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ANALYSES OF SOME CRUDE OILS FROM ALASKA

BY C. M. MCKINNEY, E. L. GARTON, AND F. G. SCHWARTZ

United States Department of the Interior—1959

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ANALYSES OF SOME CRUDE OILS FROM ALASKA[1/]

by

C. M. McKinney,[2/] E. L. Garton,[3/] and F. G. Schwartz[3/]

INTRODUCTION AND SUMMARY

This report contains Bureau of Mines routine crude-oil analyses of 20 samples from 5 areas on the arctic slope of Alaska. Two samples were condensates from the South Barrow gasfield, Barrow Lakes area. The remaining 18 samples were crude oils from the following areas: Barrow Lakes, 1 seepage sample; Umiat, 10 well samples; Cape Simpson, 1 seepage sample and 3 well samples; Fish Creek, 2 well samples; and Wolf Creek, 1 well sample.

Table 1 summarizes information on the origin of the crude-oil samples, and table 2 summarizes characteristics of the samples. Item numbers in both tables correspond to item numbers of the analyses at the end of this report, and the samples are referred to by these numbers throughout the text.

Inspection data are presented for straight-run gasolines prepared from condensate produced from the South Barrow gasfield; gasoline and diesel fuel from Umiat crude oil; diesel fuels from Cape Simpson crude oils; and diesel fuels, viscous distillates, and residua from Fish Creek crude oils.

Physical characteristics are given for 19 oil-seepage samples obtained by a Bureau of Mines oil-reconnaissance party in 1943. A map is included showing approximately where all of the samples were obtained.

The analyses given in this report show that the oils produced in the five areas vary greatly in physical characteristics and chemical composition. The extremes in characteristics are represented by a sample from Fish Creek with specific gravity 0.974, color brownish black, and Saybolt viscosity at 100° F. of 3,650 seconds and a sample from Umiat with specific gravity 0.839, color NPA 4-1/2, and Saybolt viscosity at 100° F. of 36 seconds. Sulfur content of these samples ranged from less than 0.10 weight-percent for most of the samples from Umiat to 1.92 weight-percent for a sample from Fish Creek.

1/ Work on manuscript completed September 1958.

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TABLE 1. - Summary of information on source of crude-oil samples

Item	Area	Sampling information	Producing formation and age[1/]	Depth, ft.
1	Barrow	Seepage	Surface sample	0
2	do.	South Barrow well 2	U. Cre.	2,473-2,504
3	do.	South Barrow well 4	Barrow gas sand, U. Cre.	2,343-2,502
4	Umiat	Umiat test well 1	-	775
5	do.	Umiat test well 3	Grandstand, Cre.	572
6	do.	do.	do.	-
7	do.	Umiat test well 4	do.	353-427
8	do.	do.	do.	353-427
9	do.	Umiat test well 8	do.	1,080
10	do.	Umiat test well 5	do.	335-1,060
11	do.	Umiat test well 10	Cre.	1,339-1,518
12	do.	do.	do.	1,339-1,510
13	do.	do.	do.	653-748
14	Cape Simpson	Seepage	Surface sample	0
15	do.	Simpson core hole 26	Cre.	300-306
16	do.	do.	do.	289-325
17	do	Simpson core hole 31	-	354-355
18	Fish Creek	Fish Creek well 1	Tert.	2,950-3,010
19	do.	do.	do.	2,950-3,010
20	Wolf Creek	Wolf Creek well 3	Nanushuk, L. Cre.	2,644-2,681

1/ Geologic-age names are abbreviated as follows: Cretaceous, Cre.; Lower Cretaceous, L. Cre.; Upper Cretaceous, U. Cre.; and Tertiary, Tert.

TABLE 2. - Summary of general characteristics of crude-oil samples

Item	Area	Gravity, ° A.P.I.	Color[1/]	Sulfur, weight-percent	Viscosity, Saybolt, at 100° F., seconds	Carbon residue, Conradson, weight-percent
1	Barrow	18.4	B.B.	0.32	2,710	3.3
2	do.	40.6	<NPA 1	<.10	32	<.1
3	do.	48.3	NPA 1	<.10	<32	<.1
4	Umiat	37.2	NPA 5	<.10	44	.3
5	do.	36.4	NPA 6	<.10	37	.2
6	do.	36.6	NPA 4-1/2	<.10	36	.2
7	do.	36.8	NPA 4-1/2	<.10	37	.2
8	do.	36.6	NPA 4	<.10	37	.2
9	do.	36.6	NPA 4	.10	36	.1
10	do.	36.0	NPA 4	.12	38	.1
11	do.	36.4	NPA 4	<.10	39	.2

See footnote at end of table.

TABLE 2. - Summary of general characteristics of crude-oil samples (Con.)

Item	Area	Gravity, ° A.P.I.	Color[1/]	Sulfur, weight-percent	Viscosity, Saybolt, at 100° F., seconds	Carbon residue, Conradson, weight-percent
12	Umiat	36.0	NPA 4-1/2	<0.10	38	0.1
13	do.	37.2	NPA 4	< .10	36	.1
14	Cape Simpson	20.2	B.G.	.34	640	2.0
15	do.	21.0	B.G.	.40	480	2.0
16	do.	20.7	B.G.	.36	-	-
17	do.	20.3	Green	.44	670	1.8
18	Fish Creek	13.9	B.B.	1.92	2,080	10.4
19	do.	13.8	B.B.	1.15	3,650	9.8
20	Wolf Creek	34.0	B.G.	.15	42	.2

1/ Colors of crude oils are abbreviated as follows: Brownish black, B.B., and brownish green, B. G.; National Petroleum Association color numbers, NPA.

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OBJECTIVES

This report results from the Bureau of Mines program for obtaining analyses of crude oils from areas throughout the world. The analyses are used in engineering, geological, and other scientific studies. In addition, the Office of Naval Petroleum and Oil Shale Reserves needed information on the quantity and quality of products obtainable from Alaska crude oils. To satisfy this need, routine crude-oil analyses were made on 19 samples and several gasolines, diesel fuels, and other products made and tested for yield and quality.

CHRONOLOGY OF ALASKA OIL SAMPLES

The first Alaska crude-oil sample received by the Bureau of Mines for analysis was submitted in November 1938, through the Bureau of Indian Affairs, United States Department of the Interior, by the Field Service, Juneau, Alaska.

A routine crude-oil analysis of the sample, obtained from an oil seepage in the Barrow Lakes area, is included as item 1 in tables 1 and 2 and in the analyses appearing at the end of this report.

In 1943 a Bureau of Mines oil-reconnaissance party collected 19 samples from oil seepages on the arctic slope of Alaska and submitted them for analysis. The characteristics of these samples and of bituminous material extracted from them are described in the following section of this report.

From June 1946 to January 1951 the Office of Naval Petroleum and Oil Shale Reserves, United States Department of the Navy, submitted 17 crude oils and 2 condensate samples to be analyzed. The 2 condensate samples were produced from gas wells in the South Barrow gasfield; 10 of the crude-oil samples were from test wells in the Umiat area; 1 was from an oil seepage in the Cape Simpson area; 3 were from test wells in the Cape Simpson area; 2 were from test wells in the Fish Creek area; and 1 was from a test well in the Wolf Creek area. The map (fig. 1) shows approximately where the samples were obtained, for which routine analyses (items 2 through 20) are included.

Gasolines were prepared from samples from the South Barrow condensate and Umiat crude oil; diesel fuels from Umiat, Cape Simpson, and Fish Creek crude oils; and viscous distillate and residua from Fish Creek crude oil. Inspection data for these products also are included in this report.

ANALYSES OF ALASKA SEEPAGE SAMPLES

The first Alaska crude-oil sample analyzed by the Bureau of Mines was received in November 1938. Correspondence received with the sample stated that the source was an extensive seepage in the Barrow Lakes area, from which oil was being produced and used locally for heating. An analysis of the oil is included as item 1, sample 38458, in the analyses at the end of this report.

The next samples were collected during August and September 1943 by a Bureau of Mines oil-reconnaissance party. Of 19 samples submitted, most were oil and water, with gravel, sand, and other insoluble material. Table 3 summarizes the properties determined, which were limited because of the small quantities of oil in the samples. Data were determined on solvent-extracted material when extraction was necessary to give a relatively clean oil. Ebbley (1)4/ described in detail the region where the samples were obtained. Data for samples 1 and 10 that could not be included conveniently in table 3 follow:

Sample 1		Sample 10	
Specific gravity	0.884	Specific gravity	0.937
Distillation, ASTM D86, °F.:		Distillation, ASTM D86, °F.:	
Initial boiling point	275	Initial boiling point	492
Evaporated, percent:		Evaporated, percent:	
10	437	10	581
20	495	20	629
30	529	30	641
40	563	(Distillation discontinued at 641° F.)	
46	580		
(Distillation discontinued at 580° F.)			

4/ Underlined numbers in parentheses refer to citations in the bibliography at the end of this report.

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FIGURE 1. - Map of Arctic Slope of Alaska, Showing Where Samples Were Obtained.

TABLE 3. - Characteristics of seepage samples obtained by Bureau of Mines oil-reconnaissance party, August and September 1943

Seepage sample No.2/	Specific gravity, 60°/60° F.	Original sample		Extracted material1/				Sample occurrence
		Gravity, °API	Characteristics	Specific gravity, 60°/60° F.	Gravity, °API	Characteristics		
						Color3/	Consistency	
1	0.884	28.6	Green, liquid	(No extraction made)				Pothole on north side of Umiat Mt. Lake.
2	-	-	Mixture of gravel and oils	0.976	13.5	Black	Semisolid	Cut bank 300 feet north of Umiat Mt. Lake.
3	-	-	Black, semisolid	.986	12.0	do.	Viscous	Seep about 15 miles SW. of mouth of Fish River.
4	-	-	do.	.967	14.8	do.	do.	Dease Inlet near mouth of Chipp River.
5	-	-	Black, very viscous	.989	11.6	do.	Solid	Bench 200 yards east of sample 4.
6	-	-	Black, semisolid	.975	13.6	do.	Viscous	Cape Simpson oil seep 3.
7	-	-	do.	.965	15.1	do.	do.	Cape Simpson oil seep 1.
8	-	-	Brown, liquid	.949	17.6	do.	do.	Do.
9	-	-	Black, asphaltic	.941	18.9	do.	do.	Cape Simpson oil seep 2.
10	.937	19.5	Brownish-green liquid	(No extraction made)				Do.
11	-	-	Mixture of oil, water, and silt	.951	17.3	B.G.	do.	NW. beach at Manning Point near Barter Island.
12	-	-	Mixture of oil, water, and sand	.940	19.0	do.	do.	Streams in area where sample 11 was obtained.
13	-	-	Mixture of oil and sand	1.055	2.6	B.B.	Solid	Bank in area where sample 11 was obtained.
14	-	-	Mixture of asphalt and silt	.926	21.3	Black	Waxy	North beach at Manning Point.
15	-	-	Black, viscous	1.000	10.0	B.G.	Viscous	Pitch pools 1-1/2 miles south of Ungoon Point.
16	-	-	do.	1.023	6.8	Black	Solid	Do.
17	-	-	Mixture of asphalt and sand	1.040	4.6	do.	do.	Do.
18	-	-	Black, asphaltic	.950	17.5	do.	Semisolid	Point Barrow.
19	-	-	Black, viscous	.955	16.7	do.	Viscous	Do.

1/ Mixture of benzene and chloroform was used as extraction solvent.
2/ Sample number corresponds to locations shown on map, fig. 1.
3/ Color abbreviations are brownish-green, B. G., and brownish-black, B.B.

In 1948 the Office of Naval Petroleum and Oil Shale Reserves submitted a sample obtained from an oil seepage in the Cape Simpson area. The analysis of this oil is included as item 14.

ANALYSES OF ALASKA WELL SAMPLES

In 1946 the first sample of oil from drilling activity in Alaska was received for analysis. This sample (item 4) and 17 other samples received during the period 1946-50 were submitted at the request of the Office of Naval Petroleum and Oil Shale Reserves. A history of the exploration and drilling that resulted in the production represented by the samples has been published by the Geological Survey, United States Department of the Interior, in cooperation with the Office of Naval Petroleum and Oil Shale Reserves (3).

South Barrow Condensate Samples

Two samples were submitted from wells in the South Barrow gasfield. In January 1950 a sample taken from the high-pressure separator at South Barrow well 2 was analyzed (item 2). Information submitted with the sample stated that the well was predominantly a gas-producing well and that only a small quantity of liquid was being produced. In January 1951 a second condensate sample was received from South Barrow well 4 (item 3).

Figure 2 shows correlation-index curves (4) for the two condensate samples (items 2 and 3) and the seepage sample (item 1) obtained from the same locality in 1938. The two condensate samples have similar gravity-boiling point relationships, as indicated by the correlation-index curves, although their percentage yields at equal distillation temperatures differ considerably.

Table 4 gives inspection data for a gasoline prepared from the second condensate, sample 51027 (item 3).

TABLE 4. - Inspection data for gasoline prepared from South Barrow condensate, sample 51027 (item 3)

Yield from condensate	volume-percent	87.7
Distillation temp., ASTM D86, °F.:		
Initial boiling point		158
Evaporated, percent:		
5		194
10		206
50		276
90		360
End point		390
Specific gravity at 60°/60° F.		0.779
Gravity	°API	50.1
Octane number, ASTM D357 (motor method):		
Clear		69.3
Plus 3.0 ml. TEL/gal.		83.6
Sulfur, ASTM D1266 (lamp)	weight-percent	0.052
Corrosion, ASTM D130: Copper strip, 3 hr. at 212° F.		Positive.1/
Vapor pressure, ASTM D323 (Reid)	lb.	2.0

1/ Very slight corrosion.

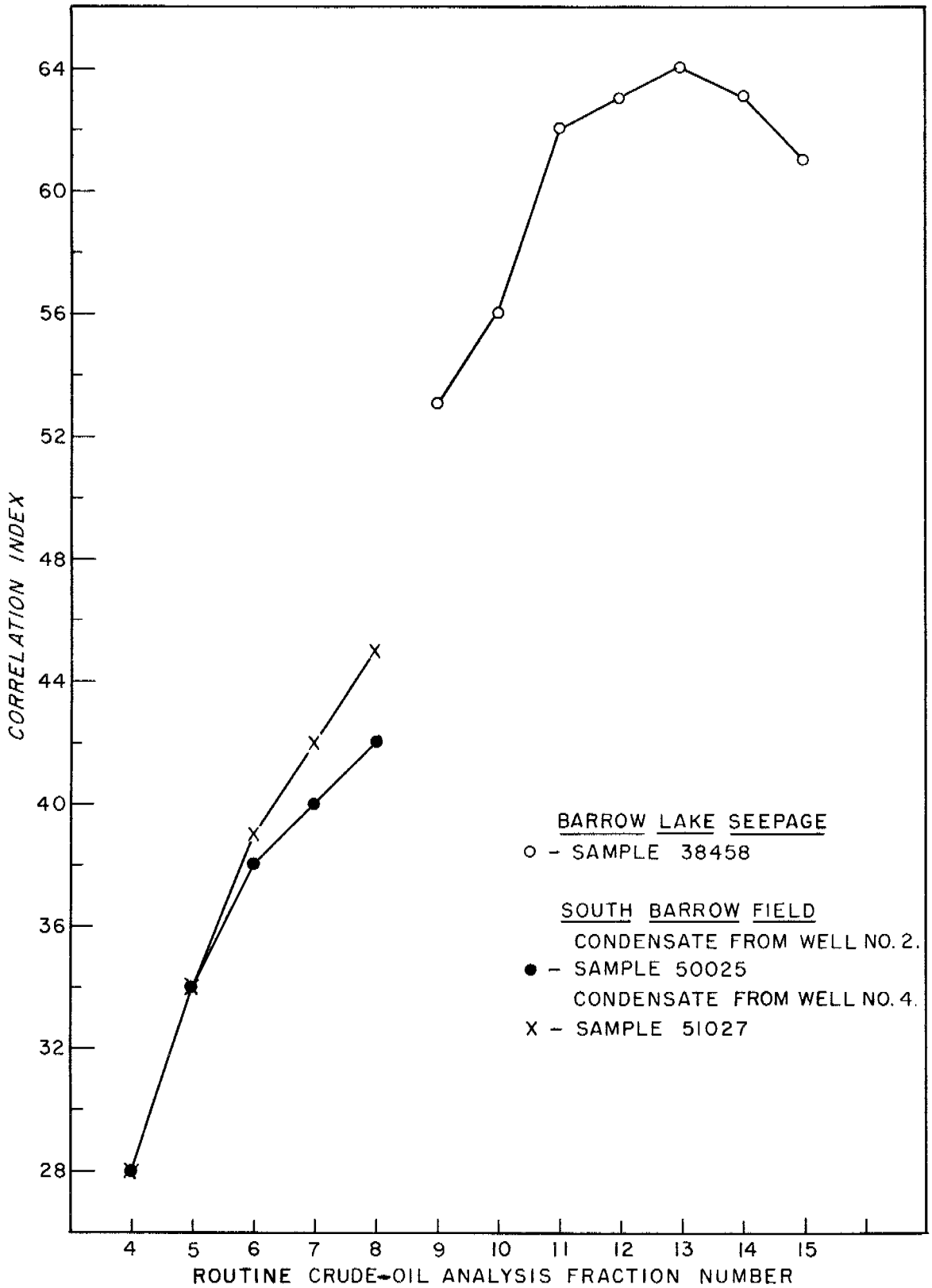

FIGURE 2. - Correlation-Index Curves for Three Samples From Barrow Area.

Umiat Samples

Ten samples ranging in size from 1 pint to 5 gallons were received from the Umiat area. The first sample was obtained from Umiat test well 1 from a 20-foot head of oil above an ice plug at 775 feet. The routine analysis of this oil (item 4, sample 46064) is unique among the 10 Umiat analyses included in this report; the other 9 were similar to each other but definitely different from sample 46064.

In November 1946 a sample (item 5) from Umiat test well 3 (originally called Umiat Ruby cable-tool test No. 1) was received. In March 1947 a second sample from test well 3 was received; in addition to the routine analysis (item 6) a gasoline and diesel fuel were prepared, data for which are given in table 5.

TABLE 5. - Inspection data for gasoline and diesel fuel prepared from Umiat crude-oil sample 47017 (item 6)

Gasoline

Yield from crude oil	volume-percent	40.0
Distillation temp., ASTM D86, °F.:		
Initial boiling point		199
Evaporated, percent:		
5		218
10		225
50		283
90		356
End point		387
Specific gravity at 60°/60° F.		0.790
Gravity	°API	47.6
Octane number, ASTM D357 (motor method):		
Clear		57.2
Plus 3.0 ml. TEL/gal.		77.2
Vapor pressure, ASTM D323 (Reid)	lb.	1.2

Diesel fuel

Yield from crude oil	volume-percent	32.2
Distillation temp., ASTM D158, °F.:		
Initial boiling point		400
Evaporated, percent:		
5		432
10		448
50		519
90		600
End point		628
Specific gravity at 60°/60° F.		0.858
Gravity	°API	33.4
Cetane number, ASTM D613		48
Aromatic content	volume-percent	25.7

Seven other Umiat samples were analyzed between June 1950 and December 1952. Two samples (items 7 and 8) were from test well 4, one sample (item 9) was from test well 8, one sample (item 10) was from test well 5, and three samples (items 11-13) were from test well 10.

The 10 samples from Umiat represent only 2 types of oil, as shown in figure 3, where correlation-index data from 6 analyses are plotted on a comparative basis; the 4 analyses omitted from figure 3 for clarity are similar to analyses of the samples for which data are shown in the upper part of figure 3. The distinct differences between the sample from well 1 and the other Umiat samples are caused not only by weathering but also by a basic difference in types of hydrocarbons present. The CI curves in figure 3 show that the sample from well 1 was a paraffinic-type crude oil, whereas the samples from the other wells were high in naphthenes or aromatics.

Cape Simpson Samples

Four samples from the Cape Simpson area were analyzed. In 1948 a sample described as an oil-seepage sample was submitted, and the routine analysis (item 14) indicated that the oil was very similar to the oil from Barrow Lakes (item 1). In August 1950 a sample recovered from the mud ditch at Simpson core hole 26 was analyzed (item 15), and in October 1950 a sample from the same well after oil flow had begun was analyzed (item 16). In April 1951 a sample from core hole 31 was analyzed (item 17). The routine analyses and correlation-index curves (fig. 4) for these oils indicate that they are similar.

Table 6 gives inspection data for diesel fuels prepared from two of the samples.

Fish Creek Samples

Two crude-oil samples (items 18 and 19) from Fish Creek well 1 were received in May and June 1949. The samples were similar, as indicated by their routine analyses and correlation-index curves shown in figure 5.

Inspection data for diesel fuels, viscous distillates, and residua prepared from the Fish Creek samples are given in tables 7, 8, and 9, respectively.

Wolf Creek Sample

In November 1952 a sample from Wolf Creek well 3 was analyzed (item 20). Figure 6 shows a correlation-index curve for the sample. In figure 7 this curve is compared with similar curves for samples from other areas of Alaska.

CONCLUSIONS

Three distinct types of crude oil are represented by the 18 samples from 5 areas of Alaska: (1) The highly aromatic or naphthenic crude oils, including 4 well samples from Cape Simpson and a seepage sample from Barrow Lakes; (2) samples intermediate in composition, including 9 of the 10 samples from Umiat and a sample from Wolf Creek; and (3) a paraffinic sample from Umiat well 1. These differences are shown in figure 7, where correlation-index curves are given for samples from all areas represented by analyses in this report.

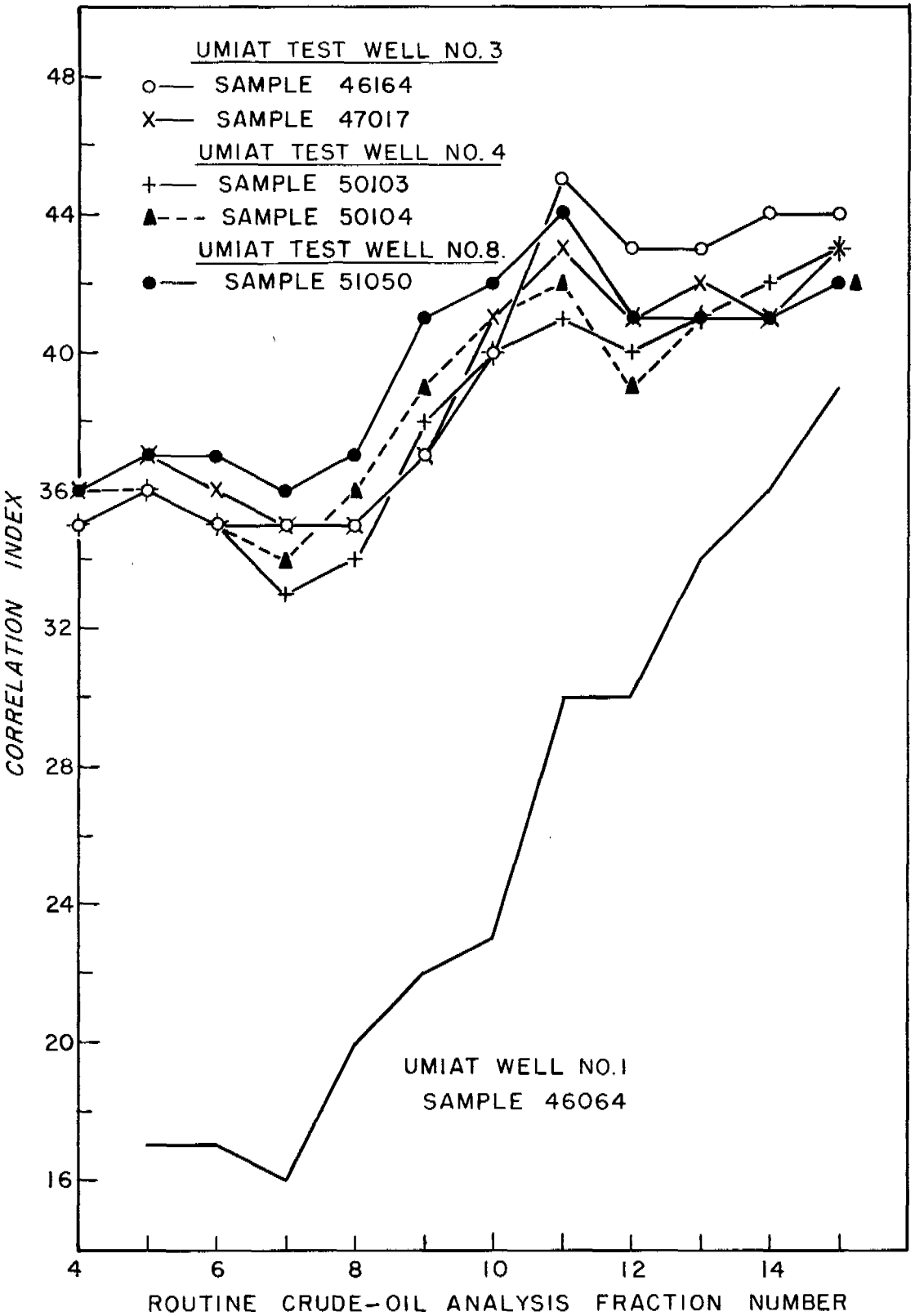

FIGURE 3. - Correlation-Index Curves for Six Samples From Umiat Area.

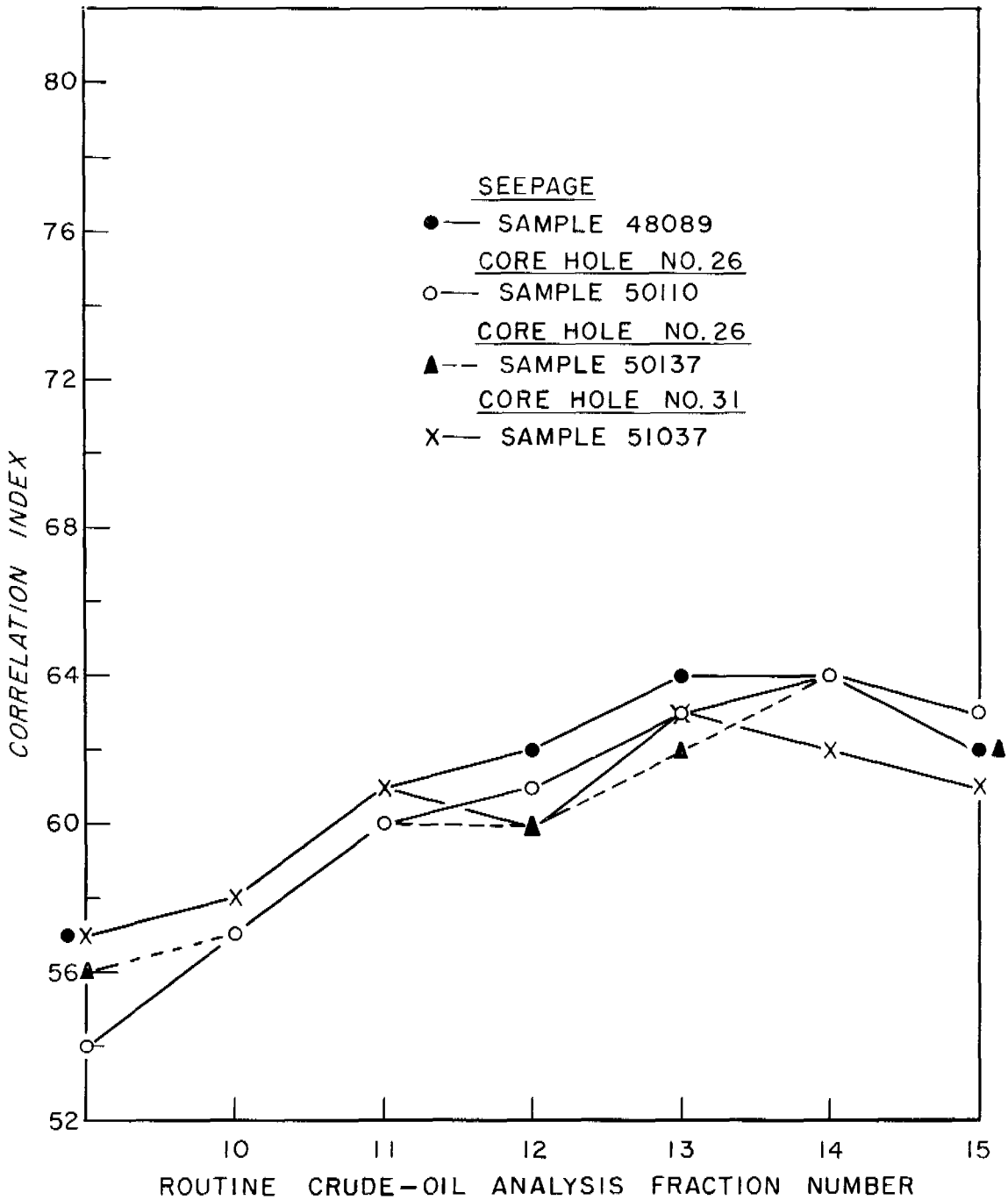

FIGURE 4. - Correlation-Index Curves for Four Samples From Cape Simpson Area.

TABLE 6. - Inspection data for diesel fuels prepared from Cape Simpson crude oil

	Properties of diesel fuels prepared from sample -	
	50110 (Item 15)	51037 (Item 17)
Yield from crude oil ..... volume-percent	41.6	32.9
Distillation temp., ASTM D158, °F.:		
Initial boiling point	386	446
Evaporated, percent:		
5	478	484
10	492	496
50	562	550
90	641	598
End point	644	629
Specific gravity at 60°/60° F.	0.905	0.900
Gravity .....°API	24.9	25.7
Sulfur, ASTM D129 ..... weight-percent	0.12	0.09
Viscosity, ASTM D88, Saybolt Universal:		
At 100° F. ..... seconds	48	48
At 77° F. ..... do.	-	57
Cetane number, ASTM D613	37.6	35.5
Aniline point, ASTM D611 ..... °F.	139.1	140.4
Flash point, ASTM D93: Pensky-Marten ..... °F.	180	205
Corrosion, ASTM D130: Copper strip, 3 hr. at 212° F.	Positive 1/	Negative.
Cloud point, ASTM D97 ..... °F.	<-90	-
Pour point, ASTM D97 ..... °F.	<-70	-

1/ Very slight corrosion.

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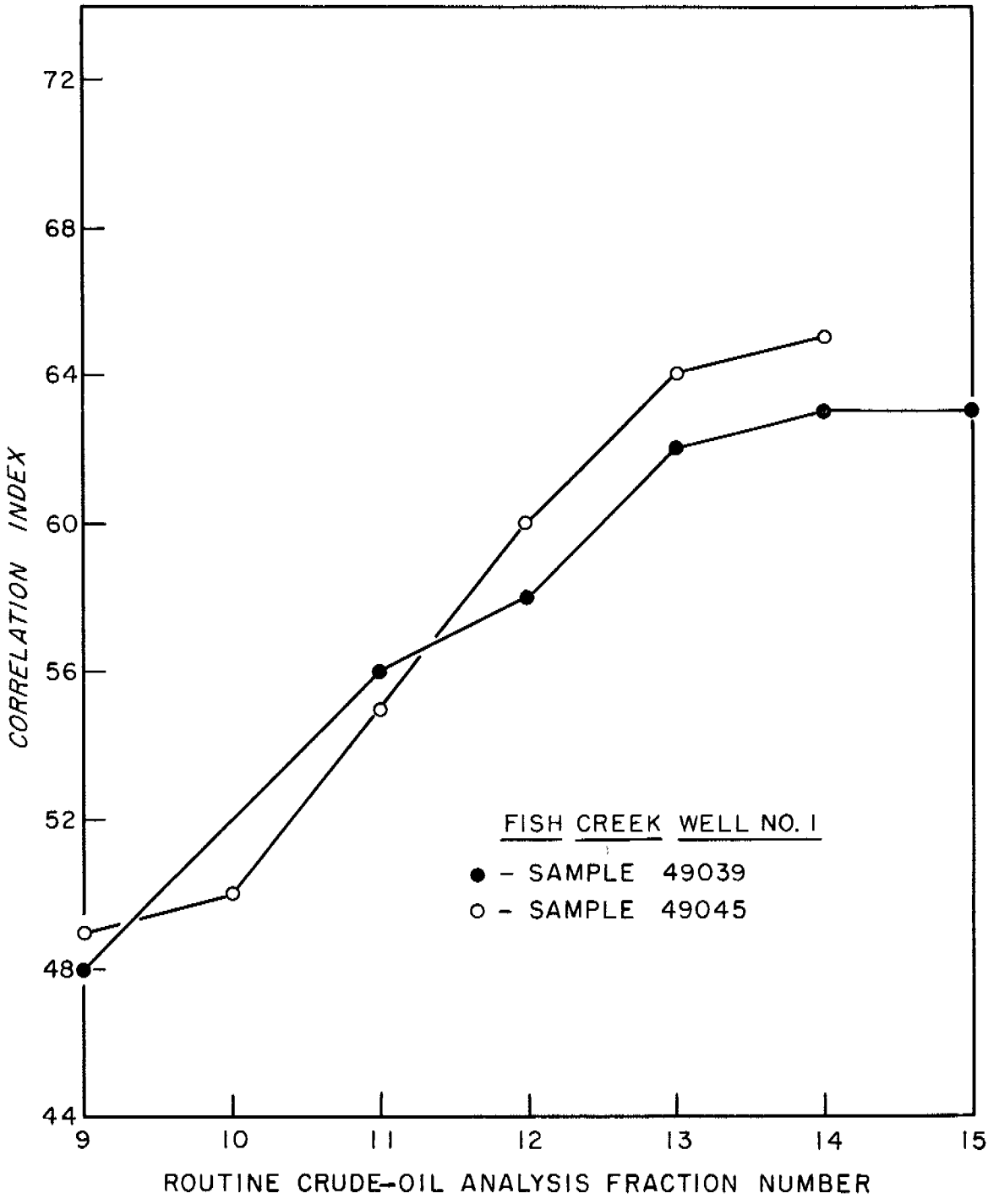

FIGURE 5. - Correlation-Index Curves for Two Samples From Fish Creek Area.

TABLE 7. - Inspection data for diesel fuels prepared from Fish Creek crude oils

	Properties of diesel fuels prepared from sample - 49039 (Item 18)	None[1/]
Yield from crude oil ..... volume-percent	40.0	36.7
Distillation temp., ASTM D158, °F.:		
Initial boiling point	400	411
Evaporated, percent:		
5	470	461
10	501	484
50	611	582
90	704	679
End point	732	718
Specific gravity, 60°/60° F.	0.902	0.900
Gravity ..... °API	25.4	25.7
Sulfur, ASTM D129 ..... weight-percent	1.17	1.00
Viscosity, ASTM D88, Saybolt Universal:		
At 100° F. ..... seconds	67.1	48.5
At 77° F. ..... do.	52.5	40.6
Cetane number, ASTM D613	38	38
Aniline point, ASTM D611 ..... °F.	138.4	130.1
Flash point, ASTM D 93: Pensky-Marten ..... °F.	215	194
Corrosion, ASTM D130: Copper strip, 3 hr. at 212° F..	Negative	Negative.
Cloud point, ASTM D97 ..... °F.	<-76	<-80
Pour point, ASTM D97 ..... °F.	-50	<-80
Aromatic content ..... volume-percent	26.6	26.3

1/ No routine analysis was made; physical properties and appearance were similar to those of sample 49039.

TABLE 8. - Inspection data for viscous distillate prepared from Fish Creek crude-oil, sample 49039 (item 18)

	Distillate[1/]					
	1	2	3	4	5	6
Yield from crude oil..volume-percent	9.0	9.0	9.0	9.5	19.0	28.5
Specific gravity, 60°/60° F.	0.935	0.949	0.955	0.940	0.943	0.947
Gravity .....°API	19.8	17.6	16.7	19.1	18.1	17.9
Sulfur, ASTM D129.....weight-percent	1.57	1.72	2.02	1.68	1.72	1.84
Viscosity, ASTM D88, Saybolt Universal:						
At 100° F. .....seconds	787	2,074	3,670	484	941	1,502
At 130° F. .....do.	298	664	1,093	192	330	505

1/ Distillates 1, 2, and 3 were obtained by distillation at 5 mm. Hg pressure after prior distillation of 40.0 percent of the crude oil. Distillate 1 was obtained between 40.0 and 49.0 percent, distillate 2 between 49.0 and 58.0 percent, and distillate 3 between 58.0 and 67.0 percent. Distillates 4, 5, and 6 were obtained by distillation at 1 mm. Hg pressure after prior distillation of 36.7 percent of the crude oil. Distillate 4 was obtained between 36.7 and 46.2 percent, distillate 5 between 36.7 and 55.7 percent, and distillate 6 between 36.7 and 65.2 percent.

TABLE 9. - Inspection data for residua prepared from Fish Creek crude oil, sample 49039 (item 18)

	Residua from distillation at 5 mm. Hg pressure				Residua from distillation at 1 mm. Hg pressure			
	1	2	3	4	5	6	7	8
Yield from crude oil ..... volume-percent	60.0	51.0	42.0	33.0	63.3	53.8	44.3	34.8
Specific gravity, 60°/60° F.	1.007	1.018	1.036	1.056	0.999	1.009	1.019	1.033
Gravity ..... °API	9.0	7.5	5.1	2.5	10.1	8.7	7.4	5.5
Sulfur, ASTM D129 ..... wt., percent	2.47	2.61	2.81	3.05	-	-	-	-
Viscosity, ASTM D88, Saybolt Furol:								
At 180° F. ..... seconds	468	880	4,584	-	434	1,186	4,194	
At 210° F. ..... do.	157	248	1,100	13,860	171	410	1,380	2,720
Carbon residue, ASTM D189, Conradson ..... percent	15.8	20.5	25.9	31.1	-	-	-	-
Ash, ASTM D482 ..... do.	0.2	0.2	0.2	0.3	-	-	-	-
Penetration, ASTM D5:								
At 32° F., 200 gm., 60 sec. ..... dmm[1/]	-	136	30	55	-	119	29	12
At 60° F., 100 gm., 5 sec. ..... do.	-	200	43	69	-	189	49	17
At 77° F., 100 gm., 5 sec. ..... do.	-	-	105	16	-	-	151	50
Spot test, Oliensis (2):								
Initial	Pos.	Pos.	Pos.	Pos.	Neg.	Neg.	Pos.	Pos.
After 24 hours	do.	do.	do.	do.	do.	do.	do.	Do.
Softening point, ASTM D36 ..... °F.	69	84	114	156	-	-	-	-

1/ Decimillimeters.

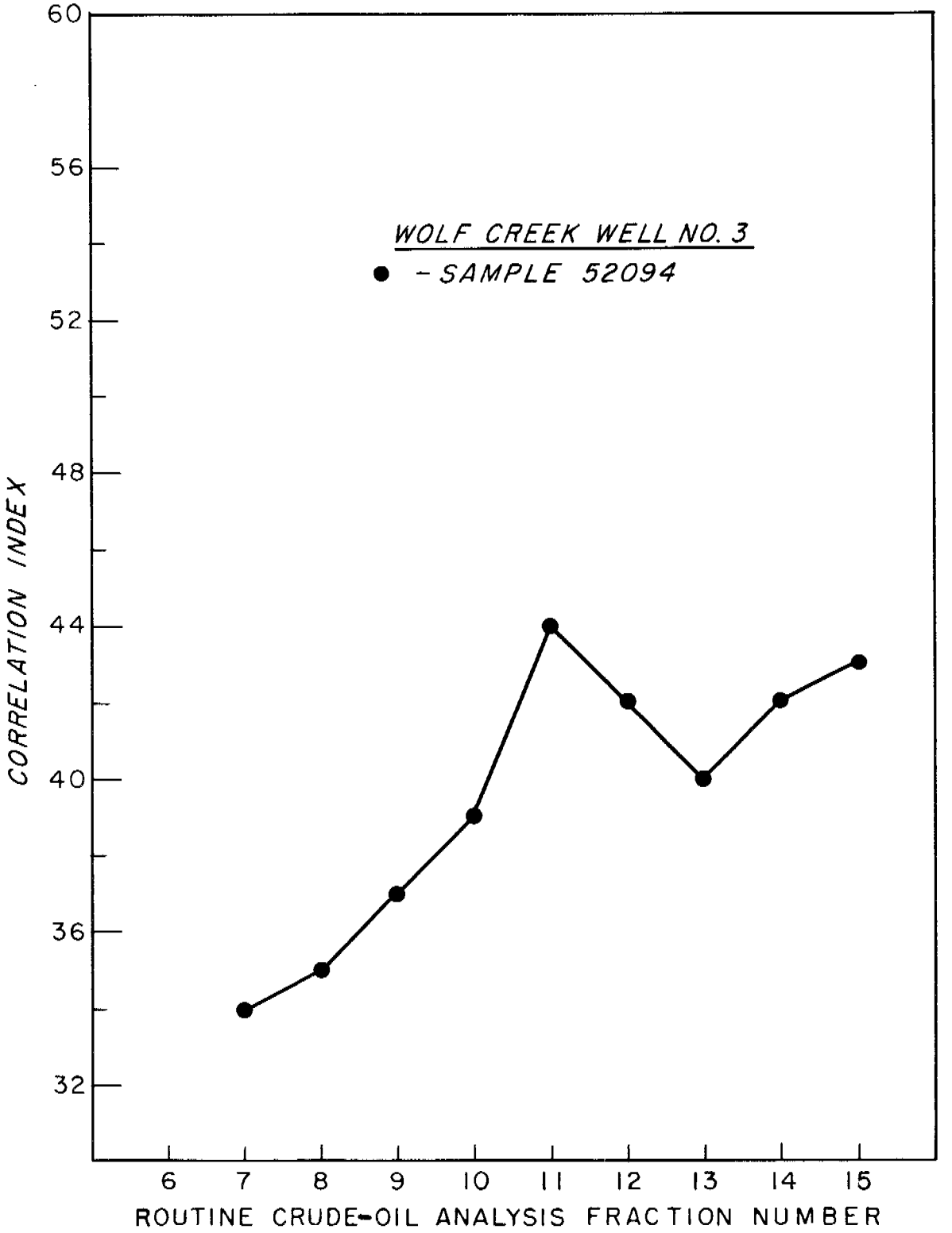

FIGURE 6. - Correlation-Index Curve for Sample From Wolf Creek Area.

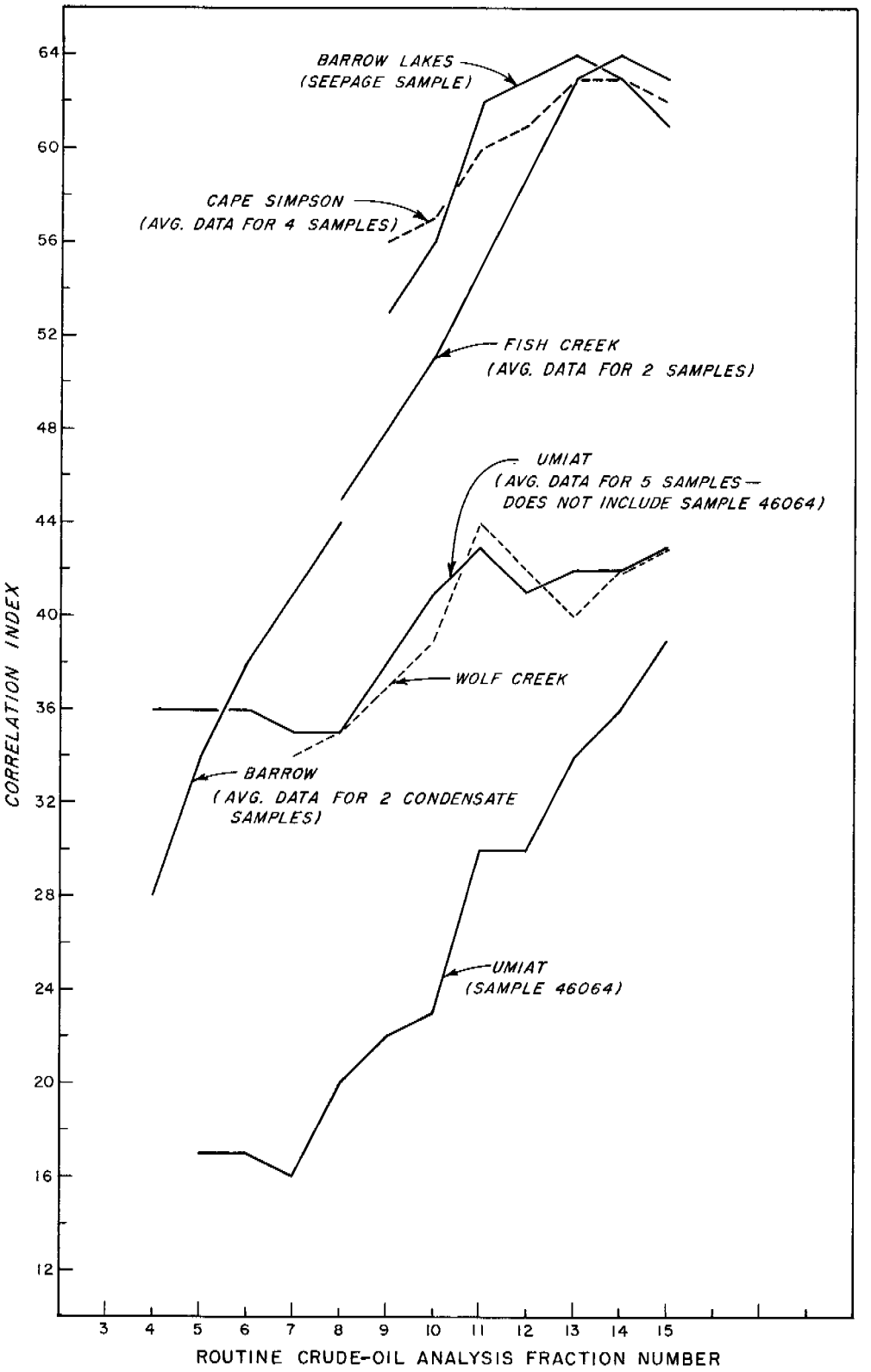

FIGURE 7. - Comparison of Correlation-Index Curves for Crude Oils From Several Areas in Alaska.

BIBLIOGRAPHY

1. EBBLEY, NORMAN, JR. Oil Seepages on the Alaskan Arctic Slope. Min. and Met., vol. 25, September 1944, pp. 415-419.

2. OLIENSIS, G. L. A Qualitative Test for Determining the Degree of Heterogeneity of Asphalts. Proc. ASTM, vol. 33, 1933, pt. II, pp. 715-721. (See also Universal Oil Products Co., Heterogeneity of Asphalt - Oliensis. U.O.P. Laboratory Test Methods for Petroleum and Its Products, June 1953, pp. B5 - B7.) ASTM, Tentative Method of Test for Contact Comparability Between Asphaltic Materials (Oliensis Test): ASTM Designation: D1370-55T, 1955, pp. 1569-1570.

3. REED, JOHN C., COMDR., USNR. Exploration of Naval Petroleum Reserve No. 4 and Adjacent Areas, Northern Alaska, 1944-53: Part 1, History of the Exploration. Geol. Survey Prof. Paper 301, 1958, 192 pp.

4. SMITH, H. M. Correlation Index to Aid in Interpreting Crude-Oil Analyses. Bureau of Mines Tech. Paper 610, 1940, 34 pp.

ANALYSES OF ALASKA SAMPLES

Item 1

Bureau of Mines Bartlesville Laboratory
Sample 38458

IDENTIFICATION

Barrow Lakes
Seepage
Surface sample

Alaska
Naval Petroleum
Reserve No. 4

GENERAL CHARACTERISTICS

Specific gravity, 0.944 A. P. I. gravity, 18.4 Pour point, ° F., -
Sulfur, percent 0.32 Color, brownish black
Saybolt Universal viscosity at 100° F., 2,710 sec.;
at 130° F., 1,460 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 748 mm. Hg
First drop, 192° C. (378° F.)

Fraction No.	Cut temp. ° C	Cut temp. ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I. 60° F.	C. I.	S. U. visc., 100° F.	Cloud test, ° F.
1	50	122							
2	75	167							
3	100	212							
4	125	257							
5	150	302							
6	175	347							
7	200	392							
8	225	437	0.4	0.4	0.843	36.4	-		
9	250	482	1.5	1.9	.873	30.6	53		
10	275	527	5.0	6.9	.889	27.7	56		

STAGE 2—Distillation continued at 40 mm. Hg

11	300	572	4.5	11.4	0.909	24.2	62	52	Below 5
12	325	437	9.3	20.7	.920	22.3	63	67	do.
13	350	482	9.0	29.7	.928	21.0	64	110	do.
14	375	527	8.6	38.3	.933	20.2	63	220	do.
15	400	572	13.5	51.8	.936	19.7	61	Over 400	do.
Residuum			46.4	98.2	.957				

Conradson carbon residue: Residuum, 7.2 percent; crude, 3.3 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline				
Total gasoline and naphtha				
Kerosine distillate				
Gas oil	8.3	0.887	28.0	
Nonviscous lubricating distillate	14.8	.907-.926	24.5-21.3	50-100
Medium lubricating distillate	9.3	.926-.932	21.3-20.3	100-200
Viscous lubricating distillate	19.4	.932-.937	20.3-19.5	Above 200
Residuum	46.4	.957	16.4	
Distillation loss	1.8			

Item 2

Bureau of Mines Bartlesville Laboratory
Sample 50025

IDENTIFICATION

Barrow, South field
Barrow, South well 2
Barrow gas sand, Upper Cretaceous
2,282-2,402 and 2,473-2,504 feet

Alaska
Naval Petroleum
Reserve No. 4

GENERAL CHARACTERISTICS

Specific gravity, 0.822 A. P. I. gravity, 40.6 Pour point, ° F., below -70
Sulfur, percent less than 0.10 Color, less than N. P. A. No. 1
Saybolt Universal viscosity at 100° F., 32 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 750 mm. Hg
First drop, 75° C. (167° F.)

Fraction No.	Cut temp. ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I., 60° F.	C. I.	Refractive index N_D at 20° C.	Specific dispersion	S. U. visc., 100° F.	Cloud test, ° F.
1	122									
2	167									
3	212	1.8	1.8	0.721	64.8	-	1.40125	127.5		
4	257	3.4	5.2	.754	56.2	28	1.41751	132.8		
5	302	7.9	13.1	.782	49.5	34	1.43135	136.8		
6	347	19.1	32.2	.804	44.5	38	1.44217	136.6		
7	392	26.3	58.5	.822	40.6	40	1.45076	135.7		
8	437	26.7	85.2	.838	37.4	42	1.45884	136.3		
9 1/	482	12.1	97.3	.855	34.0	-	1.46787	137.0		
10	527									

STAGE 2—Distillation continued at 40 mm. Hg

11	392								
12	437								
13	482								
14	527								
15	572								
Residuum		2.6	99.9	0.879	29.5				

Conradson carbon residue: Residuum, 1.6 percent; crude, 0.3 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline	1.8	0.721	64.8	
Total gasoline and naphtha	58.5	0.804	44.5	
Kerosine distillate	-	-	-	
Gas oil	38.8	.843	36.4	
Nonviscous lubricating distillate	-	-	-	50-100
Medium lubricating distillate	-	-	-	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	2.6	.879	29.5	
Distillation loss	.1			

1/ Distillation discontinued at 480° F., flask dry.

Item 3

Bureau of Mines Bartlesville Laboratory
Sample 51027

IDENTIFICATION

Barrow, South field
Barrow, South well 4
Barrow gas sand, Cretaceous
2,343–2,502 feet

Alaska
Naval Petroleum
Reserve No. 4

GENERAL CHARACTERISTICS

Specific gravity, 0.787 A. P. I. gravity, 48.3 Pour point, ° F., below -70
Sulfur, percent less than 0.10 Color, N.P.A. No. 1
Saybolt Universal viscosity at 100° F., less than 32 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

Stage 1—Distillation at atmospheric pressure, 747 mm. Hg
First drop, 44 ° C., 111 ° F.

Fraction No.	Cut temp. ° F.	Percent	Sum, percent	Sp. gr. 60°/60° F.	° A. P. I. 60° F.	C. I.	Refractive index N_D at 20° C	Specific dispersion	S. U. visc. 100° F.	Cloud test, ° F.
1	122									
2	167									
3	212	16.4	16.4	0.718	65.6	-	1.39948	-		
4	257	22.5	38.9	.753	56.4	28	1.41708	131.1		
5	302	16.4	55.3	.782	49.5	34	1.43172	134.6		
6	347	17.3	72.6	.808	43.6	39	1.44501	137.9		
7	392	12.3	84.9	.827	39.6	42	1.45422	139.1		
8	437	8.1	93.0	849	35.2	45	1.46216	138.9		
9 1/	482	3.9	96.9	.854	34.2	-	1.46854	140.5		
10	527									

Stage 2—Distillation continued at 40 mm. Hg

11	392									
12	437									
13	482									
14	527									
15	572									
Residuum		2.8	99.7	0.875	30.2					

Conradson carbon residue: Residuum, 1.7 percent; crude, 0.2 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline	16.4	0.718	65.6	
Total gasoline and naphtha	84.9	0.774	51.3	
Kerosine distillate	-	-	-	
Gas oil	12.0	.847	35.6	
Nonviscous lubricating distillate	-	-	-	55–100
Medium lubricating distillate	-	-	-	100–200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	2.8	.875	30.2	
Distillation loss	.3			

1/ Distillation discontinued at 457° F., flask dry.

Item 4

Bureau of Mines Bartlesville Laboratory
Sample 46064

IDENTIFICATION

Umiat field
Umiat test well 1
775 feet 1/

Alaska
Naval Petroleum
Reserve No. 4

GENERAL CHARACTERISTICS

Specific gravity, 0.839 A. P. I. gravity, 37.2 Pour point, ° F., -
Sulfur, percent 0.077 Color, N.P.A. No. 5
Saybolt Universal viscosity at 100° F., 44 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

Stage 1—Distillation at atmospheric pressure, 742 mm. Hg
First drop, 77 ° C., 171 ° F.

Fraction No.	Cut temp. ° F.	Percent	Sum, percent	Sp. gr. 60°/60° F.	° A. P. I. 60° F.	C. I.	Refractive index N_D at 20° C	Specific dispersion	S. U. visc. 100° F.	Cloud test, ° F.
1	122									
2	167									
3	212	0.9	0.9							
4	257	2.1	3.0	0.725	63.7	-	1.40331	123.4		
5	302	3.1	6.1	.745	58.4	17	1.41412	122.7		
6	347	4.3	10.4	.760	54.7	17	1.42175	125.1		
7	392	5.3	15.7	.772	51.8	16	1.42976	127.2		
8	437	6.9	22.6	.792	47.2	20	1.43794	128.7		
9	482	9.1	31.7	.806	44.1	22	1.44644	131.0		
10	527	10.9	42.6	.818	41.5	23	1.45480	126.4		

Stage 2—Distillation continued at 40 mm. Hg

11	392	8.1	50.7	0.842	36.6	30			42	20
12	437	10.3	61.0	.851	34.8	30			47	35
13	482	8.3	69.3	.865	32.1	34			74	45
14	527	6.2	75.5	.877	29.9	36			91	55
15	572	6.4	81.9	.890	27.5	39			160	60
Residuum		17.1	99.0	.919	22.5					

Conradson carbon residue: Residuum, 1.7 percent; crude, 0.2 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline	0.9	-	-	
Total gasoline and naphtha	15.7	0.754	56.2	
Kerosine distillate	26.9	.807	43.8	
Gas oil	14.3	.846	35.8	
Nonviscous lubricating distillate	16.3	.853–.879	34.4–29.5	50–100
Medium lubricating distillate	8.7	.879–.897	29.5–26.3	100–200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	17.1	.919	22.5	
Distillation loss	1.0			

1/ Sample of 20' of oil above an ice plug at 775' formed between Sept. 19, 1945 and June 4, 1946.

Item 5

Bureau of Mines Bartlesville Laboratory
Sample 46164

IDENTIFICATION

Umiat field
Umiat test well 3
(Core test 1)
Grandstand, Cretaceous
572 feet

Alaska
Naval Petroleum
Reserve No. 4

GENERAL CHARACTERISTICS

Specific gravity, 0.843 A. P. I. gravity, 36.4 Pour point, ° F., -15
Sulfur, percent 0.079 Color, N.P.A. No. 6
Saybolt Universal viscosity at 100° F., 37 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 757 mm. Hg
First drop, 52 ° C. (126 ° F.)

Fraction No.	Cut temp. ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I., 60° F.	C. I.	Refractive index N_D at 20° C.	Specific dispersion	S. U. visc., 100° F.	Cloud test, ° F.
1	122									
2	167	1.1	1.1							
3	212	5.3	6.4	0.723	64.2	-	1.4094	146		
4	257	8.3	14.7	.768	52.7	35	1.4265	146		
5	302	7.0	21.7	.785	48.8	36	1.4324	132		
6	347	7.2	28.9	.799	45.6	35	1.4400	131		
7	392	5.3	34.2	.811	43.0	35	1.4450	132		
8	437	6.1	40.3	.823	40.4	35	1.4525	134		
9	482	7.4	47.7	.838	37.4	37	1.4622	152		
10	527	10.2	57.9	.855	34.0	40	1.4763	162		

STAGE 2—Distillation continued at 40 mm. Hg

11	392	6.4	64.3	0.873	30.6	45			42	5
12	437	7.1	71.4	.878	29.7	43			48	20
13	482	6.0	77.4	.884	28.6	43			61	45
14	527	4.7	82.1	.893	27.0	44			83	55
15	572	5.3	87.4	.899	25.9	44			165	65
Residuum		12.4	99.8	.913	23.5					

Conradson carbon residue: Residuum, 1.6 percent; crude, 0.2 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline	6.4	0.723	64.2	
Total gasoline and naphtha	34.2	0.776	50.9	
Kerosine distillate	6.1	.823	40.4	
Gas oil	28.6	.858	33.4	
Nonviscous lubricating distillate	11.9	.879-.894	29.5-26.8	50-100
Medium lubricating distillate	6.2	.894-.901	26.8-25.6	100-200
Viscous lubricating distillate	.4	.901-.902	25.6-25.4	Above 200
Residuum	12.4	.913	23.5	
Distillation loss	.2			

Item 6

Bureau of Mines Bartlesville Laboratory
Sample 47017

IDENTIFICATION

Umiat field
Umiat test well 3
(Core test 1)
Grandstand, Cretaceous

Alaska
Naval Petroleum
Reserve No. 4

GENERAL CHARACTERISTICS

Specific gravity, 0.842 A. P. I. gravity, 36.6 Pour point, ° F., -25
Sulfur, percent 0.079 Color, N.P.A. No. 4½
Saybolt Universal viscosity at 100° F., 36 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 748 mm. Hg
First drop, 62 ° C. (144 ° F.)

Fraction No.	Cut temp. ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I., 60° F.	C. I.	Refractive index N_D at 20° C.	Specific dispersion	S. U. visc., 100° F.	Cloud test, ° F.
1	122									
2	167	0.7	0.5							
3	212	4.5	5.2	0.739	60.0	-	1.4131	137		
4	257	9.0	14.2	.769	52.5	36	1.4270	146		
5	302	7.0	21.2	.788	48.1	37	1.4390	153		
6	347	6.9	28.1	.800	45.4	36	1.4454	153		
7	392	5.7	33.8	.811	43.0	35	1.4506	149		
8	437	6.5	40.3	.824	40.2	35	1.4582	149		
9	482	7.5	47.8	.839	37.2	37	1.4683	155		
10	527	10.0	57.8	.858	33.4	41	1.4768	161		

STAGE 2—Distillation continued at 40 mm. Hg

11	392	5.1	62.9	0.869	31.3	43			42	15
12	437	7.8	70.7	.873	30.6	41			47	30
13	482	6.5	77.2	.883	28.8	42			60	45
14	527	5.2	82.4	.888	27.9	41			94	55
15	572	6.4	88.8	.897	26.3	43			190	70
Residuum		10.8	99.6	.916	23.0					

Conradson carbon residue: Residuum, 1.1 percent; crude, 0.1 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline	5.2	0.739	60.0	
Total gasoline and naphtha	33.8	0.782	49.5	
Kerosine distillate	6.5	.824	40.2	
Gas oil	28.1	.858	33.4	
Nonviscous lubricating distillate	11.7	.875-.889	30.2-27.7	50-100
Medium lubricating distillate	6.0	.889-.898	27.7-26.1	100-200
Viscous lubricating distillate	2.7	.898-.902	26.1-25.4	Above 200
Residuum	10.8	.916	23.6	
Distillation loss	.4			

Item 7

Bureau of Mines Bartlesville Laboratory
Sample 50103

IDENTIFICATION

Umiat field
Umiat test well 4
(Ruby) test well 1
Grandstand, Cretaceous
353-427 feet

Alaska
Naval Petroleum
Reserve No. 4

GENERAL CHARACTERISTICS

Specific gravity, 0.841 A. P. I. gravity, 36.8 Pour point, ° F., -25
Sulfur, percent, less than 0.1 Color, N.P.A. No. 4½
Saybolt Universal viscosity at 100° F., 37 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 749 mm. Hg
First drop, 48 ° C. (118 ° F.)

Fraction No.	Cut temp. ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I., 60° F.	C. I.	Refractive index N_D at 20° C.	Specific dispersion	S. U. visc., 100° F.	Cloud test, ° F.
1	122									
2	167	1.1	1.1	0.695	72.1	-				
3	212	5.1	6.2	.738	60.2	30	1.41006	136.8		
4	257	9.0	15.2	.767	53.0	35	1.42593	145.7		
5	302	6.8	22.0	.785	48.8	36	1.43712	153.5		
6	347	6.7	28.7	.798	45.8	35	1.44442	153.1		
7	392	5.7	34.4	.808	43.6	33	1.44960	149.3		
8	437	6.2	40.6	.822	40.6	34	1.45676	149.6		
9	482	7.8	48.4	.840	37.0	38	1.46646	155.0		
10	527	8.9	57.3	.855	34.0	40	1.47541	161.2		

STAGE 2—Distillation continued at 40 mm. Hg

11	392	6.6	63.9	0.866	31.9	41			40	Below 5
12	437	7.9	71.8	.872	30.8	40			46	20
13	482	6.1	77.9	.881	29.1	41			60	35
14	527	5.3	83.2	.889	27.7	42			85	50
15	572	4.7	87.9	.897	26.3	43			175	55
Residuum		12.0	99.9	.915	23.1					

Conradson carbon residue: Residuum, 1.5 percent; crude, 0.2 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline	6.2	0.730	62.3	
Total gasoline and naphtha	34.4	0.777	50.6	
Kerosine distillate	6.2	.822	40.6	
Gas oil	29.3	.857	33.6	
Nonviscous lubricating distillate	11.5	.875-.890	30.2-27.5	50-100
Medium lubricating distillate	5.6	.890-.899	27.5-25.9	100-200
Viscous lubricating distillate	.9	.899-.901	25.9-25.6	Above 200
Residuum	12.0	.915	23.1	
Distillation loss	.1			

Item 8

Bureau of Mines Bartlesville Laboratory
Sample 50104

IDENTIFICATION

Umiat field
Umiat test well 4
(Ruby) test well 1
Grandstand, Cretaceous
353-427 feet

Alaska
Naval Petroleum
Reserve No. 4

GENERAL CHARACTERISTICS

Specific gravity, 0.842 A. P. I. gravity, 36.6 Pour point, ° F., -25
Sulfur, percent, less than 0.1 Color, N.P.A. No. 4
Saybolt Universal viscosity at 100° F., 37 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 749 mm. Hg
First drop, 54 ° C. (129 ° F.)

Fraction No.	Cut temp. ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I., 60° F.	C. I.	Refractive index N_D at 20° C.	Specific dispersion	S. U. visc., 100° F.	Cloud test, ° F.
1	122									
2	167	1.3	1.3	0.691	73.3	-				
3	212	4.9	6.2	.742	59.2	32	1.41207	137.7		
4	257	9.5	15.7	.769	52.5	36	1.42705	146.4		
5	302	6.6	22.3	.787	48.3	36	1.43808	153.6		
6	347	6.8	29.1	.799	45.6	35	1.44492	152.3		
7	392	5.4	34.5	.809	43.4	34	1.44991	148.7		
8	437	7.0	41.5	.825	40.0	36	1.45830	150.1		
9	482	7.0	48.5	.842	36.6	39	1.46787	156.2		
10	527	9.8	58.3	.856	33.8	41	1.47626	162.2		

STAGE 2—Distillation continued at 40 mm. Hg

11	392	4.6	62.9	0.868	31.5	42			41	Below 5
12	437	8.6	71.5	.870	31.1	39			46	20
13	482	6.1	77.6	.881	29.1	41			60	35
14	527	4.6	82.2	.887	28.0	41			88	50
15	572	5.1	87.3	.895	26.6	42			155	55
Residuum		12.1	99.4	.915	23.1					

Conradson carbon residue: Residuum, <0.1 percent; crude, <0.1 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline	6.2	0.731	62.1	
Total gasoline and naphtha	34.5	0.778	50.4	
Kerosine distillate	7.0	.825	40.0	
Gas oil	27.8	.858	33.4	
Nonviscous lubricating distillate	11.5	.873-.888	30.6-27.9	50-100
Medium lubricating distillate	6.5	.888-.899	27.9-25.9	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	12.1	.915	23.1	
Distillation loss	.6			

Item 9

Bureau of Mines Bartlesville Laboratory
Sample 51050

IDENTIFICATION

Umiat field
Umiat test well 8
Grandstand, Cretaceous
1,080 feet

Alaska
Naval Petroleum
Reserve No. 4
Lat. 69° 23' 59.6" N.
Long. 152° 06' 56.5" W.

GENERAL CHARACTERISTICS

Specific gravity, 0.842 A. P. I. gravity, 36.6 Pour point, ° F., -25
Sulfur, percent, 0.10 Color, N.P.A. No. 4
Saybolt Universal viscosity at 100° F., 36 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 746 mm. Hg
First drop, 48° C. (118° F.)

Fraction No.	Cut temp. ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I., 60° F.	C. I.	Refractive index N. at 20° C.	Specific dispersion	S. U. visc., 100° F.	Cloud test, F.
1	122									
2	167									
3	212	7.0	7.0	0.731	62.1	-	1.40735	135.4		
4	257	9.0	16.0	.770	52.3	36	1.42702	145.5		
5	302	7.1	23.1	.789	47.8	37	1.43878	154.9		
6	347	7.1	30.2	.802	44.9	37	1.44606	153.0		
7	392	5.4	35.6	.813	42.6	36	1.45087	148.9		
8	437	6.4	42.0	.827	39.6	37	1.45830	150.7		
9	482	8.1	50.1	.846	35.8	41	1.46933	157.6		
10	527	8.7	58.8	.859	33.2	42	1.48042	158.3		

STAGE 2—Distillation continued at 40 mm. Hg

11	392	4.8	63.6	0.871	31.0	44			42	Below 5
12	437	8.1	71.9	.873	30.6	41			46	20
13	482	5.9	77.6	.881	29.1	41			60	40
14	527	5.0	82.6	.888	27.9	41			91	65
15	572	4.8	87.4	.895	26.6	42			100	70
Residuum		12.4	99.8	.914	23.3					

Conradson carbon residue: Residuum, <0.1 percent; crude, <0.1 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline	7.0	0.731	62.1	
Total gasoline and naphtha	35.6	0.779	50.1	
Kerosine distillate	-	-	-	
Gas oil	34.2	.854	34.2	
Nonviscous lubricating distillate	11.0	.876-.889	30.0-27.7	50-100
Medium lubricating distillate	6.6	.889-.898	27.7-26.1	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	12.4	.914	23.3	
Distillation loss	.2			

Item 10

Bureau of Mines Bartlesville Laboratory
Sample 51084

IDENTIFICATION

Umiat field
Umiat test well 5
Grandstand, Cretaceous
335-1,060 feet

Alaska
Naval Petroleum
Reserve No. 4
Lat. 69° 23' 05" N.
Long. 152° 04' 56" W.

GENERAL CHARACTERISTICS

Specific gravity, 0.845 A. P. I. gravity, 36.0 Pour point, ° F., below 5
Sulfur, percent, 0.12 Color, N.P.A. No. 4
Saybolt Universal viscosity at 77° F., 40 sec.; at 100° F., 38 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 752 mm. Hg
First drop, 65° C. (149° F.)

Fraction No.	Cut temp. ° C.	Cut temp. ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I. 60° F.	C. I.	S. U. visc., 100° F.	Cloud test, ° F.
1	50	122							
2	75	167							
3	100	212	4.5	4.5	0.726	63.4	-		
4	125	257	8.4	12.9	.766	53.2	34		
5	150	302	6.9	19.8	.785	48.8	36		
6	175	347	6.8	26.6	.799	45.6	35		
7	200	392	5.7	32.3	.810	43.2	34		
8	225	437	6.6	38.9	.825	40.0	36		
9	250	482	7.4	46.3	.843	36.4	39		
10	275	527	9.5	55.8	.857	33.6	41		

STAGE 2—Distillation continued at 40 mm. Hg

11	200	392	4.2	60.0	0.871	31.0	44		42	Below 5
12	225	437	9.1	69.1	.872	30.8	40		46	25
13	250	482	6.9	76.0	.883	28.8	42		58	40
14	275	527	4.8	80.8	.889	27.7	42		91	55
15	300	572	5.5	86.3	.895	26.6	42		175	60
Residuum			12.5	98.8	.924	21.6				

Conradson carbon residue: Residuum, 1.0 percent; crude, 0.1 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline	4.5	0.726	63.4	
Total gasoline and naphtha	32.3	0.779	50.1	
Kerosine distillate	6.6	.825	40.0	
Gas oil	28.5	.860	33.0	
Nonviscous lubricating distillate	11.6	.876-.890	30.0-27.5	50-100
Medium lubricating distillate	6.1	.890-.897	27.5-26.3	100-200
Viscous lubricating distillate	1.2	.897-.898	26.3-26.1	Above 200
Residuum	12.5	.924	21.6	
Distillation loss	1.2			

Item 11

Bureau of Mines Bartlesville Laboratory

Sample 52001

IDENTIFICATION

Umiat field
Umiat test well 10
Cretaceous
1,339-1,518 feet

Alaska
Naval Petroleum
Reserve No. 4
Lat. 69° 24' 04" N.
Long. 152° 07' 57" W.

GENERAL CHARACTERISTICS

Specific gravity, 0.843 A. P. I. gravity, 36.4 Pour point, ° F., below 5
Sulfur, percent, less than 0.1 Color, N.P.A., No. 4
Saybolt Universal viscosity at 77° F., 39 sec.
at 100° F., 37 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 753 mm. Hg
First drop, 47 ° C., 117 ° F.

Fraction No.	Cut temp. ° C.	Cut temp. ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I. 60° F.	C. I.	S. U. visc., 100° F.	Cloud test, ° F.
1	50	122							
2	75	167	1.5	1.5	0.679	76.9	-		
3	100	212	5.3	6.8	.733	61.5	27		
4	125	257	9.0	15.8	.765	53.5	34		
5	150	302	6.9	22.7	.786	48.5	36		
6	175	347	6.7	29.4	.801	45.2	36		
7	200	392	5.8	35.2	.813	42.6	36		
8	225	437	6.4	41.6	.828	39.4	37		
9	250	482	7.2	48.8	.844	36.2	40		
10	275	527	9.9	58.7	.859	33.2	42		
STAGE 2—Distillation continued at 40 mm. Hg									
11	300	572	5.2	63.9	0.878	29.7	47	41	Below 5
12	325	617	6.8	70.7	.879	29.5	44	48	20
13	350	662	6.3	77.0	.888	27.9	45	62	40
14	375	707	4.9	81.9	.893	27.0	44	93	55
15	400	752	5.2	87.1	.900	25.7	44	170	65
Residuum			11.8	98.9	.923	21.8			

Conradson carbon residue: Residuum, 1.5 percent; crude, 0.2 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline	6.8	0.721	64.8	
Total gasoline and naphtha	35.2	0.775	51.1	
Kerosene distillate	-	-	-	
Gas oil	33.3	.856	33.8	
Nonviscous lubricating distillate	11.5	.880-.896	29.3-26.4	50-100
Medium lubricating distillate	6.6	.896-.903	26.4-25.2	100-200
Viscous lubricating distillate	.5	.903-.904	25.2-25.0	Above 200
Residuum	11.8	.923	21.8	
Distillation loss	1.1			

Item 12

Bureau of Mines Bartlesville Laboratory

Sample 52010

IDENTIFICATION

Umiat field
Umiat test well 10
Cretaceous
1,339-1,510 feet

Alaska
Naval Petroleum
Reserve No. 4
Lat. 69° 24' 04" N.
Long. 152° 07' 57" W.

GENERAL CHARACTERISTICS

Specific gravity, 0.845 A. P. I. gravity, 36.0 Pour point, ° F., below 5
Sulfur, percent, less than 0.1 Color, N.P.A., No. 4½
Saybolt Universal viscosity at 100° F., 38 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 739 mm. Hg
First drop, 63 ° C., 145 ° F.

Fraction No.	Cut temp. ° C.	Cut temp. ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I. 60° F.	C. I.	S. U. visc., 100° F.	Cloud test, ° F.
1	50	122							
2	75	167							
3	100	212	5.8	5.8	0.728	62.9	-		
4	125	257	8.8	14.6	.767	53.0	35		
5	150	302	6.9	21.5	.788	48.1	37		
6	175	347	6.7	28.2	.802	44.9	37		
7	200	392	5.5	33.7	.812	42.8	35		
8	225	437	6.3	40.0	.826	39.8	36		
9	250	482	8.3	48.3	.845	36.0	40		
10	275	527	9.3	57.6	.861	32.8	43		
STAGE 2—Distillation continued at 40 mm. Hg									
11	300	572	5.7	63.3	0.875	30.2	46	41	Below 5
12	325	617	7.8	71.1	.877	29.9	43	47	20
13	350	662	5.8	76.9	.884	28.6	43	62	35
14	375	707	5.3	82.2	.892	27.1	43	94	45
15	400	752	4.8	87.0	.898	26.1	43	180	55
Residuum			12.8	99.8	.917	22.8			

Conradson carbon residue: Residuum, 1.0 percent; crude, 0.1 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline	5.8	0.728	62.9	
Total gasoline and naphtha	33.7	0.779	50.1	
Kerosene distillate	-	-	-	
Gas oil	35.1	.856	33.8	
Nonviscous lubricating distillate	11.2	.879-.893	29.5-27.0	50-100
Medium lubricating distillate	5.8	.893-.899	27.0-25.9	100-200
Viscous lubricating distillate	1.2	.899-.901	25.9-25.6	Above 200
Residuum	12.8	.917	22.8	
Distillation loss	.2			

Item 13

Bureau of Mines Bartlesville Laboratory
Sample 52011

IDENTIFICATION

Umiat field
Umiat test well 10
Cretaceous
653-748 feet

Alaska
Naval Petroleum
Reserve No. 4
Lat. 69° 24' 04" N.
Long. 152° 07' 57" W.

GENERAL CHARACTERISTICS

Specific gravity, 0.839 A. P. I. gravity, 37.2 Pour point, ° F., below 5
Sulfur, percent, less than 0.1 Color, N.P.A. No. 4
Saybolt Universal viscosity at 100° F., 36 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 739 mm. Hg
First drop, 54 ° C. (129 ° F.)

Fraction No.	Cut temp. ° C.	Cut temp. ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I. 60° F.	C. I.	S. U. visc., 100° F.	Cloud test, ° F.
1	50	122							
2	75	167							
3	100	212	6.9	6.9	0.728	62.9	-		
4	125	257	9.1	16.0	.767	53.0	35		
5	150	302	7.2	23.2	.786	48.5	36		
6	175	347	6.7	29.9	.799	45.6	35		
7	200	392	5.7	35.6	.807	43.8	33		
8	225	437	6.4	42.0	.824	40.2	35		
9	250	482	7.8	49.8	.839	37.2	37		
10	275	527	9.3	59.1	.855	34.0	40		

STAGE 2—Distillation continued at 40 mm. Hg

11	200	392	5.0	64.1	0.869	31.3	43	41	10
12	225	437	7.9	72.0	.870	31.1	39	46	25
13	250	482	6.3	78.3	.878	29.7	40	58	45
14	275	527	5.3	83.6	.885	28.4	40	86	55
15	300	572	4.5	88.1	.893	27.0	41	155	65
Residuum			11.7	99.8	.916	23.0			

Conradson carbon residue: Residuum, 0.8 percent; crude, 0.1 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline	6.9	0.728	62.9	
Total gasoline and naphtha	35.6	0.776	50.9	
Kerosine distillate	6.4	.824	40.2	
Gas oil	28.6	.857	33.6	
Nonviscous lubricating distillate	11.4	.873-.887	30.6-28.0	50-100
Medium lubricating distillate	6.1	.887-.897	28.0-26.3	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	11.7	.916	23.0	
Distillation loss	.2			

Item 14

Bureau of Mines Bartlesville Laboratory
Sample 48089

IDENTIFICATION

Cape Simpson
Seepage
Surface sample

Alaska
Naval Petroleum
Reserve No. 4

GENERAL CHARACTERISTICS

Specific gravity, 0.933 A. P. I. gravity, 20.2 Pour point, ° F., below 5
Sulfur, percent, 0.34 Color, brownish green
Saybolt Universal viscosity at 100° F., 640 sec.; at 130° F., 260 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 749 mm. Hg
First drop, 217 ° C. (423 ° F.)

Fraction No.	Cut temp. ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I., 60° F.	C. I.	Refractive index N_D at 20° C.	Specific dispersion	S. U. visc., 100° F.	Cloud test, ° F.
1	122									
2	167									
3	212									
4	257									
5	302									
6	347									
7	392									
8	437									
9	482	3.6	3.6	0.877	29.9	-	1.47098	124.5		
10	527	6.6	10.2	.892	27.1	58	1.47993	129.2		

STAGE 2—Distillation continued at 40 mm. Hg

11	392	3.9	14.1	0.907	24.5	61			49	Below 5
12	437	8.8	22.9	.918	22.6	62			64	do.
13	482	8.7	31.6	.928	21.0	64			105	do.
14	527	8.5	40.1	.935	19.8	64			210	do.
15	572	10.1	50.2	.937	19.5	62			>400	do.
Residuum		49.2	99.4	.949	17.6					

Conradson carbon residue: Residuum, 18.5 percent; crude, 10.4 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline				
Total gasoline and naphtha				
Kerosine distillate				
Gas oil	12.7	0.891	27.3	
Nonviscous lubricating distillate	13.5	.908-.927	24.3-21.1	50-100
Medium lubricating distillate	8.9	.927-.934	21.1-20.0	100-200
Viscous lubricating distillate	15.1	.934-.938	20.0-19.4	Above 200
Residuum	49.2	.949	17.6	
Distillation loss	.6			

Item 15

Bureau of Mines Bartlesville Laboratory

Sample 50110

IDENTIFICATION

Cape Simpson field
Simpson core hole 26 (seep 3)
Cretaceous
300-306 feet

Alaska
Naval Petroleum
Reserve No. 4

GENERAL CHARACTERISTICS

Specific gravity, 0.928 A. P. I. gravity, 21.0 Pour point, ° F., below 5

Sulfur, percent, 0.40 Color, brownish green

Saybolt Universal viscosity at 100° F., 480 sec.; at 130° F., 210 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 750 mm. Hg

First drop, 143° C. (289° F.)

Fraction No.	Cut temp. ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I., 60° F.	C. I.	Refractive index N_D at 20° C.	Specific dispersion	S. U. visc., 100° F.	Cloud test, ° F.
1	122									
2	167									
3	212									
4	257									
5	302									
6	347									
7	392	0.1	0.1)							
8	437	2.3	2.4)	0.841	36.8	-				
9	482	4.9	7.3	.874	30.4	54				
10	527	9.9	17.2	.890	27.5	57				

STAGE 2—Distillation continued at 40 mm. Hg

11	392	4.8	22.0	0.905	24.9	60			51	Below 5
12	437	9.1	31.1	.915	23.1	61			64	do.
13	482	8.1	39.2	.925	21.5	63			110	do.
14	527	7.9	47.1	.935	19.8	64			240	do.
15	572	7.7	54.8	.939	19.2	63			>400	do.
Residuum		44.9	99.7	.950	17.5					

Conradson carbon residue: Residuum, 18.9 percent; crude, 9.8 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline				
Total gasoline and naphtha				
Kerosine distillate				
Gas oil	19.2	0.881	29.1	
Nonviscous lubricating distillate	14.1	.904-.923	25.0-21.8	50-100
Medium lubricating distillate	7.5	.923-.932	21.8-20.3	100-200
Viscous lubricating distillate	14.0	.932-.941	20.3-18.9	Above 200
Residuum	44.9	.950	17.5	
Distillation loss	.3			

Item 16

Bureau of Mines Bartlesville Laboratory

Sample 50137

IDENTIFICATION

Cape Simpson field
Simpson core hole 26 (seep 3)
289-325 feet

Alaska
Naval Petroleum
Reserve No. 4

GENERAL CHARACTERISTICS

Specific gravity, 0.930 A. P. I. gravity, 20.7 Pour point, ° F., below 5

Sulfur, percent, 0.36 Color, brownish green

Saybolt Universal viscosity at -

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 744 mm. Hg

First drop, 210° C. (410° F.)

Fraction No.	Cut temp. ° C.	Cut temp. ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I. 60° F.	C. I.	S. U. visc., 100° F.	Cloud test, ° F.
1	50	122							
2	75	167							
3	100	212							
4	125	257							
5	150	302							
6	175	347							
7	200	392							
8	225	437	1.3	1.3	0.868	31.5	-		
9	250	482	6.1	7.4	.879	29.5	56		
10	275	527	9.5	16.9	.890	27.5	57		

STAGE 2—Distillation continued at 40 mm. Hg

11	200	392	3.2	20.1	0.905	24.9	60	-	-
12	225	437	8.7	28.8	.914	23.3	60	-	-
13	250	482	9.1	37.9	.925	21.5	62	-	-
14	275	527	8.0	45.9	.935	19.8	64	-	-
15	300	572	8.7	54.6	.938	19.4	62	-	-
Residuum			44.7	99.3	.948	17.8			

Conradson carbon residue: Residuum, - percent; crude, - percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline				
Total gasoline and naphtha				
Kerosine distillate				
Gas oil	16.9	0.884	28.6	
Nonviscous lubricating distillate	37.7	Indeterminate		50-100
Medium lubricating distillate				100-200
Viscous lubricating distillate				Above 200
Residuum	44.7	.948	17.8	
Distillation loss	.7			

Item 17

Bureau of Mines Bartlesville Laboratory
Sample 51037

IDENTIFICATION

Cape Simpson field
Simpson core hole 31 (seep 2A)
354-355 feet

Alaska
Naval Petroleum
Reserve No. 4

GENERAL CHARACTERISTICS

Specific gravity, 0.932 A. P. I. gravity, 20.3 Pour point, ° F., below 5
Sulfur, percent, 0.44 Color, green
Saybolt Universal viscosity at 100° F., 670 sec.;
at 130° F., 290 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 749 mm. Hg
First drop, 211 ° C. (412 ° F.)

Fraction No.	Cut temp. ° C.	Cut temp. ° F.	Percent	Sum. percent	Sp. gr., 60/60° F.	° A. P. I. 60° F.	C. I.	S. U. visc., 100° F.	Cloud test, ° F.
1	50	122							
2	75	167							
3	100	212							
4	125	257							
5	150	302							
6	175	347							
7	200	392							
8	225	437	1.5	1.5	0.864	32.3	-		
9	250	482	5.4	6.9	.881	29.1	57		
10	275	527	7.7	14.6	.892	27.1	58		

STAGE 2—Distillation continued at 40 mm. Hg

11	200	392	3.2	17.8	0.907	24.5	61	49	Below 5
12	225	437	9.2	27.0	.914	23.3	60	63	do.
13	250	482	8.1	35.1	.927	21.1	63	110	do.
14	275	527	8.2	43.3	.931	20.5	63	225	do.
15	300	572	8.7	52.0	.936	19.7	61	>400	do.
Residuum			47.4	99.4	.951	17.3			

Conradson carbon residue: Residuum, 4.0 percent; crude, 2.0 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline				
Total gasoline and naphtha				
Kerosine distillate				
Gas oil	21.8	0.893	27.0	
Nonviscous lubricating distillate	7.5	.913-.924	23.5-21.6	50-100
Medium lubricating distillate	8.2	.924-.930	21.6-20.7	100-200
Viscous lubricating distillate	14.5	.930-.939	20.7-19.2	Above 200
Residuum	47.4	.951	17.3	
Distillation loss	.6			

Item 18

Bureau of Mines Bartlesville Laboratory
Sample 49039

IDENTIFICATION

Fish Creek field
Fish Creek well 1
Tertiary
2,950-3,010 feet

Alaska
Naval Petroleum
Reserve No. 4

GENERAL CHARACTERISTICS

Specific gravity, 0.973 A. P. I. gravity, 13.9 Pour point, ° F., 25
Sulfur, percent, 1.92 Color, brownish black
Saybolt Universal viscosity at 100° F., 2,080 sec.;
at 130° F., 800 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 745 mm. Hg
First drop, 163° C. (325 ° F.)

Fraction No.	Cut temp. ° F.	Percent	Sum. percent	Sp. gr., 60/60° F.	° A. P. I., 60° F.	C. I.	Refractive index N_D at 20° C	Specific dispersion	S. U. visc., 100° F.	Cloud test, ° F.
1	122									
2	167									
3	212									
4	257									
5	302									
6	347	0.9	0.9							
7	392	1.0	1.9	0.820	41.1	-	1.44782	131.9		
8	437	1.7	3.6	.845	36.0	45	1.46219	135.1		
9	482	3.6	7.2	.861	32.8	48	1.47160	143.3		
10 1/	527	6.8	14.0	.874	30.4	-	1.48111	154.6		

STAGE 2—Distillation continued at 40 mm. Hg

11	392	3.0	17.0	0.898	26.1	-			45	Below 5
12	437	7.3	24.3	.909	24.2	58			54	do.
13	482	6.3	30.6	.924	21.6	62			80	do.
14	527	7.1	37.7	.933	20.2	63			145	do.
15	572	8.4	46.1	.940	19.0	63			350	do.
Residuum		53.8	99.9	1.019	7.4					

Conradson carbon residue: Residuum, 4.3 percent; crude, 2.0 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline				
Total gasoline and naphtha	1.9	0.820	41.1	
Kerosine distillate	-	-	-	
Gas oil	16.6	.765	30.2	
Nonviscous lubricating distillate	7.8	.904-.921	25.0-22.1	50-100
Medium lubricating distillate	10.0	.921-.935	22.1-19.8	100-200
Viscous lubricating distillate	9.8	.935-.944	19.8-18.4	Above 200
Residuum	53.8	1.019	7.4	
Distillation loss	.1			

1/ Distillation discontinued at 518° F.

Item 19

Bureau of Mines Bartlesville Laboratory
Sample 49045

IDENTIFICATION

Fish Creek field
Fish Creek well 1
Tertiary
2,950-3,010 feet

Alaska
Naval Petroleum
Reserve No. 4

GENERAL CHARACTERISTICS

Specific gravity, 0.974 A. P. I. gravity, 13.8 Pour point, ° F., 15
Sulfur, percent, 1.15 Color, brownish black
Saybolt Universal viscosity at 100° F., 3,650 sec.
at 130° F., 1,150 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 743 mm. Hg
First drop, 171 ° C. (340 ° F.)

Fraction No.	Cut temp ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I., 60° F.	C. I.	Refractive index N_D at 20° C.	Specific dispersion	S. U. visc., 100° F.	Cloud test, F.
1	122									
2	167									
3	212									
4	257									
5	302									
6	347									
7	392	1.1	1.1							
8	437	1.9	3.0	0.839	37.2	-	1.45846	136.8		
9	482	3.0	6.0	.863	32.5	49	1.47296	146.3		
10	527	7.1	13.1	.877	29.9	50	1.48312	161.4		
STAGE 2—Distillation continued at 40 mm. Hg										
11	392	2.6	15.7	0.896	26.4	55			45	Below 5
12	437	10.2	25.9	.913	23.5	60			60	do.
13	482	6.1	32.0	.928	21.0	64			105	do.
14	527	5.6	37.6	.937	19.5	65			180	do.
15 1/	572	9.8	47.4	.941	18.9	-			>400	do.
Residuum		49.8	97.2	1.015	7.9					

Conradson carbon residue: Residuum, 3.8 percent; crude, 1.8 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline				
Total gasoline and naphtha				
Kerosine distillate				
Gas oil	16.6	0.872	30.8	
Nonviscous lubricating distillate	11.5	.901-.926	25.6-21.3	70-100
Medium lubricating distillate	7.4	.926-.938	21.3-19.4	100-200
Viscous lubricating distillate	11.9	.938-.943	19.4-18.6	Above 200
Residuum	49.8	1.015	7.9	
Distillation loss	2.8			

1/ Distillation discontinued at 568° F.

Item 20

Bureau of Mines Bartlesville Laboratory
Sample 52094

IDENTIFICATION

Wolf Creek field
Wolf Creek well 3
Nanushuk, Lower Cretaceous
2,644-2,681 feet

Alaska
Naval Petroleum
Reserve No. 4

GENERAL CHARACTERISTICS

Specific gravity, 0.855 A. P. I. gravity, 34.0 Pour point, ° F., below 5
Sulfur, percent, 0.15 Color, brownish green
Saybolt Universal viscosity at 100° F., 42 sec.

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1—Distillation at atmospheric pressure, 759 mm. Hg
First drop, 133 ° C. (271 ° F.)

Fraction No.	Cut temp ° F.	Percent	Sum, percent	Sp. gr., 60/60° F.	° A. P. I., 60° F.	C. I.	Refractive index N_D at 20° C.	Specific dispersion	S. U. visc., 100° F.	Cloud test, F.
1	122									
2	167									
3	212									
4	257									
5	302									
6	347	6.7	6.7	0.791	47.4	-	1.44086	146.5		
7	392	9.3	16.0	.809	43.4	34	1.44672	153.3		
8	437	14.2	30.2	.823	40.4	35	1.45525	139.9		
9	482	14.7	44.9	.838	37.4	37	1.46432	150.6		
10	527	12.6	57.5	.852	34.6	39	1.47300	153.9		
STAGE 2—Distillation continued at 40 mm. Hg										
11	392	6.2	63.7	0.871	31.0	44			42	5
12	437	7.1	70.8	.875	30.2	42			49	30
13	482	5.6	76.4	.879	29.5	40			64	40
14	527	5.5	81.9	.890	27.5	42			100	50
15	572	5.0	86.9	.898	26.1	43			195	55
Residuum		12.3	99.2	.918	22.6					

Conradson carbon residue: Residuum, 2.6 percent; crude, 0.3 percent.

APPROXIMATE SUMMARY

	Percent	Sp. gr.	° A. P. I.	Viscosity
Light gasoline				
Total gasoline and naphtha	16.0	0.801	45.2	
Kerosine distillate	14.2	.823	40.4	
Gas oil	37.6	.852	34.6	
Nonviscous lubricating distillate	11.4	.876-.890	30.0-27.5	70-100
Medium lubricating distillate	5.5	.890-.899	27.5-25.9	100-200
Viscous lubricating distillate	2.2	.899-.902	25.9-25.4	Above 200
Residuum	12.3	.918	22.6	
Distillation loss	.8			

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