

Fischer Assay Report on
Cleveland Cliffs Oil Shale Samples
HRI Project: 7466

Hole Number	Sample Type(1)	Footage		Oil Yield	Oil Specific	Water Yield	Residue Weight	Gas+ Loss
		Begin	End	(gpt)	Gravity	(gpt)	(lb/ton)	(lb/ton)
6-1	DC	444	445	12.7	1.006	6.9	1817	19
6-1	DC	445	446	12.6	1.006	3.0	1837	34
6-1	DC	446	447	6.8	1.006	2.3	1907	17
6-1	DC	447	448	4.2	1.006	2.3	1929	17
6-1	DC	448	449	4.4	1.004	2.1	1931	16
6-1	DC	449	450	5.1	1.006	1.8	1926	16
9-1	RC	160	170	4.5	1.006	4.6	1910	14
9-1	RC	170	180	4.6	1.006	4.6	1911	13
9-1	RC	180	190	7.8	1.006	4.6	1877	19
9-1	RC	190	200	11.3	1.006	3.2	1857	22
STD		27-G		21.4	1.006	3.4	1742	49
9-1	RC	200	210	5.5	1.006	1.8	1925	14
9-1	RC	210	220	4.6	1.006	1.8	1934	12
9-1	RC	220	230	6.7	1.006	1.8	1913	16
9-1	RC	230	240	5.2	1.006	1.4	1933	13
9-1	RC	240	250	4.6	1.006	1.4	1939	12
9-1	RC	250	260	3.5	1.006	1.6	1947	10
9-1	RC	260	270	4.8	1.006	1.6	1932	15
9-1	RC	270	280	6.4	1.006	1.4	1919	16
9-1	RC	280	290	7.9	1.006	1.4	1907	16
9-1	RC	290	300	7.3	1.006	1.4	1910	17
9-1	RC	290	300R	7.4	1.006	1.4	1909	18
9-1	RC	300	310	6.7	1.006	1.6	1913	18
9-1	RC	320	330	7.7	1.006	2.3	1897	20
9-1	RC	330	340	6.8	1.008	2.3	1709	216
9-1	RC	380	390	4.1	1.006	1.8	1939	12
9-1	RC	367	377	7.6	1.006	2.5	1897	18
9-1	RC	377	390	7.7	1.006	2.7	1897	16
9-1	RC	390	400	9.3	1.006	2.3	1882	21
9-1	RC	400	410	10.6	1.006	2.3	1871	22
9-1	RC	410	420	9.9	1.006	2.5	1874	22
9-1	RC	420	430	13.5	1.006	2.5	1840	26
STD		27-G		21.4	1.006	3.2	1745	49
(1) DC- Drill Core				STD - Standard (22 gpt)				
RC - Rotary Cuttings				RE - Repeat Analysis				

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Hole Number	Sample Type(1)	Footage		Oil Yield (gpt)	Oil Specific Gravity	Water Yield (gpt)	Residue Weight (lb/ton)	Gas+ Loss (lb/ton)
		Begin	End					
9-1	RC	430	440	11.1	1.006	3.0	1858	25
9-1	RC	440	450	8.3	1.006	3.4	1882	20
9-1	RC	450	460	8.5	1.006	3.0	1879	21
9-1	RC	460	480	9.4	1.006	3.4	1872	21
9-1	DC	481.5	482	8.8	1.006	3.4	1877	21
9-1	DC	482	483	4.7	1.006	3.0	1920	16
9-1	DC	483	484	2.1	1.006	3.4	1944	10
9-1	DC	484	485	6.9	1.006	3.9	1894	17
9-1	DC	485	486	15.9	1.006	3.4	1810	29
9-1	DC	486	487	10.0	1.006	3.2	1871	19
9-1	DC	487	488	8.1	1.006	4.1	1883	14
9-1	DC	488	489	9.0	1.006	3.4	1881	15
9-1	DC	489	490	9.1	1.006	3.7	1875	18
9-1	DC	490	491	11.9	1.006	7.5	1819	19
9-1	DC	491	492	12.0	1.006	2.7	1854	22
9-1	DC	492	493	8.3	1.006	3.2	1889	15
9-1	DC	493	494	7.9	1.006	4.3	1883	15
9-1	DC	493	494R	8.6	1.006	4.1	1871	22
9-1	DC	494	495	7.2	1.006	3.2	1897	16
9-1	DC	495	496	7.7	1.006	3.2	1894	15
9-1	DC	496	497	10.2	1.006	3.7	1866	18
9-1	DC	497	498	14.7	1.006	6.6	1802	19
9-1	DC	498	499	9.7	1.006	3.4	1871	19
9-1	DC	499	500	9.6	1.006	3.4	1874	18
9-1	DC	500	501	8.8	1.006	3.2	1882	18
9-1	DC	501	502	8.7	1.006	3.4	1881	17
9-1	DC	502	503	10.3	1.006	2.8	1874	17
9-1	DC	503	504	9.8	1.006	3.2	1873	18
9-1	DC	504	505	8.6	1.006	2.5	1893	14
9-1	DC	505	506	10.9	1.006	4.6	1857	14
9-1		STD.	27-G	21.5	1.006	3.4	1741	50
9-1	DC	506	507	8.6	1.006	4.1	1875	18
9-1	DC	507	508	10.3	1.006	2.7	1871	20
9-1	DC	508	509	10.6	1.006	3.4	1865	18
9-1	DC	509	510	8.3	1.006	3.7	1886	14

(1) DC- Drill Core
RC - Rotary Cuttings

STD - Standard (22 gpt)
RE - Repeat Analysis

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Hole Number	Sample Type(1)	Footage		Oil Yield (gpt)	Oil Specific Gravity	Water Yield (gpt)	Residue Weight (lb/ton)	Gas+ Loss (lb/ton)
		Begin	End					
9-1	DC	510	511	8.8	1.006	3.0	1885	17
9-1	DC	511	512	13.4	1.006	3.0	1838	25
9-1	DC	512	513	7.5	1.006	3.9	1889	16
9-1	DC	513	514	6.5	1.006	3.2	1903	16
9-1	DC	514	515	4.1	1.006	2.5	1936	9
9-1	DC	515	516	7.3	1.006	2.7	1898	18
9-1	DC	516	517	12.5	1.006	2.5	1852	23
9-1	DC	517	518	9.7	1.006	2.5	1878	19
9-1	DC	518	519	7.9	1.006	2.3	1898	17
9-1	DC	519	520	8.5	1.006	2.3	1892	17
9-1	DC	520	521	9.4	1.006	3.2	1878	17
9-1	DC	520	521R	9.7	1.006	2.7	1879	17
9-1	DC	521	522	9.8	1.006	4.8	1863	15
9-1	DC	522	523	2.6	1.006	6.8	1914	7
9-1	DC	523	524	7.4	1.006	4.6	1883	17
9-1	DC	524	525	10.2	1.006	1.8	1881	18
9-1	DC	525	526	11.1	1.006	1.8	2083	18
9-1	DC	526	527	13.8	1.006	1.8	1306	25
9-1	DC	527	528	15.9	1.006	2.3	1847	29
9-1	DC	528	529	11.3	1.006	2.3	2079	24
9-1	DC	529	530	8.3	1.006	2.3	2033	21
9-1	DC	530	531	5.9	1.006	2.5	2207	19
9-1	DC	531	532	8.1	1.006	2.3	1650	19
9-1	DC	532	533	11.7	1.006	2.3	1372	23
9-1	DC	533	534	7.1	1.006	2.8	1899	19
9-1	DC	534	535	6.0	1.006	2.5	1911	18
9-1	DC	535	536	6.5	1.006	3.2	1900	19
9-1	DC	536	537	5.5	1.006	2.3	1917	18
9-1	DC	537	538	9.1	1.006	2.3	1886	19
9-1	DC	538	539	13.5	1.006	2.3	1843	25
9-1	DC	539	540	7.7	1.006	2.3	1895	22
9-1		STD.	27-G	21.3	1.006	3.4	1744	49
9-1	DC	540	541	8.2	1.006	2.1	1892	22
9-1	DC	541	542	15.4	1.006	2.3	1821	31
9-1	DC	542	543	29.5	1.006	3.0	1675	53

(1)

DC- Drill Core
RC - Rotary Cuttings

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Hole Number	Sample Type(1)	Footage		Oil Yield (gpt)	Oil Specific Gravity	Water Yield (gpt)	Residue Weight (lb/ton)	Gas+ Loss (lb/ton)
		Begin	End					
9-1	DC	543	544	10.5	1.006	1.8	1872	25
9-1	DC	544	545	11.2	1.006	2.3	1863	24
9-1	DC	545	546	11.8	1.006	2.3	1858	24
9-1	DC	546	547	12.5	1.006	2.3	1851	26
9-1	DC	547	548	26.0	1.006	3.0	1709	48
9-1	DC	548	549	12.2	1.006	2.3	1856	22
9-1	DC	549	550	15.6	1.000	2.3	1820	31
9-1	DC	550	551	26.2	1.006	3.4	1705	47
9-1	DC	551	552	6.5	1.006	2.3	1909	18
9-1	DC	552	553	4.4	1.006	2.3	1924	20
9-1		STD.	27-G	21.4	1.006	3.4	1742	50
9-1	DC	553	554	3.4	1.006	1.6	1940	18
9-1	DC	554	555	2.6	1.006	1.4	1951	16
9-1	DC	555	556	5.2	1.006	1.8	1925	16
9-1	DC	556	557	3.5	1.006	2.1	1937	17
9-1	DC	557	558	2.2	1.006	2.3	1948	15
9-1	DC	558	559	1.5	1.006	1.6	1960	14
9-1	DC	559	560	1.5	1.006	1.8	1960	12
9-1	DC	560	561	3.5	1.006	1.8	1940	15
9-1	DC	561	562	13.0	1.006	2.5	1838	32
9-1	DC	562	563	9.8	1.006	2.3	1875	24
9-1	DC	563	564	28.1	1.006	3.9	1662	70
9-1	DC	564	565	12.8	1.006	4.1	1829	30
9-1	DC	565	566	11.9	1.006	2.8	1849	29
9-1	DC	565	566R	12.0	1.006	2.5	1850	29
9-1	DC	566	567	9.2	1.006	3.2	1877	19
9-1	DC	567	568	14.9	1.006	4.1	1816	25
9-1	DC	568	569	23.3	1.006	4.6	1726	40
9-1	DC	569	570	21.0	1.006	2.3	1768	37
9-1	DC	570	571	30.7	1.006	2.7	1675	44
9-1	DC	571	572	33.7	1.006	4.1	1631	52
9-1	DC	572	573	17.4	1.006	3.4	1794	32
9-1	DC	573	574	13.3	1.006	3.4	1832	28
9-1	DC	574	575	9.7	1.006	3.0	1873	21

(1)

DC- Drill Core

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Hole Number	Sample Type(1)	Footage		Oil Yield (gpt)	Oil Specific Gravity	Water Yield (gpt)	Residue Weight (lb/ton)	Gas+ Loss (lb/ton)
		Begin	End					
9-1	DC	575	576	17.7	1.006	3.2	1794	31
9-1	DC	576	577	9.2	1.006	2.3	1884	20
9-1	DC	577	578	9.9	1.006	1.8	1879	22
9-1	DC	578	579	6.7	1.006	4.6	1890	16
9-1	DC	579	580	8.3	1.006	1.6	1896	21
9-1	DC	580	581	7.3	1.006	1.6	1907	19
9-1	DC	581	582	10.7	1.000	2.1	1874	20
9-1	DC	582	583	28.6	1.006	2.5	1701	38
9-1		STD.	27-G	21.9	1.006	3.2	1741	49
9-1	DC	583	584	30.3	1.006	3.9	1660	54
9-1	DC	584	585	18.1	1.006	2.3	1799	31
9-1	DC	585	586	14.8	1.006	2.7	1824	29
9-1	DC	586	587	14.6	1.006	2.8	1823	32
9-1	DC	587	588	24.3	1.006	3.0	1733	38
9-1	DC	588	589	27.9	1.006	2.7	1696	48
9-1	DC	589	590	26.8	1.006	2.7	1718	35
9-1	DC	590	591	32.6	1.004	2.7	1657	47
9-1	DC	591	592	41.1	1.006	4.3	1552	67
9-1	DC	592	593	70.6	1.006	6.8	1225	126
9-1	DC	593	594	61.7	1.006	7.5	1327	93
9-1	DC	594	595	40.9	1.006	4.1	1566	57
9-1	DC	595	596	51.2	1.006	4.6	1453	80
9-1	DC	596	597	23.4	1.006	3.4	1740	36
9-1		STD.	27-G	21.3	1.006	3.4	1743	50
9-1	DC	597	598	17.6	1.006	2.7	1796	34
9-1	DC	598	599	32.8	1.006	2.7	1654	48
9-1	DC	599	600	42.2	1.006	3.2	1558	61
9-1	DC	600	601	19.1	1.006	3.4	1779	33
9-1	DC	601	602	14.2	1.006	3.0	1827	29
9-1	DC	602	603	15.0	1.006	3.4	1834	12
9-1	DC	603	604	16.8	1.006	3.4	1800	30
9-1	DC	604	605	17.6	1.006	2.3	1807	26
9-1	DC	605	606	25.5	1.006	2.7	1728	36
9-1	DC	606	607	38.8	1.006	3.2	1585	63

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DC- Drill Core

RC - Rotary Cuttings

STD - Standard (22 gpt)

RE - Repeat Analysis

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Hole Number	Sample Type(1)	Footage		Oil Yield (gpt)	Oil Specific Gravity	Water Yield (gpt)	Residue Weight (lb/ton)	Gas+ Loss (lb/ton)
		Begin	End					
9-1	DC	607	608	20.3	1.006	2.3	1774	37
9-1	DC	608	609	24.1	1.006	2.8	1738	37
9-1	DC	609	610	26.8	1.006	2.3	1713	42
9-1	DC	610	611	15.8	1.006	3.7	1807	31
9-1		STD.	27-G	21.0	1.006	3.4	1749	47
9-1	DC	611	612	13.4	1.006	3.0	1834	29
9-1	DC	612	613	32.0	1.000	3.4	1651	53
9-1	DC	613	614	25.9	1.006	3.7	1711	42
9-1	DC	614	615	8.5	1.006	2.5	1885	23
9-1	DC	615	616	11.1	1.006	3.4	1855	24
9-1	DC	616	617	8.9	1.006	2.3	1883	23
9-1	DC	617	618	15.8	1.006	2.5	1820	27
9-1	DC	618	619	33.7	1.006	3.0	1642	51
9-1	DC	619	620	29.9	1.006	2.3	1691	39
9-1	DC	620	621	22.1	1.006	1.8	1768	32
9-1	DC	621	622	19.1	1.006	3.0	1783	32
9-1	DC	622	623	23.4	1.006	3.0	1745	34
9-1	DC	622	623R	23.5	1.006	3.2	1742	35
9-1	DC	623	624	22.3	1.006	2.3	1757	37
9-1	DC	624	625	16.2	1.006	3.9	1797	35
9-1	DC	625	626	11.3	1.006	2.8	1857	26
9-1	DC	626	627	9.4	1.006	3.0	1873	23
9-1	DC	627	628	12.8	1.006	3.0	1838	29
9-1	DC	628	629	20.2	1.006	3.2	1764	40
9-1	DC	629	630	8.6	1.006	2.7	1883	23
9-1	DC	630	631	7.1	1.006	2.5	1898	22
9-1	DC	631	632	5.3	1.006	3.0	1911	20
9-1	DC	632	633	3.9	1.006	1.8	1936	16
9-1	DC	633	634	10.2	1.006	2.5	1874	20
9-1	DC	634	635	9.4	1.006	2.3	1884	19
9-1	DC	635	636	4.2	1.006	5.7	1904	14
9-1	DC	636	637	17.9	1.006	2.8	1800	27
9-1	DC	636	637R	17.9	1.006	2.7	1800	27
9-1	DC	637	638	17.4	1.006	2.3	1805	30

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DC- Drill Core

RC - Rotary Cuttings

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RE - Repeat Analysis

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Hole Number	Sample Type(1)	Footage		Oil Yield (gpt)	Oil Specific Gravity	Water Yield (gpt)	Residue Weight (lb/ton)	Gas+ Loss (lb/ton)
		Begin	End					
9-1	DC	638	639	6.7	1.006	1.8	1908	20
9-1	DC	639	640	8.0	1.006	2.3	1892	22
9-1	DC	640	641	28.9	1.006	3.4	1685	44
9-1	DC	641	642	11.6	1.006	3.0	1857	21
9-1	DC	642	643	5.5	1.006	2.7	1912	19
9-1	DC	643	644	2.7	1.006	2.7	1942	13
9-1	DC	644	645	3.5	1.000	3.0	1935	11
9-1	DC	645	646	5.5	1.006	3.0	1915	14
9-1	DC	646	647	16.2	1.006	4.1	1802	28
9-1	DC	647	648	16.5	1.006	6.9	1781	23
9-1	DC	648	649	11.4	1.006	3.7	1851	23
9-1	DC	649	650	6.0	1.006	2.7	1909	18
9-1		STD.	27-G	21.3	1.006	3.4	1745	48
9-1	DC	650	651	4.2	1.006	2.5	1930	14
9-1	DC	651	652	4.2	1.006	2.7	1928	14
9-1	DC	652	653	5.1	1.006	2.5	1920	17
9-1	DC	653	654	5.3	1.006	3.0	1914	17
9-1	DC	654	655	7.0	1.006	3.0	1898	19
9-1	DC	655	656	3.1	1.006	3.0	1935	15
9-1	DC	656	657	8.6	1.006	3.6	1875	23
9-1	DC	657	658	5.3	1.006	3.4	1907	20
9-1	DC	658	659	1.6	1.006	4.6	1933	15
9-1	DC	659	660	3.2	1.006	3.4	1932	12
9-1	DC	660	661	3.4	1.006	6.4	1902	16
9-1	DC	661	662	3.2	1.006	4.6	1924	11
9-1	DC	662	663	5.3	1.006	4.1	1910	11
9-1	DC	663	664	4.1	1.006	2.5	1918	26
9-1	DC	664	665	6.4	1.006	3.7	1900	17
9-1	DC	665	666	4.5	1.006	3.0	1926	12
9-1	DC	666	667	2.8	1.006	2.5	1944	13
9-1		STD.	27-G	21.3	1.006	3.4	1746	47
9-1	DC	667	668	2.2	1.006	3.9	1935	14
9-1	DC	668	669	5.6	1.006	1.4	1928	14
9-1	DC	669	670	6.5	1.006	1.4	1924	10

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DC - Drill Core

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RE - Repeat Analysis

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Hole Number	Sample Type(1)	Footage		Oil Yield (gpt)	Oil Specific Gravity	Water Yield (gpt)	Residue Weight (lb/ton)	Gas+ Loss (lb/ton)
		Begin	End					
9-1	DC	670	671	1.0	1.006	1.6	1969	10
9-1	DC	671	672	0.5	1.006	1.6	1973	9
9-1	DC	672	673	0.6	1.006	1.6	1972	10
9-1	DC	673	674	0.8	1.006	1.6	1970	10

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