WAR: 23
 NATIONAL FOREST: Wasatch STATE/COUNTY: Utah, Cache/Elder
 ACREAGE (GROSS): 23,780 ACREAGE (NET): 23,780 100 N/G: 100 LATITUDE: 41°37' LONGITUDE: 112°01'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	4	3		Stratigraphic and structural traps com- pounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOHERMAL	3/2	1			
CRITICAL MINERALS	4/3	1			
OVERALL RATING (WEIGHTED)	3+		3		

NAMES OF CRITICAL MINERALS PRESENT: Base metals and Sb

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. May be traversed by existing gas pipeline.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

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ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04761 TRACT NAME: Mollens Hollow Ecoreg: 3112 WAR: 19
 NATIONAL FOREST: Wasatch STATE/COUNTY: Utah, Cache
 ACREAGE (GROSS): 16,900 ACREAGE (NET): 16,500 100 N/G: 98 LATITUDE: 41°33' LONGITUDE: 110°31'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEO THERMAL	2/2	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	2-		3		

NAMES OF CRITICAL MINERALS PRESENT: Base metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

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ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04762 TRACT NAME: Willard Ecoreg: 3112 WAR: 17
 NATIONAL FOREST: Wasatch STATE/COUNTY: Utah, Elder/Weber
 ACREAGE (GROSS): 17,480 ACREAGE (NET): 16,580 100 N/G: 95 LATITUDE: 41°24' LONGITUDE: 111°59'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	1	2		Stratigraphic and structural traps com- pounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	4	2		Potential in Tertiary rocks
COAL	1/4	1	1		
GEOTHERMAL	2/2	1			
CRITICAL MINERALS	4/4	4			
OVERALL RATING (WEIGHTED)	3-		2		

NAMES OF CRITICAL MINERALS PRESENT: Base metals

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

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ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04763 TRACT NAME: Lewis Peak Ecoreg: 3112 WAR: 19
 NATIONAL FOREST: Wasatch STATE/COUNTY: Utah, Weber
 ACREAGE (GROSS): 11,500 ACREAGE (NET): 11,500 100 N/G: 100 LATITUDE: 41°17' LONGITUDE: 111°54'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	1	2		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	2		
COAL	1/4	1	1		
GEO THERMAL	3/2	1			
CRITICAL MINERALS	4/1	1			Small asbestos-talc prospects in PE rocks
OVERALL RATING (WEIGHTED)	2+		2		

NAMES OF CRITICAL MINERALS PRESENT: (Asbestos, talc)?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present. May be traversed by existing gas pipeline.

GEOLOGY: Paris-Bannock thrust belt (includes terrain between Paris-Bannock fault on east and the Wasatch fault and its northward projection on the west). The Wasatch fault is the major east boundary fault of the Basin and Range structural province and is generally normal in character, usually having a steep westward dip. Bedrock includes strata from the younger Precambrian, all Paleozoic systems, and Tertiary and Quaternary deposits. Tertiary and Quaternary volcanic rocks and similar age gravels locally cover the older rocks and structures.

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ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04764 TRACT NAME: Upper South Fork Ecoreg: 3112 WAR: 20
 NATIONAL FOREST: Wasatch STATE/COUNTY: Utah, Weber
 ACREAGE (GROSS): 12,900 ACREAGE (NET): 11,800 100 N/G: 91 LATITUDE: 41°19' LONGITUDE: 111°32'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	4	3		Stratigraphic and structural traps compounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOHERMAL	2/2	1			
CRITICAL MINERALS	4/2	4			
OVERALL RATING (WEIGHTED)	2		3		

NAMES OF CRITICAL MINERALS PRESENT: P (U, V, F, Zn, Cd, Cr)

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present.

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ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 04765 TRACT NAME: Burch Creek ECOREG: 3112 WAR: 19
 NATIONAL FOREST: Wasatch STATE/COUNTY: Utah, Weber/Morgan
 ACREAGE (GROSS): 8,340 ACREAGE (NET): 7,700 100 N/G: 92 LATITUDE: 41°11' LONGITUDE: 111°53'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/1	1	2		Stratigraphic and structural traps com- pounded by thrusting; similar to Canadian Rockies Foothills Belt
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEO THERMAL	3/2	1			
CRITICAL MINERALS	2/1	1			Base metals and Au in PE rocks
OVERALL RATING (WEIGHTED)	1+		2		

NAMES OF CRITICAL MINERALS PRESENT: Base and precious metals?

COMMENTARY AND SUMMARY: Petroleum exploration has not been as intensive in the Paris-Bannock thrust belt as in the more easterly thrust structures; however, several holes showing some oil and gas have been completed in the past. The Rocky Mountain Oil and Gas Association estimates that over 300 million barrels of oil and approximately three trillion cubic feet of gas occur in Rare II tracts in this belt. Phosphate resources are minor in comparison with the more easterly belts. Some potential for disseminated gold and base metals in the Precambrian and Lower Paleozoic strata is also present.

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3. EASTERN SECTION

3.1 Description of the Central Appalachians

The central Appalachians studied in the second application are shown in Fig. 3. The region lies within a 330- by 100-mile belt paralleling the regional geologic structure and encompasses large parts of Virginia, West Virginia, North Carolina, and Tennessee. The area comprises approximately 33,000 sq miles, or about 21,100,000 acres, and contains 72 RARE II tracts totalling about 610,000 acres. Figure 1 illustrates the relatively small size of the central Appalachian tracts as compared with the Idaho-Wyoming-Utah thrust belt.

The central Appalachians include three relatively distinct northeast-trending physiographic provinces, which correspond roughly to geologic/structural provinces (Fenneman 1946). Along the southeast side is the Blue Ridge province, which consists largely of Precambrian igneous and metamorphic rocks and smaller amounts of Paleozoic sedimentary rocks. Fifteen tracts are located in the metamorphic and igneous eastern part of the province, and fourteen are located in the sedimentary rocks on the western edge. Adjacent to the Blue Ridge to the northwest is the Valley and Ridge province, which consists of Lower and Middle Paleozoic sedi-

mentary rocks. Thirty-four tracts are located in this province. Immediately northwest of the Valley and Ridge is the Appalachian Plateau province, which consists of Middle and Upper Paleozoic sedimentary rocks. Nine tracts are included in this province.

All three provinces have been deformed as a result of late Paleozoic compression directed to the northwest (Harris and Milici 1977). The compression has formed abundant folds and thrust faults, particularly in the Valley and Ridge. In general, thrust faults are the dominant structures at the surface in the southern and eastern parts of the province, whereas the northern and western segments are characterized by large fold structures with only nominal faulting. These parts of the province are informally called thrust fault-dominated and fold-dominated, respectively, in this report. Eleven tracts are located in the thrust-dominated area, and twenty-three tracts are located in the fold-dominated area. In the Appalachian Plateau, the compressional deformation is much less severe, although large folds and areally extensive thrust sheets have been recognized. To the east, the intensity of deformation increases, and metamorphic effects are widespread, especially in the Blue Ridge.

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Fig. 3. RARE II tracts in the central Appalachian thrust belt.

3.2 Assessment Forms for Central
Appalachian Thrust Belt

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ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08032 TRACT NAME: Rodgers Ridge Ecoreg: 2214 WAR: 15
 NATIONAL FOREST: Cherokee STATE/COUNTY: Tennessee, Johnson
 ACREAGE (GROSS): 6,721 ACREAGE (NET): 5,841 100 N/G: 87 LATITUDE: 36°34' LONGITUDE: 81°42'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/1	1			
URANIUM	2/2	1	2		NURE favorable area (ERDA 1976)
COAL	1/4	1	1		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	4/4	1			Shady Valley Manganese District (King and Ferguson 1960)
OVERALL RATING (WEIGHTED)	3		2		

NAMES OF CRITICAL MINERALS PRESENT: Manganese; possible iron, zinc, lead, and barite

COMMENTARY AND SUMMARY: This tract is in the Hot Springs Window of the Blue Ridge province. The rocks below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). The tract is within an area classified as favorable for uranium by NURE (ERDA 1976). The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The mineral environment is similar to that of the Hot Springs Barite District, N.C. (Oriel 1950), so that the rocks are favorable for barite, iron, and manganese. Little exploration has occurred for any resources in the immediate area.

GEOLOGY: The Precambrian Rogers Volcanic Group underlies the northeast part of the tract, and Lower Cambrian shales, sandstones, and carbonates of the Unicoi, Hampton, Erwin and Shady formations of the Johnson County Cove Window underlie the rest.

REFERENCE/CITATION: All resources — Hardeman and Others, 1966, Geol. Map of Tenn.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris, 1976, J. Res. USGS, v. 4, no. 4; Harris and Milici, 1977, USGS Prof. Paper 1018; Van Den Berg and Others, 1978, AAPG Bull. 62: 1340-55. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North Am. Critical Minerals — King and Ferguson, 1960, USGS Prof. Paper 311.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08033 TRACT NAME: Beaverdam Creek ECOREG: 2214 WAR: 17
 NATIONAL FOREST: Cherokee STATE/COUNTY: Tennessee, Johnson
 ACREAGE (GROSS): 4,900 ACREAGE (NET): 4,900 100 N/G: 100 LATITUDE: 36°36' LONGITUDE: 81°52'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/1	1			
URANIUM	2/1	1	2		
COAL	1/4	1	1		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	4/4	1			Shady Valley Manganese District (King and Ferguson 1960)
OVERALL RATING (WEIGHTED)	3-		2		

NAMES OF CRITICAL MINERALS PRESENT: Manganese and iron; possible zinc, lead, and barite

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The rocks may be favorable for gas at depth below the basal Blue Ridge Thrust (Harris 1976). Sandstone and conglomerate units may be favorable for uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The weathered Shady Dolomite contains mined deposits of manganese and iron ore and is quite favorable for zinc, lead, and barite (King and Ferguson 1960). Except for critical minerals, little exploration for resources has occurred.

GEOLOGY: Surface rocks are the Lower Cambrian shales, sandstones, and carbonates of the Unicoi through Shady formations on the NW flank of the Shady Valley Syncline.

REFERENCE/CITATION: All resources — Hardeman and Others, 1966, Geol. Map of Tenn.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris, 1976, J. Res. USGS, v. 4, no. 4; Harris and Milici, 1977, USGS Prof. Paper 1018; Van Den Berg and Others, 1978, AAPG Bull. 62: 1340-55. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumhull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North Am. Critical Minerals — King and Ferguson, 1960, USGS Prof. Paper 311.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: L8033 TRACT NAME: Beaver Dam Creek ECOREG: 2214 WAR: 15
 NATIONAL FOREST: Cherokee STATE/COUNTY: Tennessee, Sullivan
 ACREAGE (GROSS): 2,000 ACREAGE (NET): 2,000 100 N/G: 100 LATITUDE: 36°33' LONGITUDE: 82°40'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/1	1			
URANIUM	2/1	1	2		
COAL	1/4	1	1		
GEOHERMAL	2/1	1			possible shady residuum; near Shady Valley manganese district (King and Ferguson 1960)
CRITICAL MINERALS	3/2	1			
OVERALL RATING (WEIGHTED)	2-		2		

NAMES OF CRITICAL MINERALS PRESENT: Possible manganese, iron, zinc, lead, and barite

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The rocks at depth below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). Sandstone and conglomerate units may be favorable for uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. Iron, manganese, zinc, lead, and barite may exist in unmapped residuum of Shady Dolomite (King and Ferguson 1960), but the unit has been completely eroded from the tract. Except for critical minerals, little exploration has occurred for resources in the immediate area.

GEOLOGY: Surface rocks are Lower Cambrian Unicoi and Hampton Shales and Sandstones on NW flank of Shady Valley Syncline.

REFERENCE/CITATION: All resources — Hardeman and Others, 1966, Geol. Map of Tenn.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris, 1976, J. Res. USGS, v. 4, no. 4; Harris and Milici, 1977, USGS Prof. Paper 1018; Van Den Berg and Others, 1978, AAPG Bull. 62: 1340-55. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North Am. Critical Minerals — King and Ferguson, 1960, USGS Prof. Paper 311.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08035 TRACT NAME: Pond Mountain Ecoreg: 2214 WAR: 17
 NATIONAL FOREST: Cherokee STATE/COUNTY: Tennessee, Carter
 ACREAGE (GROSS): 4,368 ACREAGE (NET): 4,368 100 N/G: 100 LATITUDE: 36°18' LONGITUDE: 82°07'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	2/2	1			Igneous rocks
COAL	1/4	1			
GEO THERMAL	2/1	1			
CRITICAL MINERALS	4/4	1			Shady dolomite (King and Others 1961)
OVERALL RATING (WEIGHTED)	3-				

NAMES OF CRITICAL MINERALS PRESENT: Iron and manganese; possible zinc, lead, and barite.

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. Possible sedimentary rocks below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). The Precambrian igneous rocks may be favorable for uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The weathered Shady Dolomite contains mined deposits of iron and manganese and is favorable for zinc, lead, and barite (King and Ferguson 1960). In the immediate area, little exploration for any resources except critical minerals has occurred.

GEOLOGY: Surface rocks are the Lower Cambrian shales, sandstones, and carbonates of the Unicoi, Hampton, Erwin, and Shady formations within the Doe River Cove Window and Precambrian igneous rock along the southwest edge of the tract.

REFERENCE/CITATION: All resources — Hardeman and Others, 1966, Geol. Map of Tenn.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris, 1976, J. Res. USGS, v. 4, no. 4; Harris and Milici, 1977, USGS Prof. Paper 1018; Van Den Berg and Others, 1978, AAPG Bull. 62: 1340-55. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North Am. Critical Minerals — King and Ferguson, 1960, USGS Prof. Paper 311.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08036 TRACT NAME: Jennings Creek Ecoreg: 2214 WAR: 21
 NATIONAL FOREST: Cherokee STATE/COUNTY: Tennessee, Greene/Washington/Unicoi
 ACREAGE (GROSS): 14,700 ACREAGE (NET): 12,500 100 N/G: 85 LATITUDE: 36°07' LONGITUDE: 82°40'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/1	1			
URANIUM	2/2	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/2	1			Possible Shady residuum
OVERALL RATING (WEIGHTED)	2+				

NAMES OF CRITICAL MINERALS PRESENT: Possible manganese, iron, lead, zinc, and barite

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The rocks at depth below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). Sandstone and conglomerate units may be favorable for uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. Iron, manganese, zinc, lead, and barite may exist in unmapped residuum of Shady Dolomite (King and Ferguson 1960), but the unit has been completely eroded from the tract. Except for critical minerals, little exploration has occurred for resources in the immediate area.

GEOLOGY: Surface rocks are the Lower Cambrian shales as well as sandstones of the Unicoi, Hampton, and Erwin formations.

REFERENCE/CITATION: All resources — Hardeman and Others, 1966, Geol. Map of Tenn.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris, 1976, J. Res. USGS, v. 4, no. 4; Harris and Milici, 1977, USGS Prof. Paper 1018; Van Den Berg and Others, 1978, AAPG Bull. 62: 1340-55. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North Am. Critical Minerals — King and Ferguson, 1960, USGS Prof. Paper 311.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08040 TRACT NAME: Rough Mountain ECOREG: 2214 WAR: 20
 NATIONAL FOREST: George Washington STATE/COUNTY: Virginia, Bath
 ACREAGE (GROSS): 9,300 ACREAGE (NET): 9,300 100 N/G: 100 LATITUDE: 37°55' LONGITUDE: 79°42'

INDIVIDUAL TRACT RESOURCE RATINGS	<u>ORNL</u>	<u>USFS</u>	<u>DOE</u>	<u>USGS</u>	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/2	1			Hear an area with warm springs
CRITICAL MINERALS	3/3	1			Along strike of a belt of manganese deposits in Bath County
OVERALL RATING (WEIGHTED)	2				

NAMES OF CRITICAL MINERALS PRESENT: Probable copper; cadmium possible; iron, zinc, lead, fluorite, phosphate, and barite at depth.

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge province. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Warm springs in the area suggest that there is potential for geothermal energy. The Upper Devonian red beds at the surface may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Silurian Clinton Formation); and zinc, lead, cadmium, fluorite, and barite (Ordovician carbonates). Little exploration for any commodity has occurred except for oil and gas, which has been only moderate.

GEOLOGY: Surface rocks are Upper Devonian shales and sandstones folded into several gentle anticlines and synclines.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1C18; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08041 TRACT NAME: Rich Hole ECOREG: 2214 WAR: 22
 NATIONAL FOREST: George Washington STATE/COUNTY: Virginia, Rockbridge/Alleghany
 ACREAGE (GROSS): 5,030 ACREAGE (NET): 5,030 100 N/G: 100 LATITUDE: 37°52' LONGITUDE: 79°38'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	1+				

NAMES OF CRITICAL MINERALS PRESENT: Possible manganese, iron, and zinc; possible cadmium, zinc, lead, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge province. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may have some potential for geothermal energy. The Devonian Oriskany Sandstone at the surface may contain critical minerals manganese, iron, and zinc, and the Silurian Clinton Formation may contain iron. Critical minerals for which the subsurface rocks may be favorable include zinc, lead, cadmium, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any commodity, except for oil and gas for which exploration has been moderate.

GEOLOGY: Surface rocks are Silurian and Lower to Middle Devonian shales and sandstones along the southeast flank of an anticline.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08042 TRACT NAME: St. Mary's ECOREG: 2214 WAR: 20
 NATIONAL FOREST: Washington STATE/COUNTY: Virginia, Augusta
 ACREAGE (GROSS): 10,695 ACREAGE (NET): 10,695 100 N/G: 100 LATITUDE: 37°56' LONGITUDE: 79°06'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/2	1			Along strike of mined manganese deposits. Irish Creek tin deposit 5 miles south (Gooch and Pharr 1959)
OVERALL RATING (WEIGHTED)	2-				

NAMES OF CRITICAL MINERALS PRESENT: Possible manganese, zinc, lead, and tin

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. Rocks at depth below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). The basal Cambrian clastics may be favorable for uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. Possible critical minerals include manganese, zinc, lead, and barite in the basal clastics and tin in the gneiss if the Irish Creek tin deposit extends to the tract from five miles south along strike (Gooch and Pharr 1959). Little exploration has occurred in the immediate area for any resources except for critical resources.

GEOLOGY: Surface rocks are the Precambrian Pedlar Gneiss and the Cambrian sedimentary and meta-sedimentary Chilhowee Group, strongly folded and thrust faulted.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08043 TRACT NAME: Crawford Mountain ECOREG: 2214 WAR: 21
 NATIONAL FOREST: George Washington STATE/COUNTY: Virginia, Augusta
 ACREAGE (GROSS): 15,360 ACREAGE (NET): 15,360 100 N/G: 100 LATITUDE: 38°19' LONGITUDE: 79°16'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	1+				

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible manganese, iron, zinc, lead, cadmium, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may have some potential for geothermal energy. Upper Devonian red beds may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). In the vicinity of the tract, little exploration has occurred except for oil and gas, for which exploration has been moderate.

GEOLOGY: Surface rocks are Upper Devonian and Lower Mississippian shales and sandstones synclinally folded.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08044 TRACT NAME: Ramseys Draft Study Area Ecoreg: 2214 WAR: 23
 NATIONAL FOREST: George Washington STATE/COUNTY: Virginia, Highland/Augusta
 ACREAGE (GROSS): 6,700 ACREAGE (NET): 6,700 100 N/G: 100 LATITUDE: 38°21' LONGITUDE: 79°20'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/2	1			Possibly mineral-bearing rocks are at shallow depth
OVERALL RATING (WEIGHTED)	2-				

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible manganese, iron, zinc, lead, cadmium, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may have some potential for geothermal energy. Upper Devonian red beds may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). In the vicinity of the tract, little exploration has occurred except for oil and gas, for which exploration has been moderate.

GEOLOGY: Surface rocks are Upper Devonian shales and sandstones, synclinally folded.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08045 TRACT NAME: Laurel Fork ECOREG: 2214 WAR: 21
 NATIONAL FOREST: Monongahela STATE/COUNTY: Virginia/West Virginia,
 Highland/Pendleton
 ACREAGE (GROSS): 10,965 ACREAGE (NET): 10,965 100 N/G: 100 LATITUDE: 38°33' LONGITUDE: 79°37'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/2	1			Possibly mineral-bearing rocks at shallow depth
OVERALL RATING (WEIGHTED)	2 ⁻				

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible iron, zinc, cadmium, lead, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may have some potential for geothermal energy. Upper Devonian red beds may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). In the vicinity of the tract, little exploration has occurred except for oil and gas, for which exploration has been moderate.

GEOLOGY: Surface rocks are Upper Devonian shales and sandstones on the northwest flank of an anticline.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08046 TRACT NAME: Little River ECOREG: 2214 WAR: 20
 NATIONAL FOREST: George Washington STATE/COUNTY: Virginia, Augusta
 ACREAGE (GROSS): 10,816 ACREAGE (NET): 10,816 100 N/G: 100 LATITUDE: 38°25' LONGITUDE: 79°13'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/2	1			Possibly mineral-bearing rocks are at shallow depth
OVERALL RATING (WEIGHTED)	2-				

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible zinc, lead, iron, cadmium, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may have some potential for geothermal energy. Upper Devonian red beds may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). In the vicinity of the tract, little exploration has occurred except for oil and gas, for which exploration has been moderate.

GEOLOGY: Surface rocks are Upper Devonian shales and sandstones, synclinally folded. Tract cut by Triassic (?) dike.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08047 TRACT NAME: Big Schloss Ecoreg: 2214 WAR: 16
 NATIONAL FOREST: George Washington STATE/COUNTY: Virginia, Shenandoah/Frederick
 ACREAGE (GROSS): 20,817 ACREAGE (NET): 20,478 100 N/G: 98.4 LATITUDE: 39°00' LONGITUDE: 78°35'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/1	1			@ 15 mi. east of an oil and gas field (Patchen and Others 1978)
URANIUM	2/1	1			
COAL	1/4	1			
GEO THERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			Track lies within Timberlake Fluorite District (Worl and others 1974)
OVERALL RATING (WEIGHTED)	1+				

NAMES OF CRITICAL MINERALS PRESENT: Possible iron; possible zinc, cadmium, lead, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge province. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may have some potential for geothermal energy. The Silurian Clinton Formation at the surface may contain iron. Critical minerals for which the subsurface rocks may be favorable include zinc, cadmium, lead, barite, and fluorite (Ordovician carbonates). Fluorite has been produced in the region (Worl and Others 1974). In the vicinity of the tract, little exploration has occurred for any commodities except for oil and gas, for which exploration has been only moderate.

GEOLOGY: Surface rocks are Ordovician and Silurian shales and sandstones anticlinally folded.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08048 TRACT NAME: Beartown ECOREG: 2214 WAR: 22
 NATIONAL FOREST: Jefferson STATE/COUNTY: Virginia, Tazewell/Bland
 ACREAGE (GROSS): 10,542 ACREAGE (NET): 7,469 100 N/G: 70.8 LATITUDE: 37°03' LONGITUDE: 81°27'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1	2		
COAL	1/4	1	3		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/1	1			
OVERALL RATING (WEIGHTED)	2+		3		

NAMES OF CRITICAL MINERALS PRESENT: Possible iron, manganese, zinc, and lead; possible zinc, lead, cadmium, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the thrust fault-dominated part of the Valley and Ridge province. The rocks are quite favorable for oil and gas. Sandstone units may be favorable for uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. Critical minerals for which the surface rocks are favorable include zinc, manganese, and lead (weathered Devonian Oriskany Sandstone) and iron (Devonian Helderberg Limestone and Silurian Clinton Formation). Ordovician carbonates at depth may contain zinc, lead, cadmium, barite, and fluorite. Except for oil and gas, little exploration has taken place for resources in the immediate area.

GEOLOGY: Surface rocks are Upper Ordovician to Lower Devonian shales and sandstones anticlinally folded.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08049 TRACT NAME: Little Dry Run ECOREG: 2214 WAR: 21
 NATIONAL FOREST: Jefferson STATE/COUNTY: Virginia, Wythe
 ACREAGE (GROSS): 2,998 ACREAGE (NET): 2,998 100 N/G: 100 LATITUDE: 36°47' LONGITUDE: 81°13'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/3	1			Shady dolomite at surface
OVERALL RATING (WEIGHTED)	2				

NAMES OF CRITICAL MINERALS PRESENT: Possible manganese and iron

COMMENTARY AND SUMMARY: This tract is in the thrust fault-dominated part of the Valley and Ridge province. The rocks may be favorable for gas in thrust sheets at depth below the Cambrian rocks (Harris 1976). Sandstones and conglomerates may be favorable for uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. Manganese and iron deposits are likely to be found in the weathered Shady Dolomite (King and Ferguson 1960). Except for manganese and iron, for which there has been moderate exploration, little exploration has occurred in the immediate area for resources.

GEOLOGY: Partly metamorphosed Cambrian Chilhowee Group, the Cambrian Shady Dolomite, and the Cambrian Rome Shale synclinally folded and thrust faulted.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08050 TRACT NAME: Lewis Fork ECOREG: 2210 WAR: 20
 NATIONAL FOREST: Jefferson STATE/COUNTY: Virginia, Grayson/Smyth
 ACREAGE (GROSS): 5,771 ACREAGE (NET): 5,749 100 N/G: 100 LATITUDE: 36°40' LONGITUDE: 81°33'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1				
URANIUM	2/2				
COAL	1/4				
GEOTHERMAL	2/1				
CRITICAL MINERALS	3/1				Volcanic rocks favorable
OVERALL RATING (WEIGHTED)	1+				

NAMES OF CRITICAL MINERALS PRESENT: Possible igneous or vein deposits of mica, feldspar, and rare earths

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The rocks may be favorable for gas at depth below the basal Blue Ridge Thrust (Harris 1976). The rocks are favorable for uranium but are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. No critical minerals are known to occur in the tract, but igneous or hydrothermal veins may be favorable for mica, feldspar, and rare earths. Little exploration has occurred for resources in the immediate area.

GEOLOGY: Surface rocks are the Precambrian-Cambrian Mt. Rogers Volcanic Group

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08051 TRACT NAME: Roaring Branch ECOREG: 2211 WAR: 21
 NATIONAL FOREST: Jefferson STATE/COUNTY: Virginia, Lee/Wise
 ACREAGE (GROSS): 3,160 ACREAGE (NET): 2,700 100 N/G: 85.4 LATITUDE: 36°52' LONGITUDE: 82°49'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/3	1			Near crest of oil-bearing Powell Mountain Anticline (Patchen and Others 1978)
URANIUM	2/2	1	2		
COAL	3/4	1	3		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	2+		3		

NAMES OF CRITICAL MINERALS PRESENT: Possible copper, zinc, iron, cadmium, lead, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the thrust fault-dominated part of the Valley and Ridge province. The rocks are favorable for oil and gas, which are produced in this part of the province. Sandstone units may be favorable for uranium. The tract is on the edge of the Appalachian coal field. Coal underlies part of the tract but is thin and of low quality. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks probably contain no critical minerals, but older rocks at depth may be favorable for copper (Upper Devonian red beds); zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). In the general area, little exploration for any commodities has occurred except for oil and gas, for which exploration has been considerable.

GEOLOGY: Surface rocks are Upper Mississippian and Pennsylvanian shales and sandstones on the northwest flank of an anticline in the upper plate of Pine Mountain Thrust.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08052 TRACT NAME: Little Stoney Ecoreg: 2214 WAR: 16
 NATIONAL FOREST: Jefferson STATE/COUNTY: Virginia, Scott/Wise
 ACREAGE (GROSS): 1,050 ACREAGE (NET): 1,050 100 N/G: 100 LATITUDE: 36°52' LONGITUDE: 82°27'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1			Pine Mountain over thrust block contains gas in Wise County
URANIUM	2/2	1	1		
COAL	3/4	1	2		Edge of Appalachian coal field
GEOHERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	2+		2		

NAMES OF CRITICAL MINERALS PRESENT: Possible copper, zinc, iron, cadmium, lead, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the thrust fault-dominated part of the Valley and Ridge province. The rocks are favorable for oil and gas, which are produced in this part of the province. Sandstone units may be favorable for uranium. The tract is on the edge of the Appalachian coal field. Coal underlies part of the tract but is thin and of low quality. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks probably contain no critical minerals, but older rocks at depth may be favorable for copper (Upper Devonian red beds); zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). In the general area, little exploration for any commodities has occurred except for oil and gas, for which exploration has been considerable.

GEOLOGY: Surface rocks are Lower Pennsylvanian shales and sandstones, synclinally folded, in the upper plate of the Pine Mountain overthrust.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08053 TRACT NAME: Little Wilson Creek Ecoreg: 2214 WAR: 22
 NATIONAL FOREST: Jefferson STATE/COUNTY: Virginia, Grayson
 ACREAGE (GROSS): 3,568 ACREAGE (NET): 3,523 100 N/G: 99 LATITUDE: 36°39' LONGITUDE: 81°28'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	2/2	1			
COAL	1/4	1			
GEOHERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	1+				

NAMES OF CRITICAL MINERALS PRESENT: Possible igneous or vein deposits of mica, feldspar, and rare earths

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The rocks may be favorable for gas at depth below the basal Blue Ridge Thrust (Harris 1976). The rocks are favorable for uranium but are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. No critical minerals are known to occur in the tract, but igneous or hydrothermal veins may be favorable for mica, feldspar, and rare earths. Little exploration has occurred for resources in the immediate area.

GEOLOGY: Surface rocks are the Precambrian Mt. Rogers Volcanic Group.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 75; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08054 TRACT NAME: Big Creek Ecoreg: 2214 WAR: 20
 NATIONAL FOREST: Pisgah STATE/COUNTY: North Carolina, Madison
 ACREAGE (GROSS): 5,500 ACREAGE (NET): 4,200 100 N/G: 76 LATITUDE: 36°05' LONGITUDE: 82°40'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	2/2	1	2		Within NURE favorable area (ERDA 1976)
COAL	1/4	1	1		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/1	1			
OVERALL RATING (WEIGHTED)	2-		2		

NAMES OF CRITICAL MINERALS PRESENT: Possible iron, barite, and manganese

COMMENTARY AND SUMMARY: This tract is in the Hot Springs Window of the Blue Ridge province. The rocks below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). The tract is within an area classified as favorable for uranium by NURE (ERDA 1976). The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The mineral environment is similar to that of the Hot Springs Barite District, N.C. (Oriol 1950), so that the rocks are favorable for barite, iron, and manganese. Little exploration has occurred for any resources in the immediate area.

GEOLOGY: Surface rocks are Upper Precambrian sediments and the Lower Cambrian Unicoi Formation.

REFERENCE/CITATION: All resources — N.C. Dept. Conserv. and Develop., Div. Min. Res., 1959, Geol. Map of N.C.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Bryant and Reed, 1970, USGS Prof. Paper 615; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — Bryant and Reed, 1966, USGS Circ. 521; ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America. Critical Minerals — Lesure, 1968, USGS Prof. Paper 577; Oriol, 1950, N.C. Dept. Conserv. and Devel., Div. Min. Res., Bull. 60.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08055 TRACT NAME: Balsam Cone ECOREG: 2214 WAR: 19
 NATIONAL FOREST: Pisgah STATE/COUNTY: North Carolina, Yancy
 ACREAGE (GROSS): 14,429 ACREAGE (NET): 13,529 100 N/G: 93.7 LATITUDE: 35°52' LONGITUDE: 82°15'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	2/2	1			NURE favorable area (ERDA 1976)
COAL	1/4	1			
GEO THERMAL	2/1	1			
CRITICAL MINERALS	4/3	1			Spruce Pine Mica District (Lesure 1968)
OVERALL RATING (WEIGHTED)	3+				

NAMES OF CRITICAL MINERALS PRESENT: Probable mica; possible nickel, chromium, and asbestos

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. Sedimentary rocks below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). Pegmatite veins are favorable for uranium (ERDA 1976). The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The tract is in the Spruce Pine Mica District (Lesure 1968). Pegmatite veins and mica schists are quite favorable for mica. Considerable exploration and production have taken place in the area. Ultramafic rocks may contain nickel and chromium. Except for critical minerals, little exploration has occurred for resources in the immediate area.

GEOLOGY: Surface rocks are Upper Precambrian Great Smoky Group, chiefly mica and hornblende gneiss and schist, possibly some ultramafics.

REFERENCE/CITATION: All resources — N.C. Dept. Conserv. and Develop., Div. Min. Res.; 1959, Geol. Map of N.C.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Bryant and Reed, 1970, USGS Prof. Paper 615; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — Bryant and Reed, 1966, USGS Circ. 521; ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America. Critical Minerals — Lesure, 1968, USGS Prof. Paper 577; Oriel, 1950, N.C. Dept. Conserv. and Devel., Div. Min. Res., Bull. 60.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08056 TRACT NAME: Craggy Mountain Extension Ecoreg: 2214 WAR: 22
 NATIONAL FOREST: Pisgah STATE/COUNTY: North Carolina, Buncombe
 ACREAGE (GROSS): 1,280 ACREAGE (NET): 1,195 100 N/G: 93.3 LATITUDE: 35°43' LONGITUDE: 82°23'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	2/2	1			
COAL	1/4	1			
GEO THERMAL	2/1	1			
CRITICAL MINERALS	3/1	1			
OVERALL RATING (WEIGHTED)	2+				

NAMES OF CRITICAL MINERALS PRESENT: Possible mica

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. Sedimentary rocks below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). The tract is in a NURE favorable area (ERDA 1976). Pegmatite veins may contain uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The gneisses and schists probably contain mica; the tract is in the Buncombe Mica District (Lesure 1968), and some exploration has occurred. Except for critical minerals, little exploration has taken place for resources in the immediate area.

GEOLOGY: Upper Precambrian Great Smoky Group, mainly mica and hornblende gneiss and schist.

REFERENCE/CITATION: All resources — N.C. Dept. Conserv. and Develop., Div. Min. Res., 1959, Geol. Map of N.C.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Bryant and Reed, 1970, USGS Prof. Paper 615; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — Bryant and Reed, 1966, USGS Circ. 521; ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America. Critical Minerals — Lesure, 1968, USGS Prof. Paper 577; Oriel, 1950, N.C. Dept. Conserv. and Devel., Div. Min. Res., Bull. 60.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08057 TRACT NAME: Shining Rock Extension Ecoreg: 22 WAR: 16
 NATIONAL FOREST: Pisgah STATE/COUNTY: North Carolina, Haywood
 ACREAGE (GROSS): 10,400 ACREAGE (NET): 10,400 100 N/G: 100 LATITUDE: 35°20' LONGITUDE: 82°52'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	3/2	1			Within NURE favorable area (ERDA 1976)
COAL	1/4	1			
GEO THERMAL	2/1	1			
CRITICAL MINERALS	4/3	1			Franklin-Sylva Mica District (Lesure 1968)
OVERALL RATING (WEIGHTED)	3				

NAMES OF CRITICAL MINERALS PRESENT: Mica, gold(?), and silver (?)

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. It is actually three separate tracts, to all of which this assessment applies. The rocks below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). Pegmatites are favorable for uranium (ERDA 1976). The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. Prospects for mica, a critical mineral, occur within the larger lower tract, and all tracts are within the Franklin-Sylva Mica District (Lesure 1968). Except for critical minerals, little exploration has occurred for resources in the immediate area.

GEOLOGY: Surface rocks are chiefly gneiss and migmatite with abundant granite, all believed to be of Precambrian age.

REFERENCE/CITATION: All resources — N.C. Dept. Conserv. and Develop., Div. Min. Res., 1959, Geol. Map of N.C.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Bryant and Reed, 1970, USGS Prof. Paper 615; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 75; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — Bryant and Reed, 1966, USGS Circ. 521; ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America. Critical Minerals — Lesure, 1968, USGS Prof. Paper 577; Oriel, 1950, N.C. Dept. Conserv. and Devel., Div. Min. Res., Bull. 60.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08058 TRACT NAME: Linville Gorge Extension ECOREG: 2214 WAR: 12
 NATIONAL FOREST: Pisgah STATE/COUNTY: North Carolina, Burke
 ACREAGE (GROSS): 3,503 ACREAGE (NET): 3,103 100 N/G: 88.5 LATITUDE: 35°52' LONGITUDE: 81°52'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	3/2	1			"Speculative" area (ERDA 1976)
COAL	1/4	1			
GEO THERMAL	2/1	1			
CRITICAL MINERALS	3/2	1			
OVERALL RATING (WEIGHTED)	2 ⁺				

NAMES OF CRITICAL MINERALS PRESENT: Possible zinc, manganese, iron, and lead

COMMENTARY AND SUMMARY: This tract is within the Grandfather Mountain Window of the Blue Ridge province. The rocks may be favorable for gas at depth below the basal Blue Ridge Thrust (Harris 1976), but if the Brevard Zone nearby to the southeast is the root zone of the west-directed thrusting (Bryant and Reed 1970), the potential is very slight. The tract is in a "speculative" area for uranium potential (ERDA 1976). The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. No critical minerals are known to occur on the tract, but it is close to the North Cove zinc deposits (Bryant and Reed 1966). Little exploration has occurred for any resources in the immediate area.

GEOLOGY: Surface rocks are primarily the Cambrian Chilhowee Group; some Precambrian Cranberry Gneiss along the east side of the tract.

REFERENCE/CITATION: All resources — N.C. Dept. Conserv. and Develop., Div. Min. Res., 1959, Geol. Map of N.C.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Bryant and Reed, 1970, USGS Prof. Paper 615; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — Bryant and Reed, 1966, USGS Circ. 521; ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America. Critical Minerals — Lesure, 1968, USGS Prof. Paper 577; Oriol, 1950, N.C. Dept. Conserv. and Devel., Div. Min. Res., Bull. 60.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: L8058 TRACT NAME: Linville Gorge Extension ECOREG: 2214 WAR: 22
 NATIONAL FOREST: Pisgah STATE/COUNTY: North Carolina, Burke
 ACREAGE (GROSS): 2,925 ACREAGE (NET): 2,925 100 N/G: 100 LATITUDE: 35°52' LONGITUDE: 81°52'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	3/2	1			Within NURE favorable area (ERDA 1976)
COAL	1/4	1			
GEO THERMAL	2/1	1			
CRITICAL MINERALS	3/2	1			
OVERALL RATING (WEIGHTED)	2+	1			

NAMES OF CRITICAL MINERALS PRESENT: Possible mica, feldspar, rare earths

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The rocks below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). The tract is in an area favorable for uranium (ERDA 1976). The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. Pegmatites in the granite gneiss may contain mica, feldspar, and rare earths. Little exploration has occurred in the immediate area for any resources.

GEOLOGY: Surface rocks are Precambrian granite gneiss and Precambrian (?) and Cambrian Chilhowee Group sediments.

REFERENCE/CITATION: All resources — N.C. Dept. Conserv. and Develop., Div. Min. Res., 1959, Geol. Map of N.C.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Bryant and Reed, 1970, USGS Prof. Paper 615; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — Bryant and Reed, 1966, USGS Circ. 521; ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America. Critical Minerals — Lesure, 1968, USGS Prof. Paper 577; Oriel, 1950, N.C. Dept. Conserv. and Devel., Div. Min. Res., Bull. 60.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08150 TRACT NAME: Iron Mountain ECOREG: 2214 WAR: 17
 NATIONAL FOREST: Cherokee STATE/COUNTY: Tennessee, Johnson
 ACREAGE (GROSS): 13,700 ACREAGE (NET): 13,700 100 N/G: 100 LATITUDE: 36°33' LONGITUDE: 81°51'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/1	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	4/4	1			Shady Valley Manganese District (King and Ferguson 1960)
OVERALL RATING (WEIGHTED)	3				

NAMES OF CRITICAL MINERALS PRESENT: Iron and manganese; possible zinc, lead, and barite

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The rocks may be favorable for gas at depth below the basal Blue Ridge Thrust (Harris 1976). Sandstone and conglomerate units may be favorable for uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The weathered Shady Dolomite contains mined deposits of manganese and iron ore and is quite favorable for zinc, lead, and barite (King and Ferguson 1960). Except for critical minerals, little exploration for resources has occurred.

GEOLOGY: Surface rocks are Lower Cambrian shales, sandstones, and carbonates of the Unicoi, Hampton, Erwin, and Shady formations on the southeastern flank of the Shady Valley syncline.

REFERENCE/CITATION: All resources — Hardeman and Others, 1966, Geol. Map of Tenn.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris, 1976, J. Res. USGS, v. 4, no. 4; Harris and Milici, 1977, USGS Prof. Paper 1018; Van Den Berg and Others, 1978, AAPG Bull. 62: 1340-55. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North Am. Critical Minerals — King and Ferguson, 1960, USGS Prof. Paper 311.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08170 TRACT NAME: Dry River ECOREG: 2214 WAR: 16
 NATIONAL FOREST: George Washington STATE/COUNTY: West Virginia, Pendleton
 ACREAGE (GROSS): 16,660 ACREAGE (NET): 16,135 100 N/G: 97 LATITUDE: 38°32' LONGITUDE: 79°13'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/2	1			Mineral-bearing rocks closer to surface
OVERALL RATING (WEIGHTED)	2				

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible iron, zinc, lead, barite, fluorite, cadmium at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge province. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may have some potential for geothermal energy. The Devonian Oriskany Sandstone at the surface may contain critical minerals manganese, iron, and zinc, and the Silurian Clinton Formation may contain iron. Critical minerals for which the subsurface rocks may be favorable include zinc, lead, cadmium, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any commodity, except oil and gas for which exploration has been moderate.

GEOLOGY: Surface rocks are Upper Devonian shales and sandstones on NW flank of a major syncline.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08171 TRACT NAME: Dolly Anne ECOREG: 2214 WAR: 18
 NATIONAL FOREST: Washington STATE/COUNTY: Virginia, Alleghany
 ACREAGE (GROSS): 7,900 ACREAGE (NET): 7,900 100 N/G: 100 LATITUDE: 37°50' LONGITUDE: 79°56'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/2	1			In area of warm springs
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	1+				

NAMES OF CRITICAL MINERALS PRESENT: Possible manganese, zinc, lead, cadmium, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge province. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Warm springs in the area suggest that there is potential for geothermal energy. Critical minerals for which the subsurface rocks may be favorable include iron (Silurian Clinton Formation) and zinc, lead, cadmium, fluorite, and barite (Ordovician carbonates). Little exploration for any commodity has occurred except for oil and gas, for which exploration has been moderate.

GEOLOGY: Surface rocks are Upper Ordovician to Lower Devonian shales and sandstones anticlinally folded.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 75; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08172 TRACT NAME: Elliott Knob Ecoreg: 2214 WAR: 20
 NATIONAL FOREST: Washington STATE/COUNTY: Virginia, Augusta
 ACREAGE (GROSS): 12,075 ACREAGE (NET): 12,075 100 N/G: 100 LATITUDE: 38°10' LONGITUDE: 79°19'

INDIVIDUAL TRACT RESOURCE RATINGS	<u>ORNL</u>	<u>USFS</u>	<u>DOE</u>	<u>USGS</u>	<u>REMARKS</u>
OIL AND GAS	3/2	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEO THERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	1+				

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible manganese, iron, lead, zinc, cadmium, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may have some potential for geothermal energy. Upper Devonian red beds may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). In the vicinity of the tract, little exploration has occurred except for oil and gas, for which exploration has been moderate.

GEOLOGY: Surface rocks are Upper Devonian and Lower Mississippian shales and sandstones synclinally folded.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DFS, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08173 TRACT NAME: Head of Dry River ECOREG: 2214 WAR: 21
 NATIONAL FOREST: Washington STATE/COUNTY: Virginia, Rockingham
 ACREAGE (GROSS): 1,300 ACREAGE (NET): 1,300 100 N/G: 100 LATITUDE: 38°31' LONGITUDE: 79°13'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/1	1			
OVERALL RATING (WEIGHTED)	1+				

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible iron, lead, manganese, zinc, cadmium, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may have some potential for geothermal energy. Upper Devonian red beds may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). In the vicinity of the tract, little exploration has occurred except for oil and gas, for which exploration has been moderate.

GEOLOGY: Surface rocks are sandstones and shales of Upper Devonian age, with some Lower Mississippian sandstones, essentially flat-lying within a major syncline.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vliissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08174 TRACT NAME: Ramseys Draft (Addition) Ecoreg: 2214 WAR: 21
 NATIONAL FOREST: Washington STATE/COUNTY: Virginia, Highland/Augusta
 ACREAGE (GROSS): 13,475 ACREAGE (NET): 13,475 100 N/G: 100 LATITUDE: 38°20' LONGITUDE: 79°20'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/2	1			Possible mineral-bearing rocks are at shallow depth
OVERALL RATING (WEIGHTED)	2-				

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible zinc, cadmium, lead, manganese, iron, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may have some potential for geothermal energy. Upper Devonian red beds may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). In the vicinity of the tract, little exploration has occurred except for oil and gas, for which exploration has been moderate.

GEOLOGY: Surface rocks are Upper Devonian shales and sandstones synclinally folded.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08180 TRACT NAME: Devils Fork ECOREG: 2214 WAR: 18
 NATIONAL FOREST: Jefferson STATE/COUNTY: Virginia, Scott
 ACREAGE (GROSS): 5,887 ACREAGE (NET): 4,750 100 N/G: 81 LATITUDE: 36°49' LONGITUDE: 82°39'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1			Pine Mountain overthrust has trapped gas in Wise County. Tract is on SE border of Appalachian Gas and Oil Field (USGS 1974, 1975)
URANIUM	2/2	1	2		
COAL	4/4	1	2		Tract is within Appalachian coal field
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	2+				

NAMES OF CRITICAL MINERALS PRESENT: Possible copper, iron, zinc, lead, cadmium, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the thrust fault-dominated part of the Valley and Ridge province. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. Exploration overall has been fairly meager. This tract has unusually high favorability because of its location with respect to a gas-producing anticline. Sandstone units may be favorable for uranium but little exploration has occurred. This tract is located within the Appalachian coal field and overlies minable, thick, high-quality coal. Hot dry rock at depth may have some potential for geothermal energy, but little exploration has taken place. The surface rocks probably contain no critical minerals. The subsurface rocks may be favorable for copper (Upper Devonian red beds); zinc (Devonian Oriskany sandstone); iron (Silurian Clinton Formation); and zinc, lead, cadmium, fluorite, and barite (Cambro-Ordovician carbonates); little exploration has been performed.

GEOLOGY: Surface rocks are synclinally folded Lower Pennsylvanian sandstones and shales in the Upper plate of the Pine Mountain overthrust.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08181. TRACT NAME: Big Stoney ECOREG: 2214 WAR: 18
 NATIONAL FOREST: Jefferson STATE/COUNTY: Virginia, Scott/Wise
 ACREAGE (GROSS): 4,115 ACREAGE (NET): 4,065 100 N/G: 99 LATITUDE: 36°52' LONGITUDE: 82°35'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1			Pine Mountain overthrust block contains gas in Wise County
URANIUM	2/2	1	2		
COAL	4/4	1	2		Tract lies within Appalachian Coal Field
GEOHERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	2+				

NAMES OF CRITICAL MINERALS PRESENT: Possible copper, zinc, iron, cadmium, lead, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the thrust fault-dominated part of the Valley and Ridge province. The rocks are favorable for oil and gas, which are produced in this part of the province. Sandstone units may be favorable for uranium. This tract is on the Appalachian coal field overlying thick, minable, high-quality coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks probably contain no critical minerals, but older rocks at depth may be favorable for copper (Upper Devonian red beds); zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has occurred in the immediate area for any resources except for oil, gas, and coal, for which there has been large exploration.

GEOLOGY: Surface rocks are Lower Pennsylvanian sandstone and shale, synclinally folded, in the upper plate of the Pine Mountain overthrust.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DCS, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08182 TRACT NAME: Kimberling Creek Ecoreg: 2214 WAR: 20
 NATIONAL FOREST: Jefferson STATE/COUNTY: Virginia, Bland
 ACREAGE (GROSS): 5,726 ACREAGE (NET): 5,580 100 N/G: 98 LATITUDE: 37°11' LONGITUDE: 81°05'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	1+				

NAMES OF CRITICAL MINERALS PRESENT: Possible zinc, iron, lead, cadmium, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the thrust fault-dominated part of the Valley and Ridge province. The rocks are quite favorable for oil and gas. Sandstone units may be favorable for uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks probably contain no critical minerals. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, lead, cadmium, barite, and fluorite (Ordovician carbonates). Except for oil and gas, little exploration has occurred for resources in the immediate area.

GEOLOGY: Surface rocks are Middle Devonian shales and sandstones anticlinally folded.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08183 TRACT NAME: Barbours Creek ECOREG: 2214 WAR: 16
 NATIONAL FOREST: Jefferson/George Washington STATE/COUNTY: Virginia, Craig/Alleghany
 ACREAGE (GROSS): 16,312 ACREAGE (NET): 15,835 100 N/G: 97.1 LATITUDE: 37°36' LONGITUDE: 80°08'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOHERMAL	2/1	1			
CRITICAL MINERALS	3/2	4			Eight miles along strike from Clifton Forge Iron Area (Lesure 1957)
OVERALL RATING (WEIGHTED)	3-				

NAMES OF CRITICAL MINERALS PRESENT: Possible zinc, manganese, iron, lead, cadmium, barite, and fluorite

COMMENTARY AND SUMMARY: This tract is in the thrust fault-dominated part of the Valley and Ridge province. The rocks are quite favorable for oil and gas. Sandstone units may be favorable for uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks are favorable for critical minerals: zinc, manganese, and lead in the weathered Devonian Oriskany Sandstone; iron in the Devonian Helderberg Limestone and Silurian Clinton Formation; and zinc, lead, cadmium, barite, and fluorite in the Ordovician carbonates. Considerable exploration and production of iron has occurred nearby in the Clifton Forge area (Lesure 1957), but little exploration has been performed in the immediate area for other resources.

GEOLOGY: Surface rocks are Ordovician to Middle Devonian limestones, shales, and sandstones in complex anticlines and synclines.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08184 TRACT NAME: Hoop Hole Ecoreg: 2214 WAR: 17
 NATIONAL FOREST: George Washington STATE/COUNTY: Virginia, Alleghany
 ACREAGE (GROSS): 5,405 ACREAGE (NET): 5,240 100 N/G: 97 LATITUDE: 37°41' LONGITUDE: 79°56'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEO THERMAL	2/1	1			
CRITICAL MINERALS	3/2	4			In Clifton Forge Iron-Manganese District (Lesure 1957), Oriskany (Ridgely) exposed
OVERALL RATING (WEIGHTED)	2+				Gas pipeline crosses the tract

NAMES OF CRITICAL MINERALS PRESENT: Possible manganese, iron, zinc, lead, and barite; possible iron, zinc, cadmium, lead, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge province. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rocks at depth may have some potential for geothermal energy. Critical minerals for which the surface rocks are favorable include manganese, lead, and zinc (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, lead, cadmium, fluorite, and barite (Ordovician carbonates). Considerable exploration for, and production of, iron and manganese has taken place in the surrounding area. For everything else except oil and gas, little exploration has occurred, and for oil and gas, exploration has only been moderate.

GEOLOGY: Surface rocks are Ordovician to Middle Devonian limestones, shales, and sandstones anticlinally and synclinally folded.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USDM, 1960, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08185 TRACT NAME: Thunder Ridge ECOREG: 2214 WAR: 19
 NATIONAL FOREST: Jefferson STATE/COUNTY: Virginia, Botetourt/Rockbridge
 ACREAGE (GROSS): 2,530 ACREAGE (NET): 2,530 100 N/G: 100 LATITUDE: 37°32' LONGITUDE: 79°30'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	3/1	1			Pedlar Gneiss favorable (ERDA 1976)
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	1+				

NAMES OF CRITICAL MINERALS PRESENT: Possible mica, feldspar, and rare earths

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The rocks below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). The Pedlar Gneiss is favorable for uranium (ERDA 1976), which may be present in veins. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. No critical minerals are known to exist in the tract, but pegmatite veins could contain mica, feldspar, and rare earths. Little exploration has occurred for any resources in the immediate area.

GEOLOGY: Surface rock is the Precambrian Pedlar Gneiss.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08186 TRACT NAME: Mill Creek WSA Ecoreg: 2214 WAR: 17
 NATIONAL FOREST: Jefferson STATE/COUNTY: Virginia, Giles
 ACREAGE (GROSS): 4,000 ACREAGE (NET): 3,870 100 N/G: 96.8 LATITUDE: 37°17' LONGITUDE: 80°48'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/1	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEO THERMAL	2/1	1			
CRITICAL MINERALS	3/3	4			Manganese mined in past; iron prospects
OVERALL RATING (WEIGHTED)	2				Crossed by high-tension line

NAMES OF CRITICAL MINERALS PRESENT: Possible iron, zinc, manganese, and lead; possible zinc, lead, cadmium, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the thrust fault-dominated part of the Valley and Ridge province. The rocks are quite favorable for oil and gas. Sandstone units may be favorable for uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. Critical minerals for which the surface rocks are favorable include zinc, manganese, and lead (weathered Devonian Oriskany Sandstone) and iron (Devonian Helderberg Limestone and Silurian Clinton Formation). Ordovician carbonates at depth may contain zinc, lead, cadmium, barite, and fluorite. Manganese has been mined in the area, and there are prospects for iron in the tract. Except for iron, manganese, oil, and gas, little exploration has been performed for resources in the immediate area.

GEOLOGY: Surface rocks are Upper Ordovician to Lower Devonian shales and sandstones synclinally folded.

REFERENCE/CITATION: All resources — Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlistides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals — Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/2	4			Potentially mineral-bearing rocks at surface
OVERALL RATING (WEIGHTED)	3-				

COMMENTARY AND SUMMARY: This tract is in the thrust fault-dominated part of the Valley and Ridge province. The rocks are quite favorable for oil and gas. Sandstone units may be favorable for uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. Critical minerals for which the surface rocks are favorable include zinc, manganese, and lead (weathered Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, lead, cadmium, barite, and fluorite (Ordovician carbonates). Except for oil and gas, little exploration has occurred for resources in the area.

REFERENCE/CITATION: All resources - Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives - RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas - Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium - ERDA, 1976, NURE Preliminary Report. Coal - Trumbull, 1960, Coal Fields of the U.S. Geothermal - AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals - Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

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INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/2	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/2	4			Potentially mineral-bearing rocks at surface
OVERALL RATING (WEIGHTED)					

COMMENTARY AND SUMMARY: This tract is in the thrust fault-dominated part of the Valley and Ridge province. The rocks are quite favorable for oil and gas. Sandstone units may be favorable for uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. Critical minerals for which the surface rocks are favorable include zinc, manganese, and lead (Devonian Oriskany Sandstone) and iron (Devonian Heiderberg Limestone and Silurian Clinton Formation). Ordovician carbonates at depth may contain zinc, lead, cadmium, barite, and fluorite. Little exploration has occurred for resources in the area except for oil and gas.

REFERENCE/CITATION: All resources - Milici and Others, 1963, Geol. Map of Va.; Gooch and Pharr, 1959, Mineral Indus. and Res. of Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives - RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas - Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 75; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium - ERDA, 1976, NURE Preliminary Report. Coal - Trumbull, 1960, Coal Fields of the U.S. Geothermal - AAPG, 1976a and b, Geothermal Gradient Map and Subsurf. Temp. Map of N. Am. Critical Minerals - Lesure, 1957, V.P.I. Bull., Eng. Expt. Sta. series 118; Worl and Others, 1968, Fluorite Deposits of the U.S.; Lesure and Others, 1978, U.S.G.S. Bull. 1397c.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08193 TRACT NAME: Craggy Mountain WSA Ecoreg: 2214 WAR: 15
 NATIONAL FOREST: Pisgah STATE/COUNTY: North Carolina, Buncombe
 ACREAGE (GROSS): 1,100 ACREAGE (NET): 1,100 100 N/G: 100 LATITUDE: 35°43' LONGITUDE: 82°23'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	2/2	1			Within NURE favorable area (ERDA 1976) and associated with pegmatites
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/1	1			Mica potential
OVERALL RATING (WEIGHTED)	2+				

NAMES OF CRITICAL MINERALS PRESENT: Possible mica

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The rocks below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). Pegmatites are favorable for uranium (ERDA 1976). The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The tract is quite favorable for mica because it lies within a broad northeast-trending region known for pegmatites and associated mica deposits. Little exploration has occurred for any resources in the immediate area.

GEOLOGY: Chiefly mica gneiss and mica schist of Precambrian age.

REFERENCE/CITATION: All resources — N.C. Dept. Conserv. and Develop., Div. Min. Res., 1959, Geol. Map of N.C.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Bryant and Reed, 1970, USGS Prof. Paper 615; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — Bryant and Reed, 1966, USGS Circ. 521; ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America. Critical Minerals — Lesure, 1968, USGS Prof. Paper 577; Oriol, 1950, N.C. Dept. Conserv. and Devel., Div. Min. Res., Bull. 60.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08197 TRACT NAME: Wildcat Ecoreg: 2214 WAR: 18
 NATIONAL FOREST: Pisgah STATE/COUNTY: North Carolina, Madison
 ACREAGE (GROSS): 7,120 ACREAGE (NET): 7,120 100 N/G: 100 LATITUDE: 34°46' LONGITUDE: 83°02'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	2/2	1	2		Within NURE favorable area (ERDA 1976)
COAL	1/4	1	1		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/2	1			
OVERALL RATING (WEIGHTED)	2		2		

NAMES OF CRITICAL MINERALS PRESENT: Possible zirconium, titanium, and barium

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The rocks at depth below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). The tract is in an area favorable for uranium (ERDA 1976). The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. Finds of the critical mineral barite have been reported, and paleoplacers of titanium and zirconium may be located on the tract (USGS and USBM 1968). Little exploration has occurred in the immediate area for any resources except critical minerals.

GEOLOGY: Surface rocks are chiefly the Precambrian/Cambrian metasedimentary Ocoee Series and Cambrian Unicoi formation and, in the southern part of the tract, the Cranberry granite gneiss.

REFERENCE/CITATION: All resources — N.C. Dept. Conserv. and Develop., Div. Min. Res., 1959, Geol. Map of N.C.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Bryant and Reed, 1970, USGS Prof. Paper 615; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — Bryant and Reed, 1966, USGS Circ. 521; ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America. Critical Minerals — Lesure, 1968, USGS Prof. Paper 577; Oriel, 1950, N.C. Dept. Conserv. and Devel., Div. Min. Res., Bull. 60.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08200 TRACT NAME: Middle Prong Ecoreg: 2214 WAR: 20
 NATIONAL FOREST: Pisgah STATE/COUNTY: North Carolina, Haywood
 ACREAGE (GROSS): 10,200 ACREAGE (NET): 10,200 100 N/G: 100 LATITUDE: 35°20' LONGITUDE: 82°58'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	3/2	1			Within NURE favorable area (ERDA 1976)
COAL	1/4	1			
GEOTHERMAL	2/1	1			Possible hot dry rock at depth
CRITICAL MINERALS	3/3	1			Franklin-Sylva Mica District (Lesure 1968)
OVERALL RATING (WEIGHTED)	3-				

NAMES OF CRITICAL MINERALS PRESENT: Possible mica, gold, and silver

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The rocks below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). Pegmatite veins are favorable for uranium (ERDA 1976). The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The tract is along the outer part of the Franklin-Sylva Mica District (Lesure 1968), and mica prospects in pegmatites are located on the tract. Gold and silver also may be present in the pegmatites. Except for critical minerals, little exploration has occurred in the immediate area.

GEOLOGY: Surface rocks are gneiss, schist, and irregular pegmetites at probable Precambrian age.

REFERENCE/CITATION: All resources — N.C. Dept. Conserv. and Develop., Div. Min. Res., 1959, Geol. Map of N.C.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Bryant and Reed, 1970, USGS Prof. Paper 615; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vliessides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — Bryant and Reed, 1966, USGS Circ. 521; ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America. Critical Minerals — Lesure, 1968, USGS Prof. Paper 577; Oriel, 1950, N.C. Dept. Conserv. and Devel., Div. Min. Res., Bull. 60.

REFERENCE/CITATION: All resources - Hardeman and Others, 1966, Geol. Map of Tenn.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives - RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas - Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris, 1976, J. Res. USGS, v. 4, no. 4; Harris and Milici, 1977, USGS Prof. Paper 1018; Van Den Berg and Others, 1978, AAPG Bull. 62: 1340-55. Uranium - ERDA, 1976, NURE Preliminary Report. Coal - Irmubull, 1960, Coal Fields of the U.S. Geothermal - AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North Am. Critical Minerals - King and Ferguson, 1960, USGS Prof. Paper 311.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08271 TRACT NAME: Hickory Flat Branch Ecoreg: 2214 WAR: 18
 NATIONAL FOREST: Cherokee STATE/COUNTY: Tennessee, Johnson/Carter
 ACREAGE (GROSS): 4,500 ACREAGE (NET): 4,500 100 N/G: 100 LATITUDE: 36°26' LONGITUDE: 81°58'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/1	1			
URANIUM	2/1	1			
COAL	1/4	1			
GEO THERMAL	2/1	1			
CRITICAL MINERALS	4/4	1			Stony Creek Manganeŕe District (King and Ferguson 1960)
OVERALL RATING (WEIGHTED)	3				

NAMES OF CRITICAL MINERALS PRESENT: Manganese and iron; possible zinc, lead, and barite

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The rocks may be favorable for gas at depth below the basal Blue Ridge Thrust (Harris 1976). Sandstone and conglomerate units may be favorable for uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The weathered Shady Dolomite contains mined deposits of manganese and iron ore and is quite favorable for zinc, lead, and barite (King and Ferguson 1960). Except for critical minerals, little exploration for resources has occurred.

GEOLOGY: Surface rocks are Lower Cambrian shales, sandstones, and carbonates of the Unicoi, Hampton, Erwin, and Shady formations, on the southeastern flank of the Stony Creek syncline, which is cut by the Cross Mountain Fault.

REFERENCE/CITATION. All resources — Hardeman and Others, 1966, Geol. Map of Tenn.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vliissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris, 1976, J. Res. USGS, v. 4, no. 4; Harris and Milici, 1977, USGS Prof. Paper 1018; Van Den Berg and Others, 1978, AAPG Bull. 62: 1340-55. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North Am. Critical Minerals — King and Ferguson, 1960, USGS Prof. Paper 311.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08272 TRACT NAME: Big Laurel Branch Ecoreg: 2214 WAR: 13
 NATIONAL FOREST: Cherokee STATE/COUNTY: Tennessee, Carter
 ACREAGE (GROSS): 6,000 ACREAGE (NET): 6,000 100 N/G: 100 LATITUDE: 36°22' LONGITUDE: 82°04'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	3/1	1			
URANIUM	2/1	1	1		
COAL	1/4	1	1		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	4/4	1			Shady Valley Manganese District (King and Ferguson 1960)
OVERALL RATING (WEIGHTED)	3		4*		*Based on existing Wilbur Dam hydroelectric facilities (DOE 1978)

NAMES OF CRITICAL MINERALS PRESENT: Manganese and iron; possible zinc, lead, and barite

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The rocks may be favorable for gas at depth below the basal Blue Ridge Thrust (Harris 1976). Sandstone and conglomerate units may be favorable for uranium. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The weathered Shady Dolomite contains mined deposits of manganese and iron ore and is quite favorable for zinc, lead, and barite (King and Ferguson 1960). Except for critical minerals, little exploration for resources has occurred.

GEOLOGY: Surface rocks are Lower Cambrian shales, sandstones, and carbonates of the Unicoi, Hampton, Erwin, and Shady formations on the southeastern flank of the Stony Creek Valley Syncline.

REFERENCE/CITATION: All resources — Hardeman and Others, 1966, Geol. Map of Tenn.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris, 1976, J. Res. USGS, v. 4, no. 4; Harris and Milici, 1977, USGS Prof. Paper 1018; Van Den Berg and Others, 1978, AAPG Bull. 62: 1340-55. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North Am. Critical Minerals — King and Ferguson, 1960, USGS Prof. Paper 311.

ENERGY AND MINERAL RESOURCE EVALUATION - RARE II TRACTS

TRACT NO: 08273 TRACT NAME: Pond Mountain Addition ECOREG: 2214 WAR: 13
 NATIONAL FOREST: Cherokee STATE/COUNTY: Tennessee, Carter
 ACREAGE (GROSS): 2,300 ACREAGE (NET): 2,300 100 N/G: 100 LATITUDE: 36°18' LONGITUDE: 82°05'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	3/2	1			Partly in NURE favorable area (ERDA 1976) and Walnut Mountain Uranium District (USGS 1968)
COAL	1/4	1			
GEO THERMAL	2/1	1			
CRITICAL MINERALS	3/2	1			Shady Dolomite (King and Others 1961) and Precambrian granite (USGS 1968)
OVERALL RATING (WEIGHTED)	3-				

NAMES OF CRITICAL MINERALS PRESENT: Possible iron, manganese, zinc, lead, barite, zirconium, thorium, and rare earths

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge. Possible sedimentary rocks below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). The Precambrian granite rocks are within the Walnut Mountain Uranium District (USGS and USBM 1968) and within one of the NURE favorable areas (ERDA 1976). The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The weathered Shady Dolomite is quite favorable for iron, manganese, zinc, lead, and barite, and the granites may contain zirconium, thorium, and rare earths (King and Ferguson 1960 and USGS and USBM 1968). Except for uranium and critical minerals, little exploration for resources in the immediate area has occurred.

GEOLOGY: Surface rocks are Precambrian granitic rocks and Lower Cambrian shales, sandstones, and carbonates of the Unicoi through Shady formations in the Doe River Cove Window.

REFERENCE/CITATION: All resources - Hardeman and Others, 1966, Geol. Map of Tenn.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973; USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives - RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas - Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris, 1976, J. Res. USGS, v. 4, no. 4; Harris and Milici, 1977, USGS Prof. Paper 1018; Van Den Berg and Others, 1978, AAPG Bull. 62: 1340-55. Uranium - ERDA, 1976, NURE Preliminary Report. Coal - Trumbull, 1960, Coal Fields of the U.S. Geothermal - AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North Am. Critical Minerals - King and Ferguson, 1960, USGS Prof. Paper 311.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08274 TRACT NAME: Laurel Fork Ecoreg: 2214 WAR: 14
 NATIONAL FOREST: Cherokee STATE/COUNTY: Tennessee, Carter
 ACREAGE (GROSS): 2,200 ACREAGE (NET): 2,200 100 N/G: 100 LATITUDE: 36°15' LONGITUDE: 82°05'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	3/2	1			Within NURE favorable area (ERDA 1976) and Walnut Mountain Uranium District (USGS and USBM 1968)
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/3	1			Veins in granite
OVERALL RATING (WEIGHTED)	1				

NAMES OF CRITICAL MINERALS PRESENT: Possible hematite, zirconium, thorium, and rare earths

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The rocks at depth below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). The tract is within the Walnut Mountain Uranium District (USGS and USBM 1968) and a NURE favorable area (ERDA 1976). The uranium occurs in veins in the granite. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. Hematite, zirconium, thorium, and rare earths may occur in pegmatites (USGS 1968). Little exploration has occurred in the immediate area for any resources except uranium.

GEOLOGY: Surface rock is Precambrian Beech granite.

REFERENCE/CITATION: All resources — Hardeman and Others, 1966, Geol. Map of Tenn.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris, 1976, J. Res. USGS, v. 4, no. 4; Harris and Milici, 1977, USGS Prof. Paper 1018; Van Den Berg and Others, 1978, AAPG Bull. 62: 1340-55. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North Am. Critical Minerals — King and Ferguson, 1960, USGS Prof. Paper 311.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08275 TRACT NAME: Unaka Mountain ECOREG: 2214 WAR: 16
 NATIONAL FOREST: Cherokee STATE/COUNTY: Tennessee, Unicoi
 ACREAGE (GROSS): 4,700 ACREAGE (NET): 4,700 100 N/G: 100 LATITUDE: 36°09' LONGITUDE: 82°18'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	2/2	1			Within NURE favorable area (ERDA 1976)
COAL	1/4	1			
GEO THERMAL	2/1	1			
CRITICAL MINERALS	2/2	1			Possible Shady residuum
OVERALL RATING (WEIGHTED)	1+				

NAMES OF CRITICAL MINERALS PRESENT: Possible iron, manganese, zinc, lead, and barite

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The rocks at depth below the basal Blue Ridge Thrust may be favorable for gas (Harris 1976). The tract is within an area classified as favorable for uranium by NURE (ERDA 1976). The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. Iron, manganese, zinc, lead, and barite may exist in unmapped residuum of Shady Dolomite (King and Ferguson 1960), but the unit has been completely eroded from the tract. Little exploration for any resources has occurred except for critical minerals in the immediate area.

GEOLOGY: Surface rocks are the Lower Cambrian shales and sandstones of the Unicoi-Erwin Formations.

REFERENCE/CITATION: All resources — Hardeman and Others, 1966, Geol. Map of Tenn.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris, 1976, J. Res. USGS, v. 4, no. 4; Harris and Milici, 1977, USGS Prof. Paper 1018; Van Den Berg and Others, 1978, AAPG Bull. 62: 1340-55. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North Am. Critical Minerals — King and Ferguson, 1960, USGS Prof. Paper 311.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 08276 TRACT NAME: Devil's Backbone Ecoreg: 2214 WAR: 16
 NATIONAL FOREST: Cherokee STATE/COUNTY: Tennessee, Cocke
 ACREAGE (GROSS): 4,100 ACREAGE (NET): 4,100 100 N/G: 100 LATITUDE: 35°51' LONGITUDE: 83°09'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	2/2	1			NURE favorable area (ERDA 1976)
COAL	1/4	1			
GEO THERMAL	2/1	1			
CRITICAL MINERALS	3/2	1			Shady Dolomite (very little on tract)
OVERALL RATING (WEIGHTED)	2-				

NAMES OF CRITICAL MINERALS PRESENT: Possible iron, manganese, zinc, lead, and barite

COMMENTARY AND SUMMARY: This tract is in the Blue Ridge province. The sedimentary rocks at depth below the basal Blue Ridge thrust may be favorable for gas (Harris 1976). The tract is in an area favorable for uranium (ERDA 1976). The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The weathered Shady Dolomite contains mined deposits of manganese and prospects for iron and is quite favorable for zinc, lead, and barite (King and Ferguson 1960). For other resources, little exploration in the immediate area has occurred.

GEOLOGY: Surface rocks are the Lower Cambrian shales and sandstones of the Erwin Formation and the Shady Dolomite.

REFERENCE/CITATION: All resources — Hardeman and Others, 1966, Geol. Map of Tenn.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris, 1976, J. Res. USGS, v. 4, no. 4; Harris and Milici, 1977, USGS Prof. Paper 1018; Van Den Berg and Others, 1978, AAPG Bull. 62: 1340-55. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North Am. Critical Minerals — King and Ferguson, 1960, USGS Prof. Paper 311.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: L8313 TRACT NAME: Upper Wilson ECOREG: 2214 WAR: 17
 NATIONAL FOREST: Pisgah STATE/COUNTY: North Carolina, Caldwell
 ACREAGE (GROSS): 6,590 ACREAGE (NET): 6,530 100 N/G: 99.1 LATITUDE: 36°03' LONGITUDE: 81°48'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	4/2	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	3	1			

NAMES OF CRITICAL MINERALS PRESENT: Possible mica, feldspar, and rare earths

COMMENTARY AND SUMMARY: This tract is within the Grandfather Mountain Window of the Blue Ridge province. The rocks may be favorable for gas at depth below the basal Blue Ridge Thrust (Harris 1976). If the Brevard Zone nearby to the southeast is the root zone of the west-directed thrusting (Bryant and Reed 1970), the potential is very slight. Uranium has been reported as occurring on the tracts nearby (Bryant and Reed 1966). The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. Other than uranium, no critical minerals are known to occur in the tract, but mica, feldspar, rare earths, and others could occur in pegmatites in the gneiss. Little exploration has occurred in the immediate area for any resources except uranium, for which minor exploration has taken place.

GEOLOGY: Surface rock is Precambrian Wilson Creek Gneiss.

REFERENCE/CITATION: All resources — N.C. Dept. Conserv. and Develop., Div. Min. Res., 1959, Geol. Map of N.C.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Bryant and Reed, 1970, USGS Prof. Paper 615; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives -- RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — Bryant and Reed, 1966, USGS Circ. 521; ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America. Critical Minerals — Lesure, 1968, USGS Prof. Paper 577; Oriel, 1950, N.C. Dept. Conserv. and Devel., Div. Min. Res., Bull. 60.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: L8314 TRACT NAME: Lost Cove ECOREG: 2214 WAR: 21
 NATIONAL FOREST: Pisgah STATE/COUNTY: North Carolina, Avery
 ACREAGE (GROSS): 5,708 ACREAGE (NET): 5,708 100 N/G: 100 LATITUDE: 36°01' LONGITUDE: 81°50'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	4/4	1			
COAL	1/4	1			
GEO THERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	3 ⁺	1			

NAMES OF CRITICAL MINERALS PRESENT: Uranium

COMMENTARY AND SUMMARY: This tract is within the Grandfather Mountain Window of the Blue Ridge province. The rocks may be favorable for gas at depth below the basal Blue Ridge Thrust (Harris 1976). If the Brevard Zone nearby to the southeast is the root zone of the west-directed thrusting (Bryant and Reed 1970), the potential is very slight. Uranium has been reported as occurring on the tract (Bryant and Reed 1966), but none has been mined. The rocks are too old for coal. Hot dry rock at depth may be favorable as a source of geothermal energy. Other than uranium, no critical minerals are known to occur in the tract, but mica, tin, rare earths, and others could occur in pegmatites in the gneiss. In the immediate area, little exploration has occurred for any resource except uranium, for which only minor exploration has taken place.

GEOLOGY: Precambrian Wilson Creek gneiss.

REFERENCE/CITATION: All resources — N.C. Dept. Conserv. and Develop., Div. Min. Res., 1959, Geol. Map of N.C.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Bryant and Reed, 1970, USGS Prof. Paper 615; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — Bryant and Reed, 1966, USGS Circ. 521; ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America. Critical Minerals — Lesure, 1968, USGS Prof. Paper 577; Oriel, 1950, N.C. Dept. Conserv. and Devel., Div. Min. Res., Bull. 60.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: L8315 TRACT NAME: Harper Creek Ecoreg: 2214 WAR: 19
 NATIONAL FOREST: Pisgah STATE/COUNTY: North Carolina, Avery/Caldwell
 ACREAGE (GROSS): 7,163 ACREAGE (NET): 7,138 100 N/G: 99.6 LATITUDE: 35°59' LONGITUDE: 81°49'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	2/1	1			
URANIUM	4/4	1			
COAL	1/4	1			
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	3 ⁺				

NAMES OF CRITICAL MINERALS PRESENT: Uranium

COMMENTARY AND SUMMARY: This tract is within the Grandfather Mountain Window of the Blue Ridge province. Potential for gas may exist at depth below the basal Blue Ridge Thrust (Harris 1976). If the Brevard Zone, nearby to the southeast, is the root zone of the west-directed thrusting (Bryant and Reed 1970), the potential is very slight, and little exploration has occurred. Uranium has been reported as occurring on the tract (Bryant and Reed 1966), but none has been mined. The rocks are too old for coal. Hot dry rock at depth may have some potential as a source of geothermal energy, but little exploration has taken place. Other than uranium, no critical minerals are known to occur in the tract, but mica, tin, rare earths, and others could occur in pegmatites in the gneiss. Little exploration has been performed.

GEOLOGY: Surface rock is the Precambrian Wilson Creek gneiss.

REFERENCE/CITATION: All resources — N.C. Dept. Conserv. and Develop., Div. Min. Res., 1959, Geol. Map of N.C.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Bryant and Reed, 1970, USGS Prof. Paper 615; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vliessides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 8. Uranium — Bryant and Reed, 1966, USGS Circ. 521; ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America. Critical Minerals — Lesure, 1968, USGS Prof. Paper 577; Oriel, 1950, N.C. Dept. Conserv. and Devel., Div. Min. Res., Bull. 60.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 09010 TRACT NAME: Cranberry Ecoreg: 2211 WAR: 21
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Pocahontas/Webster
 ACREAGE (GROSS): 36,300 ACREAGE (NET): 36,300 100 N/G: 100 LATITUDE: 38°17' LONGITUDE: 80°18'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1			
URANIUM	2/2	1	1		
COAL	3/4	4	2		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	3		2		

NAMES OF CRITICAL MINERALS PRESENT: Possible copper, iron, zinc, lead, cadmium, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the Appalachian Plateau province. The rocks are favorable for oil and gas, which are produced throughout the province in the study area. Sandstone units may be favorable for deposits of uranium. This tract is situated on the edge of the Appalachian coal field. Coal underlies part of the tract but is thin and of low quality. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks probably contain no critical minerals, but older rocks at depth may be favorable for copper (Upper Devonian red beds); zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any resources, except for oil, gas, and coal in the immediate area.

GEOLOGY: Surface rocks are Upper Mississippian and Lower Pennsylvanian shales and sandstones mostly flat-lying but with a few local folds and faults.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 09040 TRACT NAME: Cheat Mountain ECOREG: 2214 WAR: 23
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Randolph
 ACREAGE (GROSS): 7,720 ACREAGE (NET): 7,720 100 N/G: 100 LATITUDE: 38°47' LONGITUDE: 79°47'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1			Three miles west of Gladys gas field (Patchen and Others 1978)
URANIUM	2/1	1	1		
COAL	4/4	1	3		Within Appalachian Coal Field
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	2+	1			Gas pipeline may cross tract

NAMES OF CRITICAL MINERALS PRESENT: Possible copper, iron, lead, zinc, cadmium, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the Appalachian Plateau. The rocks are very favorable for oil and gas, which are produced throughout the province. Sandstone units may be favorable for uranium. This tract is located within the Appalachian coal field and overlies thick, high-quality coal seams. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks contain no critical minerals. The subsurface rocks may be favorable for copper (Upper Devonian red beds); zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has been performed for all resources except for oil, gas, and coal in the immediate area.

GEOLOGY: Surface rocks are Upper Mississippian and Lower Pennsylvanian shales and sandstones synclinally folded.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 09041 TRACT NAME: Seneca Creek ECOREG: 2214 WAR: 20
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Randolph/Pendleton
 ACREAGE (GROSS): 20,780 ACREAGE (NET): 19,660 100 N/G: 95 LATITUDE: 38°46' LONGITUDE: 79°31'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1			Five miles east of Gladys gas field (Patchen and Others 1978)
URANIUM	2/1	1	1		
COAL	1/4	1	3		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	2		3		Gas pipeline may cross tract (DOE 1978a)

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible iron, lead, zinc, cadmium, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. This tract has unusually high favorability for petroleum because of its location with respect to a gas-producing anticline. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The Upper Devonian red beds at the surface may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any commodity except for oil and gas, which has been only moderate.

GEOLOGY: Surface rocks are Upper Devonian and Mississippian shales and sandstones synclinally and anticlinally folded.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 09042 TRACT NAME: North Mountain Hopeville Ecoreg: 2214 WAR: 19
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Grant
 ACREAGE (GROSS): 7,040 ACREAGE (NET): 5,410 100 N/G: 77 LATITUDE: 38°57' LONGITUDE: 79°16'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1			On an anticline
URANIUM	2/1	1	1		
COAL	1/4	1	3		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/2	1			Mineral-bearing units closer to surface
OVERALL RATING (WEIGHTED)	2	1	3		

NAMES OF CRITICAL MINERALS PRESENT: Possible manganese, iron, zinc, and lead; possible zinc, lead, cadmium, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also would make gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks are quite favorable for critical minerals: manganese, zinc, and lead in the weathered Devonian Oriskany Sandstone and iron in the Devonian Helderberg Limestone and Silurian Clinton Formation. Zinc, lead, cadmium, fluorite, and barite may also be present in Ordovician carbonates below the surface. Little exploration has occurred for any commodity except for oil and gas, which has been only moderate.

GEOLOGY: Surface rocks are Upper Ordovician to Lower Devonian shales and sandstones anticlinally folded.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION -- RARE II TRACTS

TRACT NO: 09043 TRACT NAME: Canaan Loop Ecoreg: 2214 WAR: 16
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Tucker
 ACREAGE (GROSS): 7,240 ACREAGE (NET): 7,240 100 N/G: 100 LATITUDE: 39°06' LONGITUDE: 79°29'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1			Three miles from crest of gas-bearing Blackwater Anticline (Patchen and Others 1978)
URANIUM	2/1	1	1		
COAL	4/4	1	3		Within Appalachian coal field
GEO THERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	2+		3		

NAMES OF CRITICAL MINERALS PRESENT: Possible copper, iron, zinc, lead, cadmium, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the Appalachian Plateau. The rocks are very favorable for oil and gas, which are produced throughout the province. Sandstone units may be favorable for uranium. This tract is located within the Appalachian coal field and overlies thick, high-quality coal seams. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks contain no critical minerals. The subsurface rocks may be favorable for copper (Upper Devonian red beds); zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has been performed for all resources except for oil, gas, and coal in the immediate area.

GEOLOGY: Surface rocks are Lower Pennsylvanian shales and sandstones, essentially flat-lying within a syncline.

REFERENCE/CITATION: All resources -- Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives -- RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas -- Vlisides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium -- ERDA, 1976, NURE Preliminary Report. Coal -- Trumbull, 1960, Coal Fields of the U.S. Geothermal -- AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 09044 TRACT NAME: Laurel Fork North Ecoreg: 2214 WAR: 20
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Randolph
 ACREAGE (GROSS): 6,120 ACREAGE (NET): 6,120 100 N/G: 100 LATITUDE: 38°47' LONGITUDE: 79°38'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/4	1			In known gas field (Patchen and Others 1978)
URANIUM	2/1	1	1		
COAL	1/4	1	3		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	3		3		Gas pipeline may cross tract

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible iron, zinc, lead, cadmium, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. This tract has unusually high favorability for petroleum because of its location with respect to a gas-producing anticline. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The Upper Devonian red beds at the surface may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any commodity except for oil and gas, which has been only moderate.

GEOLOGY: Surface rocks are mostly Upper Devonian with a few Lower Mississippian shales and sandstones on the east flank of an anticline.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 09045 TRACT NAME: Laurel Fork South Ecoreg: 2214 WAR: 20
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Randolph
 ACREAGE (GROSS): 5,920 ACREAGE (NET): 5,920 100 N/G: 100 LATITUDE: 38°43' LONGITUDE: 79°41'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/4	1			In known gas field (Patchen and Others 1978)
URANIUM	2/1	1	1		
COAL	1/4	1	3		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	3		3		

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible iron, zinc, lead, cadmium, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. This tract has unusually high favorability for petroleum because of its location with respect to a gas-producing anticline. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The Upper Devonian red beds at the surface may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any commodity except for oil and gas, which has been only moderate.

GEOLOGY: Surface rocks are mostly Upper Devonian with a few Lower Mississippian shales and sandstones on the east flank of an anticline.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION - RARE II TRACTS

TRACT NO: 09047 TRACT NAME: Gauley Mountain Ecoreg: 2211 WAR: 18
NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Webster/Randolph/
Pocahontas
ACREAGE (GROSS): 13,320 ACREAGE (NET): 12,890 100 N/G: 97 LATITUDE: 38°29' LONGITUDE: 80°10'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	4			
URANIUM	2/2	1	1		
COAL	2/4	4	3		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/2	4			
OVERALL RATING (WEIGHTED)	2+		3		

NAMES OF CRITICAL MINERALS PRESENT: Possible copper, iron, lead, zinc, cadmium, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the Appalachian Plateau province. The rocks are favorable for oil and gas, which are produced throughout the province in the study area. Sandstone units may be favorable for deposits of uranium. This tract is situated on the edge of the Appalachian coal field. Coal underlies part of the tract but is thin and of low quality. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks probably contain no critical minerals, but older rocks at depth may be favorable for copper (Upper Devonian red beds); zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any resources, except for oil, gas, and coal in the immediate area.

GEOLOGY: Surface rocks are Upper Mississippian and Lower Pennsylvanian shales and sandstones, mostly flat-lying but with occasional folds and faults.

REFERENCE/CITATION: All resources - Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives - RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas - Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium - ERDA, 1976, NURE Preliminary Report. Coal - Trumbull, 1960, Coal Fields of the U.S. Geothermal - AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 09048 TRACT NAME: Tea Creek Mountain Ecoreg: 2211 WAR: 18
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Pocahontas
 ACREAGE (GROSS): 10,120 ACREAGE (NET): 10,100 100 N/G: 99.8 LATITUDE: 38°22' LONGITUDE: 80°10'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	4			
URANIUM	2/2	1	1		
COAL	2/4	4	2		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/2	4			
OVERALL RATING (WEIGHTED)	2+		2		

NAMES OF CRITICAL MINERALS PRESENT: Possible copper, iron, zinc, lead, cadmium, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the Appalachian Plateau province. The rocks are favorable for oil and gas, which are produced throughout the province in the study area. Sandstone units may be favorable for deposits of uranium. This tract is situated on the edge of the Appalachian coal field. Coal underlies part of the tract but is thin and of low quality. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks probably contain no critical minerals, but older rocks at depth may be favorable for copper (Upper Devonian red beds); zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any resources, except for oil, gas, and coal in the immediate area.

GEOLOGY: Surface rocks are Upper Mississippian and Lower Pennsylvanian shales and sandstones mostly flat lying but with a few local folds and faults.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION -- RARE II TRACTS

TRACT NO: 09049 TRACT NAME: Falls of Hills Creek ECOREG: 2211 WAR: 13
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Pocahontas/Greenbrier
 ACREAGE (GROSS): 7,640 ACREAGE (NET): 6,800 100 N/G: 89 LATITUDE: 38°11' LONGITUDE: 80°19'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1			
URANIUM	2/2	1	1		
COAL	2/4	1	2		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/2	1			
OVERALL RATING (WEIGHTED)	2+	1			

NAMES OF CRITICAL MINERALS PRESENT: Possible copper, iron, zinc, lead, cadmium, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the Appalachian Plateau province. The rocks are favorable for oil and gas, which are produced throughout the province in the study area. Sandstone units may be favorable for deposits of uranium. This tract is situated on the edge of the Appalachian coal field. Coal underlies part of the tract but is thin and of low quality. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks probably contain no critical minerals, but older rocks at depth may be favorable for copper (Upper Devonian red beds); zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any resources, except for oil, gas, and coal in the immediate area.

GEOLOGY: Surface rocks are Upper Mississippian and Lower Pennsylvanian shales and sandstones, mostly flat lying but with a few local folds and faults.

REFERENCE/CITATION: All resources -- Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives -- RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas -- Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium -- ERDA, 1976, NURE Preliminary Report. Coal -- Trumbull, 1960, Coal Fields of the U.S. Geothermal -- AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 09050 TRACT NAME: Middle Mountain Ecoreg: 2214 WAR: 20
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Pocahontas/Greenbrier
 ACREAGE (GROSS): 19,240 ACREAGE (NET): 18,920 100 N/G: 98 LATITUDE: 38°04' LONGITUDE: 80°02'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1			Near Brown's Mountain Anticline, which is on strike with gas-bearing Blackwater Anticline (Patchen and Others 1978)
URANIUM	2/1	1	1		
COAL	1/4	1	3		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	3/2	1			Mineral-bearing units closer to the surface
OVERALL RATING (WEIGHTED)	2 ⁺		3		

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible iron, lead, zinc, cadmium, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. This tract has unusually high favorability for petroleum because of its location with respect to a gas-producing anticline. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The Upper Devonian red beds at the surface may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any commodity except for oil and gas, which has been only moderate.

GEOLOGY: Surface rocks are Middle and Upper Devonian shales and sandstones anticlinally folded.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 09051 TRACT NAME: Little Allegheny Mountain Ecoreg: 2214 WAR: 19
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Greenbrier
 ACREAGE (GROSS): 11,200 ACREAGE (NET): 10,480 100 N/G: 94 LATITUDE: 37°55' LONGITUDE: 80°08'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1			Near Brown's Mountain Anticline, which is on strike with gas-bearing Blackwater Anticline (Patchen and Others 1978)
URANIUM	2/1	1	1		
COAL	1/4	1	3		
GEO THERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	2-		3		

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible iron, lead, zinc, cadmium, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. This tract has unusually high favorability for petroleum because of its location with respect to a gas-producing anticline. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The Upper Devonian red beds at the surface may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any commodity except for oil and gas, which has been only moderate.

GEOLOGY: Surface rocks are Upper Devonian and Lower Mississippian shales and sandstones on east flank of an anticline.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the IVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441
 Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S.
 Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 09052 TRACT NAME: Little Mountain Ecoreg: 2214 WAR: 20
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Pocahontas
 ACREAGE (GROSS): 8,440 ACREAGE (NET): 8,440 100 N/G: 100 LATITUDE: 38°28' LONGITUDE: 79°51'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1			Near crest of Brown's Mountain Anticline, which is on strike with gas-bearing Blackwater anticline (Patchen and Others 1978)
URANIUM	2/1	1	1		
COAL	1/4	1	2		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	2-				

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible iron, lead, zinc, cadmium, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. This tract has unusually high favorability for petroleum because of its location with respect to a gas-producing anticline. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The Upper Devonian red beds at the surface may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any commodity except for oil and gas, which has been only moderate.

GEOLOGY: Surface rocks are Upper Devonian shales and sandstones on the northwestern flank of an anticline.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 09326 TRACT NAME: East Fork of Greenbrier ECOREG: 2214 WAR: 19
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Pocahontas
 ACREAGE (GROSS): 6,810 ACREAGE (NET): 6,810 100 N/G: 100 LATITUDE: 38°36' LONGITUDE: 79°42'

INDIVIDUAL TRACT RESOURCE RATINGS	<u>ORNL</u>	<u>USFS</u>	<u>DOE</u>	<u>USGS</u>	REMARKS
OIL AND GAS	4/2	1			Near crest of Blackwater Anticline (Patchen and Others 1978)
URANIUM	2/1	1	1		
COAL	1/4	1	2		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	2		2		

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible iron, zinc, lead, cadmium, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. This tract has unusually high favorability for petroleum because of its location with respect to a gas-producing anticline. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The Upper Devonian red beds at the surface may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any commodity except for oil and gas, which has been only moderate.

GEOLOGY: Surface rocks are Upper Devonian shales and sandstones at the southwestern end of a north-eastern plunging syncline, Western Valley and Ridge tract.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION - RARE II TRACTS

TRACT NO: 09327	TRACT NAME: Dolly Sods Roaring Plain	ECOREG: 2214	WAR: 12
NATIONAL FOREST: Monongahela	STATE/COUNTY: West Virginia, Randolph/Pendleton/ Tucker/Grant		
ACREAGE (GROSS): 14,270	ACREAGE (NET): 11,270	100 N/G: 79	LATITUDE: 38°57' LONGITUDE: 79°23'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	4			Near Blackwater Anticline near gas field (Patchen and Others 1978)
URANIUM	2/1	1	1		
COAL	4/4	4	3		Low volatile coal of Upper Potomac Field
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/1	4			
OVERALL RATING (WEIGHTED)	3-		3		Gas pipeline crosses tract

NAMES OF CRITICAL MINERALS PRESENT: Possible copper, iron, lead, zinc, cadmium, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the Appalachian Plateau. The rocks are very favorable for oil and gas, which are produced throughout the province. Sandstone units may be favorable for uranium. This tract is located within the Appalachian coal field and overlies thick, high-quality coal seams. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks contain no critical minerals. The subsurface rocks may be favorable for copper (Upper Devonian red beds); zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has been performed for all resources except for oil, gas, and coal in the immediate area.

GEOLOGY: Surface rocks are Mississippian and Pennsylvanian shales and sandstones synclinally folded.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 09328 TRACT NAME: Turkey Mountain Ecoreg: 2211 WAR: 19
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Webster/Pocahontas
 ACREAGE (GROSS): 6,480 ACREAGE (NET): 6,480 100 N/G: 100 LATITUDE: 38°23' LONGITUDE: 80°16'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	4			
URANIUM	2/2	1	1		
COAL	3/4	4	3		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/2	4			
OVERALL RATING (WEIGHTED)	3-		3		

NAMES OF CRITICAL MINERALS PRESENT: Possible copper, iron, zinc, lead, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the Appalachian Plateau province. The rocks are favorable for oil and gas, which are produced throughout the province in the study area. Sandstone units may be favorable for deposits of uranium. This tract is situated on the edge of the Appalachian coal field. Coal underlies part of the tract but is thin and of low quality. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks probably contain no critical minerals, but older rocks at depth may be favorable for copper (Upper Devonian red beds); zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any resources, except for oil, gas, and coal in the immediate area.

GEOLOGY: Surface rocks are Upper Mississippian and Lower Pennsylvanian shales and sandstones, mostly flat-lying but with a few local folds and faults.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 09329 TRACT NAME: Spice Run ECOREG: 2214 WAR: 20
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Pocahontas/Greenbrier
 ACREAGE (GROSS): 6,320 ACREAGE (NET): 6,160 100 N/G: 97 LATITUDE: 38°02' LONGITUDE: 80°12'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1			West of Brown's Mountain Anticline, which is on strike with gas-bearing Blackwater Anticline (Patchen and Others 1978)
URANIUM	2/1	1	1		
COAL	1/4	1	3		
GEO THERMAL	2/1	1			
CRITICAL MINERALS	2/1	1			
OVERALL RATING (WEIGHTED)	2-				

NAMES OF CRITICAL MINERALS PRESENT: Possible copper; possible iron, zinc, lead, cadmium, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also made gas more common than oil throughout the province. These hydrocarbons are produced in several places in the province in the study area. This tract has unusually high favorability for petroleum because of its location with respect to a gas-producing anticline. Sandstone units may be favorable for uranium. The rocks are too old to contain coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The Upper Devonian red beds at the surface may contain the critical mineral copper. Critical minerals for which the subsurface rocks may be favorable include zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any commodity except for oil and gas, which has been only moderate.

GEOLOGY: Surface rocks are Upper Devonian and Lower Mississippian shales and sandstones on the north-western flank of an anticline.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 09331 TRACT NAME: Cranberry Addition ECOREG: 2211 WAR: 15
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Webster/Pocahontas
 ACREAGE (GROSS): 9,840 ACREAGE (NET): 9,840 100 N/G: 100 LATITUDE: 38°15' LONGITUDE: 80°19'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	4			
URANIUM	2/2	1	1		
COAL	3/4	4	3		
GEOTHERMAL	2/1	1			
CRITICAL MINERALS	2/2	4			
OVERALL RATING (WEIGHTED)	3-		3		

NAMES OF CRITICAL MINERALS PRESENT: Possible copper, iron, zinc, lead, cadmium, barite, and fluorite at depth

COMMENTARY AND SUMMARY: This tract is in the Appalachian Plateau province. The rocks are favorable for oil and gas, which are produced throughout the province in the study area. Sandstone units may be favorable for deposits of uranium. This tract is situated on the edge of the Appalachian coal field. Coal underlies part of the tract but is thin and of low quality. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks probably contain no critical minerals, but older rocks at depth may be favorable for copper (Upper Devonian red beds); zinc and lead (Devonian Oriskany Sandstone); iron (Devonian Helderberg Limestone and Silurian Clinton Formation); and zinc, cadmium, lead, fluorite, and barite (Ordovician carbonates). Little exploration has occurred for any resources, except for oil, gas, and coal in the immediate area.

GEOLOGY: Surface rocks are Middle Silurian to Upper Devonian shales and sandstones on the northwestern flank of an anticline.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

ENERGY AND MINERAL RESOURCE EVALUATION — RARE II TRACTS

TRACT NO: 09330 TRACT NAME: Marlin Mountain ECOREG: 2214 WAR: 18
 NATIONAL FOREST: Monongahela STATE/COUNTY: West Virginia, Pocahontas
 ACREAGE (GROSS): 8,640 ACREAGE (NET): 3,640 100 N/G: 100 LATITUDE: 38°14' LONGITUDE: 80°00'

INDIVIDUAL TRACT RESOURCE RATINGS	ORNL	USFS	DOE	USGS	REMARKS
OIL AND GAS	4/2	1			On Brown's Mountain Anticline, which is on strike with gas-bearing Blackwater Anticline (Patchen and Others 1978)
URANIUM	2/1	1	1		
COAL	1/4	1	2		
GEO THERMAL	2/1	1			
CRITICAL MINERALS	3/2	1			Mineral-bearing rocks are near or at the surface. Black shales may have zinc and lead
OVERALL RATING (WEIGHTED)	3-				

NAMES OF CRITICAL MINERALS PRESENT: Possible manganese, iron, zinc, lead, and copper; possible lead, zinc, cadmium, fluorite, and barite at depth

COMMENTARY AND SUMMARY: This tract is in the fold-dominated part of the Valley and Ridge. The rocks are quite favorable for oil and gas, although some hydrocarbons may have been driven off by heat from metamorphism and igneous activity in the nearby Blue Ridge, heat that also would make gas more common than oil throughout the province. These hydrocarbons are produced in several localities in the province in the study area. This tract has unusually high favorability because of its location with respect to a gas-producing anticline. Sandstone units may be favorable for deposits of uranium. The rocks are too old to contain coal. Hot dry rock at depth may be favorable as a source of geothermal energy. The surface rocks are quite favorable for critical minerals: copper in the Upper Devonian red beds; manganese, iron, zinc, and lead in the weathered Devonian Oriskany Sandstone; iron in the Devonian Helderberg Limestone; and iron in the Silurian Clinton Formation. Zinc, lead, cadmium, fluorite, and barite may also be present in Ordovician carbonates below the surface. Little exploration has been performed for all commodities except for oil and gas, and only moderate amounts for them.

GEOLOGY: This tract is in the fold-dominated Valley and Ridge. Surface rocks are Middle Silurian to Upper Devonian shales and sandstones on the northwestern flank of an anticline.

REFERENCE/CITATION: All resources — Stose and Ljungstedt, 1932, Geol. Map of W. Va.; USGS and USBM, 1968, USGS Prof. Paper 580; Miller and Others, 1970, Mineral Res. of the TVA Region; Brobst and Pratt, 1973, USGS Prof. Paper 820; DOE, 1978, Energy Res. Assessments of RARE II Lands; DOE, 1978, Energy Res. Assessments of Ten Alternatives — RARE II Lands; USFS, 1978, RARE II DES, So. Appal. Suppl. Oil and Gas — Vlissides and Quirin, 1963, Oil and Gas Fields of the U.S.; Cardwell, 1971, AAPG Mem. 15; USGS, 1974 and 1975, Maps of Appal. Oil and Gas Production; Miller and Others, 1975, USGS Circ. 725; Harris and Milici, 1977, USGS Prof. Paper 1018; Patchen and Others, 1978, AAPG Bull. 62: 1399-1441. Uranium — ERDA, 1976, NURE Preliminary Report. Coal — Trumbull, 1960, Coal Fields of the U.S. Geothermal — AAPG, 1976a and b, Geothermal Gradient Map and Subsurface Temperature Map of North America.

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