

## OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from Great Lakes Natural Gas Corporation, No. 1 Cottonwood Wash unit well,  
drilled NE 1/4, SW 1/4 of sec. 21, T. 11 S., R. 21 E., Uintah County, Utah

UR231 0' of 30  
0' of 25  
0' of 15  
40' of 11.7

Derrick Floor elevation 5,743 feet

Mohogany No. 1 25' 3'

Sample number		Run No.	Yield of product				Specific gravity of oil at 60°/60° F.		Properties of spent shale		Remarks
			Weight percent		Gas + loss	Gal. per ton			Tendency to	cokes	
Laramie	Their		Oil	Water		Spent shale		Oil	Water		
SBR59-4230	750-760	62654	1.2	1.8	96.3	0.7	3.0a	4.3		None	
SBR59-4231	760-770	62655	1.2	1.8	96.2	.8	3.1a	4.3		None	
SBR59-4232	770-780	62663	1.3	1.3	96.9	.8	3.3a	3.2		None	
SBR59-4233	780-790	62657	1.1	1.4	96.9	.6	2.7a	3.4		None	
SBR59-4234	790-800	62658	1.2	1.3	96.9	.6	3.0a	3.1		None	
SBR59-4235	800-810	62659	1.8	.7	95.8	1.7	4.7a	1.6		None	
SBR59-4236	<del>820-830</del>	62660	1.3	1.0	95.7	2.0	3.5a	2.3		None	
SBR59-4237	<del>830-840</del>	62661	1.5	.9	96.9	.7	3.9a	2.3		None	
SBR59-4238	<del>840-850</del>	62662	1.5	.9	96.7	.9	3.8a	2.2		None	
SBR59-4239	850-860	62656	1.5	1.2	96.5	.8	3.8a	2.9		None	
SBR59-4240	860-870	62664	1.3	1.1	96.9	.7	3.4a	2.8		None	
SBR59-4241	870-880	62665	1.4	1.0	97.1	.5	3.6a	2.3		None	
SBR59-4242	880-890	62666	1.4	.9	97.1	.6	3.7a	2.0		None	
SBR59-4243	890-900	62667	1.4	.7	97.1	.8	3.8a	1.7		None	
SBR59-4244	900-910	62668	1.7	.8	96.4	1.1	4.5a	1.8		None	
SBR59-4245	910-920	62669	1.5	1.0	96.7	.8	4.0a	2.4		None	
SBR59-4246	920-930	62670	1.5	1.1	96.6	.8	3.9a	2.7		None	
SBR59-4247	930-940	62671	2.0	1.1	95.9	1.0	5.2	2.6	0.925	None	
SBR59-4248	940-950	62672	2.1	1.0	96.1	.8	5.3	2.4	.925	None	
SBR59-4249	950-960	62673	1.9	1.1	96.1	.9	5.1a	2.6		None	
SBR59-4250	960-970	62674	1.9	1.1	96.4	.6	4.8a	2.6		None	
SBR59-4251	970-980	62675	2.6	1.1	95.3	1.0	6.9a	2.6		None	
SBR59-4252	980-990	62676	2.6	1.0	94.8	1.6	6.9	2.4	.925	None	
SBR59-4253	990-1000	62677	3.2	1.0	94.6	1.2	8.3	2.4	.921	None	
SBR59-4254	1000-1010	62678	2.8	1.2	95.0	1.0	7.4	2.9	.920	None	
SBR59-4255	1010-1020	62679	1.7	1.2	96.2	.9	4.5a	2.9		None	
SBR59-4256	1020-1030	62680	2.2	1.3	95.7	.8	5.8	3.1	.919	None	
SBR59-4257	1030-1040	62681	2.3	.7	96.2	.8	6.0a	1.7		None	
SBR59-4258	1040-1050	62682	3.0	1.2	94.7	1.1	7.7	2.9	.923	None	
SBR59-4259	1050-1060	62683	1.8	1.2	96.4	.6	4.8a	2.8		None	

a - Specific gravity estimated due to insufficient oil.

Drill-cutting samples received March 23, 1959; assays made on air-dried samples.

## OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from Great Lakes Natural Gas Corporation, No. 1 Cottonwood Wash unit well,  
drilled NE 1/4, SW 1/4 of sec. 21, T. 11 S., R. 21 E., Uintah County, Utah

Derrick Floor elevation 5,743 feet

Derrick Floor elevation 5,743 feet			Yield of product						Specific gravity of oil at 60°/60° F.	Properties of spent shale		Remarks
Sample number		Run No.	Weight percent				Gal. per ton			Tendency to coke		
			Oil	Water	Spent shale	Gas + loss	Oil	Water				
Laramie	Their											
SBR59-4260	1060-1070	62684	1.5	1.2	96.5	0.8	3.9a	2.9		None		
SBR59-4261	1070-1080	62685	1.6	1.2	96.6	.6	4.2a	2.9		None		
SBR59-4262	1080-1090	62686	.9	1.4	97.4	.3	2.4a	3.4		None		
SBR59-4263	1090-1100	62687	2.2	.8	96.4	.6	5.6	2.0	0.922	None		
SBR59-4264	1100-1110	62688	2.5	.8	95.7	1.0	6.5	1.8	.924	None		
SBR59-4265	1110-1120	62689	2.5	.7	95.8	1.0	6.5	1.7	.929	None		
SBR59-4266	1120-1130	62690	2.7	.8	95.6	.9	7.0	1.9	.923	None		
SBR59-4267	1130-1140	62691	3.0	.7	95.5	.8	7.8	1.8	.921	None		
SBR59-4268	1140-1150	62692	2.9	.8	95.3	1.0	7.5	1.9	.921	None		
SBR59-4269	1150-1160	62693	2.2	1.2	95.4	1.2	5.9a	2.8		None		
SBR59-4270	1160-1170	62694	2.1	1.1	96.0	.8	5.5	2.6	.923	None		
SBR59-4271	1170-1180	62695	2.2	.9	95.9	1.0	5.6	2.3	.925	None		
SBR59-4272	1180-1190	62696	3.1	1.1	95.0	.8	8.3	2.6	.903	None		
SBR59-4273	1190-1200	62697	2.8	.9	95.2	1.1	7.2	2.2	.926	None		
SBR59-4274	1200-1210	62698	3.0	1.0	95.3	.7	7.7	2.4	.922	None		
SBR59-4275	1210-1220	62699	2.9	.7	95.4	1.0	7.4	1.8	.923	None		
SBR59-4276	1220-1230	62700	2.7	.8	95.3	1.2	6.9	1.9	.931	None		
SBR59-4277	1230-1240	62701	2.6	1.0	95.8	.6	6.8	2.4	.925	None		
SBR59-4278	1240-1250	62702	3.7	1.1	94.0	1.2	9.6	2.6	.927	None		
SBR59-4279	1250-1260	62703	4.1	1.0	94.0	.9	10.5	2.4	.922	None		
SBR59-4280	1260-1270	62704	3.7	1.0	94.4	.9	9.7	2.4	.921	None		
SBR59-4281	1270-1280	62705	4.9	.8	93.1	1.2	12.8	2.0	.911	None		
SBR59-4282	1280-1290	62706	4.2	1.0	93.5	1.3	10.9	2.4	.919	None		
SBR59-4283	1290-1300	62707	4.3	.7	93.3	1.7	11.0	1.8	.925	None		
SBR59-4284	1300-1310	62708	4.6	1.3	91.1	3.0	12.0	3.1	.922	None		
SBR59-4285	1310-1320	62709	3.5	1.2	94.3	1.0	9.1	3.0	.915	None		
SBR59-4286	1320-1330	62710	3.4	1.6	94.0	1.0	9.0	3.8	.922	None		
SBR59-4287	1330-1340	62711	3.4	1.5	94.0	1.1	8.7	3.7	.925	None		
SBR59-4288	1340-1350	62712	3.1	1.7	94.4	.8	8.0	4.1	.924	None		
SBR59-4289	1350-1360	62713	3.3	1.6	94.0	1.1	8.6	3.8	.924	None		

a - Specific gravity estimated due to insufficient oil.

Drill-cutting samples received March 23, 1959; assays made on air-dried samples.

Laramie Petroleum Research Center, Laramie, Wyoming, Illustration No. SBR-2855P

September 22, 1959

## OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from Great Lakes Natural Gas Corporation, No. 1 Cottonwood Wash unit well,  
drilled NE 1/4, SW 1/4 of sec. 21, T. 11 S., R. 21 E., Uintah County, Utah

Derrick Floor elevation 5,743 feet

Derrick floor elevation 5,743 feet											
Sample number		Run No.	Yield of product				Specific gravity of oil at 60°/60° F.		Properties of spent shale Tendency to coke		Remarks
			Weight percent		Spent shale	Gas + loss					
			Oil	Water			Oil	Water			
Laramie	Thier										
SBR59-4290	1360-1370	62714	3.1	1.7	94.2	1.0	8.0	4.1	0.935	None	
SBR59-4291	1370-1380	62715	3.8	1.1	93.9	1.2	9.7	2.8	.925	None	
SBR59-4292	1380-1390	62716	3.7	1.3	93.5	1.5	9.7	3.1	.922	None	
SBR59-4293	1390-1400	62717	4.0	1.1	94.0	.9	10.6	2.6	.913	None	
SBR59-4294	1400-1410	62718	4.1	1.3	93.8	.8	10.7	3.1	.914	None	
SBR59-4295	1410-1420	62719	3.7	1.3	94.0	1.0	9.7	3.1	.917	None	
SBR59-4296	1420-1430	62720	3.6	1.3	94.2	.9	9.5	3.1	.917	None	
SBR59-4297	1430-1440	62721	3.7	1.2	94.1	1.0	9.7	2.9	.916	None	
SBR59-4298	1440-1450	62722	5.2	1.2	92.4	1.2	13.6	2.9	.914	None	
SBR59-4299	1450-1460	62723	5.4	1.2	92.0	1.4	14.1	2.9	.912	None	
SBR59-4300	1460-1470	62724	.8	1.4	97.2	.6	2.2a	3.4		None	
SBR59-4301	1470-1480	62725	2.4	1.2	95.9	.5	6.1	2.9	.922	None	
SBR59-4302	1480-1490	62726	2.4	1.3	95.4	.9	6.2	3.2	.921	None	
SBR59-4303	1490-1500	62727	2.5	1.3	95.4	.8	6.4	3.1	.918	None	
SBR59-4304	1500-1510	62728	2.2	1.4	95.8	.6	5.8	3.4	.932	None	
SBR59-4305	1510-1520	62729	2.5	1.2	95.4	.9	6.5	3.0	.921	None	
SBR59-4306	1520-1530	62730	1.2	.7	97.3	.8	3.1a	1.6		None	
SBR59-4307	1530-1540	62731	1.4	.8	97.4	.4	3.6a	2.0		None	
SBR59-4308	1540-1550	62732	2.1	.8	96.5	.6	5.4a	2.0		None	
SBR59-4309	1550-1560	62733	2.0	.7	97.0	.3	5.1a	1.7		None	
SBR59-4310	1560-1570	62734	1.5	.8	97.5	.2	4.0a	1.8		None	
SBR59-4311	1570-1580	62735	1.6	.9	97.3	.2	4.0a	2.2		None	
SBR59-4312	1580-1590	62736	1.7	.9	97.2	.2	4.5a	2.2		None	
SBR59-4313	1590-1600	62737	1.5	.9	97.3	.3	4.0a	2.1		None	
SBR59-4314	1600-1610	62738	1.3	1.3	97.0	.4	3.5a	3.0		None	
SBR59-4315	1610-1620	62739	1.2	1.3	97.2	.3	3.1a	3.1		None	
SBR59-4316	1620-1630	62740	.3	2.8	96.6	.3	.7a	6.7		None	
SBR59-4317-20	1630-1670						c				
SBR59-4321	1670-1680						b				
SBR59-4322-27	1680-1740						c				

a - Specific gravity estimated due to insufficient oil.

b - Less than 1.0 gallon of oil per ton of shale.

c - More than 1.0 but less than 3.0 gallons of oil per ton of shale.

Drill-cutting samples received March 23, 1959; assays made on air-dried samples.

Laramie Petroleum Research Center, Laramie, Wyoming, Illustration No. SBR-2856P September 22, 1959

## OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from Great Lakes Natural Gas Corporation, No. 1 Cottonwood Wash Unit well, drilled NE1/4, SW1/4 of sec. 21, T. 11 S., R. 21 E., Uintah County, Utah

Derrick Floor elevation - 5,743

Derrick Floor elevation - 5.743

Sample number	Run	Yield of product							Specific gravity of oil at 60°/60° F.	Properties of spent shale Tendency to coke	Remarks
		Weight percent				Gal. per ton					
		Oil	Water	Spent shale	Gas + loss	Oil	Water				
Laramie	Their	No.									
SBR59-4328	1740-1750	62741	0.7	2.1	97.1	0.1	1.7a	5.1		none	
SBR59-4329	1750-1760	62742	1.8	2.0	95.6	.6	4.8a	4.8		none	
SBR59-4330	1760-1770	62743	1.7	1.7	95.6	1.0	4.5a	4.1		none	
SBR59-4331	1770-1780	62744	2.0	2.0	95.5	.5	5.2a	4.7		none	
SBR59-4332	1780-1790	62745	2.1	1.8	95.3	.8	5.5a	4.3		none	
SBR59-4333	1790-1800	62746	1.6	1.9	95.7	.8	4.2a	4.6		none	
SBR59-4334	1800-1810	62747	1.6	1.9	96.1	.4	4.1a	4.6		none	
SBR59-4335	1810-1820	62748	1.3	1.4	96.2	1.1	3.3a	3.4		none	
SBR59-4336	1820-1830	62749	1.1	1.6	96.9	.4	2.8a	4.0		none	
SBR59-4337	1830-1840	62750	2.0	1.8	94.7	1.5	5.3a	4.2		none	
SBR59-4338	1840-1850	62751	1.9	1.2	96.2	.7	5.0a	2.9		none	
SBR59-4339	1850-1860	62752	1.4	.8	97.5	.3	3.7a	1.9		none	
SBR59-4340	1860-1870	62753	1.1	2.1	90.0	6.8	2.9a	5.1		none	
SBR59-4341	1870-1880	62754	1.3	2.0	95.2	1.5	3.4a	4.8		none	
SBR59-4342	1880-1890						trace				
SBR59-4343	1890-1900						b				
SBR59-4344	1900-1910	62755	1.5	1.1	96.4	1.0	3.8a	2.7		none	
SBR59-4345	1910-1920	62756	1.5	1.8	95.8	.9	3.8a	4.4		none	
SBR59-4346	1920-1930						b				
SBR59-4347-48	1930-1950						no oil				
SBR59-4349	1950-1960						b				
SBR59-4350	1960-1970	62757	.8	1.4	97.5	.3	2.2a	3.4		none	
SBR59-4351	1980-1990	62758	1.2	.8	97.7	.3	3.2a	2.0		none	
SBR59-4352-53	1990-2010						b				
SBR59-4354	2010-2020						c				
SBR59-4355	2020-2030						b				
SBR59-4356-57	2030-2050						c				
SBR59-4358	2050-2060						b				
SBR59-4359-60	2060-2080						c				
SBR59-4361	2080-2090						b				

a. - Specific gravity estimated due to insufficient oil; b. - Less than 1.0 gallon of oil per ton of shale; c. - More than 1.0 but less than 3.0 gallons of oil per ton of shale.

## OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from Great Lakes Natural Gas Corporation, No. 1 Cottonwood Wash Unit well, drilled NE1/4, SW1/4 of sec. 21, T. 11 S., R. 21 E., Uintah County, Utah

Derrick Floor elevation - 5,743

Derrick floor elevation - 5.743

Sample number		Run No.	Yield of product				Specific gravity of oil at 60°/60° F.	Properties of spent shale		Remarks
			Weight percent		Spent shale	Gas + loss		Gal. per ton		
Laramie	Their		Oil	Water					Oil	Water
SBR59-4362	2090-2100	62759	0.9	1.1	97.7	0.3	2.2a	2.6		none
SBR59-4363	2100-2110	62760	3.3	1.2	94.8	.7	8.5a	3.0		none
SBR59-4364	2110-2120	62761	1.2	.4	97.9	.5	3.0a	1.1		none
SBR59-4365	2120-2130						c			
SBR59-4366	2130-2140						trace			
SBR59-4367	2140-2150	62762	1.6	.5	97.4	.5	4.2a	1.3		none
SBR59-4368-69	2150-2170						no oil			
SBR59-4370	2170-2180						c			
SBR59-4371	2180-2190	62763	1.0	.8	96.7	1.5	2.7a	2.0		none
SBR59-4372	2190-2200						no oil			
SBR59-4373-74	2200-2220						b			
SBR59-4375	2220-2230						trace			
SBR59-4376	2230-2240						b			
SBR59-4377-78	2240-2260						trace			
SBR59-4379-81	2260-2300						b			
SBR59-4382	2360-2370						no oil			
SBR59-4383	2390-2400						trace			
SBR59-4384-86	2400-2430						b			
SBR59-4387	2430-2440						trace			
SBR59-4388-90	2450-2510						c			
SBR59-4391	2510-2520						b			
SBR59-4392-93	2520-2540						c			
SBR59-4394	2540-2550						trace			
SBR59-4395	2550-2560						b			
SBR59-4396-99	2560-2580						c			
SBR59-4400-02	2580-2600						no oil			
SBR59-4403	2590-2600						trace			
SBR59-4404-07	2600-2620						b			
SBR59-4408-09	2620-2640						no oil			
SBR59-4410	2630-2640						c			

a. - Specific gravity estimated due to insufficient oil; b. - Less than 1.0 gallon of oil per ton of shale; c. - More than 1.0 but less than 3.0 gallons of oil per ton of shale.

Drill cutting samples received March 23 1959; assays made on air-dried samples.

Laramie Petroleum Research Center, Laramie, Wyoming, Illustration No. SBR-2858P

September 22, 1959

## OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from Great Lakes Natural Gas Corporation, No. 1 Cottonwood Wash Unit well, drilled NE1/4, SW1/4 of sec. 21, T. 11 S., R. 21 E., Uintah County, Utah

Derrick Floor elevation - 5,743

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Sample number		Run No.	Yield of product				Gal. per ton		Specific gravity of oil at 60°/60° F.	Properties of spent shale Tendency to coke	Remarks
			Weight percent		Spent shale	Gas + loss	Oil	Water			
Laramie	Their		Oil	Water							
SBR59-4411	2610-2650						b				
SBR59-4412	2650-2660						trace				
SBR59-4413	2660-2670						c				
SBR59-4414	2670-2680						trace				
SBR59-4415	2680-2690						no oil				
SBR59-4416	2690-2700						c				
SBR59-4417-18	2700-2720						b				
SBR59-4419	2720-2730						no oil				
SBR59-4420	2730-2740						trace				
SBR59-4421-22	2740-2760						no oil				
SBR59-4423	2760-2770						b				
SBR59-4424-25	2770-2790						trace				
SBR59-4426	2790-2800						c				
SBR59-4427	2800-2810						trace				
SBR59-4428	2810-2820						b				
SBR59-4429	2820-2830						c				
SBR59-4430	2830-2840						b				
SBR59-4431	2860-2870						trace				
SBR59-4432-34	2870-2900						c				
SBR59-4435-36	2900-2920						trace				
SBR59-4437	2920-2930						b				
SBR59-4438	2930-2940						c				
SBR59-4439-40	2940-2960						no oil				
SBR59-4441	2960-2970						c				
SBR59-4442-45	2970-3010						no oil				
SBR59-4446	3010-3020	62764	2.2	1.6	95.3	0.9	5.8	3.8	0.925	none	
SBR59-4447-48	3020-3040						b				
SBR59-4449-53	3040-3090						no oil				
SBR59-4454-58	3090-3130						c				
SBR59-4459	3130-3140	62765	2.6	2.2	94.7	.5	6.7	5.3	.913	none	

b. - Less than 1.0 gallon of oil per ton of shale; c. - More than 1.0 but less than 3.0 gallons of oil per ton of shale.

Drill cutting samples received March 23, 1959; assays made on air-dried samples.

## OIL-SHALE ASSAYS BY MODIFIED FISCHER RETORT METHOD

Samples from Great Lakes Natural Gas Corporation, No. 1 Cottonwood Wash Unit well, drilled NE1/4, SW1/4 of sec. 21, T. 11 S., R. 21 E., Uintah County, Utah

Derrick Floor elevation - 5,743

Derrick floor elevation - 2,745

Sample number		Run No.	Yield of product				Specific gravity of oil at 60°/60° F.		Properties of spent shale		Remarks
			Weight percent		Spent shale	Gas + loss			Gal. per ton		
Laramie	Their		Oil	Water					Oil	Water	
SBR59-4460	3140-3150	62766	5.4	2.3	91.2	1.1	14.3	5.5	0.912	none	
SBR59-4461	3150-3160	62767	3.3	2.3	93.3	1.1	8.4	5.5	.925	none	
SBR59-4462-64	3160-3190						b				
SBR59-4465-66	3190-3210						trace				
SBR59-4467	3210-3220						no oil				
SBR59-4468	3220-3230						c				
SBR59-4469-72	3230-3270						no oil				
SBR59-4473	3270-3280	62768	2.0	1.4	95.8	.8	5.2a	3.4		none	
SBR59-4474-75	3280-3300						no oil				
SBR59-4476	3300-3310						c				
SBR59-4477-78	3310-3330						b				
SBR59-4479	3330-3340						trace				
SBR59-4480-81	3340-3360						c				
SBR59-4482	3360-3370						trace				
SBR59-4483-85	3370-3400						b				
SBR59-4486	3400-3410						trace				
SBR59-4487	3410-3420						no oil				
SBR59-4488	3420-3430						c				
SBR59-4489-90	3430-3450						no oil				
SBR59-4491-92	3450-3470						trace				
SBR59-4493-4510	3470-3650						no oil				
SBR59-4511	3650-3660						b				
SBR59-4512	3660-3670						c				
SBR59-4513-15	3670-3700						b				
SBR59-4516-18	3700-3730						trace				
SBR59-4519-22	3740-3780						no oil				
SBR59-4523-24	3780-3800						trace				
SBR59-4525	3800-3810						no oil				
SBR59-4526	3810-3820						b				
SBR59-4527-28	3820-3840						trace				

a. - Specific gravity estimated due to insufficient oil; b. - Less than 1.0 gallon of oil per ton of shale; c. - More than 1.0 but less than 3.0 gallons of oil per ton of shale.

Drill cutting samples received March 23, 1959; assays made on air-dried samples.