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CHARACTERISTICS AND DESCRIPTION OF CORES FROM THE USGS CORE HOLE CRU-1. PARACHUTE CREEK MEMBER, GREEN RIVER FORMATION, EAST-CENTRAL UINTA BASIN, UTAH

By

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CHARACTERISTICS AND DESCRIPTION OF CORES FROM THE USGS CORE HOLE CRU-1 PARACHUTE CREEK MEMBER, GREEN RIVER FORMATION, EAST-CENTRAL UINTA BASIN, UTAH

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Abstract

Oil-yield, lithologic, and mineral distribution data were determined for cores taken from a 497.7-foot drill hole in the upper part of the Parachute Creek Member of the Eocene Green River Formation. The drill hole, 1050 feet FEL, 700 feet FNL, sec. 3, T. 12 S., R. 24 E., Uintah County, Utah, started slightly below the contact between the Uinta Formation, also of Eocene age, and the underlying Green River Formation. It ended 32 feet below the base of the Mahogany bed (the richest oil-shale bed between A groove and B groove--which define the upper and lower boundaries, respectively, of the Mahogany zone). Most of the interval studied is kerogen- or carbonate-rich, commonly tuffaceous, and is very fine grained.

Several thin (<3 feet) oil-shale beds which yield as much as 25 gallons of oil per ton occur above the Mahogany zone, but are probably not of economic interest. The cored sequence contains several tuff beds. The thickest of these beds is approximately 2 feet thick; the average thickness is rarely greater than 0.5 feet. Two oil-saturated tuff beds occur approximately 65 feet above the Mahogany oil-shale bed. Although these two tuffs are exposed on nearby surface outcrops, no evidence of oil is seen on outcrop. The Mahogany zone is approximately 69 feet thick at the drill site; the lowermost few feet were not penetrated. At the site cored, the Mahogany zone is overlain by 435 feet of overburden. Fischer assays indicate that 42.3 feet of oil shale within the Mahogany zone could yield at least 25 gallons of oil per ton from beds at least 10 feet thick.

Introduction and Previous Work

As part of a mapping and resource appraisal program of oil shale in the Parachute Creek Member of the Eocene Green River Formation, cores from the U.S. Geological Survey core hole CRU-1, located in sec. 3, T. 12 S., R. 24 E. (fig. 1), were collected for study. The U.S. Geological Survey data-bank file number for this hole is U-55. Drilling started slightly below the contact between the Uinta Formation and the underlying Parachute Creek Member of the Green River Formation. The hole was terminated at a depth of 497.7 feet, approximately 65 feet above the contact with the Douglas Creek Member of the Green River Formation. Location of the drill hole is shown by Keighin (1977c). Oil yields of splits of the cores were determined by Fischer assay performed by the Laramie Energy Research Center (U.S. Energy Research and Development Administration, 1976). The assays are given in Appendix A. The core was described and samples selected for mineralogical examination by X-ray diffraction.

The oil-shale bearing Green River Formation of the eastern Uinta Basin has been studied by numerous investigators (Cashion, 1967, 1974, 1977; Cashion and Brown, 1956; Cashion and Dixon, 1976; Cashion and Donnell, 1972; Dana and others, 1980; Keighin, 1977a, 1977b, 1977c; Pipiringos, 1978, 1979). A more comprehensive view of the drill site and related areas may be gained by reference to the reports cited.

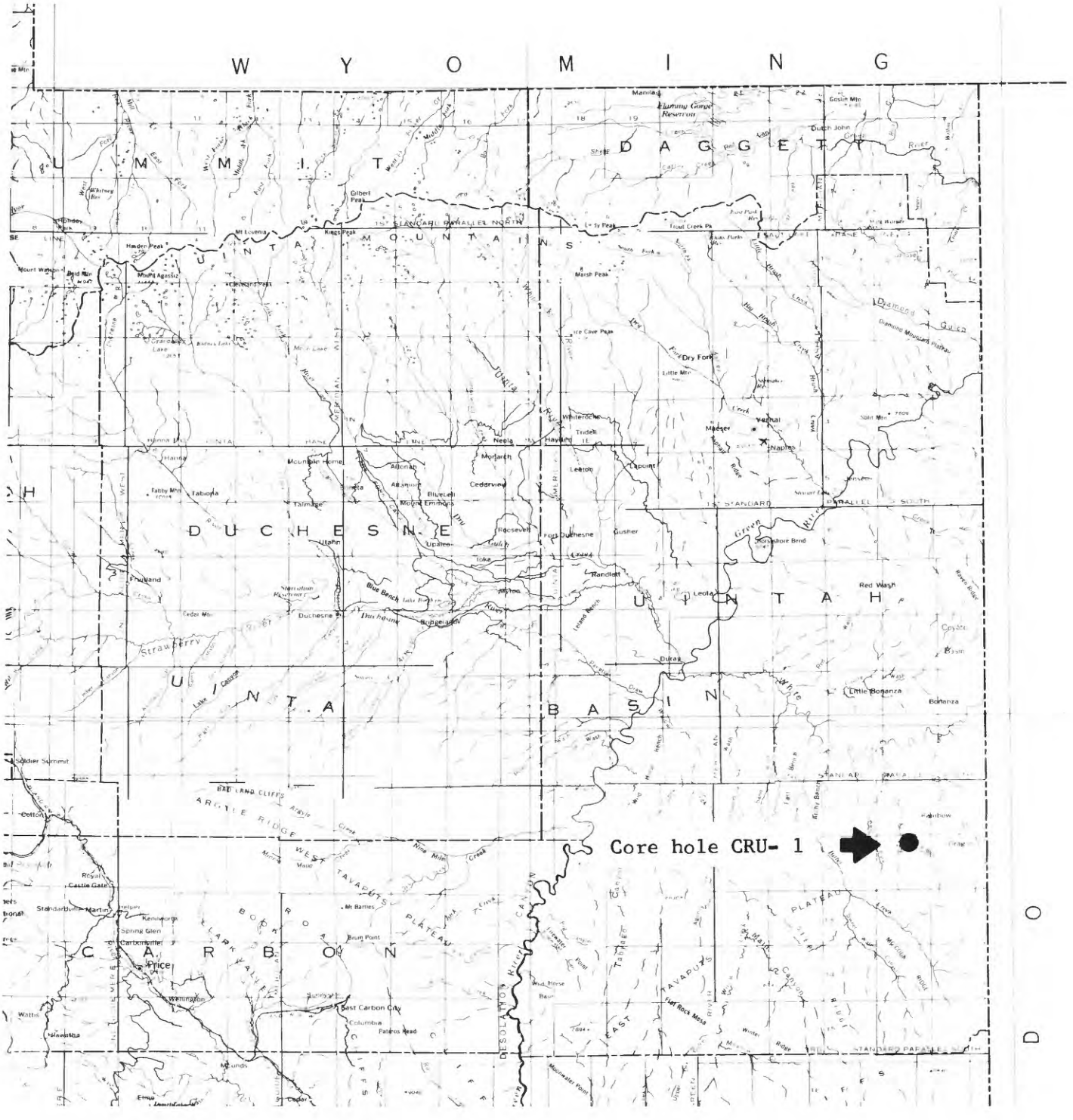

Figure 1. - Map showing location of USGS core hole CRU - 1

Mineralogy

Bulk mineralogy of selected samples was determined by X-ray diffraction. Samples were taken at intervals of 5 feet or less. Figure 2 shows the relative peak intensities for the major minerals contained in oil shale; the peak intensities should not be interpreted as quantitative indicators of the composition of the oil shale. Visual examination of the split core indicates that pyrite is commonly distributed throughout the core, but not in sufficient quantities to be detected by X-ray diffraction.

No clear relationships between mineralogy and oil-yield are obvious. Dolomite, calcite, and quartz are the major minerals indentified, and are generally persistent throughout the interval studied. Dolomite is somewhat more consistent in appearance than calcite. Albite is more abundant than K-feldspar, and is found throughout the section, although in relatively lower quantities in the upper 165 feet where analcime is relatively more abundant.

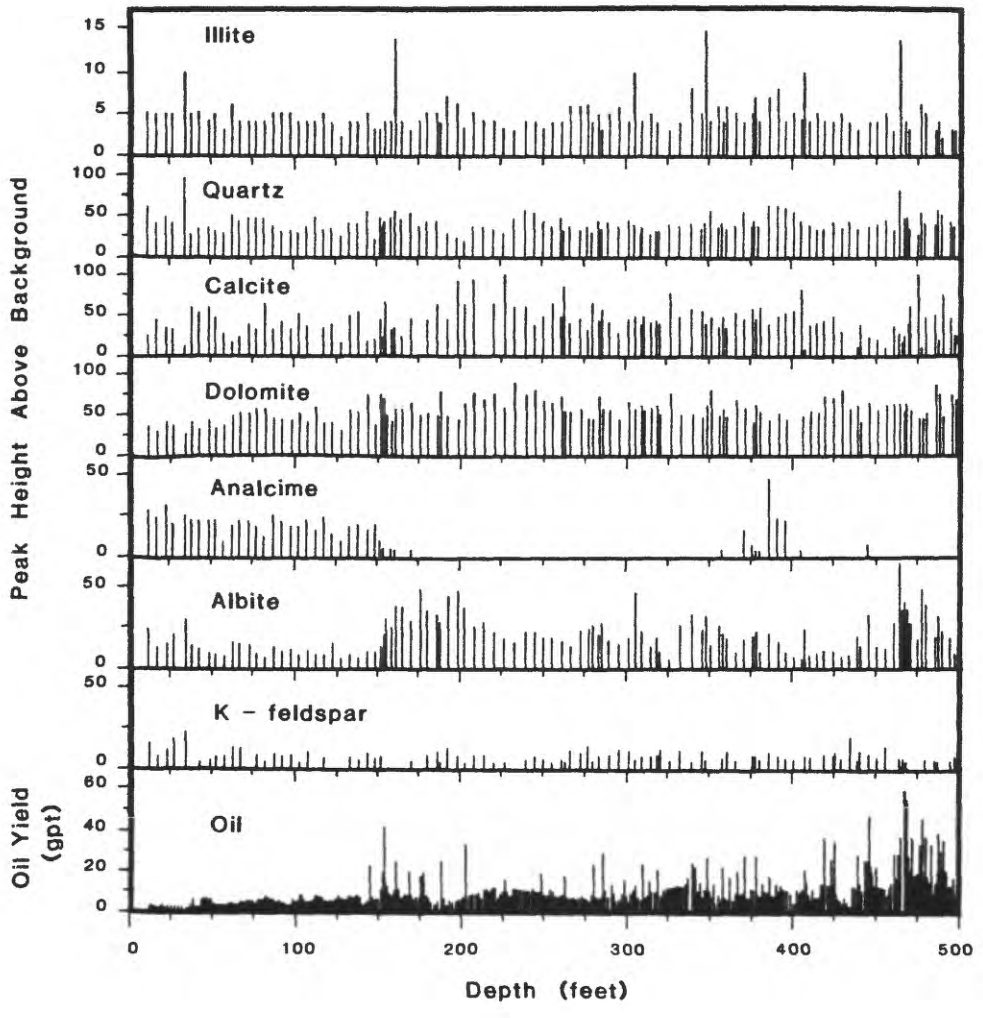

Figure 2.--Relationship between mineral distribution and oil yield.

Although analcime is a common accessory mineral in the upper 165 feet of the core hole, it was not identified in the Mahogany zone. Illite and mixed-layer clay minerals occur together above the Mahogany zone. The mixed-layer clays decrease in quantity as the Mahogany zone is approached, and no mixed-layer clays are detected in the Mahogany zone. Illite was detected in all samples examined from the Mahogany zone. Examination of X-ray diffraction patterns obtained from bulk rock samples from cores did not reveal the presence of any potentially valuable accessory minerals in the stratigraphic interval studied.

The interval structure and mineralogical distribution of a sample of raw oil shale (which yields 25 gallons of oil per ton) and a sample of high-grade (which yields 72.8 gallons of oil per ton) after Fischer assay are shown by scanning electron microscope (SEM) (figs 3-6). Fine-grained, commonly euhedral, authigenic minerals are abundant, and include feldspars, pyrite, and carbonates.

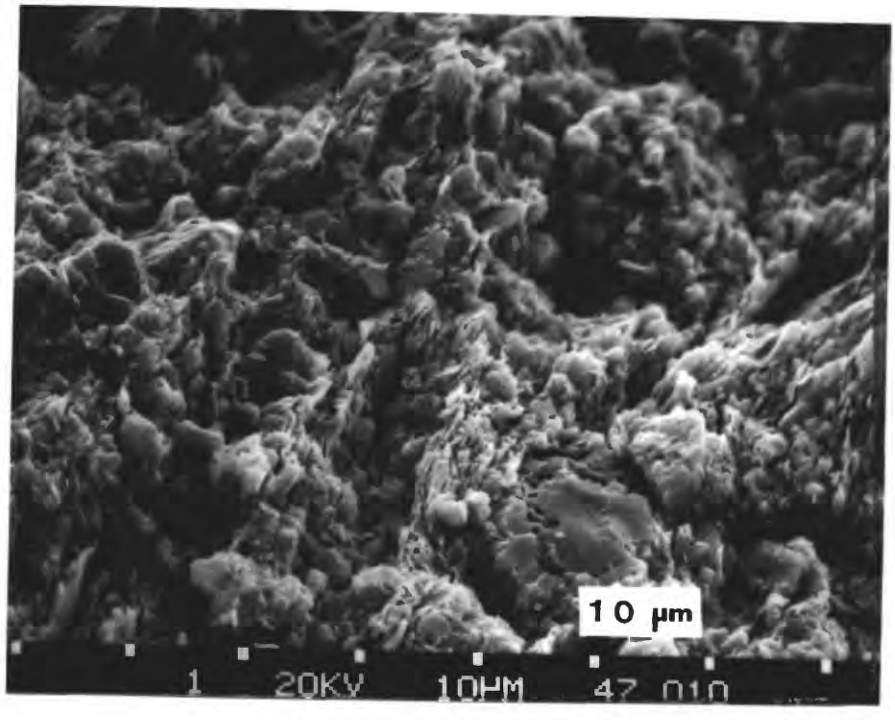

Figure 3.--Nature of kerogen and authigenic minerals in raw oil shale which yields 25 gallons of oil per ton.

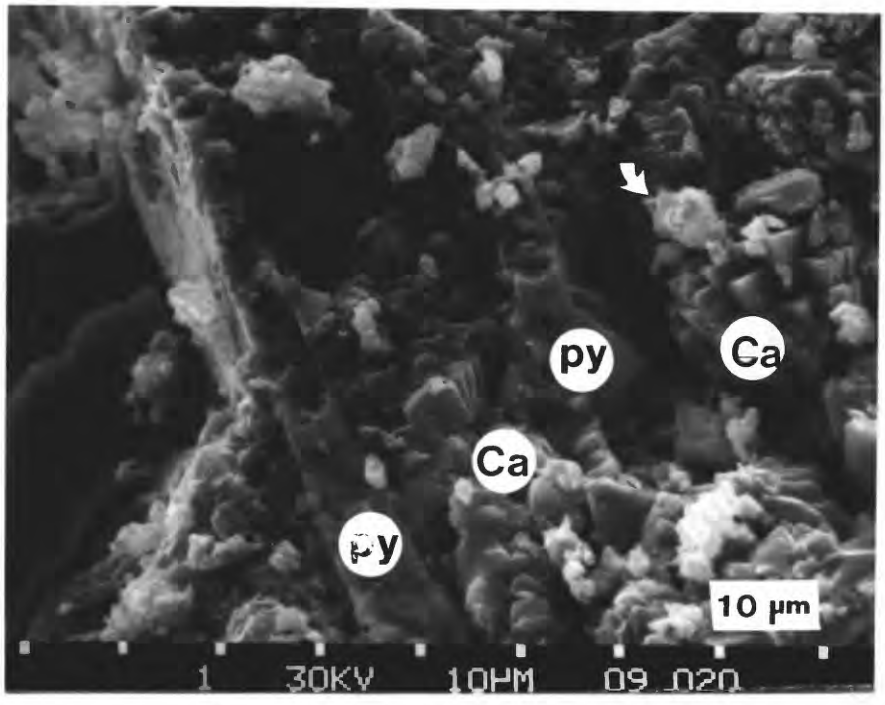

Figure 4.--Authigenic pyrite (py), iron-bearing calcite (Ca), and detrital clay (arrow), sample as in Figure 3.

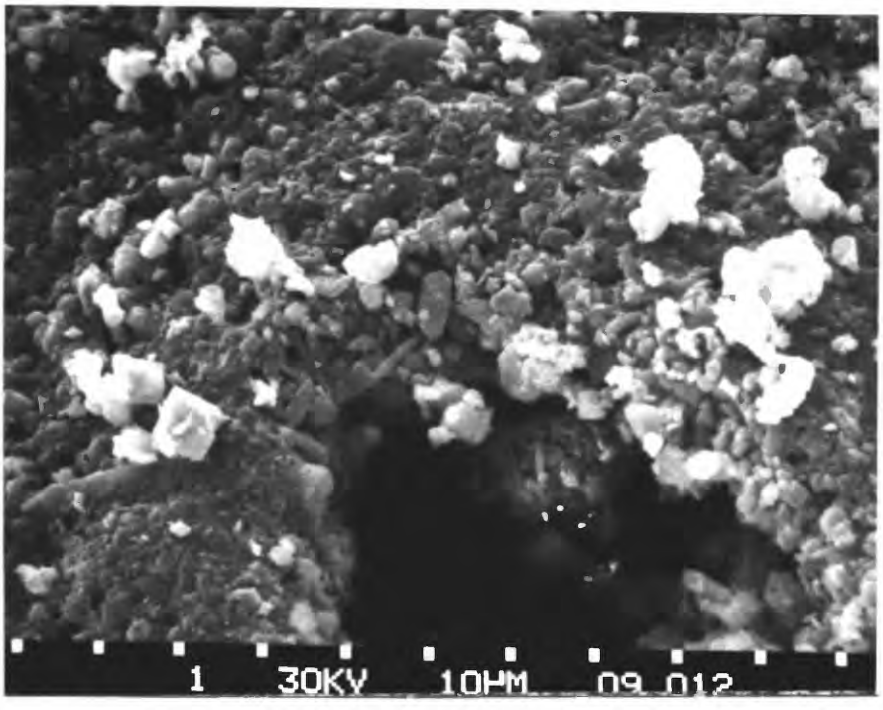

Figure 5.--Abundant, fine-grained, authigenic feldspars in spent shale (after Fischer assay). Sample from Mahogany bed which yields 72.8 gallons of oil per ton.

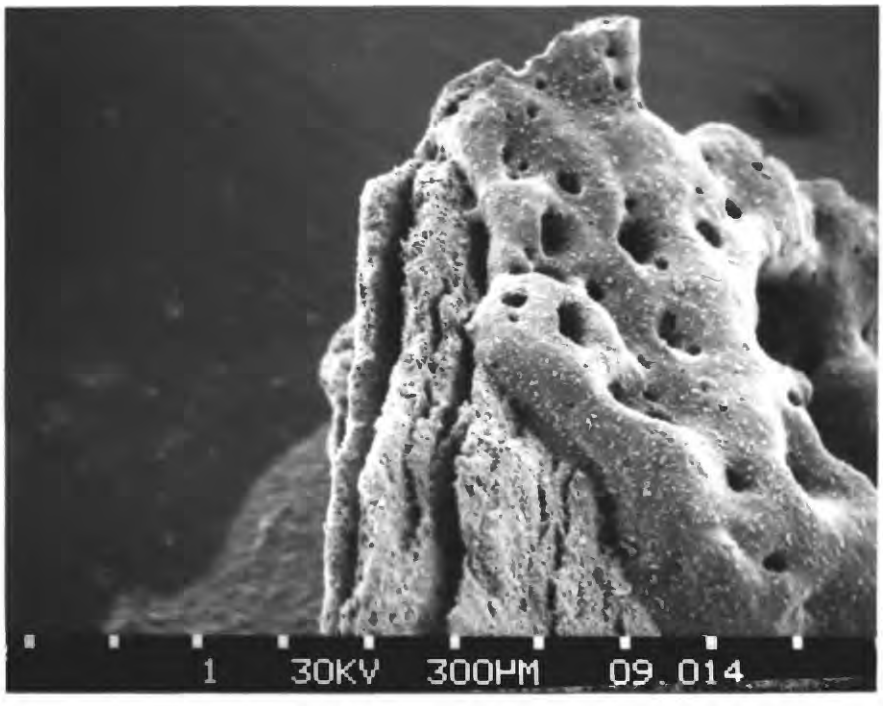

Figure 6.--Partial agglomeration of high grade oil shales is common during assaying. Sample from Mahogany bed.

Oil yield and calculated resources

Fischer assays indicate that isolated, relatively rich (25-40 gallons per ton) oil shale beds are found above the Mahogany zone (fig. 7), but average grade is below economic mining limits at this time. The thickness and calculated shale-oil resources from three grades of oil shale (15, 25, 35 gallons of oil per ton) from beds greater than 10 feet thick are illustrated on Figure 8. This figure indicates that minable oil shale is probably restricted to the Mahogany zone, the upper limit is defined by A groove, a thin, essentially barren zone, approximately 10 feet thick.

Lithologic description

The lithologic characteristics of the core are given in Table 1.

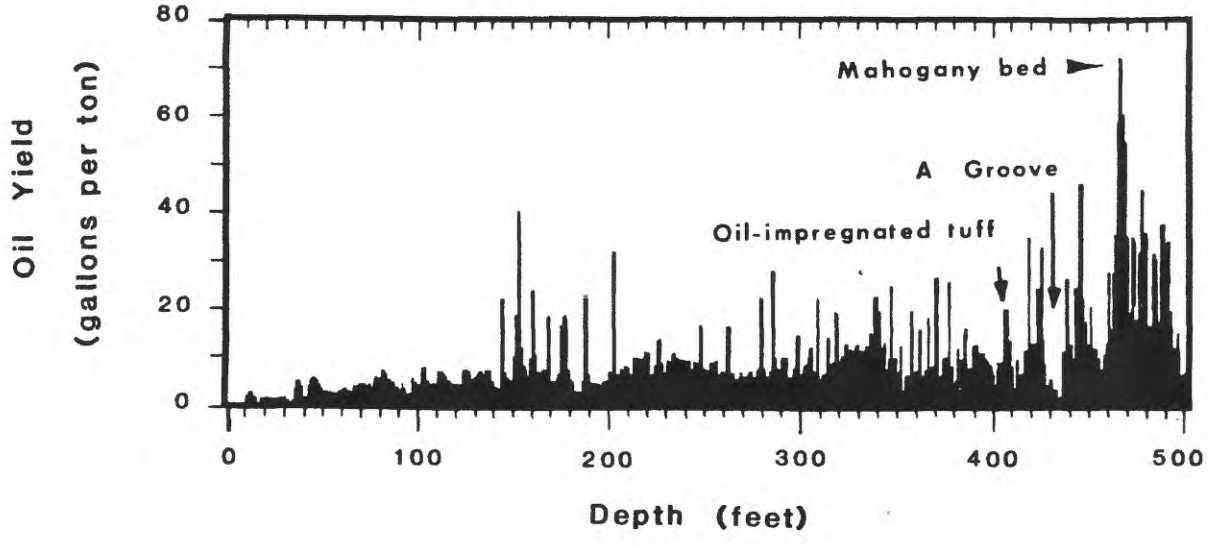

Figure 7.--Histogram illustrating variable shale-oil yield as a function of depth. The Mahogany zone begins immediately below A groove.

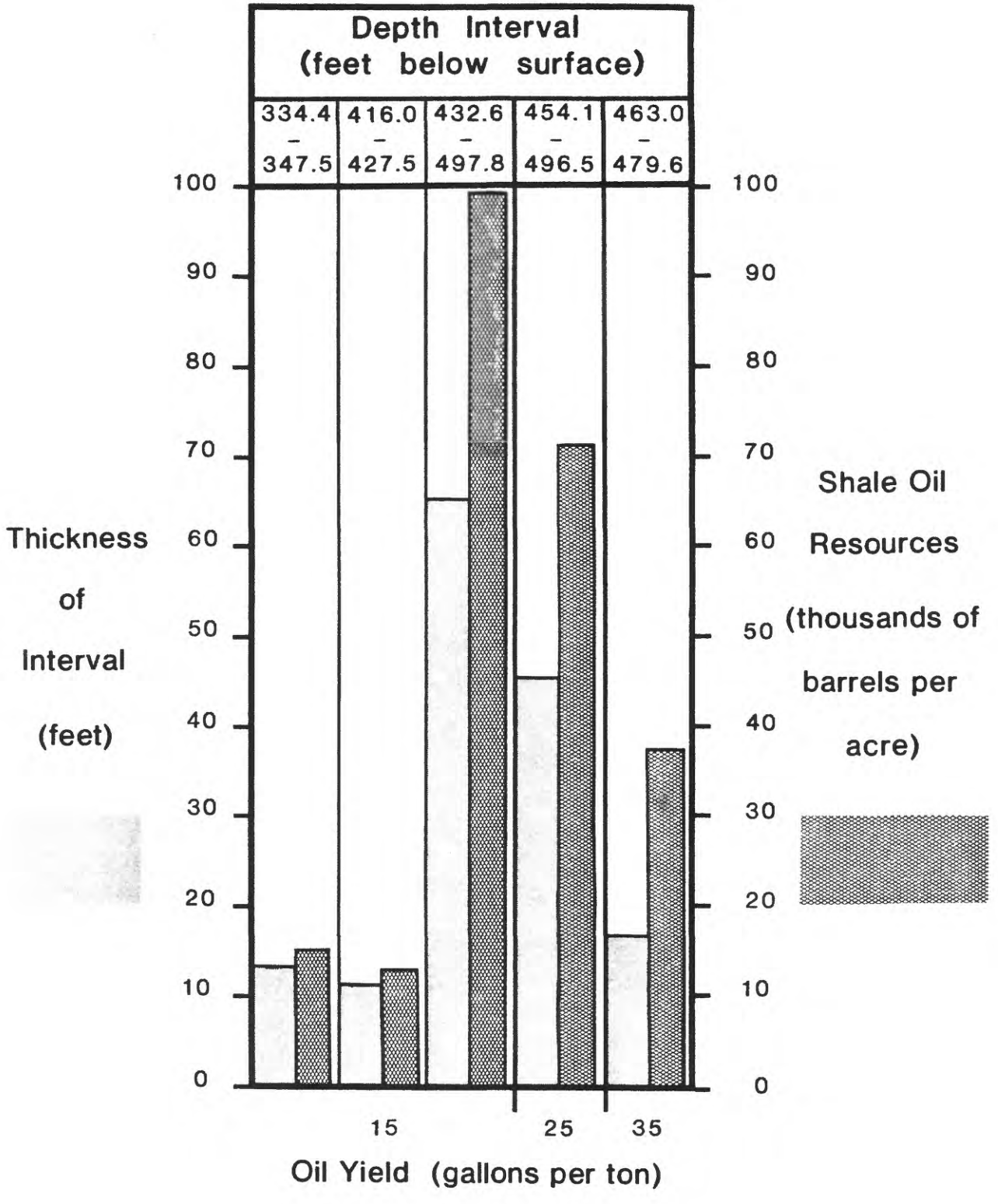

Figure 8.--Thickness and calculated shale-oil resources of three grades of oil shale, core hole CRU-1.

Table 1.--Lithologic description of core from USGS corehole CRU-1

Depth (feet) From	To	Thickness (feet)	Lithology
10.00	11.25	1.25	Sandy siltstone, light-brown (iron stained) to light-gray; contains small filled casts near top; some disseminated chips of bituminous material; slightly contorted bedding
11.25	16.6	5.35	Siltstone; light-gray to light-brown; lamellar to massive; bituminous material occurs as disseminated chips and as coating along some horizontal joints
16.6	17.4	0.8	Siltstone to very fine sand; brown; bituminous material occurs as disseminated chips and coating along vertical joints
17.4	18.0	0.6	Siltstone to mudstone; light- to medium-gray; lamellar
18.0	20.0	2.0	Mudstone; light-gray, lamellar; disseminated and fracture and joint-filling (roughly vertical) bituminous material
20.0	22.5	2.5	Mudstone with minor interbedded siltstone; mudstones light-brown to light-gray at base; siltstone light-gray; generally lamellar; variable quantities of disseminated bituminous material
22.5	26.0	3.5	Siltstone; light-gray; some light-brown slightly wavy lamellae; disseminated bituminous material locally abundant

Table 1.--Lithologic description of core from USGS corehole CRU-1-Continued

Depth (feet) From	To	Thickness (feet)	Lithology
26.0	29.2	3.2	Mudstone; light-gray with slight brownish cast; wavy lamellae and disseminated bitumen
29.2	35.4	6.2	Siltstone; light-gray; more massive than immediately above; finer toward base; disseminated bituminous chips
35.4	39.9	4.5	Mudstone; light- to medium-brown; some wavy and pinch-and-swell lamellae; slightly higher concentration of disseminated bitumen in pinch-and-swell lamellae
39.9	40.6	0.7	Siltstone; lamellar; some lamellae slightly more coarse; much more abundant disseminated bitumen or carbon hash; horizontal joint (1 mm wide) filled with gilsonite (?)
40.6	42.4	1.8	Siltstone - decreasing grain size; light-gray with light-brown lamellae; some pinch-and-swell (dilatancy?); lamellae filled with bitumen; thin, pinch-and-swell veinlet of pryite with bitumen envelope
42.4	48.4	6.0	Mudstone/oil shale; medium-brown; highly inclined to vertical joints filled with bitumen; minor quantities of nodular pyrite at base
48.4	58.9	10.5	Oil shale, lean; light-brown; variable quantities of bitumen (disseminated and concentrated along horizontal laminae

Table 1.--Lithologic description of core from USGS corehole CRU-1-Continued

Depth (feet) From	To	Thickness (feet)	Lithology
58.9	60.0	1.1	Mudstone grading downward to siltstone; light- to medium-brown; alternating light-gray and medium-brown lamellae; disseminated bitumen along horizontal bedding planes
60.0	60.6	0.6	Tuffaceous zone, light-gray biotite-bearing (?) tuff; grades downward into siltstone; abundant disseminated bitumen at base
60.6	70.0	9.4	Mudstone with minor quantities of interbedded siltstone; light-brown to gray-brown; variable quantities of disseminated bitumen; local concentrations of pyrite along inclined joints; spongiform, slightly leached zone at 69.4-69.7 feet
70.0	77.0	7.0	Mudstone or lean oil shale; light-grayish-brown; lamellar; variable quantities of disseminated pyrite and bitumen. Zone of minor deformation (74.15-74.6 ft) containing coarse bitumen
77.0	78.0	1.0	Oil shale; medium-brown; massive to faintly lamellar; minor quantities of disseminated pyrite
78.0	86.8	8.8	Oil shale; light- to medium-brown; generally faintly lamellar; thin (0.1 ft), light-gray tuff at 80.25 feet. Variable quantities of disseminated pyrite (pyrite is more abundant between 85.6-86.0 and 86.4-86.8 ft)

Table 1.--Lithologic description of core from USGS corehole CRU-1-Continued

Depth (feet) From	To	Thickness (feet)	Lithology
86.8	89.3	2.5	Mudstone; light-brown; laminated (slightly contorted); some joints filled with pyrite or pyrite and bitumen
89.3	89.7	0.4	Low-grade oil shale; faint to distinct laminae; horizontal to inclined joints filled with pyrite (and minor quantities of bitumen)
89.7	92.4	2.7	Mudstone or lean oil shale; light- to medium-brown; lamellar; abundant disseminated pyrite; some flecks of bitumenous material
92.4	93.4	1.0	Mudstone or siltstone; grayish-brown; lamellar; some disseminated bitumen
93.4	96.6	3.2	Mudstone; light-grayish-brown; fine lamellae; abundant disseminated bitumen between 94-95 and 95.6-96.6 feet; pyrite-filled joints (?) 93.7-93.8 and 95.3 feet
96.6	98.3	1.7	Oil shale; medium-brown; faintly lamellar; some disseminated pyrite; traces of bitumen
98.3	99.5	1.2	Oil shale; medium- to light-brown; lamellar; abundant disseminated bitumen
99.5	99.54	0.04	Tuff (?); very light-gray; contains disseminated biotite
99.54	101.3	1.76	Oil shale; light- to medium-brown; pyrite occurs in veinlets with bitumen and as disseminated grains

Table 1.--Lithologic description of core from USGS corehole CRU-1-Continued

Depth (feet) From	To	Thickness (feet)	Lithology
101.3	109.5	8.2	Oil shale; medium- to dark-brown; faint lamellae; commonly horizontal to inclined fractures or joints filled with carbonate(s); minor disseminated pyrite and bitumen in lower 2 feet
109.5	116.0	6.5	Oil shale; medium-brown; some disseminated carbonate (?) along horizontal planes; minor disseminated bitumen and pyrite between 114.25-114.3 feet
116.0	118.0	2.0	Mudstone; dark-grayish-brown; faintly lamellar; disseminated pyrite and carbonate (?)
118.0	119.3	1.3	Oil shale (?); medium-brown; faint lamellae; horizontal to vertical fractures or joints filled with carbonate (seal-brown carbonate (?) fills fractures/joints to 125.5 ft)
119.3	121.7	2.4	Siltstone; medium-brown; minor disseminated carbonate; oil shale (?) 120.2-121.1; very thin tuff, light gray, biotite-bearing at 119.8 feet
121.7	121.72	0.02	Tuff; light-brown, very fine grained
121.72	123.9	2.18	Siltstone; light-grayish-brown; lamellar; horizontal veinlets contain minor disseminated carbonate
123.9	134.0	10.1	Oil shale; medium-dark brown; variable quantities of disseminated pyrite; horizontal to inclined fractures/ joints filled with carbonate

Table 1.--Lithologic description of core from USGS corehole CRU-1-Continued

Depth (feet) From	To	Thickness (feet)	Lithology
134.0	142.4	8.4	Mudstone; dark- to medium-gray, some with brownish cast; minor to common disseminated pyrite, very thin (0.06 ft); bitumen-stained tuff at 138.3 feet
142.4	145.0	2.6	Mudstone-siltstone; medium-gray with brownish cast; lamellar (some pinch and swell lamella); two thin tuffs in lower foot of interval are oil-stained
145.0	154.7	9.7	Siltstone-mudstone; gray with decreasing brown cast; lamellar; some disseminated carbonate; some thin bitumen (?) veinlets with pyrite core; thin (0.07 ft) tuff at 151 feet, almost black due to oil stain
154.7	155.2	0.5	Tuffaceous zone containing pinch/swell lamina of siltstone; tuffs are medium-gray with slight brownish cast; some contain biotite
155.2	158.4	3.2	Mudstone-siltstone; dark-gray with brownish cast; pyrite occurs as disseminations, nodules, and in veinlets
158.4	159.4	1.0	Siltstone-mudstone; grayish-brown; finely laminated; contains thin, oil-stained tuff and minor quantity of nodular pyrite

Table 1.--Lithologic description of core from USGS corehole CRU-1-Continued

Depth (feet) From	To	Thickness (feet)	Lithology
159.4	165.0	5.6	Mudstone; dark-brown to dark-gray; lamellar; some disseminated and veinlets of pyrite; few thin, medium-brown tuffs
165.0	166.0	1.0	Tuffaceous zone containing intermixed siltstones; dark-gray to grayish-brown; laminated; distorted; petroliferous odor
166.0	167.3	1.3	Siltstone; medium-dark gray with brownish cast; lamellar; some bitumen stain
167.3	(174.0)	(6.7)	APPEARS TO BE UPPER CARBONATE/TUFF ZONE IN HORSE BENCH SANDSTONE BED (Cashion, 1967, p. 14, 17) or "t" zone (Cashion, 1974)
167.3	219.0	51.7	Horse bench Sandstone Bed or "t" zone. Interbedded marlstone and thin, irregular, and often contorted tuffaceous beds; often has a speckled appearance due to presence and distribution of light-gray to light-brown carbonate minerals which fill cavities formerly filled with saline (?) minerals. Carbonate also occurs in 1-4 mm veinlets parallel to bedding. Breccia of medium-gray silt chips in a light-gray matrix noted between 193.9-194.7 feet

Table 1.--Lithologic description of core from USGS corehole CRU-1-Continued

Depth (feet) From	To	Thickness (feet)	Lithology
219.0	220.0	1.0	Oil shale; medium-dark brown; contains a few very thin lenses of bitumen
220.0	224.0	4.0	Oil shale (?); light-brown; some disseminated and pinch/swell veinlets of pyrite parallel to bedding; thin (0.1 ft), chocolate-brown (oil-stained?) tuff at 223.1-223.2 feet
224.0	226.3	2.3	Oil shale; medium-brown; some disseminated carbonate parallel to bedding
226.3	230.0	2.7	Oil shale (?); low-grade; light-brown; thin (approx. 1 mm) veinlets of bitumen, often with cores of pyrite; disseminated pyrite (228.5-228.6 ft)
230.0	238.0	8.0	Oil shale; medium-brown; finely laminated; a few parallel fractures/ joints containing chocolate-brown minerals; very minor quantities of dead oil (?) in veinlets parallel to bedding; some nodules contain cores of pyrite; 3 mm carbonate-filled fracture at 238 feet
238.0	239.4	1.4	Oil shale (?); low-grade; light-brown concentrations cavity-filling carbonate parallel to some bedding planes; very fine grained, light-brown carbonate (239.0-239.4 ft)

Table 1.--Lithologic description of core from USGS corehole CRU-1-Continued

Depth (feet) From	To	Thickness (feet)	Lithology
239.4	240.5	1.1	Oil shale; medium-brown, some pinch/swell veinlets of bitumen; very fine grained carbonate concentrated parallel to bedding
240.5	246.0	5.5	Oil shale (?); low-grade; light-brown; some blebs and bands (to 5 mm) of black material (organic matter or very fine grained pyrite?)
246.0	256.0	10.0	Oil shale; medium- to dark-brown; stringers and nodules of dark-brown to black (?); some stringers and nodules of pyrite
256.0	261.0	5.0	Oil shale; medium-brown; dark to black bands of (?) 258.5-260.5 feet
261.0	262.0	1.0	Oil shale; dark-brown
262.0	270.0	8.0	Oil shale (?); light-brown to medium-gray; pyrite occurs as scattered nodules and in pinch/swell veinlets
270.0	278.0	8.0	Marlstone; medium- to dark-gray; some dark-brown to black bands of (?); some nodules which distort bedding
278.0	286.0	8.0	Oil shale; medium- to dark-brown; contains less pyrite than unit above
286.0	294.0	8.0	Marlstone-oil shale (?); light-brown to dark-gray; pyrite occurs as disseminations and stringers; very thin dark brown- to black-stained tuff (289.1 ft)

Table 1.--Lithologic description of core from USGS corehole CRU-1-Continued

Depth (feet) From	To	Thickness (feet)	Lithology
294.0	310.0	16.0	Oil shale (?)-marlstone; medium- to light-brown; nodules and stringers of pyrite; some stringers of bitumen; tuffaceous zones
310.0	318.0	8.0	Oil shale; medium- to dark-brown; variable quantities of disseminated pyrite; few very thin tuffaceous bands
318.0	326.0	8.0	Oil shale; dark-brown; nodular disseminated pyrite; very fine grained, chocolate-brown tuff (321.4-321.7 ft)
326.0	342.0	16.0	Oil shale, medium- to dark-brown; pyrite occurs as disseminations in thin stringers; scattered thin tuffaceous bands; disseminated light-brown carbonate(?) mineralization; veinlet (6 mm) of gilsonite (334.43 ft)
342.0	358.7	16.7	Oil shale; darker brown than overlying unit; contains disseminated and pinch/swell veinlets of pyrite; thin- to very-thin tuffaceous zones are common
358.7	405.3	46.6	Oil shale-marlstone; dark- to medium-gray and variable light- to medium-brown; commonly tuffaceous; tuffs are commonly lightly to heavily oil stained; contains variable quantities of disseminated pyrite

Table 1.--Lithologic description of core from USGS corehole CRU-1-Continued

Depth (feet) From	To	Thickness (feet)	Lithology
405.3	407.3	2.0	Tuff; oil saturated; features obscured by heavy stain
407.3	428.0	20.7	Oil shale; lean to moderate grade; some thin, lightly oil(?) stained tuffs; minor quantities of disseminated nodular pyrite
428.0	436.0	8.0	Marlstone; light-tan to medium-gray; tuffaceous bands; contains disseminated granular and nodular pyrite. A-groove (Cashion and Donnell, 1972)
436.0	444.0	8.0	Marlstone and common interbedded, thin tuffs; medium-gray, light-gray, light-brown; white sulfate(?) bloom on surface of some core; minor, variable quantities of disseminated pyrite; variable quantities of biotite visible in some tuffs
444.0	452.0	8.0	Siltstone/marlstone-lean oil-shale tuffs; light-to dark-brown; thin bedded to laminated tuffs; tuffs light-brown to dark-brown; variable quantities of biotite in tuffs
452.0	459.2	7.2	Oil shale; lean to moderate; light- to medium-brown; dark-brown, moderately to heavily oil stained, thin, tuffs
459.2	460.0	0.8	Oil shale; dark-brown; interbedded with very thin tuffs

Table 1.--Lithologic description of core from USGS corehole CRU-1-Continued

Depth (feet) From	To	Thickness (feet)	Lithology
460.0	462.0	2.0	Oil shale; medium-dark to light-brown; veinlets of disseminated pyrite; zone of nodular tuff(?)
462.0	463.0	1.0	Oil shale; moderately dark-brown
463.0	463.2	0.2	Tuff; gray- to light-brown; contorted; very fine grained; biotite common
463.2	465.8	2.6	Oil shale; very rich; dark-brown; Mahogany bed; some highly inclined to vertical joints/fractures with waxy, dark-brown to black surfaces; appears to have been crushed (464.4-465.0 ft)
465.8	468.1	2.3	Oil shale; dark-brown; rich
468.1	468.2	0.1	Tuff; medium chocolate-brown; contorted; very fine grained
468.2	477.4	9.2	Oil shale; moderate to rich, medium- to dark-brown; moderate quantity of nodular and thinly-bedded pyrite near base of unit
477.4	478.8	1.4	Oil shale(?); light-brown to buff; thin-bedded to irregularly laminar; pyrite occurs in thin veinlets parallel to bedding and fills some inclined joints
478.8	483.9	5.1	Oil shale; dark- to medium-brown; minor amount of disseminated pyrite
483.9	484.0	0.1	Marlstone; light-brown to buff; thin bedded
484.0	486.9	2.9	Oil shale; light medium-brown; irregularly bedded; some nodular and disseminated pyrite

Table 1.--Lithologic description of core from USGS corehole CRU-1-Continued

Depth (feet) From	To	Thickness (feet)	Lithology
486.9	490.9	4.0	Oil shale; dark-brown; thin (9 mm), very fine grained, medium-gray tuff (488.9 ft); minor disseminated pyrite
490.9	495.2	4.3	Oil shale-marlstone; light-brown; contains nodular and disseminated pyrite
495.2	495.8	0.6	Oil shale; dark-brown; seeping oil (495.7 ft)
495.8	497.7 (TD)	1.9	Marlstone-oil shale; gray-brown to light-brown; some veinlets of pyrite

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APPENDIX A

Oil shale assays by modified Fischer retort method

OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from the United States Geological Survey's CRU-1 corehole drilled
1050 feet FEL, 700 feet FNL of sec. 3, T 12 S, R 24 E, Uintah County, Utah

Surface elevation: 6,137 feet

Sample number		Run	Yield of product						Specific gravity of oil at 60°/60° F	Properties of spent shale	Remarks
			Weight percent				Gal per ton				
Laramie	Their	No.	Oil	Water	Spent shale	Gas + loss	Oil[1/]	Water		Tendency to coke	
SBR76-1810	10.0-11.7	16303	0.1	2.6	96.4	0.9	0.4a	6.2		None	
SBR76-1811	11.7-12.7	16306	1.0	2.3	96.1	.6	2.7a	5.5		None	
SBR76-1812	12.7-14.0	16307	.0	2.5	96.3	1.2	.1a	6.0		None	
SBR76-1813	14.0-15.0	16308	.7	2.2	96.7	.4	1.8a	5.3		None	
SBR76-1814	15.0-16.0	16309	.1	2.6	96.2	1.1	.3a	6.2		None	
SBR76-1815	16.0-17.0	16310	.1	2.9	95.9	1.1	.2a	7.0		None	
SBR76-1816	17.0-18.0	16311	.2	2.6	96.5	.7	.6a	6.2		None	
SBR76-1817	18.0-19.0	16312	.6	2.6	95.5	1.3	1.5a	6.2		None	
SBR76-1818	19.0-20.0	16313	.5	2.3	96.1	1.1	1.4a	5.5		None	
SBR76-1819	20.0-21.0	16314	.1	3.4	95.6	.9	.3a	8.1		None	
SBR76-1820	21.0-23.0	16315	.5	2.0	96.7	.8	1.4a	4.8		None	
SBR76-1821	23.0-25.0	16316	.3	1.8	97.2	.7	.9a	4.3		None	
SBR76-1822	25.0-27.0	16317	.4	1.6	97.2	.7	1.1a	3.9		None	
SBR76-1823	27.0-29.0	16318	.5	1.7	97.0	.8	1.3a	4.1		None	
SBR76-1824	29.0-32.0	16319	.2	1.3	97.4	1.1	.6a	3.1		None	
SBR76-1825	32.0-34.0	16320	.1	1.6	96.9	1.4	.3a	3.8		None	
SBR76-1826	34.0-35.4	16321	.3	1.8	97.3	.6	.8a	4.3		None	
SBR76-1827	35.4-36.4	16322	1.4	1.9	96.2	.5	3.5a	4.6		None	
SBR76-1828	36.4-37.7	16323	2.0	1.7	95.8	.5	5.1a	4.1		None	
SBR76-1829	37.7-38.9	16324	1.4	1.3	96.3	1.0	3.5a	3.1		None	
SBR76-1830	38.9-40.2	16325	.7	2.0	96.6	.7	1.7a	4.8		None	
SBR76-1831	40.2-41.3	16326	.4	1.7	97.3	.6	1.1a	4.1		None	
SBR76-1832	41.3-42.5	16327	.5	.7	97.0	1.8	1.2a	1.7		None	
SBR76-1833	42.5-43.5	16328	2.0	1.6	95.8	.6	5.1a	3.8		None	
SBR76-1834	43.5-44.5	16329	2.3	1.4	95.3	1.0	5.8	3.4	0.943	None	
SBR76-1835	44.5-45.7	16330	2.3	1.5	95.7	.5	5.9	3.6	.939	None	
SBR76-1836	45.7-46.9	16331	2.0	1.0	95.5	1.5	5.2a	2.4		None	
SBR76-1837	46.9-48.4	16332	1.8	1.1	95.7	1.4	4.6a	2.6		None	
SBR76-1838	48.4-49.4	16333	1.2	1.7	96.6	.5	3.1a	4.0		None	
SBR76-1839	49.4-50.4	16334	1.1	1.5	96.7	.7	2.7a	3.6		None	

See footnote at end of table.

Core samples received February 3, 1976; assays made on air-dried samples

Laramie Energy Research Center, Laramie, Wyoming Illustration No. SBR-4799P Sheet 1 of 15 February 26, 1976

OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from the United States Geological Survey's CRU-1 corehole

Surface elevation: 6,137 feet

Sample number		Run	Yield of product						Specific gravity of oil at 60°/60° F	Properties of spent shale	Remarks
			Weight percent				Gal per ton				
Laramie	Their	No.	Oil	Water	Spent shale	Gas + loss	Oil[1/]	Water		Tendency to coke	
SBR76-1840	50.4-51.5	16335	1.3	1.7	96.4	0.6	3.3a	4.1		None	
SBR76-1841	51.5-52.6	16336	1.3	1.2	96.1	1.4	3.3a	3.0		None	
SBR76-1842	52.6-53.6	16389	.8	.9	97.2	1.1	2.1a	2.2		None	
SBR76-1843	53.6-54.6	16342	1.1	1.1	97.4	.4	2.8a	2.6		None	
SBR76-1844	54.6-55.6	16343	1.0	1.4	97.1	.5	2.7a	3.4		None	
SBR76-1845	55.6-56.6	16344	.9	1.2	97.3	.6	2.3a	2.9		None	
SBR76-1846	56.6-57.6	16345	1.1	1.3	97.2	.4	2.9a	3.1		None	
SBR76-1847	57.6-58.6	16346	1.1	1.3	97.0	.6	3.0a	3.1		None	
SBR76-1848	58.6-59.6	16347	1.2	1.8	96.1	.9	3.2a	4.3		None	
SBR76-1849	59.6-60.6	16348	.5	1.5	96.8	1.2	1.3a	3.5		None	
SBR76-1850	60.6-61.6	16349	1.4	1.5	96.0	1.1	3.8a	3.6		None	
SBR76-1851	61.6-62.6	16350	1.3	1.6	96.2	.9	3.3a	3.8		None	
SBR76-1852	62.6-63.6	16351	1.2	1.4	96.6	.8	3.2a	3.4		None	
SBR76-1853	63.6-64.7	16352	1.0	1.4	96.4	1.2	2.5a	3.4		None	
SBR76-1854	64.7-65.8	16353	.9	1.6	96.7	.8	2.5a	3.8		None	
SBR76-1855	65.8-67.3	16354	1.6	1.5	96.2	.7	4.2a	3.6		None	
SBR76-1856	67.3-68.5	16355	1.4	1.0	96.5	1.1	3.7a	2.4		None	
SBR76-1857	68.5-69.9	16356	1.8	1.6	96.2	.4	4.6a	3.8		None	
SBR76-1858	69.9-71.5	16357	1.8	1.1	96.0	1.1	4.7a	2.6		None	
SBR76-1859	71.5-72.5	16358	1.7	1.5	96.3	.5	4.4a	3.6		None	
SBR76-1860	72.5-73.6	16359	2.0	1.5	95.8	.7	5.2	3.6	0.918	None	
SBR76-1861	73.6-74.7	16360	1.4	1.3	96.3	1.0	3.8a	3.1		None	
SBR76-1862	74.7-75.7	16361	1.0	1.0	97.0	1.0	2.7a	2.4		None	
SBR76-1863	75.7-77.1	16362	1.9	1.3	95.9	.9	4.9a	3.1		None	
SBR76-1864	77.1-78.2	16363	2.4	1.2	95.3	1.1	6.1	2.9	.929	None	
SBR76-1865	78.2-79.6	16364	2.2	1.2	95.5	1.1	5.6	2.9	.922	None	
SBR76-1866	79.6-80.8	16365	2.2	.9	95.9	1.0	5.6	2.2	.927	None	
SBR76-1867	80.8-82.1	16366	2.8	1.0	95.0	1.1	7.1	2.4	.934	None	
SBR76-1868	82.1-83.4	16367	2.5	1.1	95.0	1.4	6.5	2.6	.940	None	
SBR76-1869	83.4-84.4	16368	1.7	1.3	96.2	.8	4.6a	3.1		None	

See footnote at end of table.

Core samples received February 3, 1976; assays made on air-dried samples

OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from the United States Geological Survey's CRU-1 corehole

Surface elevation: 6,137 feet

Sample number		Run	Yield of product						Specific gravity of oil at 60°/60° F	Properties of spent shale	Remarks
			Weight percent				Gal per ton				
Laramie	Their	No.	Oil	Water	Spent shale	Gas + loss	Oil[1/]	Water		Tendency to coke	
SBR76-1870	84.4-85.4	16369	2.3	1.1	95.4	1.2	5.9	2.6	0.947	None	
SBR76-1871	85.4-86.4	16370	2.0	1.8	95.3	.9	5.1a	4.3		None	
SBR76-1872	86.4-87.4	16371	1.9	1.7	95.6	.8	4.8a	4.1		None	
SBR76-1873	87.4-88.4	16372	1.4	1.2	96.6	.8	3.6a	2.9		None	
SBR76-1874	88.4-89.4	16373	1.4	1.7	96.3	.6	3.7a	4.2		None	
SBR76-1875	89.4-90.4	16374	1.6	1.6	95.8	1.0	4.1a	3.7		None	
SBR76-1876	90.4-91.4	16375	1.0	.9	96.0	2.1	2.6a	2.3		None	
SBR76-1877	91.4-92.4	16376	1.7	1.7	96.0	.6	4.5a	4.1		None	
SBR76-1878	92.4-93.4	16377	1.0	1.1	97.4	.5	2.6a	2.6		None	
SBR76-1879	93.4-94.4	16378	1.0	1.0	97.3	.7	2.5a	2.4		None	
SBR76-1880	94.4-95.5	16379	.8	1.1	97.0	1.1	2.0a	2.5		None	
SBR76-1881	95.5-96.6	16380	1.1	1.3	96.4	1.2	2.8a	3.1		None	
SBR76-1882	96.6-97.7	16381	2.1	1.5	95.4	1.0	5.5	3.6	.933	None	
SBR76-1883	97.7-98.7	16382	1.9	1.1	95.9	1.1	5.0a	2.6		None	
SBR76-1884	98.7-99.8	16383	1.2	.9	97.3	.6	3.3a	2.1		None	
SBR76-1885	99.8-101.3	16384	1.8	1.1	95.6	1.5	4.8a	2.5		None	
SBR76-1886	101.3-102.3	16385	2.9	1.5	94.8	.8	7.5	3.6	.937	None	
SBR76-1887	102.3-103.3	16386	3.0	1.3	94.5	1.2	7.7	3.1	.943	None	
SBR76-1888	103.3-104.3	16387	3.0	1.5	94.9	.6	7.6	3.6	.941	None	
SBR76-1889	104.3-105.4	16388	2.1	1.7	95.5	.7	5.3	4.1	.937	None	
SBR76-1890	105.4-106.4	16390	1.9	2.0	95.5	.6	5.0a	4.8		None	
SBR76-1891	106.4-107.4	16391	1.8	1.6	95.9	.7	4.6a	3.8		None	
SBR76-1892	107.4-108.4	16392	1.7	1.8	96.1	.4	4.4a	4.3		None	
SBR76-1893	108.4-109.4	16393	1.6	2.0	95.8	.6	4.1a	4.8		None	
SBR76-1894	109.4-110.4	16394	2.1	1.3	96.0	.6	5.6a	3.1		None	
SBR76-1895	110.4-111.4	16395	2.7	.9	95.9	.5	7.1	2.2	.929	None	
SBR76-1896	111.4-112.4	16396	2.8	.8	95.2	1.2	7.1	1.9	.930	None	
SBR76-1897	112.4-113.4	16397	2.4	1.2	95.4	1.0	6.3	2.8	.932	None	
SBR76-1898	113.4-114.4	16398	2.6	1.3	94.9	1.2	6.6	3.1	.933	None	
SBR76-1899	114.4-115.4	16399	2.4	1.7	95.1	.8	6.2	4.1	.934	None	

See footnote at end of table.

Core samples received February 3, 1976; assays made on air-dried samples

Laramie Energy Research Center, Laramie, Wyoming Illustration No. SBR-4799P Sheet 3 of 15 February 26, 1976

OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from the United States Geological Survey's CRU-1 corehole

Surface elevation: 6,137 feet

Sample number		Run	Yield of product						Specific gravity of oil at 60°/60° F	Properties of spent shale	Remarks
			Weight percent				Gal per ton				
Laramie	Their	No.	Oil	Water	Spent shale	Gas + loss	Oil[1/]	Water		Tendency to coke	
SBR76-1900	115.4-116.4	16400	2.0	1.6	95.4	1.0	5.2	3.8	0.930	None	
SBR76-1901	116.4-117.4	16401	1.7	2.1	95.5	.7	4.4a	5.0		None	
SBR76-1902	117.4-118.4	16402	1.8	1.8	96.0	.4	4.6a	4.3		None	
SBR76-1903	118.4-119.5	16403	1.7	1.5	95.7	1.1	4.4a	3.6		None	
SBR76-1904	119.5-120.5	16404	1.8	1.6	95.7	.9	4.8a	3.8		None	
SBR76-1905	120.5-121.5	16405	1.8	1.2	96.3	.7	4.6a	2.9		None	
SBR76-1906	121.5-122.5	16406	1.4	1.5	96.3	.8	3.7a	3.6		None	
SBR76-1907	122.5-123.5	16407	1.8	1.2	96.0	1.0	4.8a	2.9		None	
SBR76-1908	123.5-124.7	16408	2.7	1.3	94.8	1.2	7.0	3.1	.936	None	
SBR76-1909	124.7-125.8	16409	2.8	1.1	94.9	1.2	7.1	2.6	.937	None	
SBR76-1910	125.8-126.9	16410	2.6	1.6	94.9	.9	6.7	3.9	.935	None	
SBR76-1911	126.9-128.0	16411	2.1	1.6	95.5	.8	5.4	3.8	.930	None	
SBR76-1912	128.0-129.0	16412	2.0	1.5	95.8	.7	5.2	3.5	.929	None	
SBR76-1913	129.0-130.0	16413	2.2	1.8	95.2	.8	5.6	4.2	.930	None	
SBR76-1914	130.0-131.0	16414	2.4	1.0	95.6	1.0	6.1	2.5	.929	None	
SBR76-1915	131.0-132.0	16415	2.8	1.2	94.4	1.6	7.3	2.8	.933	None	
SBR76-1916	132.0-133.0	16416	2.6	1.5	95.1	.8	6.7a	3.6		None	
SBR76-1917	133.0-134.0	16417	2.4	1.7	95.0	.9	6.3	4.1	.932	None	
SBR76-1918	134.0-135.0	16418	2.4	1.5	95.0	1.1	6.3	3.6	.935	None	
SBR76-1919	135.0-136.0	16419	2.8	1.1	94.5	1.6	7.2	2.6	.932	None	
SBR76-1920	136.0-137.0	16420	2.9	1.2	94.6	1.3	7.2	2.9	.949	None	
SBR76-1921	137.0-138.0	16421	2.9	1.5	95.0	.6	7.3	3.6	.939	None	
SBR76-1922	138.0-139.0	16422	2.1	1.5	94.7	1.7	5.3	3.6	.932	None	
SBR76-1923	139.0-140.0	16423	1.0	.7	96.5	1.8	2.7a	1.7		None	
SBR76-1924	140.0-141.3	16424	1.5	1.8	96.0	.7	3.8a	4.3		None	
SBR76-1925	141.3-142.6	16425	1.0	1.4	96.8	.8	2.6a	3.4		None	
SBR76-1926	142.6-143.7	16426	1.3	1.2	96.8	.7	3.4a	2.9		None	
SBR76-1927	143.7-145.0	16427	8.6	1.0	87.5	2.9	22.4	2.3	.924	None	
SBR76-1928	145.0-146.0	16428	2.6	.9	95.1	1.4	6.6	2.2	.933	None	
SBR76-1929	146.0-147.0	16429	2.3	1.8	94.9	1.0	5.9	4.3	.931	None	

See footnote at end of table.

Core samples received February 3, 1976; assays made on air-dried samples

Laramie Energy Research Center, Laramie, Wyoming Illustration No. SBR-4799P Sheet 4 of 15 February 26, 1976

OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from the United States Geological Survey's CRU-1 corehole

Surface elevation: 6,137 feet

Sample number		Run	Yield of product						Specific gravity	Properties of spent shale	
			Weight percent				Gal per ton				
Laramie	Their	No.	Oil	Water	Spent shale	Gas + loss	Oil[1/]	Water	of oil at 60°/60° F	Tendency to coke	Remarks
SBR76-1930	147.0-148.0	16430	2.0	1.8	94.8	1.4	5.3	4.3	0.932	None	
SBR76-1931	148.0-149.1	16431	1.9	2.2	94.9	1.0	5.0a	5.3		None	
SBR76-1932	149.1-150.2	16432	1.8	1.1	95.6	1.5	4.6a	2.8		None	
SBR76-1933	150.2-151.3	16433	4.1	1.0	93.8	1.1	10.5	2.4	.926	None	
SBR76-1934	151.3-152.6	16434	7.2	.6	90.4	1.8	18.9	1.4	.910	None	
SBR76-1935	152.6-153.1	16435	15.6	1.2	80.1	3.1	40.8	2.9	.919	None	
SBR76-1936	153.1-154.0	16436	4.5	.6	93.7	1.2	11.8	1.4	.919	None	
SBR76-1937	154.0-154.7	16437	3.2	.6	94.5	1.7	8.2	1.4	.924	None	
SBR76-1938	154.7-155.2	16438	3.4	1.2	94.9	.5	9.0	2.9	.909	None	
SBR76-1939	155.2-156.3	16439	3.1	1.2	94.5	1.2	8.1	2.9	.923	None	
SBR76-1940	156.3-157.4	16440	2.6	1.0	95.6	.8	6.7	2.4	.923	None	
SBR76-1941	157.4-158.4	16441	1.9	.7	96.8	.6	5.1a	1.7		None	
SBR76-1942	158.4-159.4	16442	3.6	.6	95.0	.8	9.5	1.4	.908	None	
SBR76-1943	159.4-160.7	16443	9.2	.8	88.0	2.0	24.1	1.9	.918	None	
SBR76-1944	160.7-161.7	16444	4.0	.4	94.5	1.1	10.4	1.0	.929	None	
SBR76-1945	161.7-162.7	16445	2.7	.4	96.0	.8	7.1	1.0	.932	None	
SBR76-1946	162.7-163.8	16446	2.3	.5	96.3	.9	5.8	1.2	.930	None	
SBR76-1947	163.8-165.0	16447	2.5	.3	96.7	.5	6.3	.7	.931	None	
SBR76-1948	165.0-166.0	16448	2.9	.3	96.3	.5	7.7	.7	.913	None	
SBR76-1949	166.0-167.4	16449	2.8	.3	96.4	.5	7.3	.7	.924	None	
SBR76-1950	167.4-168.4	16450	7.1	.5	90.8	1.6	18.5	1.2	.919	None	
SBR76-1951	168.4-169.4	16451	2.9	.2	95.5	1.4	7.6	.5	.923	None	
SBR76-1952	169.4-170.4	16452	2.1	.3	96.7	.9	5.2	.7	.940	None	
SBR76-1953	170.4-171.4	16453	1.8	.2	97.0	1.0	4.7a	.5		None	
SBR76-1954	171.4-172.4	16454	1.6	.2	97.7	.5	4.1a	.5		None	
SBR76-1955	172.4-173.4	16455	2.2	.1	97.1	.6	5.7a	.2		None	
SBR76-1956	173.4-174.4	16456	2.4	.3	96.6	.7	6.3	.7	.923	None	
SBR76-1957	174.4-175.6	16457	6.5	.5	91.3	1.7	17.0	1.2	.917	None	
SBR76-1958	175.6-176.8	16458	7.1	.7	90.6	1.6	18.4	1.7	.918	None	
SBR76-1959	176.8-177.9	16459	6.9	.6	91.0	1.5	18.0	1.4	.916	None	

See footnote at end of table.

Core samples received February 3, 1976; assays made on air-dried samples

OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from the United States Geological Survey's CRU-1 corehole

Surface elevation: 6,137 feet

Sample number		Run	Yield of product						Specific gravity of oil at 60°/60° F	Properties of spent shale	Remarks
			Weight percent				Gal per ton				
Laramie	Their	No.	Oil	Water	Spent shale	Gas + loss	Oil[1/]	Water		Tendency to coke	
SBR76-1960	177.9-178.9	16460	2.7	0.4	96.1	0.8	7.1	1.0	0.926	None	
SBR76-1961	178.9-180.1	16461	2.1	.4	96.9	.6	5.5	1.0	.927	None	
SBR76-1962	180.1-181.2	16462	1.8	.3	97.3	.6	4.8a	.7		None	
SBR76-1963	181.2-182.5	16463	1.2	.3	97.6	.9	3.1a	.7		None	
SBR76-1964	182.5-183.7	16464	1.1	.5	97.6	.8	2.8a	1.2		None	
SBR76-1965	183.7-184.8	16465	1.2	.5	97.9	.4	3.0a	1.2		None	
SBR76-1966	184.8-185.9	16466	1.3	.4	97.5	.8	3.4a	1.0		None	
SBR76-1967	185.9-186.8	16467	1.9	.5	97.1	.5	5.1a	1.1		None	
SBR76-1968	186.8-187.8	16468	8.9	.4	88.2	2.5	23.2	1.0	.923	None	
SBR76-1969	187.8-189.1	16469	2.4	.3	96.7	.6	6.3	.7	.932	None	
SBR76-1970	189.1-190.0	16470	1.2	.2	97.2	1.4	3.1a	.5		None	
SBR76-1971	190.0-191.0	16471	.6	.0	98.1	1.3	1.6a	.0		None	
SBR76-1972	191.0-192.2	16472	1.8	.4	97.3	.5	4.7a	1.0		None	
SBR76-1973	192.2-193.3	16473	1.6	.5	97.2	.7	4.1a	1.2		None	
SBR76-1974	193.3-194.7	16474	.7	.4	98.4	.5	1.7a	1.0		None	
SBR76-1975	194.7-195.7	16475	1.5	.2	96.9	1.4	3.9a	.5		None	
SBR76-1976	195.7-197.4	16476	1.8	.8	96.3	1.1	4.7a	1.9		None	
SBR76-1977	197.4-198.4	16477	1.8	1.1	96.5	.6	4.8a	2.6		None	
SBR76-1978	198.4-199.4	16478	2.2	.5	96.0	1.3	5.7	1.2	.921	None	
SBR76-1979	199.4-200.5	16479	1.7	.6	97.0	.7	4.5a	1.4		None	
SBR76-1980	200.5-201.6	16480	2.8	.2	95.6	1.4	7.3	.5	.923	None	
SBR76-1981	201.6-202.6	16481	12.4	1.1	84.1	2.4	32.2	2.6	.921	None	
SBR76-1982	202.6-204.4	16533	2.4	.3	95.9	1.4	6.2	.7	.928	None	
SBR76-1983	204.4-205.5	16483	3.0	.5	95.8	.7	7.6	1.2	.929	None	
SBR76-1984	205.5-207.0	16484	2.9	.5	95.6	1.0	7.5	1.2	.922	None	
SBR76-1985	207.0-208.0	16485	2.5	.3	95.7	1.5	6.6	.7	.929	None	
SBR76-1986	208.0-209.0	16486	3.3	.5	95.3	.9	8.6	1.2	.932	None	
SBR76-1987	209.0-210.3	16487	3.2	.5	94.5	1.8	8.2	1.2	.928	None	
SBR76-1988	210.3-211.6	16488	2.8	.5	95.9	.8	7.3	1.2	.928	None	
SBR76-1989	211.6-212.6	16581	2.2	.4	96.3	1.1	5.6	1.0	.929	None	

See footnote at end of table.

Core samples received February 3, 1976; assays made on air-dried samples

OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from the United States Geological Survey's CRU-1 corehole

Surface elevation: 6,137 feet

Sample number		Run	Yield of product						Specific gravity	Properties of spent shale	
			Weight percent				Gal per ton				
Laramie	Their	No.	Oil	Water	Spent shale	Gas + loss	Oil[1/]	Water	of oil at 60°/60° F	Tendency to coke	Remarks
SBR76-1990	212.6-214.0	16490	3.8	0.5	94.9	0.8	9.7	1.2	0.930	None	
SBR76-1991	214.0-215.4	16491	4.1	.5	94.6	.8	10.6	1.2	.928	None	
SBR76-1992	215.4-216.7	16492	3.4	.2	95.2	1.2	8.7	.5	.935	None	
SBR76-1993	216.7-217.8	16493	3.6	.3	95.0	1.1	9.3	.7	.931	None	
SBR76-1994	217.8-219.2	16494	4.2	.4	94.2	1.2	10.7	1.0	.934	None	
SBR76-1995	219.2-220.5	16495	4.3	.5	94.2	1.0	11.1	1.2	.932	None	
SBR76-1996	220.5-221.7	16496	2.4	.6	96.2	.8	6.2	1.4	.923	None	
SBR76-1997	221.7-222.7	16497	2.6	.7	96.2	.5	6.7	1.7	.921	None	
SBR76-1998	222.7-223.9	16498	2.8	.5	96.0	.7	7.4	1.2	.919	None	
SBR76-1999	223.9-225.0	16499	3.2	.4	94.9	1.5	8.3	1.0	.932	None	
SBR76-2000	225.0-226.3	16500	5.2	.4	93.2	1.2	13.6	1.0	.925	None	
SBR76-2001	226.3-227.2	16501	3.4	.3	94.9	1.4	8.9	.7	.930	None	
SBR76-2002	227.2-228.6	16557	2.4	.5	96.5	.6	6.3	1.2	.915	None	
SBR76-2003	228.6-230.2	16503	2.6	.6	96.2	.6	6.8	1.4	.919	None	
SBR76-2004	230.2-231.3	16504	3.7	.5	94.1	1.7	9.5	1.2	.932	None	
SBR76-2005	231.3-232.8	16505	3.8	.3	94.6	1.3	9.9	.7	.933	None	
SBR76-2006	232.8-233.8	16506	4.3	.7	94.0	1.0	11.0	1.7	.936	None	
SBR76-2007	233.8-234.7	16507	3.9	.7	94.4	1.0	10.1	1.7	.930	None	
SBR76-2008	234.7-236.2	16508	3.7	.5	94.7	1.1	9.6	1.2	.927	None	
SBR76-2009	236.2-237.6	16509	3.8	.5	94.7	1.0	9.8	1.2	.928	None	
SBR76-2010	237.6-239.4	16510	3.6	.4	95.1	.9	9.3	1.0	.922	None	
SBR76-2011	239.4-240.5	16511	3.8	.3	94.6	1.3	9.7	.7	.931	None	
SBR76-2012	240.5-242.0	16512	3.5	.7	95.1	.7	9.0	1.6	.925	None	
SBR76-2013	242.0-243.0	16513	3.9	.4	94.8	.9	10.2	1.0	.920	None	
SBR76-2014	243.0-244.0	16556	2.8	.7	95.7	.8	7.4	1.7	.918	None	
SBR76-2015	244.0-245.0	16515	3.6	.5	95.0	.9	9.4	1.2	.922	None	
SBR76-2016	245.0-246.0	16516	3.3	.3	94.8	1.6	8.5	.7	.925	None	
SBR76-2017	246.0-247.0	16517	3.1	.6	95.4	.9	8.2	1.4	.922	None	
SBR76-2018	247.0-248.0	16518	6.6	.4	90.6	2.4	17.1	.9	.924	None	
SBR76-2019	248.0-249.0	16519	2.2	.2	95.6	2.0	5.7	.5	.930	None	

See footnote at end of table.

Core samples received February 3, 1976; assays made on air-dried samples

Laramie Energy Research Center, Laramie, Wyoming Illustration No. SBR-4799P Sheet 7 of 15 February 26, 1976

OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from the United States Geological Survey's CRU-1 corehole

Surface elevation: 6,137 feet

Sample number		Run	Yield of product						Specific gravity	Properties of spent shale	
			Weight percent				Gal per ton				
Laramie	Their	No.	Oil	Water	Spent shale	Gas + loss	Oil[1/]	Water	of oil at 60°/60° F	Tendency to coke	Remarks
SBR76-2020	249.0-250.0	16520	3.2	0.6	95.3	0.9	8.3	1.4	0.927	None	
SBR76-2021	250.0-251.0	16521	2.4	.8	96.0	.8	6.2	1.9	.921	None	
SBR76-2022	251.0-252.5	16522	2.6	.7	95.5	1.2	6.9	1.7	.916	None	
SBR76-2023	252.5-253.5	16523	3.6	.4	94.2	1.8	9.2	1.0	.932	None	
SBR76-2024	253.5-254.5	16524	3.4	.4	95.0	1.2	8.8	1.0	.928	None	
SBR76-2025	254.5-255.5	16525	3.8	.6	94.9	.7	9.7	1.4	.930	None	
SBR76-2026	255.5-257.0	16526	2.5	.9	95.8	.8	6.4	2.2	.923	None	
SBR76-2027	257.0-258.0	16527	2.4	1.0	96.1	.5	6.3	2.4	.921	None	
SBR76-2028	258.0-259.0	16528	2.5	.4	95.5	1.6	6.4	1.0	.928	None	
SBR76-2029	259.0-260.0	16529	2.8	.7	95.6	.9	7.2	1.7	.924	None	
SBR76-2030	260.0-261.0	16530	2.9	.4	95.5	1.2	7.5	1.0	.926	None	
SBR76-2031	261.0-262.0	16531	6.5	.7	91.3	1.5	16.7	1.7	.925	None	
SBR76-2032	262.0-263.0	16532	2.6	.9	95.7	.8	6.7	2.2	.927	None	
SBR76-2033	263.0-264.0	16534	2.6	1.0	95.5	.9	6.8	2.4	.926	None	
SBR76-2034	264.0-265.0	16535	2.1	1.1	95.3	1.5	5.4	2.6	.923	None	
SBR76-2035	265.0-266.0	16536	2.2	.9	96.1	.8	5.7	2.3	.922	None	
SBR76-2036	266.0-267.0	16537	2.3	1.0	95.8	.9	5.9	2.3	.923	None	
SBR76-2037	267.0-268.0	16538	2.6	1.4	94.7	1.3	6.7	3.4	.924	None	
SBR76-2038	268.0-269.0	16539	2.1	1.4	95.6	.9	5.5	3.3	.925	None	
SBR76-2039	269.0-270.0	16540	2.0	1.1	95.7	1.2	5.1	2.6	.923	None	
SBR76-2040	270.0-271.0	16541	2.2	1.1	95.6	1.1	5.7	2.6	.920	None	
SBR76-2041	271.0-272.0	16542	2.1	1.1	95.7	1.1	5.5	2.6	.922	None	
SBR76-2042	272.0-273.0	16543	2.4	1.3	95.6	.7	6.2	3.0	.922	None	
SBR76-2043	273.0-274.0	16544	2.7	.8	95.6	.9	7.0	1.9	.925	None	
SBR76-2044	274.0-275.0	16545	2.4	1.2	95.7	.7	6.1	2.9	.922	None	
SBR76-2045	275.0-276.0	16546	2.0	1.1	96.4	.5	5.1a	2.6		None	
SBR76-2046	276.0-277.0	16547	1.6	.8	96.2	1.4	4.2a	2.0		None	
SBR76-2047	277.0-278.5	16548	3.0	.8	95.5	.7	7.8	1.9	.921	None	
SBR76-2048	278.5-279.6	16549	8.7	.6	88.5	2.2	22.7	1.4	.923	None	
SBR76-2049	279.6-280.5	16550	3.0	.9	95.1	1.0	7.7	2.2	.925	None	

See footnote at end of table.

Core samples received February 3, 1976; assays made on air-dried samples

Laramie Energy Research Center, Laramie, Wyoming Illustration No. SBR-4799P Sheet 8 of 15 February 26, 1976

OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from the United States Geological Survey's CRU-1 corehole

Surface elevation: 6,137 feet

Sample number		Run	Yield of product						Specific gravity	Properties of spent shale	
			Weight percent				Gal per ton		of oil at	Tendency to	
Laramie	Their	No.	Oil	Water	Spent shale	Gas + loss	Oil[1/]	Water	60°/60° F	coke	Remarks
SBR76-2050	280.5-281.5	16551	2.2	1.2	94.9	1.7	5.8	2.9	0.923	None	
SBR76-2051	281.5-282.5	16552	2.3	1.1	95.9	.7	6.1a	2.6		None	
SBR76-2052	282.5-283.5	16553	2.0	1.0	96.2	.8	5.3	2.4	.919	None	
SBR76-2053	283.5-284.6	16554	2.6	.9	95.7	.8	6.9	2.2	.916	None	
SBR76-2054	284.6-285.4	16555	10.8	.9	86.3	2.0	28.1	2.2	.917	None	
SBR76-2055	285.4-286.3	16558	3.7	.6	94.6	1.1	9.7	1.4	.928	None	
SBR76-2056	286.3-287.3	16559	3.0	.9	94.7	1.4	7.6	2.2	.930	None	
SBR76-2057	287.3-288.3	16560	2.5	1.2	95.5	.8	6.5	2.9	.932	None	
SBR76-2058	288.3-289.6	16561	2.6	1.4	95.2	.8	6.8	3.4	.932	None	
SBR76-2059	289.6-290.7	16562	4.1	.8	94.0	1.1	10.5	1.9	.934	None	
SBR76-2060	290.7-292.0	16563	3.6	.9	94.9	.6	9.3	2.1	.931	None	
SBR76-2061	292.0-293.0	16564	2.0	1.5	95.3	1.2	5.1	3.6	.924	None	
SBR76-2062	293.0-294.0	16565	1.8	1.8	95.7	.7	4.6a	4.3		None	
SBR76-2063	294.0-295.0	16566	2.2	1.5	95.2	1.1	5.8	3.6	.922	None	
SBR76-2064	295.0-296.0	16567	2.0	.7	95.0	2.3	5.1	1.7	.925	None	
SBR76-2065	296.0-297.1	16568	3.1	1.2	94.8	.9	8.1	2.9	.925	None	
SBR76-2066	297.1-298.3	16569	5.8	.9	91.9	1.4	14.9	2.3	.929	None	
SBR76-2067	298.3-299.3	16570	2.9	1.2	95.5	.4	7.4	2.9	.930	None	
SBR76-2068	299.3-301.1	16571	1.7	1.0	96.1	1.2	4.5a	2.4		None	
SBR76-2069	301.1-302.1	16572	3.3	.5	95.3	.9	8.5	1.2	.925	None	
SBR76-2070	302.1-303.1	16573	2.9	1.2	95.4	.5	7.6	2.9	.922	None	
SBR76-2071	303.1-304.1	16574	3.8	1.0	94.2	1.0	10.0	2.4	.920	None	
SBR76-2072	304.1-305.1	16575	4.8	1.4	92.8	1.0	12.5	3.4	.915	None	
SBR76-2073	305.1-306.1	16576	2.9	.6	95.1	1.4	7.5	1.4	.916	None	
SBR76-2074	306.1-307.8	16577	2.1	1.4	95.7	.8	5.5	3.5	.921	None	
SBR76-2075	307.8-309.0	16578	8.8	1.1	87.9	2.2	23.0	2.6	.922	None	
SBR76-2076	309.0-310.0	16579	2.9	1.0	95.4	.7	7.4	2.4	.929	None	
SBR76-2077	310.0-311.0	16580	2.1	1.0	96.0	.9	5.5	2.5	.924	None	
SBR76-2078	311.0-312.7	16582	2.7	1.1	95.5	.7	7.0	2.6	.920	None	
SBR76-2079	312.7-314.0	16583	5.7	1.0	91.6	1.7	14.9	2.4	.917	None	

See footnote at end of table.

Core samples received February 3, 1976; assays made on air-dried samples

Laramie Energy Research Center, Laramie, Wyoming Illustration No. SBR-4799P Sheet 9 of 15 February 26, 1976

OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from the United States Geological Survey's CRU-1 corehole

Surface elevation: 6,137 feet

Sample number		Run	Yield of product						Specific gravity of oil at 60°/60° F	Properties of spent shale	Remarks
			Weight percent				Gal per ton				
Laramie	Their	No.	Oil	Water	Spent shale	Gas + loss	Oil	Water		Tendency to coke	
SBR76-2080	314.0-315.0	16584	3.5	1.1	94.4	1.0	9.2	2.7	0.918	None	
SBR76-2081	315.0-316.0	16585	2.7	1.5	95.1	.7	7.0	3.6	.914	None	
SBR76-2082	316.0-317.0	16586	3.4	1.4	93.8	1.4	8.7	3.4	.920	None	
SBR76-2083	317.0-318.3	16587	7.7	1.2	89.5	1.6	20.0	2.9	.919	None	
SBR76-2084	318.3-320.0	16588	2.9	.9	94.6	1.6	7.6	2.2	.922	None	
SBR76-2085	320.0-321.3	16589	3.7	.7	94.2	1.4	9.5	1.7	.928	None	
SBR76-2086	321.3-322.8	16590	4.2	.8	93.6	1.4	11.0	1.9	.924	None	
SBR76-2087	322.8-323.8	16591	5.0	1.3	92.4	1.3	13.1	3.1	.920	None	
SBR76-2088	323.8-324.8	16592	4.2	.8	93.7	1.3	10.8	1.9	.925	None	
SBR76-2089	324.8-326.1	16593	4.7	.7	93.1	1.5	12.2	1.7	.927	None	
SBR76-2090	326.1-327.2	16594	4.4	.8	93.4	1.4	11.5	1.9	.925	None	
SBR76-2091	327.2-328.4	16595	4.6	.5	93.3	1.6	11.8	1.1	.928	None	
SBR76-2092	328.4-329.3	16596	4.9	.8	92.9	1.4	12.8	1.9	.924	None	
SBR76-2093	329.3-330.8	16597	4.1	.8	93.4	1.7	10.9	1.9	.911	None	
SBR76-2094	330.8-332.2	16598	4.6	1.4	91.9	2.1	12.0	3.5	.912	None	
SBR76-2095	332.2-333.4	16599	4.1	1.6	92.8	1.5	10.9	3.8	.912	None	
SBR76-2096	333.4-334.4	16600	5.0	1.6	92.2	1.2	13.0	3.8	.917	None	
SBR76-2097	334.4-335.4	16601	4.9	1.3	92.0	1.8	12.9	3.1	.915	None	
SBR76-2098	335.4-336.4	16602	6.0	1.4	90.9	1.7	15.7	3.4	.916	None	
SBR76-2099	336.4-337.7	16603	5.1	1.5	91.7	1.7	13.4	3.5	.917	None	
SBR76-2100	337.7-339.4	16604	8.8	1.2	87.8	2.2	23.1	2.9	.915	None	
SBR76-2101	339.4-341.0	16605	7.6	1.3	88.9	2.2	20.1	3.1	.911	None	
SBR76-2102	341.0-342.0	16606	4.8	1.5	92.3	1.4	12.6	3.6	.913	None	
SBR76-2103	342.0-343.0	16607	3.5	1.1	93.9	1.5	9.2	2.6	.912	None	
SBR76-2104	343.0-344.2	16608	5.0	1.1	92.5	1.4	13.3	2.6	.906	None	
SBR76-2105	344.2-345.7	16609	2.7	1.7	94.4	1.2	7.2	4.1	.912	None	
SBR76-2106	345.7-346.6	16610	3.8	1.6	93.3	1.3	9.9	3.8	.913	None	
SBR76-2107	346.6-347.5	16611	9.7	1.2	86.8	2.3	25.4	2.9	.915	None	
SBR76-2108	347.5-349.0	16612	3.8	1.1	93.3	1.8	10.1	2.6	.911	None	
SBR76-2109	349.0-350.7	16613	2.6	1.4	95.0	1.0	6.7	3.4	.915	None	

Core samples received February 3, 1976; assays made on air-dried samples

Laramie Energy Research Center, Laramie, Wyoming Illustration No. SBR-4799P Sheet 10 of 15 February 26, 1976

OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from the United States Geological Survey's CRU-1 corehole

Surface elevation: 6,137 feet

Sample number		Run	Yield of product						Specific gravity of oil at 60°/60° F	Properties of spent shale	Remarks
			Weight percent				Gal per ton				
Laramie	Their	No.	Oil	Water	Spent shale	Gas + loss	Oil[1/]	Water		Tendency to coke	
SBR76-2110	350.7-352.5	16614	4.9	1.3	92.0	1.8	13.0	3.1	0.912	None	
SBR76-2111	352.5-354.0	16615	1.2	1.0	94.9	2.9	3.2a	2.4		None	
SBR76-2112	354.0-355.4	16616	2.8	2.1	94.0	1.1	7.3	5.0	.913	None	
SBR76-2113	355.4-356.4	16617	2.3	1.6	95.0	1.1	6.0	3.8	.914	None	
SBR76-2114	356.4-357.6	16618	7.8	1.5	89.3	1.4	20.5	3.6	.907	None	
SBR76-2115	357.6-359.0	16619	2.6	1.5	93.9	2.0	6.8	3.6	.916	None	
SBR76-2116	359.0-360.1	16620	2.8	1.6	93.7	1.9	7.4	3.8	.916	None	
SBR76-2117	360.1-361.1	16621	2.2	2.0	94.9	.9	5.8	4.8	.920	None	
SBR76-2118	361.1-362.2	16622	6.3	1.5	89.5	2.7	16.5	3.6	.920	None	
SBR76-2119	362.2-363.2	16623	3.0	1.9	94.2	.9	7.7	4.6	.926	None	
SBR76-2120	363.2-364.3	16624	2.0	1.4	94.5	2.1	5.2a	3.4		None	
SBR76-2121	264.3-365.8	16625	3.0	2.2	93.3	1.5	7.7	5.3	.926	None	
SBR76-2122	365.8-366.7	16626	7.5	1.4	88.2	2.9	19.5	3.4	.923	None	
SBR76-2123	366.7-368.0	16627	3.0	1.6	94.2	1.2	8.0	3.8	.919	None	
SBR76-2124	368.0-369.4	16628	3.2	1.7	93.7	1.4	8.5	4.1	.913	None	
SBR76-2125	369.4-370.6	16629	10.4	1.7	84.6	3.3	27.0	4.1	.921	None	
SBR76-2126	370.6-372.2	16700	2.4	1.3	95.1	1.2	6.3	3.1	.920	None	
SBR76-2127	372.2-373.7	16701	2.4	2.2	94.6	.8	6.1	5.3	.920	None	
SBR76-2128	373.7-374.8	16632	4.1	2.0	93.0	.9	10.7	4.8	.922	None	
SBR76-2129	374.8-375.8	16633	3.4	2.2	93.7	.7	8.8	5.3	.924	None	
SBR76-2130	375.8-376.5	16634	4.0	1.9	92.8	1.3	10.4	4.6	.918	None	
SBR76-2131	376.5-377.6	16635	10.1	1.5	86.2	2.2	26.5	3.6	.915	None	
SBR76-2132	377.6-378.5	16636	3.3	1.4	93.9	1.4	8.6	3.4	.916	None	
SBR76-2133	378.5-380.0	16637	.9	1.6	96.8	.7	2.3a	3.8		None	
SBR76-2134	380.0-381.0	16638	2.4	2.1	94.7	.8	6.2	4.9	.921	None	
SBR76-2135	381.0-382.0	16639	5.0	1.7	92.3	1.0	13.1	4.0	.919	None	
SBR76-2136	382.0-383.0	16640	3.3	1.6	94.3	.8	8.6	3.8	.918	None	
SBR76-2137	383.0-384.6	16641	3.5	2.0	93.9	.6	9.2	4.7	.919	None	
SBR76-2138	384.6-385.6	16642	6.4	2.4	90.4	.8	16.9	5.8	.912	None	Half "tar sand"
SBR76-2139	385.6-386.7	16643	3.0	1.3	94.4	1.3	7.8	3.1	.925	None	

See footnote at end of table.

Core samples received February 3, 1976; assays made on air-dried samples

Laramie Energy Research Center, Laramie, Wyoming Illustration No. SBR-4799P Sheet 11 of 15 February 26, 1976

OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from the United States Geological Survey's CRU-1 corehole

Surface elevation: 6,137 feet

Sample number		Run	Yield of product						Specific gravity of oil at 60°/60° F	Properties of spent shale	Remarks
			Weight percent				Gal per ton				
Laramie	Their	No.	Oil	Water	Spent shale	Gas + loss	Oil[1/]	Water		Tendency to coke	
SBR76-2140	386.7-388.0	16644	3.0	1.2	95.3	0.5	7.9	2.9	0.922	None	
SBR76-2141	388.0-389.0	16645	2.9	1.1	94.7	1.3	7.6	2.6	.928	None	
SBR76-2142	389.0-390.4	16646	5.1	2.3	91.6	1.0	13.4	5.5	.918	None	
SBR76-2143	390.4-391.4	16647	4.0	2.4	93.0	.6	10.3	5.8	.924	None	
SBR76-2144	391.4-392.3	16648	3.7	2.2	93.0	1.1	9.4	5.3	.929	None	
SBR76-2145	392.3-393.4	16649	4.6	1.6	92.2	1.6	11.9	3.8	.927	None	
SBR76-2146	393.4-394.6	16650	3.7	1.6	93.8	.9	9.8	3.8	.921	None	
SBR76-2147	394.6-395.6	16651	4.3	2.4	92.4	.9	11.1	5.8	.918	None	
SBR76-2148	395.6-397.3	16652	3.4	2.0	93.6	1.0	8.8	4.8	.925	None	
SBR76-2149	397.3-398.5	16653	3.6	1.4	93.7	1.3	9.5	3.4	.920	None	
SBR76-2150	398.5-399.5	16654	2.8	1.4	95.2	.6	7.4	3.4	.919	None	
SBR76-2151	399.5-400.8	16655	1.5	1.4	96.1	1.0	3.8a	3.4		None	
SBR76-2152	400.8-402.5	16656	3.6	1.5	92.6	2.3	9.5	3.6	.915	None	
SBR76-2153	402.5-404.2	16657	3.5	2.3	93.0	1.2	9.1	5.5	.925	None	
SBR76-2154	404.2-405.4	16699	4.0	2.0	92.9	1.1	10.4	4.8	.922	None	
SBR76-2155	405.4-406.3	16659	7.6	2.9	88.3	1.2	20.3	7.0	.906	None	"tar sand"
SBR76-2156	406.3-407.3	16660	7.8	2.8	87.6	1.8	20.6	6.7	.907	None	"tar sand"
SBR76-2157	407.3-408.4	16661	5.1	.9	92.8	1.2	13.5	2.2	.916	None	
SBR76-2158	408.4-409.4	16662	3.2	1.0	95.0	.8	8.2	2.3	.923	None	
SBR76-2159	409.4-410.3	16663	1.5	.5	96.1	1.9	4.0a	1.2		None	
SBR76-2160	410.3-412.0	16664	4.0	1.0	94.2	.8	10.5	2.3	.924	None	
SBR76-2161	412.0-413.0	16665	2.6	1.3	95.2	.9	6.4	3.1	.925	None	
SBR76-2162	413.0-414.0	16666	2.7	1.2	95.0	1.1	7.0	2.9	.924	None	
SBR76-2163	414.0-415.0	16667	2.7	.7	95.1	1.5	7.0	1.7	.923	None	
SBR76-2164	415.0-416.0	16668	2.3	.8	95.8	1.1	6.0	1.9	.924	None	
SBR76-2165	416.0-417.0	16669	4.8	1.0	92.0	2.2	12.4	2.4	.919	None	
SBR76-2166	417.0-418.2	16670	4.0	.9	93.4	1.7	10.4	2.2	.924	None	
SBR76-2167	418.2-419.0	16671	13.9	1.0	82.6	2.5	35.8	2.5	.927	None	
SBR76-2168	419.0-420.0	16672	3.8	.6	93.9	1.7	10.0	1.4	.924	None	
SBR76-2169	420.0-421.0	16673	4.9	1.1	92.5	1.5	12.8	2.6	.922	None	

See footnote at end of table.

Core samples received February 3, 1976; assays made on air-dried samples

Laramie Energy Research Center, Laramie, Wyoming Illustration No. SBR-4799P Sheet 12 of 15 February 26, 1976

OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from the United States Geological Survey's CRU-1 corehole

Surface elevation: 6,137 feet

Sample number		Run	Yield of product						Specific gravity of oil at 60°/60° F	Properties of spent shale	
			Weight percent				Gal per ton				
Laramie	Their	No.	Oil	Water	Spent shale	Gas + loss	Oil[1/]	Water		Tendency to coke	Remarks
SBR76-2170	421.0-422.3	16674	5.0	0.7	92.4	1.9	13.2	1.7	0.920	None	
SBR76-2171	422.3-423.3	16675	9.6	1.0	87.1	2.3	25.2	2.4	.917	None	
SBR76-2172	423.3-424.4	16676	5.1	.8	92.5	1.6	13.4	1.9	.914	None	
SBR76-2173	424.4-425.2	16677	12.8	.9	82.5	3.8	33.6	2.2	.916	None	
SBR76-2174	425.2-426.2	16678	3.4	.9	94.8	.9	8.9	2.2	.920	None	
SBR76-2175	426.2-427.5	16679	1.9	.9	96.4	.8	4.9a	2.2		None	
SBR76-2176	427.5-429.2	16680	1.6	.6	97.1	.7	4.1a	1.4		None	
SBR76-2177	429.2-430.9	16681	2.3	.7	96.3	.7	5.9	1.7	.928	None	
SBR76-2178	430.9-432.6	16682	1.4	.9	96.8	.9	3.5a	2.2		None	
SBR76-2179	432.6-434.0	16683	.7	.8	97.2	1.3	1.8a	1.9		None	
SBR76-2180	434.0-435.3	16684	.9	.6	97.3	1.2	2.2a	1.4		None	
SBR76-2181	435.3-436.3	16685	4.5	1.2	92.4	1.9	12.0	2.9	.903	None	
SBR76-2182	436.3-437.4	16686	4.2	1.1	93.0	1.7	11.1	2.6	.906	None	
SBR76-2183	437.4-438.7	16687	10.3	2.2	85.3	2.2	27.3	5.3	.906	None	
SBR76-2184	438.7-440.1	16688	5.0	1.5	91.6	1.9	13.2	3.6	.907	None	
SBR76-2185	440.1-441.7	16689	3.5	1.7	93.9	.9	9.2	4.1	.910	None	
SBR76-2186	441.7-443.4	16690	9.7	1.8	86.4	2.1	25.4	4.3	.916	None	
SBR76-2187	443.4-444.7	16691	9.5	.7	86.9	2.9	25.0	1.7	.909	None	
SBR76-2188	444.7-445.7	16692	17.5	1.8	77.6	3.1	46.4	4.3	.904	None	
SBR76-2189	445.7-446.5	16693	8.4	.7	88.7	2.2	22.5	1.7	.894	None	
SBR76-2190	446.5-447.5	16694	6.7	1.3	90.1	1.9	17.7	3.1	.907	None	
SBR76-2191	447.5-448.7	16695	5.0	1.0	92.6	1.4	13.1	2.4	.914	None	
SBR76-2192	448.7-449.7	16696	4.4	.8	93.5	1.3	11.4	1.9	.919	None	
SBR76-2193	449.7-450.8	16702	8.2	.9	89.2	1.7	21.5	2.2	.909	None	
SBR76-2194	450.8-452.0	16703	4.0	.6	93.9	1.5	10.5	1.4	.911	None	
SBR76-2195	452.0-453.1	16704	4.7	1.0	93.2	1.1	12.3	2.4	.913	None	
SBR76-2196	453.1-454.1	16705	4.0	1.8	93.0	1.2	10.7	4.3	.911	None	
SBR76-2197	454.1-455.5	16706	3.8	.9	93.7	1.6	10.1	2.2	.913	None	
SBR76-2198	455.5-456.6	16707	2.9	.7	95.7	.7	7.5	1.7	.910	None	
SBR76-2199	456.6-457.9	16708	4.2	.6	93.4	1.8	11.1	1.4	.906	None	

See footnote at end of table.

Core samples received February 3, 1976; assays made on air-dried samples

OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from the United States Geological Survey's CRU-1 corehole

Surface elevation: 6,137 feet

Sample number		Run	Yield of product						Specific gravity	Properties of spent shale	
			Weight percent				Gal per ton				
Laramie	Their	No.	Oil	Water	Spent shale	Gas + loss	Oil	Water	of oil at 60°/60° F	Tendency to coke	Remarks
SBR76-2200	457.9-459.2	16709	5.1	0.6	93.2	1.1	13.4	1.4	0.909	None	
SBR76-2201	459.2-460.9	16710	10.7	.8	86.3	2.2	28.3	1.9	.906	None	
SBR76-2202	460.9-462.0	16711	6.0	.2	91.2	2.6	16.0	.5	.904	None	
SBR76-2203	462.0-463.0	16712	10.4	.9	86.7	2.0	27.6	2.2	.908	None	
SBR76-2204	463.0-464.3	16713	13.6	.7	83.2	2.5	35.7	1.7	.915	Slight	
SBR76-2205	464.3-465.8	16714	27.3	1.2	67.2	4.3	72.7	2.9	.900	Heavy	
SBR76-2206	465.8-466.9	16715	22.6	.9	70.7	5.8	59.9	2.2	.905	Heavy	
SBR76-2207	466.9-468.0	16716	20.8	.8	73.2	5.2	55.1	1.9	.906	Moderate	
SBR76-2208	468.0-469.1	16717	10.1	.9	86.9	2.1	26.5	2.2	.918	None	
SBR76-2209	469.1-470.1	16718	7.4	.3	89.9	2.4	19.3	.7	.915	None	
SBR76-2210	470.1-471.4	16719	13.8	.8	82.9	2.5	36.0	1.9	.921	None	
SBR76-2211	471.4-472.9	16720	6.1	.3	91.6	2.0	15.9	.7	.916	None	
SBR76-2212	472.9-474.0	16721	6.7	.5	91.5	1.3	17.7	1.2	.915	None	
SBR76-2213	474.0-475.0	16722	6.9	.4	91.4	1.3	18.2	.9	.907	None	
SBR76-2214	475.0-476.3	16723	12.2	1.0	84.6	2.2	32.4	2.4	.900	None	
SBR76-2215	476.3-477.4	16724	17.3	.9	78.9	2.9	45.6	2.2	.909	None	
SBR76-2216	477.4-478.8	16725	6.4	.4	91.3	1.9	16.9	1.0	.912	None	
SBR76-2217	478.8-479.6	16726	13.6	.8	83.0	2.6	36.2	1.9	.905	None	
SBR76-2218	479.6-481.0	16727	6.2	.6	91.6	1.6	16.4	1.4	.906	None	
SBR76-2219	481.0-482.3	16728	5.1	.7	92.8	1.4	13.3	1.7	.911	None	
SBR76-2220	4 .3-483.9	16729	12.3	1.0	84.0	2.7	32.5	2.4	.906	None	
SBR76-2221	483.9-484.9	16772	2.8	.3	95.0	1.9	7.4	.7	.915	None	
SBR76-2222	484.9-485.7	16731	4.6	.5	93.5	1.4	12.2	1.2	.911	None	
SBR76-2223	485.7-486.8	16732	6.8	.5	90.7	2.0	18.0	1.2	.906	None	
SBR76-2224	486.8-487.8	16733	14.4	.9	81.4	3.3	38.0	2.1	.913	None	
SBR76-2225	487.8-488.8	16734	10.7	.5	86.6	2.2	28.7	1.2	.894	None	
SBR76-2226	488.8-490.0	16735	7.8	.4	89.8	2.0	20.9	1.0	.898	None	
SBR76-2227	490.0-490.8	16736	13.0	.7	83.5	2.8	34.5	1.7	.902	None	
SBR76-2228	490.8-492.2	16737	7.4	.6	90.4	1.6	19.5	1.4	.904	None	
SBR76-2229	492.2-493.7	16738	4.3	.4	94.4	.9	11.3	1.0	.909	None	

Core samples received February 3, 1976; assays made on air-dried samples

Laramie Energy Research Center, Laramie, Wyoming Illustration No. SBR-4799P Sheet 14 of 15 February 26, 1976

OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from the United States Geological Survey's CRU-1 corehole

Surface elevation: 6,137 feet

Sample number		Run	Yield of product						Specific gravity	Properties of spent shale	
			Weight percent				Gal per ton				
Laramie	Their	No.	Oil	Water	Spent shale	Gas + loss	Oil	Water	of oil at 60°/60° F	Tendency to coke	Remarks
SBR76-2230	493.7-495.2	16739	4.6	0.3	93.1	2.0	12.2	0.7	0.908	None	
SBR76-2231	495.2-496.5	16740	5.9	.8	91.9	1.4	15.6	1.9	.914	None	
SBR76-2232	496.5-497.8	16741	2.4	.4	95.9	1.3	6.4	1.0	.919	None	

1/ "a"--indicates specific gravity estimated as 0.92.

Core samples received February 3, 1976; assays made on air-dried samples

Laramie Energy Research Center, Laramie, Wyoming Illustration No. SBR-4799P Sheet 15 of 15 February 26, 1976