

Cutting Description

Corehole #2

272' FNL x 773' FEL  
Sec. 5, T6S, R97W  
Garfield County, Colorado  
Ground Elevation 8501  
Kelly Bushing 8511

## Corehole #2

From	To	Description
0	10	Sandstone, brown badly weathered, very friable.
10	15	Siltstone, light brown to medium brown.
15	20	Sandstone, light brown, very fine grained, 60%. Siltstone, dark brown with carbonaceous inclusions, 40%.
20	25	As above.
25	30	Sandstone, as above, 82%. Siltstone dark gray, 15%. Marlstone laminated light brown to dark brown, 3%.
30	35	Sandstone, as above, with carbonaceous fragments, 50%. Shale dark gray, slightly carbonaceous, 50%.
35	40	Sandstone, as above, 50%. Shale as above, 50%.
40	45	Siltstone, dark gray, friable, 65%. Sandstone, as above, 35%.
45	50	Sandstone, medium brown, very fine grained, scattered occurrence of pyrite, 60%. Shale, dark gray, silty, 40%.
50	55	Same as above.
55	60	Shale, dark brown. Sandstone very dark brown to gray, micaceous.
60	65	Shale, as above, 70%. Marlstone, dark gray to dark brown 30%.
65	70	Marlstone dark gray, 50%. Siltstone dark gray, 50%.
70	75	Sandstone, siltstones and pieces of aragonite. (Cuttings contaminated by cavings.)
75	80	Siltstone, dark gray, 50%. Marlstone, dark gray, 50%.
80	85	Shale, siltstone, marlstone, dark brown to dark gray.

## Corehole #2

From	To	Description
85	90	As above.
90	95	Siltstone, medium brown, 50%. Shale gray, 50%.
95	100	Siltstone, dark brown, Shale dark gray.
100	105	Sandstone, light brown, Shale dark gray. (Aragonite, possibly contamination of sample due to caving.)
105	110	Shale, dark gray, silty, 50%. Sandstone, medium brown 50%.
110	115	As above.
115	120	As above.
120	125	Siltstone, gray with some carbonaceous inclusions.
125	130	As above.
130	135	As above.
135	140	As above, with dead oil stain or possibly pipe dope.
140	145	As above.
145	150	Siltstone, as above 90%. Clay, gray, 10%.
150	155	As above.
155	160	As above.
160	165	As above with a 1/4" nodule of pyrite.
165	170	Sandstone, light brown, very fine grained with some carbonaceous fragments.
170	175	Siltstone, slightly varved light gray to brown.
175	180	Siltstone, slightly varved gray.
180	185	As above.
185	190	Siltstone, varved medium to dark brown with carbonaceous fragments.

## Corehole #2

From	To	Description
190	195	Siltstone, varved medium to dark brown with carbonaceous fragments.
195	200	As above.
200	205	As above.
205	210	As above.
210	215	Siltstone, olive green with some carbonaceous fragments.
215	220	As above.
220	225	As above with distinct varving.
225	230	Oil shale, varved light brown to medium brown, 50%. Siltstone, gray, 50%.
230	235	Oil shale, as above, 30%. Siltstone, as above, 70%.
235	240	Siltstone, brown, varved.
240	245	As above.
245	250	Siltstone, marlstone interbedded with traces of altered tuff.
250	255	Siltstone, brown varved with traces of analcitized tuff.
255	260	As above, with some pyrite.
260	265	Siltstone, varved light brown.
265	270	Siltstone, light brown, 40 %. Oil shale, varved light brown to dark brown 30%. Tuff, gray, analcitized, 30%.
270	275	Marlstone, light brown to medium brown slightly varved, 60%.
275	280	Siltstone, gray to light brown.
280	285	Marlstone, slightly varved light gray to light brown, 90%. Siltstone, light brown to dark gray with traces of pyrite along laminations, 10%.

## Corehole #2

From	To	Description
285	290	Missing.
290	295	Siltstone, light brown, 80%. Marlstone, varved light brown to dark brown 20%.
295	300	Missing.
300	305	Siltstone, light brownish gray with small carbonaceous inclusions.
305	310	Siltstone, gray to brownish gray.
310	315	As above.
315'	320'	As above, with relatively large 2% showing of pyritization.
320'	325'	As above.
325'	330'	Missing.
330'	335'	As above with carbonaceous inclusions (Fragments)
335'	340'	As above.
340'	345'	As above with traces of pyritization.
345'	350'	As above.
350'	355'	Siltstone, gray, pyritization 2%, with carbonaceous inclusions.
355'	360'	Siltstone, gray argillaceous
360'	365'	Siltstone, gray, carbonaceous fragments (inclusions) 70% Marlstone varved light brown to dark brown, silty 3% .
365'	370'	Siltstone, gray to light brown carbonaceous inclusions slightly varved, traces of light brown Marlstone.
370'	375'	As above.

## Corehole #2

From	To	Description
1526'	1530'	Oil Shale dark brown, Siltstone light brown 50-50.
1530'	1535'	Siltstone, olive green oil shale light brown to dark brown slightly varved siltstone green, 80%; siltstone gray, 20%.
1535'	1540'	Missing
1540'	1545'	Siltstone gray trace of oil shale medium brown.
1545'	1550'	Siltstone olive green to brown 60%, oil shale dark brown 35%, grayish, shale 5%
1550'	1555'	Siltstone gray green 50% siltstone brown 25%, oil shale, dark brown, 25%
1555'	1570'	As above.
1570'	1575'	As above.
1575'	1580'	As above.
1580'	1585'	Siltstone light gray green 80%, shale dark gray with trace of oil shale 20%.
1585'	1590'	Siltstone light brown 80% shale dark gray with trace of oil shale.
1590'	1595'	As above.
1595'	1600'	Siltstone light brown, trace oil shale.
1600'	1605'	Siltstone light brown 40%, siltstone gray green 40%, oil shale dark brown 20%.
1605'	1610'	As above.
1610'	1615'	As above.
1615'	1620'	As above.
1620'	1625'	Siltstone gray green
1625'	1630'	Siltstone, light brown to gray green.

From	To	Description
1630'	1635'	As above.
1635'	1640'	As above.
1640'	1645'	As above.
1645'	1650'	As above.
1650'	1655'	Siltstone gray green 40%, siltstone light brown 40%, oil shale dark brown 20%.

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272' FNL x 773' FEL  
Sec. 5, T.6.S., R97W  
Garfield County, Colorado

Ground Elev. 8501'  
Kelly Bushing 8511'

## Corehole #2

From	To	Description
Core #1 375.0' to 379.6', cored 4.6' recovered 4.35 recovery 94%		
375.0	378.75	Siltstone, light buff, slightly dolomitic, very finely laminated; tuffs less than 1" thick, gray analcitized, irregularly bedded at 376.9, 377.5, 377.7 and 377.85.
378.75	379.35	Oil Shale, dark brown, irregular contact with unit above; very thin tuffs, irregularly bedded occur throughout interval; some are analcitized; small blebs of tuff are frequent throughout.
379.35	379.6	Missing.
Core #2 379.6 to 393.0 Cored 13.4 Recovered 13.2 Recovery 98%		
379.6	384.6	Oil Shale, dark brown, calcareous, blebs and very thin beds of tuffs and analcitized tuffs throughout unit, irregular and distorted bedding exists around larger tuff blebs, at 382.0' and 382.4, tuffs, 1" thick; some of the analcitized tuffs are vuggy and show traces of gilsonite.
384.6	385.9	Oil Shale (lean), medium brown, banded with light greenish brown marlstone; at 384.8 and 384.9, tuff, gray, analcitized; irregularly bedded, vuggy with trace of gilsonite around vugs.
385.9	392.8	Marlstone, finely laminated brown to light greenish brown; very thin laminae of analcitized tuff throughout unit; 388.0, a fracture at 60°, slight reddish film (iron carbonate) on fracture surface; at 391.8, 392.3 and 392.5 three beds of tuff, analcitized, irregularly bedded, gilsonite around contact of tuff at 392.30, the lower 4 1/2" of unit is grading to oil shale.
392.8	393.0	Missing.
Core #3 393.0 to 409.4 Cored 16.4 Recovered 12.5 Recovery 76%		
393.0	394.0	Oil Shale, varved dark brown to black, very thin bands of irregularly bedded light brown tuffs.

Corehole #2

From	To	Description
394.0	394.5	Oil Shale, very light brown to gray, dolomitic, bedded in bands 1/4" to 2" thick.
394.5	396.0	Marlstone, varved very light brown, dolomitic to calcareous; local banding of brown oil shale at 395.0.
396.0	397.9	Claystone varved gray to very light brownish gray; upper foot of interval fractured along bedding every few tenths of a foot; red stain on fracture surfaces at 396.2 (iron carbonate).
397.9	401.1	Claystone, varved gray to brownish gray, non-calcareous.; local banding to black oil shale; fractured on bedding every few tenths of a foot.
401.1	402.3	Claystone, very light brown, non calcareous, vuggy containing pyrite, gilsonite, distorted bedding around vugs.
Core #3	402.3 to 409.4	Cored 7.1 Recovered 3.2 Recovery 45%
402.3	404.9	Claystone, varved gray to brownish gray, non calcareous; locally porous stringers of tuff.
404.9	405.5	Claystone to very lean oil shale varved brown, dolomitic, conchoidal fracture.
405.5	409.4	Missing.
Core #4	409.4 to 419.5	Cored 10.1 Recovered 9.7 Recovery 96%
409.4	410.8	Claystone, very light brown, irregular laminae; local oil shale calcareous.
410.8	414.8	Claystone, very light brown to grayish brown with occasional black banding due to black oil shale; at 411.2 fossils.
414.8	415.0	Claystone to lean oil shale, varved very light brown to brown, distorted bedding.

## Corehole #2

From	To	Description
415.0	416.9	Claystone, grayish brown; at 415.0, tuff, approximately 1 1/4" thick analcitized.
416.9	418.4	Oil shale, black with finely interbedded and contorted analcitized tuffs; top 2 1/2" contains small vugs.
418.4	419.2	Claystone, grayish brown, containing thin gray analcitized tuffs parallel to bedding.
419.2	419.5	Missing.
Core #5	419.5 to 444.8	Cored 25.3' Recovered 18.0 Recovery 71%
419.5	423.0	Claystone to lean oil shale, very light brown, massive, non-calcareous; the lower 1 1/2" contains several thin bands of tuff.
423.0	424.8	Missing.
424.8	427.0	Oil Shale (lean), varved very light brown to dark brown; minor thin tuffs scattered in interval.
427.0	429.5	Tuff, analcitized and oil shale (lean), gray to brown, irregular bedding, dolomitic, analcitization occurs just above 428.0
429.5	431.3	Missing.
431.3	433.3	Oil shale with interbedded tuffs, light brown to gray, distorted bedding of the oil shale common.
433.3	435.1	Missing.
435.1	440.0	Oil shale, light brown, dolomitic, with many inclusions of gray tuff, distorted bedding around tuff inclusions.
440.0	441.3	Missing.
441.3	444.8	Oil Shale, very light brown, high angle fracture filled with dolomite on interval from 443.4 to 444.4.

## Corehole #2

From	To	Description	
Core #6	448.8 to 471.3	Cored 26.5'	Recovered 24.5 Recovery 92%
444.8	453.8	Oil shale (lean), varved very light brown to brown, dolomitic; alternating lean and rich zones forming banding; analcite in vug at 445.6'; thin band of tuff at 448.4.	
453.8	465.8	Oil Shale (very lean), with interbedded claystones; tuff stringers on interval common, they are sinuous and surrounding oil shale exhibits distorted bedding; at 463.6, tuff, blue gray, anacitized.	
465.8	469.3	Claystone with interbedded tuffs; interval is badly broken, long fractures breaks interval in half.	
469.3	471.3	Missing.	
Core #7	471.3 to 487.4	Cored 16.1'	Recovered 16.1 Recovery 100%
471.3	474.0	Oil Shale, very light brown with interbedded claystone, dolomitic; 1 1/4" gray tuff band at bottom of interval.	
474.0	476.0	Siltstone, gray, massive, hackly fracture on fresh break, composed of very fine crystal faces.	
476.0	481.0	Oil shale, brown to black calcareous; tuff, very light brown, 1" wide at 476.9; calcite, white, very finely crystalline at 478.2.	
481.0	482.9	Siltstone, gray, massive, calcareous, hackly fracture surface.	
482.9	487.4	Oil Shale, varved very light brown to brown, calcareous; at 486.0, lense of gilsonite, pyrite and white vein mineral anhydrite; analcite cuts halfway through the core; at 484' thin band of black gilsonite containing pyrite.	
Core #8	487.4 to 491.2	Cored 3.8'	Recovered 3.8' Recovery 100%
487.4	489.3	Oil shale, varved very light brown, calcareous.	

Corehole #2

From	To	Description
489.3	491.2	Oil Shale, varved very light brown to gray; occasional tuffs in interval; sugary crystalline inclusion 1" X 1 1/2" at 489.3; local small crystals of calcite.
Core #9 491.2 to 517.7 Cored 26.5' Recovered 26.5 Recovery 100 %		
491.2	508.1	Oil Shale, dark brown, massive, dolomitic to calcareous; vugs and brecciated zones filled with dead oil; the oil smears the core and actually exists in heavier form in fissures around the vugs; at 491.3, a vug, filled with oil; most vugs have crystals of dolomite in them; at 491.3 vug contained a dolomite crystal 3/4" in diameter; other vugs and brecciated zones saturated with heavy oil are at 492.4', 492.6', 494.1' 496.1', 498.1', 499.3', 500.7', 500.9', 502.0', and 502.2'; fractures from 503.3' to 504.8', 505.4', 508'; these zones appear to be altered from original tuff zones.
508.1	510.2	Marlstone, varved light brown, slightly kerogenetic, slump and compression structure exists from 509.4 to 510.4
510.2	517.7	Siltstone, light buff interbedded with thin 1" thick layers of varved marlstone, calcareous to dolomitic, vuggy; thin layers of medium grained sand stone have been squeezed into bleb type masses; enterolithic structures exist toward the bottom of the unit; traces of heavy oil also exist throughout the unit.
Core #10 517.7 to 565.0 Core 47.3' Recovered 46.8 Recovery 99%		
517.7	555.7	Siltstone and very fine grained sandstone light gray to grayish brown, interbedded with medium brown varved oil shale, calcareous; the siltstones and sandstones are saturated with dead oil; vugs and solution cavities exist throughout the entire unit; the vugs contain residual clay blades, boxworks are characteristic of vugs from which nahcolite has been leached; calcite and gilsonite also occur in the vugs; vugs and solution breccias

Corehole #2

From	To	Description
		of interest are at 532.7, 534.5, 546.0, 546.1, 547.5, 548.9, 549.5, 550.0, 550.4, 551.2 to 553.0, 553.3, 553.7, 554.4, 555.3 and 555.6; tuffs appear to alter greatly; in some instances sucrosic type dolomite occurs as a characteristic of the analcitized tuffs.
555.7	564.5	Oil Shale, varved light brown to medium brown, calcareous, some loop bedding structures; from 558.5 to 559.3, sandstone, gray brown, very fine grained; at 561.5, 563.0 and from 564.3 to 564.5 vugs containing residual clay blades; tuffaceous streaks exist throughout the unit; at 560.4, brecciated zone 1" thick; blebs of tuff at 562.5 and continue through remainder of unit.
564.5	565.0	Missing.
Core #11	565.0 to 611.9	Core 46.9 Recovered 45.5 Recovery 97%
565.0	573.0	Oil Shale, varved very light brown; local vugs coated with gilsonite; bladed structure in vugs; at 565.8, fracture with very smooth surface; from 571.5 to 571.9 and from 572.5 to 572.8 these intervals are siltstones.
573.0	576.2	Siltstone, pinkish brown, massive, hackly fracture.
576.2	585.1	Oil shale, very light brown, with interbedded brown siltstone.
585.1	587.0	Siltstone, gray, fossiliferous, slightly calcareous.
587.0	607.1	Oil Shale, very light brown to brown, massive; at 588.2 and 589.5 locally sinuous gray inclusions; some oil shale in so lean that it approaches marlstone.
607.1	608.5	Missing.
608.5	611.9	Oil shale, light brown, dolomitic, smooth texture, considerable fracturing parallel to bedding.

Corehole #2

From	To	Description
Core #12 611.9 to 655.0	Cored 43.1	Recovered 43.1 Recovery 100%
611.9	618.9	Oil Shale, varved medium brown to dark brown, dolomitic to calcareous; tuff bands and blebs throughout unit; from 615.9 to 616.4 brecciated zone saturated with dead oil; tuffs at 612.5, 616.5, 616.6 and 617.9 saturated with dead oil.
618.9	654.7	Oil shale, varved light brown to medium brown, dolomitic to calcareous; considerable amount of dead oil in porous zones, on some fresh fractures and tuffs at 624.3, 625.5, 628.9, 629.3, 630.2, 636.1, 638.8, 643.2 and 654.5.
654.7	655.0	Oil shale, varved medium to dark brown, loop bedding structure, enterolithic structure at 655.4; unit starts with very thin tuff at 654.7.
Core #13 655.0 to 714.0	Cored 59.0	Recovered 59.0 Recovery 100%
655.0	671.7	Oil shale, varved medium dark brown to dark brown, dolomitic, some looped bedding but unit characteristics uniform; from 656.0 to 657.5 high angle fracture, fracture surface has residual oil coating; some dead oil on core surface; at 661.1, 662.8 and 664.5 analcitized tuff bed, irregularity and discontinuously bedded, residual oil found in all of these tuffs.
671.7	688.5	Oil shale, varved light brown to dark brown, calcareous, light greenish brown to dark greenish brown banding from 1/2" to 2 1/2" thick; at 673.4, 676.3, 677.8, 680.3, 681.2 and 682.8, tuffs analcitized, vuggy, containing residual oil; core breaks on bedding planes, some residual oil on fracture surface.
688.5	707.9	Oil Shale, varved greenish brown to dark brown, calcareous, frequent loop bedding and banding; at 689.7, 693.2, 693.8, 694.9, 695.8, 701.7, 705.7 and 705.8, tuffs, 1 1/4" thick or less, analcitized, irregularly bedded; at 707.5 and 707.0 blebs of tuff surrounded by distorted bedding in the oil shale.

## Corehole #2

From	To	Description
707.9	714.0	Oil shale, varved medium brown to dark brown, uniformly laminated; at 709.5, 712.5 and 712.6, tuff beds.
Core #14	714.0 to 768.1	Cored 54' Recovered 54' Recovery 100%
714.0	743.5	Oil shale (fairly lean), greenish grey to brown; oil shale alternates richer and leaner; plant fragments and insect larvae on some bedding plane fractures; bedding plane fracture also contains residual oil; at 724.7, 734.5 and 742.3 tuffs with some residual oil.
743.5	758.1	Oil shale, dark brown massive, alternating to thick brown varved oil shale, loop bedding; at 751.1, 751.7, 753.05, 753.15 tuffs, contain residual oil and some have escaping gas.
758.1	763.0	Oil shale, varved medium greenish brown to dark brown, calcareous, loop bedding; from 760.4 to 760.7 a sequence of interbedded tuffs and oil shale, tuff is irregularly bedded, vuggy, contains some hydrocarbon and bubbles from escaping gas.
763.0	765.1	Oil shale, medium brown to dark brown, massive, calcareous to dolomitic.
765.1	768.1	Oil shale, varved dark brown to dark greenish brown, loop bedding structure, blebs of analcitized tuff rare; vertical fracture with calcite on fracture surface.
Core #15	768.1 to 826.2	Core 58.1 Recovered 58.1 Recovery 100%
768.1	774.5	Oil shale, varved dark brown, calcareous; continuation of fracture in previous core from 768.1 to 770.0; at 770.6, 770.8, 771.0 and 771.4 tuffs, analcitized, irregularly bedded, contains some degree of hydrocarbon saturation.
774.5	775.0	Oil shale, brown, almost waxy luster, irregularly bedded, strong odor.
775.0	805.0	Oil shale, varved brown to dark brown;

Corehole #2

From	To	Description
775.0	805.0 (Con't)	at 777.4, 777.8, 777.9, 780.0, 780.6, 781.3, 784.3, 787.4, 789.4, 789.5, 791.0, 792.6, 793.4, 796.5, 802.7, 803.7 and 804.5 tuffs; at 800.4, small streak of gilsonite.
805.0	815.5	Oil shale, varved dark brown to black, calcareous; streaks of gilsonite rare; at 807.9, 809.5 and 812.5 tuffs; at 814.7, tuff, 3 1/2" thick, irregularly bedded, vuggy, analcitized.
815.5	817.9 <i>Wavy bed</i>	Tuff, analcitized, vuggy with some fine laminae of oil shale, saturated with hydrocarbon.
817.9	826.2	Oil shale, varved dark brown, calcareous, some loop and truncated bedding, slump structure, blebby toward bottom.
Core #16	826.2 to 884.4	Cored 58.2 Recovered 57.7 Recovery 99%
826.2	840.6	Oil shale, dark brown, massive, calcareous, plant fragments throughout unit; at 831.9 tuff, 1/2" thick.
840.6	860.8	Oil shale, varved dark brown to medium greenish brown, from 856.3 to 857.4 and from 859.9 to 860.8 two zones, darker in color and more distinctly varved, dolomitic; at 856.5, 857.4, 858.3, 860.1, 860.4 and 860.8, blebs and irregularly bedded tuffs.
860.8	867.7	Oil shale (lean), varved very light brown to medium brown, interbedded with light brown marlstone, loop structure abundant at 864.6, 864.7, 864.8, 865.7, 865.8 and 866.3, tuff zones, at 865.8 tuff is very irregularly bedded and exhibits distinct cast loading features on its contact.
867.7	871.5	Siltstone, light buff, slightly varved with some loop structures; high angle fractures with oil residue on fracture surface (Top of "A" Groove).

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From	To	Description
871.5	875.9	Oil shale (lean) varved light brown to medium brown, loop bedding; at 872.5, 872.6, 872.8, 873.0 and 874.4 tuffs; the zone 874.4 to 875.0 is darker and more distinctly varved.
875.9	876.1 <i>False MKC</i>	Tuff, analcitized, appears to have anhydrite present also.
876.1	879.1	Marlstone, light brown, interbedded with varved brown to greenish brown oil shale; from 878.8 to 879.1 tuffaceous zone with interbedded marlstone, tuffs contain residual oil.
879.1	882.5	Oil shale, varved medium brown to greenish brown, calcareous; at 879.3, 879.6, 880.7, 881.9 and 882.0 tuffs, 1" or less in thickness, analcitized and contain residual oil.
882.5	884.0	Oil shale, varved dark brown to black, dolomitic, loop bedding, blebs and thin irregular beds of analcitized tuff containing oil residue at 883.7, 883.75, and 883.8.
884.0	884.4	Missing.
Core #17	884.4 to 942.5	Cored 58' Recovered 58' Recovery 100%
884.4	891.6	Oil shale, varved dark brown, predominantly calcareous; at 885.75 and 885.8, tuffs containing residual oil; blebs of tuff are rare.
891.6	892.1 <i>Mahogany MKC</i>	Tuff, steel gray, upper 1/2 of unit vuggy and exhibits load casting into the overlying oil shale. (Mahogany Marker)
892.1	896.4	Oil shale, varved very dark brown to black, dolomitic, loop bedding.
896.4	897.9	Oil shale, varved dark brown, calcareous, rare blebs of tuff.
897.9	898.6	Oil shale, slightly banded light brown to dark brown; at 898.1, 898.3 and 898.4, tuffs, irregularly bedded.

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898.6	900.0	Oil shale, varved medium brown to dark brown, dolomitic; blebs of tuff rare.
900.0	900.15	Tuff, brown, partially analcitized irregularly bedded on top and bottom contacts.
900.15	901.7	Oil shale, varved brown, calcareous to dolomitic, occasional thin bedded tuff in interval.
901.7	907.6	Oil shale, varved very dark brown to black, dolomitic, loop bedding and micro-faulting; 903.9 to 904.95 contains 7 light buff bands 1/4" thick, dolomitic (Mahogany Bed).
907.6	908.05	Oil shale, medium greenish brown, calcareous with occasional very thin streaks of pyrite.
908.05	909.6	Tuff, medium brown, irregularly bedded, partially analcitized.
909.6	911.6	Oil shale, light brown to medium brown, calcareous, rare loop structures; occasional blebs of tuff.
911.6	913.6	Oil shale, varved dark brown to black, calcareous, loop structures common.
913.6	916.3	Oil shale, varved dark brown to dark greenish brown, calcareous; at 916.2 very thin stringer of gilsonite.
916.3	920.7	Oil shale, varved medium brown to dark brown, calcareous, loop bedding rare, blebs of tuff abundant; at 916.8, 917.9, 918.9 beds of tuff.
920.7	921.0	Nahcolite, translucent, accompanied with clay blades.
921.0	942.6	Oil shale, dark brown, massive, grades into dark brown varved oil shale, calcareous; at 927.3, 927.4, 927.6 and 927.9 tuffs brown, irregularly bedded; from 932.7 to 934.5, crystal growth of nahcolite; oil shale has been uniformly deformed on a relatively large interval above and below the nahcolite.

Corehole #2

From	To	Description
Core #18 942.6	to 1000.8	Cored 58.2 Recovered 58.2 Recovery 100%
942.6	950.1	Oil shale, varved medium dark brown, dolomitic; at 945.1, 946.9 irregularly bedded tuff containing residual oil; at 949.4 regularly bedded tuff; blebs of tuff at 949.8; at 950.1 analcitized tuff.
950.1	950.2 <i>Fred Bed.</i>	Tuff, steel gray analcitized.
950.2	958.0	Oil shale, varved brown, dolomitic with horizontal streaks of pyrite; blebs of tuff abundant on interval 953.3 to 955.0
958.0	959.4	Oil shale, varved dark brown to black, higher percentage of illite indicated.
959.4	962.6	Oil shale, varved light brown to medium light brown, calcareous; at 960.1, 961.5, 961.7, 962.1, 962.2 tuffs, partially analcitized.
962.6	963.5	Oil shale, varved medium brown to dark greenish brown, calcareous to dolomitic, loop structures common near bottom of interval.
963.5	964.1	Tuff, medium brown, irregularly bedded.
964.1	964.8	<i>Curly Bed.</i> Oil shale, varved medium brown to dark brown, calcareous to dolomitic, loop structures near top and middle of the unit.
964.8	965.6	Tuff, medium brown, irregularly bedded.
965.6	968.1	Oil shale, varved dark green brown to olive brown, loop structures; at 967.7, tuff, 1 1/4" thick.
968.1	980.4	Oil shale, varved light greenish brown to dark greenish brown, calcareous to dolomitic; pyrite abundant throughout the unit; analcitized tuffs at 969.1, 970.9, 977.4 and 978.6.

Corehole #2

From	To	Description
980.4	995.8	Siltstone, light gray to very light brown, calcareous; pyritic streaks are common, large crystals of pyrite to 1/2" in diameter; numerous rugs and some collapse breccia.
995.8	1000.8	Oil shale, varved light brown to medium brown; blebs of mudstone common near top of unit; at 996.5, collapse breccia and slump structure.
Core #19 1000.8	to 1058.9	Core 58.1 Recovered 58.1 Recovery 100%
1000.8	1007.5	Oil shale, varved light green brown to medium greenish brown, calcareous, loop structures, micro-faulting, blebs of tuff common; at 1001.5 and 1004.1 tuffs, 1 1/4" thick, irregularly bedded; at 1003.5 and 1005.8, tuff, regularly bedded, 1 1/4" and 2 1/2" thick respectively.
1007.5	1009.6	Oil shale, varved very light brown to brown, calcareous, grading to light brown claystone; at 1008.8 tuff, analcitized, irregularly bedded.
1009.6	1042.2	Oil shale, varved light brown to dark brown, calcareous; irregularly bedded tuffs at 1010.4, 1011.2, 1015.1, 1015.4, 1017.7 and 1020.1; at 1022.0, tuff 3 1/2" thick, analcitized; irregularly bedded tuff, 1 3/4" thick, at 1025.9; at 1029.6 tuff, analcitized; blebs of tuff abundant; zone from 1034.4 to 1036.8 contains numerous irregularly bedded tuffs, partially analcitized.
1042.2	1044.4	Claystone, varved gray brown, calcareous to dolomitic, slightly kerogenetic.
1044.4	1048.6	Oil shale, varved medium brown to dark greenish brown, calcareous to dolomitic, irregularly bedded toward top of unit; streaks and blebs of pyritic and analcitized tuffs common.
1048.6	1048.9	Tuff, brown, with interbedded fine stringers of oil shale.

Corehole #2

From	To	Description
1048.9	1055.1	Siltstone, light gray to very light brown, unit is porous; streaks of pyrite common.
1055.1	1059.2	Oil shale, varved medium brown to dark brown grading to very dark greenish brown; at 1056.7, distinct load casting with marlstone injected in an interval of about 7" forming clastic dike; at 1059.0 and 1058.7 tuffs, as large as 3" thick, irregularly bedded.
Core #20	1059.2 to 1118.7	Cored 59.5 Recovered 59.5 Recovery 100%
1059.2	1060.7	Oil shale, varved dark brown to dark greenish brown, dolomitic, some loop structures.
1060.7	1066.4	Siltstone with interbedded claystone, light brown to gray, dolomitic; interbedded thin layers of darker brown, dolomitic oil shale; at 1061.0, brown tuff.
1066.4	1067.7	Oil shale, varved dark brown to dark greenish brown, dolomitic.
1067.7	1070.4	Oil shale, dark greenish brown, massive, dolomitic, with interbedded thin dark brown oil shales.
1070.4	1077.0	Siltstone, varved light brown, dolomitic, with interbedded thin dark brown oil shales.
1077.0	1081.4	Oil shale, varved light brown to dark greenish brown, blebs of tuff and stringers of pyrite rare in lower part of unit.
1081.4	1095.3	Oil shale varved medium brown to dark greenish brown with interbedded gray to brown siltstones, blebs of tuff and pyrite rare.
1095.3	1106.6	Siltstone, light buff, very porous.
1106.6	1118.70	Oil shale, dark brown to dark green, grading to dark brown varved oil shale; lower part of unit contains interbedded buff siltstone.

## Corehole #2

From	To	Description
Core #21 1118.70	to 1178.35	Cored 59.65 Recovered 59.65 Recovery 100%
1118.7	1122.5	Oil shale, varved medium brown to dark brown, calcareous; blebs of tuff and irregularly bedded tuffs at 1120.1, 1120.7, 1121.7.
1122.5	1126.6	Oil shale, varved dark greenish brown, with interbedded light brown siltstone, calcareous.
1126.6	1130.4	Oil shale, dark greenish brown, massive, dolomitic.
1130.4	1133.7	Oil shale, varved medium greenish brown to dark greenish brown, loop structures; streaks of analcitized tuff and pyrite.
1133.7	1140.9	Siltstone, light gray buff, slightly varved; local zones containing minor vugs, some interbedded lean oil shale, varved light brown.
1140.9	1143.7	Oil shale, varved medium greenish brown to light greenish brown; streaks of tuff and pyrite common; irregularly bedded tuff at 1141.5.
1143.7	1148.2	Siltstone, grayish brown, interbedded with lean oil shale; oil shale increasing toward the bottom of the unit; oil shales are dolomitic, the siltstones are slightly calcareous.
1148.2	1148.95	Oil shale, varved medium greenish brown to dark greenish brown.
1148.95	1154.1	Oil shale, varved light greenish brown to medium greenish brown, calcareous; streaks of pyrite and analcitized tuff are frequent.
1154.1	1169.2	Siltstone, varved light grayish brown interbedded with occasional light brown oil shale; occasional vuggy zones.
1169.2	1172.8	Oil shale, varved medium greenish brown to dark greenish gray; thin analcitized tuff at 1171.4; at 1171.0, tuff, 1/2" thick.

Corehole #2

From	To	Description
1172.8	1173.1	Tuff, brown, irregularly bedded, partially analcitized.
1173.1	1178.35	Siltstone, light gray to light brown; some interbedded light brown, oil shale; streaks of pyrite and analcitized tuff common.
Core #22 1178.35 to 1236.65 Core 58.3 Recovered 58.3 Recovery 100%		
1178.35	1181.2	Oil shale, varved greenish brown slightly calcareous; thin irregularly bedded tuff at 1108.4.
1181.2	1193.0	Sandstone, gray, very fine grained, argillaceous, silty layers are irregularly bedded; unit grades to siltstone toward the bottom of the interval; pyrite streaks are common.
1193.0	1199.65	Oil shale, varved light brown to medium brown, interbedded with light brown marlstone; irregularly bedded tuffs at 1195.1, 1196.1 and 1196.7.
1199.65	1234.7	Siltstone, interbedded with very fine grained sandstones and gray marlstones; interval contains occasional zones of oil shale 1/2" thick; streaks of pyritic material common; at 1206.6, glauconite.
1234.7	1236.65	Oil shale, dark greenish brown, massive, calcareous; contains numerous blebs; at 1235.1 and 1235.5, tuff, analcitized.
Core #23 1236.65 to 1295.05 Core 58.4 Recovered 58.4 Recovery 100%		
1236.65	1240.2	Siltstone, light gray brown, slightly varved; lower part of the unit is interbedded with thin light greenish brown oil shale, top of unit contains a thin conglomeratic tuff.
1240.2	1242.6	Oil shale, dark greenish brown to dark brown, massive, blebby, load cast at 1242.5.
1242.6	1252.7	Siltstone, gray, slightly varved with interbedded very thin, light greenish brown oil shale.

## Corehole #2

From	To	Description
1252.7	1254.0	Oil shale, dark greenish brown, massive, blebby, streaks, of carbonaceous material.
1254.0	1259.0	Siltstone, with interbedded light greenish brown oil shale and gray claystone.
1259.0	1261.1	Oil shale, dark greenish brown, massive, very blebby; at 1261.0, tuff, 1 1/4" thick, dark gray analcitized, irregularly bedded.
1261.1	1264.0	Oil shale, varved dark greenish brown, toward lower end of unit becomes increasingly interbedded with gray siltstone; at 1261.9, on bedding plane fracture, fossil (insect larvae).
1264.0	1267.8	Siltstone, gray, interbedded with thin light greenish brown oil shale and gray claystone.
1267.8	1269.1	Oil shale, medium greenish brown to greenish brown, blebby, load cast structures, streaks of carbonaceous material.
1269.1	1269.65	Siltstone, greenish gray to light brown, interbedded with irregularly bedded tuffs and blebs of tuff.
1269.65	1269.8	Tuff, medium brown, slightly analcitized.
1269.8	1274.5	Siltstone, gray, massive, blebby, contains streaks of carbonaceous material.
1274.5	1276.0	Oil shale, varved medium greenish brown, loop structures.
1276.0	1276.05	Tuff, brown, irregularly bedded, some local casting.
1276.05	1279.7	Oil shale, varved dark greenish brown, loop and truncated structure; various very thin layers of analcitized tuff; at 1277.5 a thin lense of gilsonite.
1279.7	1289.7	Siltstone, gray interbedded with thin lean oil shales and claystones; at 1286.9 on irregularly bedded analcitized tuff.

## Corehole #2

From	To	Description
1289.7	1292.05	Siltstone, grayish brown, with interbedded lean oil shales and claystones; high kerogenetic zones deformed around clastic lenses.
1292.05	1295.05	Oil shale, varved medium greenish brown to dark greenish brown; grades to massive toward bottom of interval; from 1294.4 to 1294.8 large load cast.
Core #24 1295.05	to 1351.0	Cored 55.95 Recovered 54.85 Recovery 98%
295.05	1299.0	Oil shale, dark greenish brown to dark brown, calcareous to dolomitic; at bottom of unit, analcitized tuff 1 1/4" thick, analcitized, also contains some residual oil.
1299.0	1307.0	Siltstone, gray, massive, grades to lean oil shale; load cast structures common; streak of gilsonite at 1300.05.
1307.0	1349.9	Siltstone, gray to light brown, local slight varving; zones of oil shale varved dark green are interbedded with the siltstone at intervals 1314.0 to 1315.9, 1320.2 to 1323.35, 1333.1 to 1335.0 and 1340.0 to 1343.35;
1349.9	1351.0	Missing.
Core #25 1351.0	to 1410.35	Cored 59.35 Recovered 59.35 Recovery 100%
1351.0	1365.8	Siltstone, grayish brown to gray, slightly varved, with interbedded lean oil shale, varved medium brown to dark brown calcareous; dark band of oil shale from 1358.0 to 1358.5; thin irregularly bedded tuff at 1358.4.
1365.8	1371.1	Oil shale, varved dark greenish brown, blebs of tuff and claystone common; blebs of gilsonite rare.
1371.1	1373.5	Oil shale, varved dark greenish brown, interbedded uniformly with siltstone, varved light brown; entire unit is calcareous.

## Corehole #2

From	To	Description
1373.5	1385.5	Oil shale, varved dark greenish brown, dolomitic to calcareous; lower 1/3 of unit grades to light gray-brown siltstone, micro-faulting, load casting and minor deformations; pyrite common in lower 1/3 of unit.
1385.5	1393.1	Marlstone, varved light gray-brown, interbedded with light brown to medium brown thin layers of oil shale; load casting in interval.
1393.1	1395.7	Oil shale, varved dark greenish brown calcareous, blebby.
1395.7	1410.35	Siltstones interbedded with marlstones and varved greenish brown oil shales; siltstones grade downward to varved marlstones and then to varved greenish brown blebby oil shale; this is a cyclothem condition; stringer of gilsonite at 1402.6.
Core #26 1410.35 to 1468.0 Cored 57.65 Recovered 58.7 Recovery 102%		
1410.35	1412.4	Oil shale, varved medium greenish brown, dolomitic; at 1411.2, tuff 1 1/4" thick, irregularly bedded, analcitized.
1412.4	1414.35	Siltstone, slightly varved gray-brown, calcareous.
1414.35	1417.80	Oil shale, varved medium brown to dark greenish brown, with some thin interbedded siltstones and marlstones; occasional load casting in lower part of unit.
1417.80	1420.55	Siltstone, slightly varved gray brown, interbedded with some irregularly bedded thin dolomitic oil shale.
1420.55	1421.95	Oil shale, dark greenish brown, calcareous; blebs of claystone common banding within interval due to black oil shale.
1421.95	1422.2	Tuff, steel gray, analcitized.

## Corehole #2

From	To	Description
1422.2	1423.75	Oil shale, light greenish brown to dark greenish brown, calcareous; in bottom part of unit oil shale is interbedded with gray siltstones.
1423.75	1430.85	Siltstone, gray, calcareous with interbedded thin brown oil shales; thin analcitized tuff at 1430.3, occasional blebs of siltstone.
1430.85	1431.65	Oil shale, varved dark greenish brown dolomitic.
1431.65	1436.4	Siltstone, gray with interbedded brown varved oil shale, calcareous.
1436.4	1437.8	Oil shale, varved dark brown to greenish brown, calcareous; exhibits some load casting.
1437.8	1443.4	Sandstone, gray to pinkish gray, very fine grained. slightly calcareous matrix; some slumpage features; badly broken in interval from 1439-1443.
1443.4	1445.2	Oil shale, varved greenish brown to dark brown, dolomitic; some load casting.
1445.2	1448.3	Siltstone, gray to greenish gray with occasional irregularly bedded oil shale calcareous.
1448.3	1451.1	Oil shale, varved greenish brown to dark brown, some interbedded gray siltstone in upper part of unit grading to siltstone in lower part of unit; exhibits some load casting.
1451.1	1452.25	Siltstone, gray with some thin interbedded brown oil shales.
1452.25	1454.8	Oil shale, varved dark brown to greenish brown, dolomitic to calcareous; top part of unit contains numerous blebs; from 1454.6 to 1454.8, interval exhibits distorted bedding.
1454.8	1457.5	Siltstone, gray with interbedded brown varved oil shale, calcareous.

## Corehole #2

From	To	Description
1457.5	1463.0	Siltstone, slightly varved gray to brown with some very thin interbedded oil shales, calcareous.
1463.0	1465.9	Oil shale, varved brown to greenish brown in upper 1/3 of unit, distorted bedding in the remainder of unit, calcareous.
1465.9	1468.0	Siltstone, gray with some brown interbedded calcareous oil shale analcitized tuffs at 1467.05 and 1466.6.
Core #27 Cored 1468.0 to 1526.0 Corec 58.0 Recovered 57.45 Recovery 99%		
1468.0	1469.35	Oil shale, varved dark brown, dolomitic lower 6" interbedded with gray siltstone.
1469.35	1472.1	Siltstone, gray, calcareous with blebs of analcitized tuff.
1472.1	1475.2	Oil shale, dark greenish brown, calcareous occasional interbedded pinkish gray siltstones; occasional load cast.
1478.98	1488.02	Oil shale, varved dark brown to greenish brown, calcareous; occasional thin tuff.
1488.02	1492.8	Siltstone, gray with interbedded oil shale and tuffs; oil shale is calcareous and some tuffs are analcitized.
1492.8	1495.1	Oil shale, varved light brown to dark brown; frequent chequing indicating higher illite content; fossil fish fragments.
1495.1	1499.0	Siltstone, gray with interbedded varved oil shales, calcareous; micro-faulting in oil shale common.
1499.0	1501.1	Siltstone, gray; lower part of interval containing interbedded brown oil shale calcareous; occasional stringer of analcitized tuff.
1501.1	1505.1	Oil shale, varved brown to dark brown, calcareous, with some interbedded siltstone.

## Corehole #2

From	To	Description
1505.1	1509.2	Siltstone, gray, occasional band of shale in upper part; blebs of analcitized tuff common; microfaulting evident; 1 1/4" oil shale at 1508.7.
1509.2	1512.3	Oil shale varved medium brown to dark brown, streaks and blebs of hydrocarbon stained tuff common; some disruptive bedding.
1512.3	1515.15	Siltstone, gray, calcareous with blebs and irregularly bedded analcitized tuffs common.
1515.15	1525.23	Siltstone, gray with some interbedded brown oil shales; oil shales exhibit varving, calcareous; occasional irregularly bedded analcitized tuffs present in interval.
1525.23	1526.0	Missing.