

SAMPLE/CORE DESCRIPTION

Hole No. West Willow #3
 Location NW NE SW Sec. 7, T3S, R97W
 County and State Rio Blanco County, Colorado
 Elev. KB6620' TD 2580.0
 Spud 02/03/80 Compl. 05/31/80
 Examined by C. McMullin - D. Malotte

From	To	
683.25		Core-point
683.25	705.6	Oil Shale, light olive brown to light gray brown, even with trace looped and wavy bedding, fair to good competence; poor competence from 687.8-690.7; low grade; slightly silty, few scattered light brown marly blebs; numerous 60° open planar fractures with calcite from 687.8-690.7; .10 zone of medium brown and light blue gray granular tuff streaks and stringers at 689.1; .10 band of silty calcareous very fine grain, medium gray sandstone at 690.8; few scattered white calcareous stringers; trace scattered light gray granular analcitized tuff blebs and streaks; .10 zone of medium brown asphaltic tuff with associated light gray calcareous stringer at 697.3; light gray calcareous siltstone from 698.8-699.8; numerous light brown to tan granular tuff blebs and stringers from 700.1-703.4; .05 light gray calcareous siltstone band at 703.6 and dark gray .10 at 703.9; gradational contact with following oil shale.
705.6	711.0	Oil Shale, medium olive brown to medium gray brown, even bedding, fair to good competence, low grade; numerous scattered thin light brown granular tuff streaks and stringers; trace looped and wavy bedding at 708.9; few scattered 60° fractures with pyrite and calcite; gradational contact with following oil shale.
711.0	715.2	Oil Shale, light olive brown to medium gray brown, even bedding, fair to good competence; low grade; white calcareous granular tuff stringers at 711.9; numerous scattered light brown to white, granular, tuff blebs and streaks; few light brown marly streaks and stringers; asphaltic tuff bleb at 714.5.
715.2	727.9	Siltstone, argillaceous; light to medium gray, massive with few dark brown oil shale stringers, very poor competence; calcareous, brittle; numerous 60°-90° planar fractures with calcite and pyrite; light tan to buff silty marlstone bed from 716.9 to 717.4; .30 core loss from 718.7-719.0; zone of (.025-.10) thick medium brown granular tuff bands from 721.5-722.6; zone of .05 light blue gray analcitized tuff bands from 722.6-723.8; zones of even with looped and irregular bedding, light to medium brown oil shale from 725.6-726.0 and 726.2-727.0; trace scattered small gilsonite flakes, trace offset and looped bedding.

From	To	
727.9	734.8	Oil Shale, medium gray brown, fair to good competence, irregular, contorted and even bedding, low to medium grade; numerous scattered light brown granular tuff streaks and stringers; light to medium gray calcareous siltstone bed from 732.7-733.1 and .025 band at 733.2; scattered thin gray calcareous siltstone stringers; gradational contact with following oil shale.
734.8	747.8	Oil Shale, light olive brown, even with trace looped and wavy bedding, fair to good competence, low grade; numerous scattered white calcareous streaks and stringers; .025 light gray silty clay band at 736.5; pyrite and calcite common on fractures; medium olive brown, low to medium grade oil shale from 737.5-739.9; several scattered light brown granular tuff streaks and stringers from 738.4-739.7; trace offset bedding; few scattered light brown tuff streaks; light brownish gray calcareous massive siltstone from 745.8-746.4 and 746.7-746.9; gradational contact with following oil shale.
747.8	749.9	Oil Shale, medium olive brown, even with looped and trace irregular bedding, fair competence, low to medium grade; several 60° fractures with calcite and pyrite; .05 band with light gray tuff band with light brown asphalt mineralization; several scattered white calcareous streaks; trace gilsonite.
749.9	775.3	Oil Shale, light olive brown, even with looped and wavy bedding, trace offset bedding, fair to good competence, low grade; several medium gray calcareous siltstone bands and beds as follows .05 at 754.0 .10 at 754.4, .05 at 754.5 and 754.7-755.0; dark olive brown, medium to high grade oil shale with trace offset and wavy bedding from 756.9-958.0; bedding inclined 15° from 758.0-758.7; several open 45-85° fractures with pyrite and calcite; .05 light to medium brown asphaltic tuff stringers at 757.0; few scattered light brown granular tuff streaks and stringers; several thin medium gray calcareous siltstone stringer at 760.5 band at 765.4; trace gilsonite at 762.6; medium brown asphaltic tuff stringer at 764.0; several scattered white calcareous streaks and stringers; light brownish gray calcareous siltstone bands at 769.5, 771.0, 771.4, 771.6 and 773.5; .30 core loss from 770.15-770.45, solution fracture zone from 770.15-771.0.
775.3	780.6	Oil Shale, light brown with dark olive brown banding from 775.3-778.8, even with contorted, looped, and irregular bedding, fair to good competence, low grade; few scattered medium brown granular tuff blebs; light gray granular tuff streaks at 778.8.
780.6	786.3	Oil Shale and Siltstone, interbedded; oil shale, light olive brown, wavy, looped and contorted bedding; siltstone, light to medium brown and light gray, massive and irregular bedding; overall good competence; overall very low to barren; tan to buff marlstone streaks associated with oil shale; bands of brittle, slightly calcareous siltstone and light gray, calcareous siltstone with irregular bedding common; .10 asphaltic bleb at 786.0.

From	To	
86.3	791.6	Siltstone, argillaceous, medium gray brown, massive, poor competence, brittle, calcareous; numerous parallel open planar fractures (joints), asphaltic; large .10 light to medium brown, marly bleb at 787.8.
791.6	800.3	Oil Shale, light to medium olive brown, even with trace looped bedding, poor competence, low grade; several scattered light brown tuff streaks and blebs; solution fracture zones from 793.3-793.9; abundant 70° open planar fractures with asphalt and calcite from 794.0-795.8 (jointing); few light blue gray to white analcitized tuff blebs at 797.7; grades to light brown to tan from 797.5-799.9.
800.3	801.4	Oil Shale, dark brown, streaked bedding, good competence, medium to high grade; looped and wavy bedding from 801.0-801.4.
801.4	811.3	Oil Shale, light to medium olive brown, even with trace looped and irregular bedding, poor to fair competence, very low to low grade; several open planar fractures with calcite; .80 core loss from 804.2-805.0; trace light brown to white calcareous tuff stringers at 805.6; large leached nahcolite vug with calcite filling at 806.5; several scattered light brown and white streaks, stringers and blebs; few scattered medium brown asphaltic tuff stringers; .10 zone of abundant calcite and asphalt at 810.2.
811.3	814.5	Oil Shale, medium to dark olive brown, even with looped and irregular bedding, fair to good competence, low to medium grade; several scattered light brown calcite and several dark brown asphaltic tuff blebs; gradational contact with following oil shale.
814.5	821.8	Oil Shale, light olive brown, even bedding, poor to fair competence, very low to low grade; several scattered light brown to white calcite and dark brown asphaltic tuff streaks and stringers; light to medium brown .20 asphaltic tuff band at 819.8; even bedding dark brown to black, high grade oil shale from 820.2-820.8; trace irregular bedding; gradational contact with following oil shale.
821.8	827.6	Oil Shale, light gray brown, even bedding, poor competence, very low grade; slightly silty solution fracture zone from 822.7-823.2, solution fracture rubble with trace leached nahcolite vug from 824.2-825.0, several planar fractures with pyrite and kaolinite; thin possibly drilling induced rubble zones .10 at 826.0, .40 at 826.7, .30 at 827.3, .15 zone of collapsed leached nahcolite with asphalt filling.
827.6	832.6	Siltstone, medium gray brown, massive, very poor to poor competence, slightly argillaceous, slightly brittle to hard; very calcareous from 827.6-829.0; very slightly calcareous from 829.0-832.6; numerous shaly partings some with pyrite; abundant small black disseminated asphalt flakes; abundant oil shale streaks from 827.6-828.4; light gray brown marly bed from 828.4-829.0; numerous irregular marly stringers from 829.0-829.9; light brown oil shale rubble with solution fractures and evidence trace leached nahcolite vugs; medium size irregular marly clasts common from 830.9-831.1 and from 831.7-832.0.

From	To	
832.6	847.9	Oil Shale, light to medium olive brown, even with looped bedding, poor competence, very low to low grade; competent zones as follows 832.6-838.2 poor competence with several fractures and partings, 838.6-843.0 fair to good competence with few partings, and 843.0-847.9 poor competence with numerous partings and solution fractures; medium brownish gray siltstone bands and beds as follows, massive from 834.3-834.7, .10 massive banded at 840.9, .05 at 841.15, massive streak .40 at 841.3, .05 streaked at 841.8, massive with oil shale streaks and stringers from 842.2-843.4, .10 band with oil shale stringers at 843.5, .20 band with oil shale streaks at 846.3; light gray massive brittle tuff with numerous oil shale stringers and close fractures from 832.85-833.25; numerous scattered white calcareous stringers and blebs; .05 brown tuff band at 844.7; asphalt common on 60° fracture set from 845.0-847.0.
847.9	850.8	Oil Shale, dark olive brown and medium olive brown, even and looped bedding, very poor to poor competence, high to very high grade, fairly low density, bedding inclined 10° from 849.0-849.6; 849.6-850.6 abundant solution breccia and solution fracture with heavy asphalt mineralization.
850.8	855.7	Siltstone, light brown to buff, massive with streaked and irregular bedding, very poor to poor competence, slightly argillaceous, moderately calcareous, brittle, oil shale streaks and stringers fairly common; brecciated and recemented, very crumbly from 850.8-851.1; 0.4 core loss from 851.1-851.5; solution fractures common from 851.5-855.7; trace leached nahcolite vugs from 851.5-851.8; medium olive brown oil shale band .30 at 853.0; irregular vertical fractures with heavy asphalt mineralization and offset bedding .70 at 855.5.
855.7	860.6	Oil Shale, light olive brown, even with looped and offset bedding, very poor to poor competence, very low to low grade; abundant solution fractures; calcite common on fractures; medium brown siltstone bands .10 at 856.2, .10 at 856.5, .20 at 857.5, .35 at 858.7; light brown granular tuff band .05 at 855.8.
860.6	861.7	Marlstone, buff, even with abundant offset bedding, very poor competence, abundant solution fractures from 860.6-861.5; brecciated and recemented from 861.5-861.7; analcitized tuff band .05 at 861.6.
861.7	863.4	Oil Shale, medium to dark olive brown, streaked bedding, very poor to poor competence, medium to high grade; slightly low density; solution fractures common.
863.4	875.0	Oil Shale, light gray brown, even with irregular and wavy bedding, poor to fair competence, very low to low grade; numerous partings and several fractures with kaolinite, calcite and asphalt; long vertical fractures with calcite, kaolinite and asphalt from 863.9-865.9; abundant light brown granular interbedded tuff bands and stringers from 866.6-867.9; light brown silty bands common from 869.5-872.2; medium gray massive to streaked siltstone bed from 872.2-872.6; trace small leached vugs at 866.8 and 871.3; medium olive brown, medium to high grade oil shale from 868.4-869.3; .10 core loss from 870.0-871.0; several scattered white granular calcite stringers from 873.5-875.0; gradational contact with following oil shale.

From	To	
875.0	879.4	Oil Shale, light olive brown, even bedding, poor competence, low grade; several partings with calcite, and several fractures with calcite and kaolinite; light blue to gray massive calcareous granular, analcitized tuff bed from 875.9-876.3; light tan and white calcareous tuff stringers common from 877.9-878.8; gradational contact with following oil shale.
879.4	881.0	Oil Shale, medium olive brown, even with trace streaked bedding, good competence, medium grade; trace gilsonite streaks; gradational contact with following oil shale.
881.0	924.5	Oil Shale, light olive brown, even bedding; poor competence from 881.0-894.4, fair to good competence from 894.4-899.6 and 899.6-901.1 poor to fair competence from 901.1-903.0; very poor competence from 903.0-904.7; poor to fair competence from 904.7-908.0; fair to good competence from 908.0-912.2; very poor competence from 912.2-912.6; good competence from 913.0-916.7; very poor competence from 916.7-924.5; low grade; few scattered solution fracture zones and several long 85-90° fractures with calcite; numerous interbedded light brown granular calcareous analcitized tuff bands from 881.7-884.1; numerous scattered white and light gray to brown calcareous tuff stringers; trace scattered gilsonite streaks; .10 irregular patch with calcite and asphalt filling and associated solution fractures at 889.4; light blue gray to white irregular calcareous tuff patches .10 at 896.0 and .05 at 898.3 and .10 at 899.8; light blue to gray calcareous tuff bands .20 at 898.45 and .05 at 898.8; some kaolinite mineralization from 901.1-924.5; trace leached nahcolite vugs; .15 core loss from 904.85-905.0; .40 core loss from 912.6-913.0; solution breccia zones from 903.4-903.9; .10 at 904.6; .10 at 905.0; from 912.2-912.6; from 916.7-917.0; from 917.4-917.9 and from 921.3-921.6; numerous calcite sealed solution fractures from 923.0-924.5; gradational contact with following oil shale.
924.5	932.2	Oil Shale, light gray brown, even bedding, poor competence from 924.5-926.7 good competence from 926.7-932.2, low grade; numerous calcareous sealed solution fractures from 924.5-926.7; light brown, granular, tuff streaks at 925.1; trace leached nahcolite vug with calcite filling and associated contorted bedding at 926.4; trace scattered gilsonite; few partings with calcite; numerous dark brown asphaltic streaks and blebs from 929.7-931.1 and .20 at 931.5; bedding inclined 15°-30° from 931.8-932.2.
932.2	935.9	Tuff, silty, light to medium brown, massive with wavy and streaked bedding, poor to fair competence, moderately calcareous; abundant oil shale streaks and stringers giving wavy appearance; from 932.2-932.7 solution breccia with abundant calcite and few planar partings; numerous scattered .05-.10 diameter leached nahcolite vugs with calcite filling; few scattered fractures with calcite and asphalt; trace gilsonite.
935.9	939.2	Oil Shale, light to medium olive brown, even with streaked bedding, good competence, low to medium grade; several scattered light brown to buff granular tuff streaks and stringers from 937.3-937.9 and 938.7-939.0; few calcite sealed 60° fractures; trace gilsonite; gradational contact with following oil shale.

From	To	
939.2	955.0	Oil Shale, light olive brown to light gray brown, even streaked and irregular bedding, poor competence, low grade; several scattered solution fracture zones with abundant calcite; numerous light brown and dark brown tuff blebs and streaks from 939.2-940.6; 0.5 core loss from 944.0-944.5; several scattered partings with radiated and bladed nahcolite structure; several scattered calcite sealed fractures; irregular white and black calcite and gilsonite patches at 945.2, at 948.8, from 952.2-952.6; medium to dark olive brown band from 954.0-955.0.
955.0	957.5	Oil Shale, medium olive brown with light brown banded, even with trace looped bedding, very poor competence, low to medium grade; abundant calcite sealed solution fractures; abundant solution fractures thru-out; dark brown asphalt and calcite tuff stringers common; buff granular calcite and asphaltic tuff bands at 956.6, 956.7 and 957.2; gradational contact with following oil shale.
957.5	967.8	Oil Shale, light to medium gray brown, even bedding, very poor to poor competence, low grade; abundant solution fractures and numerous white calcite sealed fractures from 957.5-962.0; leached nahcolite vugs .10 diameter at 963.3, 963.7, 964.3 and 964.8; 0.7 core loss from 959.5-960.2.
967.8	969.8	Oil Shale, medium to gray brown to medium brown, even bedding, good competence, medium grade; few scattered open and closed fractures with calcite, gilsonite streaks at 968.6; gradational contact with following oil shale.
969.8	978.0	Oil Shale, light brown, even bedding, fair competence, low grade; few scattered open and closed planar fractures with calcite; few thin solution fractures and solution breccia zones; few scattered partings with calcite.
978.0	980.8	Oil Shale, medium brown, even bedding with trace streaked bedding, poor competence, low to medium grade; several scattered solution fractures with kaolinite.
980.8	983.0	Oil Shale, medium olive brown, even with trace contorted bedding, fair to good competence, medium grade, trace gilsonite, trace calcite sealed partings and solution fractures; gradational contact with following oil shale.
983.0	992.7	Oil Shale, light olive brown to light brown, even bedding with trace irregular and streaked bedding, good competence, low to medium grade; few scattered open and closed fractures with calcite; trace scattered gilsonite streaks and blebs; .60 core loss zone with irregular bladed leached nahcolite structure on breaks on top and bottom from 989.2-989.8; solution breccia zones with trace collapsed leached nahcolite; calcite and asphalt from 990.1-990.5; collapsed leached nahcolite vugs at 991.5; dark brown asphalt blebs common from 992.0-992.7.

From	To	
992.7	1001.5	Oil Shale, medium olive brown and light olive brown, even with trace irregular bedding, fair competence, low to medium grade; several scattered open and closed fractures with calcite; trace gilsonite streaks; leached nahcolite vugs with asphalt and calcite filling from 997.9-1000.0; 1.6 core loss from 998.0-999.6 with leached nahcolite vug structure at top and bottom; bedding inclined 5° from 1001.3-1001.5; gradational contact with following oil shale.
1001.5	1009.5	Oil Shale, light olive brown, even with trace looped bedding, fair to good competence, low grade; trace gilsonite; very few scattered fractures with calcite; .20 solution breccia zone with leached collapsed nahcolite and calcite at 1001.7; calcite stringer at 1002.9; solution fractures common from 1007.6-1009.5; large .20 irregular nahcolite pod at 1008.4; 0.4 core loss from 1008.9-1009.3; gradational contact with following oil shale.
1009.5	1011.4	Oil Shale, medium brown, even with abundant offset and trace looped bedding, very poor competence, medium grade; abundant white calcite sealed solution fractures; trace brown asphaltic tuff blebs, gradational contact with following oil shale.
1011.4	1015.0	Oil Shale, medium gray brown to medium olive brown, even with irregular bedding, very poor to poor competence, low to medium grade; few scattered open and closed fractures with calcite, abundant solution fractures with trace collapsed leached nahcolite vugs from 1012.7-1014.3; 0.7 core loss from 1014.3-1015.0.
1015.0	1016.2	Oil Shale, dark brown to black, streaked with irregular bedding, poor to fair competence, high grade, inclined bedding 30°-50° from 1015.0-1015.7, gradational contact with following oil shale.
1016.2	1019.5	Oil Shale, light olive brown, even with irregular bedding, very poor to poor competence, very low grade, abundant solution fractures with calcite and kaolinite, few scattered solution breccia zones with leached nahcolite vugs and calcite mineralization, trace looped bedding.
1019.5	1033.8	Marlstone, light brown to tan, even bedding, very poor competence, trace kerogen content, numerous open and closed poker chip partings, few thin solution breccia zones with calcite and leached nahcolite vugs, 1.4 core loss from 1023.6-1025.0, trace scattered black granular asphaltic streaks and stringers, few scattered solution fracture zones with kaolinite mineralization, 1.3 core loss from 1031.5-1032.8, gradational contact with following oil shale.
1033.8	1042.8	Oil Shale, light brown with tan banding, even with irregular and trace looped and offset bedding, poor to fair competence, very low to low grade, few open and closed irregular solution fractures, some with evidence leached nahcolite vugs, few thin 0.1 solution breccia zones, light to medium brown medium grade oil shale with streaked bedding from 1035.2-1036.4, dark brown to black low to medium grade oil shale banding, even with looped bedding from 1036.4-1037.2, few scattered light brown granular and light blue gray analcitized tuff streaks,

From	To	
		medium gray granular tuff stringer with associated wavy bedding at 1039.3, .05 zone with light brown granular and dark gray black asphaltic tuff streak and stringer at 1039.5, 0.2 zone with solution breccia with heavy calcite and kaolinite mineralization at 1040.0, numerous light blue gray analcitized and light brown granular tuff streaks, stringers and band from 1041.0-1042.3, 0.2 zone of light gray and light brown granular tuff at 1042.6, from 1041.8-1042.6 interbedded medium olive brown to dark brown oil shale band, gradational contact with following oil shale.
1042.8	1045.4	Oil Shale, dark brown to black, even with wavy bedding, fair competence, high grade, fairly low density, .20 light gray brown bentonitic clay band at 1043.2, numerous scattered medium brown asphalt and light gray brown granular tuff pods and blebs and streaks, light gray brown granular tuff band and beds .20 at 1044.1 and 1044.9-1045.4.
1045.4	1048.1	Oil Shale, light to medium olive brown, even bedding with trace looped bedding, fair to good competence, low to medium grade, few medium gray analcitized and dark brown asphaltic tuff streaks at 1045.8, 1046.5 and 1047.2, light brown to tan tuff streaks with associated wavy bedding at 1047.4, few white calcareous stringer at 1047.6.
1048.1	1049.7	Oil Shale, dark brown to black with medium brown banding, even with trace offset and looped bedding, poor to fair competence, high grade, large .05 medium gray and light brown granular tuff bleb at 1049.3, dark gray pyrite streak at 1049.2, .30 highly broken poker chip parting zone at 1048.9.
1049.7	1061.0	Oil Shale, light olive brown, even bedding, good competence, low grade, .30 zone with numerous dark brown to black asphaltic streaks and stringers at 1050.7, .40 zone with light brown asphaltic blebs and streaks at 1051.0, solution fracture zone with abundant calcite and asphalt mineralization from 1053.2-1053.7, dark brown asphaltic tuff bleb with associated contorted bedding at 1053.8, few scattered open and closed fractures with calcite mineralization.
1061.0	1068.8	Oil Shale, light olive brown with faint tan banding, even bedding, fair to good competence, low grade, light blue gray granular tuff bed with sharp contact and trace associated light brown to tan marly stringers at top from 1062.8-1063.5 (possible mahogany marker), trace looped and wavy bedding, few scattered fractures with kaolinite, trace light brown granular tuff bleb and streak, few scattered white calcareous stringer, planar poker chip parting zone from 1068.5-1068.8.
1068.8	1075.0	Oil Shale, light to medium olive brown band, even bedding, good competence, low to medium grade, dark brown black medium to high grade even with looped bedded oil shale from 1068.8-1070.2, few scattered open and closed fractures with calcite mineralization, large dark green gray black irregular asphalt and pyrite tuff stringer at 1071.7 trace offset bedding, numerous dark brown to black small asphaltic tuff streaks and stringers from 1072.4-1073.2, .20 zone with dark olive brown with streaked bedded medium grad oil shale at 1073.3, 1.2 core loss from 1073.8-1075.0.

From	To	
75.0	1087.6	Oil Shale, dark mahogany brown and black, even with streaked and trace wavy and contorted bedding, poor to fair competence, very high grade, very low density, fairly tough and elastic, numerous scattered light brown marly band, few scattered light blue gray granular analcitized tuff streaks and stringers, .20 zones of light brown argillaceous siltstone (tuff) with dark brown irregular streaks at 1076.3 and 1076.7, few scattered light brown to dark brown tuff streaks and stringers, light brown to tan marly bed from 1078.0-1078.4, few zones with planar poker chip partings, numerous light brown marly band and streaks from 1081.2- 1082.8, .10 poorly cemented solution fracture zone at 1082.8, trace gilsonite, trace contorted bedding.
1087.6	1091.2	Oil Shale, medium olive brown with few dark brown to black streaks and bands, even with trace wavy and streaked bedding, good competence, medium to high grade, few scattered calcareous sealed solution fracture, trace light brown tuff streaks.
1091.2	1094.3	Oil Shale, dark brown to black and medium olive brown, even and irregular with trace streaked bedding, fair to good competence, high grade, fairly low density, fairly tough and elastic, numerous scattered medium olive brown irregular oil shale lamina, trace gilsonite, few scattered open planar and irregular shaly partings, trace dark brown to black asphaltic tuff streaks and blebs .20 solution fracture zone at 1094.1.
1094.3	1097.5	Oil Shale, light to medium olive brown, irregular with trace even and streaked bedding, fair to good competence, medium to high grade, few scattered closed planar and irregular calcareous sealed solution fractures, .20 zone of streaked bedded dark olive brown medium to high grade oil shale at 1097.0.
1097.5	1101.2	Oil Shale, medium to dark olive brown, streaked even and irregular bedding, fair to good competence, high grade, .40 zone with large medium brown asphaltic tuff blebs and bands with associated contorted bedding at 1099.0 and .10 at 1099.8.
1101.2	1104.8	Oil Shale, medium olive brown, even with trace wavy and streaked bedding, good competence, medium grade, dark brown asphaltic tuff stringer at 1102.0 and from 1104.4-1104.6, few open planar shaly partings.
1104.8	1106.4	Oil Shale, dark mahogany brown with medium brown banded, irregular with even bedding, good competence, high grade, numerous scattered dark brown asphaltic streaks, stringers and blebs.
1106.4	1112.0	Oil Shale, light to medium olive brown, even bedding, fair to good competence, low to medium grade, trace gilsonite, few scattered dark brown asphaltic band and streaks, trace white calcite sealed fracture, .30 solution fracture zone at 1109.8, grade to light olive brown very low grade oil shale from 1110.2-1112.0.

From	To	
1112.0	1114.0	Oil Shale, medium to dark olive brown to black, streaked with even bedding, fair competence, medium to high grade, .05 light gray and tan argillaceous siltstone stringers at 1113.0 and 1113.1, .40 solution fracture zone at 1112.6, trace gilsonite, trace looped bedding.
1114.0	1130.4	Oil Shale, light to medium olive brown, streaked with even and trace looped and wavy bedding, good competence, medium grade, few scattered calcite sealed fractures and partings, moderate to heavy solution fractures with calcite and asphalt mineralization and trace leached nahcolite vug, from 1116.3-1117.6 light brown tan and marly from 1117.6-1118.2 and 1120.7-1121.6, few scattered dark brown asphaltic blebs and streaks, .40 zone with irregular dark brown to black asphaltic streaks and associated white calcareous granular tuff blebs, abundant white calcite sealed fractures from 1122.7-1124.0 and .20 at 1126.2, gradational contact with following oil shale.
1130.4	1140.0	Oil Shale, light olive brown, even bedding, very poor to poor competence, very low to low grade, heavy solution fractures with associated solution breccia with calcite and trace asphalt mineralization from 1132.9-1134.7, .30 core loss from 1134.7-1135.0, numerous scattered white planar and irregular calcite sealed solution fractures, .20 solution breccia zone at 1137.6, 1.0 core loss from 1138.6-1139.6.
1140.0	1142.0	Oil Shale, medium brown and dark brown black, even with trace streaked bedding, poor competence, medium to high grade; few open planar shaly and calcite sealed partings, few open and closed planar fractures with calcite mineralization, trace offset bedding, 0.5 dark brown to black asphalt bleb at 1141.0, gradational contact with following oil shale.
1142.0	1144.3	Oil Shale, medium brown, even bedding, fair competence, low to medium grade, numerous closed planar and irregular calcite sealed fractures, .40 solution fracture zones with irregular calcite sealed fractures and trace leached nahcolite vugs at 1143.9.
1144.3	1150.2	Oil Shale, light to medium olive brown, even with streaked and irregular bedding, very poor competence, low to medium grade, numerous zones with open and closed solution fractures from 1144.9-1146.7 zone with light medium brown marly oil shale, .30 silty clay band, several thin .20-.40 zones with solution breccia, dark brown to black asphaltic tuff band at 1147.7 and at 1150.0, several scattered dark green gray pyrite streaks and stringers, gradational contact with following oil shale.
1150.2	1159.8	Oil Shale, light to medium brown with trace tan banding, even bedding, very poor competence, very low to low grade, slightly marly, numerous open and closed planar poker chip partings, several zones of solution fractures, several scattered dark green gray pyrite streaks and stringers, few scattered medium to dark brown asphaltic streak and stringer, dark brown to black with medium brown streaked bedded high grade from 1153.2-1154.0, trace faint pinpoint calcite at 1153.9, solution breccia with abundant calcite from 1154.5-1155.0, highly broken with numerous

From	To	
1159.8	1169.2	<p>open planar poker chip partings from 1155.0-1157.8, .40 zone of solution breccia at 1156.9, 0.7 core loss from 1158.3-1159.0, from 1157.8-1159.8 even with trace looped bedding, light olive brown slightly marly, low grade oil shale.</p> <p>Oil Shale, medium olive brown, even with offset bedding, low grade, very poor to poor competence, from 1160.0-1160.7 very high grade oil shale with abundant solution fractures and wavy bedding and trace leached nahcolite vugs, inclined bedding at 30-45° from 1160.7-1161.8, .50 zone of solution fractures with white calcite mineralization at 1160.7, black asphalt stringer at 1161.3, heavy, moderate to well cemented solution fracture zone with some associated breccia and white calcite mineralization and trace leached nahcolite vugs from 1162.4-1164.4, .90 solution fracture zone with leached nahcolite vugs at 1164.6, trace dark granular gray pyrite streak, several dark brown to black asphalt stringer, open and closed solution breccia zones with some calcite and collapsed leached nahcolite from 1165.5, 1166.1 and 1166.8-1167.4, solution fracture zone with open planar and irregular fractures with trace asphalt from 1166.1-1166.8 and 1168.2-1169.2, 0.7 core loss from 1167.5-1168.2.</p>
1169.2	1174.2	<p>Oil Shale, medium olive brown with dark brown to black bands and stringers, even with trace offset and wavy bedding, poor to fair competence, medium grade, few scattered dark brown asphalt blebs and streaks, solution fracture zone with open planar and irregular kaolinite mineralization from 1169.5-1170.0, closed, irregular and hackly solution breccia zone with abundant calcite and asphalt from 1170.0-1170.7, trace gilsonite, .40 zone with abundant dark brown to black asphalt streaks and stringers at 1171.3 and .10 at 1174.1.</p>
1174.2	1178.0	<p>Oil Shale, light to medium olive brown, even with trace looped irregular and wavy bedding, very poor to poor competence, low grade, .05 light to dark brown tuffaceous band with some asphalt mineralization at 1174.7, abundant solution fractures from 1175.0-1176.4 and 1177.4-1178.0, 0.4 core loss from 1176.4-1176.8, irregular and hackly solution breccia with abundant calcite and collapsed leached nahcolite from 1176.8-1177.3 and .10 at 1177.4, few light brown marly bands from 1177.4-1177.9, gradational contact with following oil shale.</p>
1178.0	1194.0	<p>Oil Shale, medium to dark olive brown, even with irregular and trace offset bedding, very poor competence, medium to high grade, numerous zones of calcite sealed solution fractures, numerous zones with solution breccia, numerous large .05-.15 dark brown to black asphaltic tuff streaks and pods from 1179.8-1180.4, 0.6 core loss from 1181.0-1181.6, trace pinpoint calcite .10 zone at 1182.0, 0.4 core loss from 1182.6-1183.0, .10 light brown to tan irregular clay band at 1186.7, .10 very light brown to buff tuffaceous band at 1187.0, 0.6 core loss from 1187.6-1188.2, numerous .10-.30 zones with pinpoint calcite from 1189.5-1194.0 numerous scattered leached nahcolite vugs some collapsed few scattered argillaceous, irregular and hackly open and closed very poor to poor cemented solution breccia zones from 1190.7-1194.0, gradational contact with following oil shale.</p>

m	To	
1194.0	1200.7	Oil Shale, light to medium olive brown, even with trace streaked and irregular bedding, very poor competence, very low to low grade, open and closed irregular and hackly solution fractures and solution breccia with some calcite and kaolinite mineralization, numerous .10-.20 zones with pinpoint calcite, trace leached nahcolite vugs and collapsed leached nahcolite, few scattered dark gray pyrite streaks and stringers, 1.0 core loss from 1199.7-1200.7.
1200.7	1203.0	Marlstone with few interbedded oil shale bands, light brown with faint blue tint, even bedding, very poor competence, trace kerogen content, highly fractured thru-out.
1203.0	1208.3	Marlstone, very argillaceous, brecciated and recemented, light gray blue with few light to medium brown bands and streaks, very poor competence, trace kerogen to barren, bentonitic, slightly greasy, abundant white pinpoint calcite from 1203.2-1203.8, few scattered slightly silty zones, few scattered zones with white pinpoint calcite, few thin tan marly stringers.
1208.3	1214.3	Marlstone, argillaceous, light brown to light blue gray, even with trace offset bedding, very poor to poor competence, trace kerogen, numerous zones with open planar poker chip partings, few scattered solution fracture zones with open and closed planar fractures, few scattered dark green gray pyrite streaks and stringers from 1211.6-1212.5 light olive brown even bedding very low to low oil shale bed, abundant white pinpoint calcite from 1212.3-1213.9, abundant breccia from 1212.5-1214.3.
1214.3	1216.1	Oil Shale, dark brown, streaked with even bedding, fair to good competence, medium to high grade, numerous scattered leached nahcolite vugs some collapsed with associated solution fractures.
1216.1	1219.0	Oil Shale, light olive brown with dark brown, streaked with even and wavy and irregular bedding, poor competence, low to medium grade, very argillaceous from 1216.1-1216.4, few scattered light to dark brown granular asphaltic tuff blebs and streaks, several scattered open planar shaly partings, bedding inclined 15° from 1217.8-1218.5, gradational contact with following oil shale.
1219.0	1223.5	Oil Shale, marly, light brown, even bedding, very poor to poor competence, very low grade, numerous open and closed planar poker chip partings, few solution fractures, evidence leached nahcolite vug at 1221.7 with associated bedding inclined of 30° at 1222.2.
1223.5	1227.0	Oil Shale, medium olive brown, even with trace streaked bedding, low grade, poor competence, numerous scattered planar partings, some poker chip, 0.5 core loss from 1224.5-1225.0, gradational contact with following oil shale.

From	To	Description
1227.0	1234.0	Oil Shale, slightly marly, light to medium gray brown, even with trace looped, offset, and wavy bedding, very poor competence, low grade, numerous scattered planar partings, numerous solution fracture zones with calcite mineralization; 0.40 zone of light orange brown slightly oxidized granular, tuffaceous with several solution fractures with asphalt mineralization at 1227.7 and .20 at 1228.4 and .20 at 1230.6, trace scattered light brown granular tuff blebs, trace gilsonite, several scattered light green gray pyrite streaks and stringers; 1.0 core loss from 1232.0-1233.0.
1234.0	1244.0	Oil Shale, light brown, irregular with trace even bedding, very poor competence, very low grade to barren, argillaceous, abundant very small white pinpoint calcite, numerous solution fractured, numerous zones of solution breccia, 0.8 core loss from 1238.4-1239.2, several scattered dark brown to black asphaltic tuffaceous streaks, trace gilsonite, trace looped and offset bedding, poor competence from 1239.2-1244.0, several close planar and irregular calcite sealed solution fractures.
1244.0	1248.6	Oil Shale, dark olive brown, even with trace contorted and irregular bedding, very poor to poor competence, medium to high grade, several zones of solution breccia with evidence collapsed leached nahcolite, several open planar and irregular partings with kaolinite and asphalt, several scattered solution fracture zones .20 zone with light to medium brown asphaltic tuffaceous bleb and associated concentric banding at 1245.8 and 1246.2, .40 zone with abundant asphaltic bands and streaks at 1247.1.
1248.6	1252.9	Oil Shale, light to medium gray brown, even with trace streaked, contorted and wavy bedding, very poor to poor competence, medium grade, 0.2 core loss from 1250.1-1250.3, numerous light brown granular tuff blebs, streaks, and stringers from 1251.0-1251.6, several scattered light brown marly streaks and stringers, abundant planar poker chip partings, several scattered solution breccia and solution fracture zones with leached nahcolite vugs and collapsed leached nahcolite.
1252.9	1255.9	Oil Shale, light olive brown, even with trace streaked and offset bedding, poor competence, very low grade, several irregular and hackly open and closed solution breccia zones, several open and closed planar solution fractures, .20 zone with irregular dark brown asphaltic streaks, several scattered dark brown asphaltic blebs.
1255.9	1261.3	Oil Shale, light to medium brown, streaked bedding, good competence, medium to high grade, fairly tough and elastic, fairly low density, numerous scattered light brown granular tuffaceous blebs and streaks trace dark brown asphaltic stringers, several scattered large leached nahcolite vugs with bladed structure, solution fracture zone with offset bedding from 1258.4-1259.1, solution fracture zone from 1258.7-1260.4 and 1261.0-1261.3.

From	To	
1261.3	1263.4	Oil Shale, light to medium olive brown, even with trace looped bedding, poor to fair competence, medium grade, several scattered light brown granular tuff blebs and streaks, trace gilsonite, trace white calcite sealed partings.
1263.4	1268.0	Oil Shale, light brown, even bedding, very poor competence, very low grade, trace offset bedding, trace gilsonite, from 1263.5-1265.0 zone with abundant close irregular solution fracture, few scattered dark green gray pyrite streaks and stringers, from 1266.1-1267.0 medium brown streaked bedded medium grade oil shale, light brown granular tuff bleb with associated dark green gray pyrite and asphalt streaks and stringers at 1266.4, few scattered thin solution fracture zones trace leached nahcolite vugs.
1268.0	1270.0	Oil Shale, medium olive brown, streaked bedding, good competence, medium grade, numerous scattered light brown to tan granular tuffaceous blebs and streaks.
1270.0	1276.6	Oil Shale, light to medium olive brown, even bedding, poor to fair competence, low to medium grade, streaked bedding from 1272.4-1273.0, dark olive brown streaked bedded high grade oil shale from 1275.4-1276.0, numerous zones of planar shaly poker chip partings with some kaolinite, few scattered open and closed solution fractures, trace gilsonite, trace leached nahcolite vugs and collapsed leached nahcolite dark brown asphaltic tuffaceous streaks at 1273.4, trace dark green gray pyrite stringers.
1276.6	1280.0	Oil Shale, medium to dark olive brown, streaked with even bedding, fair competence, medium to high grade, even bedded from 1279.3-1280.0, few scattered fractures with asphalt mineralization, from 1277.8-1278.4 zone of solution breccia with evidence leached nahcolite vugs, collapsed leached nahcolite and asphalt mineralization, .15 dark brown asphaltic band at 1279.9.
1280.0	1289.1	Oil Shale, light to medium olive brown, even with irregular and trace streaked bedding, fair competence, medium grade, few scattered open planar and irregular solution fractures, few thin scattered solution fracture zones, .10 dark brown irregular oil shale band at 1282.7, .20 zone with irregular pyrite and asphalt streaks and stringers at 1283.4, gilsonite streaks at 1284.2, few scattered light brown granular tuff blebs and streaks, dark gray brown oil shale streaks and stringers from 1285.0-1286.7, from 1286.7-1287.2 zone with medium brown slightly breccia high grade oil shale with evidence collapsed leached nahcolite, large leached nahcolite vugs .20 at 1287.3 and 1288.1, from 1287.9-1288.7 zone with moderate solution breccia with evidence collapsed leached nahcolite and leached nahcolite vugs.
1289.1	1294.1	Oil Shale, marly, light olive brown, even with trace offset and wavy bedding poor to fair competence, very low grade, few zones with open planar poker chip partings with kaolinite mineralization, .10 leached nahcolite vugs with associated hackly structure and contorted bedding at 1291.9, few scattered light brown to tan granular tuff streaks, solution fractures and associated breccia zone with collapsed leached nahcolite from 1293.0-1294.1,

From	To	
1294.1	1298.3	Oil Shale, medium olive brown, irregular with streaked and trace even bedding, poor competence, medium to high grade, solution breccia and solution fractures common, trace gilsonite, trace looped bedding, streaked bedding from 1297.1-1297.7, core loss 0.5 from 1294.5-1295.0.
1298.3	1300.4	Oil Shale, light olive brown, even with trace streaked bedding, fair competence, low grade.
1300.4	1303.0	Oil Shale, medium to dark olive brown with light brown to tan banding, even to streaked bedding, poor competence, low to medium grade, numerous open planar partings, some poker chip.
1303.0	1307.0	Marlstone with some thin oil shale streaks and stringers, light to medium blue gray with medium dark brown band, even with trace offset and wavy bedding, poor competence, very low to barren, numerous light to medium blue gray pyrite streaks and stringers with .20 band at 1303.1, abundant irregular closed moderate to well cemented solution fractures some with kaolinite mineralization.
1307.0	1313.3	Oil Shale, light to medium olive brown, even with streaked and trace wavy and offset bedding, poor to fair competence, medium grade, abundant open and closed solution fractures, numerous open planar shaly partings, few scattered dark green gray pyrite streaks and stringers, .10 leached nahcolite vugs at 1310.2, dark brown to black asphaltic tuffaceous stringers at 1311.1, light to medium brown granular tuffaceous stringers with associated dark green gray pyrite mineralization at 1311.9, few thin zones with heavy solution fractures with evidence collapsed leached nahcolite.
1313.3	1316.4	Oil Shale, dark olive brown, streaked with even bedding, poor to fair competence, high to very high grade, few scattered open planar and irregular partings some with kaolinite.
1316.4	1318.7	Oil Shale, light to medium olive brown, even with trace irregular bedding, fair competence, low to medium grade, .30 zone with abundant collapsed leached nahcolite and asphaltic mineralization at 1317.2 and 1318.1.
1318.7	1321.5	Oil Shale, very marly, light gray brown, faint even bedding to massive, poor competence, very low grade, abundant disseminated pinpoint blebs and stringers, soft white altered nahcolite, from 1318.7-1319.3 abundant solution fractures with irregular altered nahcolite streaks and stringers and abundant offset bedding, solution fractures common from 1320.4-1320.9, evidence collapsed leached nahcolite vugs.
1321.5	1323.0	Marlstone, light brown gray to buff, massive with irregular and offset bedding, very poor competence, slightly argillaceous with few shaly partings, brittle, very crumbly in parts, abundant solution fractures and breccia from 1321.5-1322.5.

From	To	
1323.0	1325.3	Oil Shale, dark olive brown, streaked with some even and trace looped bedding, fair competence, high grade, fairly low density, buff marly streaks and blebs common, few scattered light gray to buff undulatory marly bands, few gilsonite streaks and stringers, trace collapsed leached nahcolite vugs with associated contorted bedding at 1324.3, bedding inclined 10-15° from 1325.0-1325.3.
1325.3	1327.6	Oil Shale, light olive brown to tan, even with looped bedding, fair competence, low grade, trace scattered solution fractures and several shaly planar partings, white pinpoint possibly altered nahcolite vugs common?, numerous dark gray pinpoint pyrite blebs.
1327.6	1330.2	Oil Shale, dark olive brown to dark gray brown, even with trace looped and offset bedding, poor to fair competence, medium grade, few scattered calcite stringers and solution fractures with pyrite from 1327.6-1328.9, from 1328.9-1330.2 slightly argillaceous with numerous hair-line sealed fractures with pyrite and offset bedding.
1330.2	1333.0	Marlstone, light olive brown to tan and light gray brown, even with offset bedding, very poor to poor competence, abundant white pinpoint altered nahcolite blebs, light olive brown to tan from 1330.2-1330.7 and from 1332.3-1333.0; light gray brown slightly argillaceous with abundant solution fractures from 1330.7-1332.3, generally very brittle, crumbly, gradational contact with following oil shale.
1333.0	1335.0	Oil Shale, medium gray brown, even with abundant offset bedding, very poor competence, low to medium grade, abundant closed moderate to well cemented solution fracture zones, several scattered shaly planar partings with gilsonite and pyrite common, few scattered dark brown oil shale stringers and dark gray pyrite stringers.
1335.0	1336.6	Oil Shale, medium olive brown with dark brown banded, even bedding, poor to fair competence, medium to high grade, numerous white soft altered nahcolite blebs, trace leached nahcolite vugs.
1336.6	1340.2	Marlstone, light gray brown, massive with faint even bedding, very poor competence, trace kerogen, numerous open and closed planar partings, abundant solution breccia thru-out, abundant soft white altered disseminated nahcolite, from 1338.8-1340.2 numerous white tuffaceous bands, stringers and streaks.
1340.2	1342.6	Oil Shale, dark olive brown, streaked bedding, poor to fair competence, high to very high grade, trace leached nahcolite vugs, trace gilsonite, few scattered open and irregular and planar shaly partings, trace pyrite streaks and blebs.
1342.6	1347.8	Oil Shale, medium olive brown, even with trace offset bedding, poor competence, low to medium grade, few solution fracture zones with abundant offset bedding and trace asphalt and pyrite mineralization, numerous open and closed planar and irregular partings, .30 zone with dark olive brown even bedded oil shale band at 1346.3.

From	To	
1347.8	1353.5	Oil Shale, medium olive brown, even with trace offset and wavy bedding, very poor competence, medium grade, numerous zones of open and closed solution fractures with collapsed leached nahcolite, 1.6 core loss from 1348.1-1350.0, .20 light brown argillaceous band at 1351.5, 0.40 core loss from 1352.0-1352.4, numerous open planar and irregular partings gradational contact with following oil shale.
1353.5	1360.4	Oil Shale, light olive brown to tan, even bedding, poor to fair competence from top to 1357.1, very poor competence from 1357.1-1357.9, poor to fair competence from 1357.9-1360.4, low grade, several scattered open planar partings and fractures with kaolinite, 0.60 core loss from 1354.4-1355.0, abundant white altered disseminated nahcolite blebs, high solution fracture with trace solution breccia from 1357.0-1359.0.
1360.4	1369.2	Oil Shale, light to medium brown with few dark gray bands and stringers, even with irregular and trace offset bedding, fair to good competence, medium grade, numerous dark green gray pyrite streaks and stringers, from 1361.8-1362.5 solution fracture zone with abundant pyrite offset bedding, trace leached nahcolite vug, trace faint white disseminated nahcolite blebs, medium gray brown oil shale zones from 1364.0-1364.5 and 1365.7-1366.4, few scattered open and closed solution fractures with offset bedding, leached nahcolite vugs trace kaolinite, .30 light brown solution breccia with abundant asphalt mineralization at 1365.1, numerous white disseminated nahcolite zones from 1367.6-1368.4 and .40 at 1368.7.
1369.2	1372.1	Shale, light gray, massive with faint even bedding, very poor competence, argillaceous, bentonitic, numerous scattered white disseminated nahcolite blebs, few scattered irregular and undulatory shaly partings, few thin dark brown oil shale streaks.
1372.1	1374.7	Oil Shale, light brown and medium gray brown, offset with even bedding and trace wavy, poor competence very low to low grade, few open planar partings some with kaolinite, .30 zone with white altered disseminated nahcolite at 1372.1, trace dark green gray, pyrite streaks and stringers, several scattered white altered and dark brown asphalt filled disseminated nahcolite vugs.
1374.7	1379.3	Oil Shale, light gray brown with medium olive brown, massive with trace streaked, even and offset bedding, poor competence, very low grade, white altered disseminated nahcolite thru-out, solution fractures with leached nahcolite vugs common, trace gilsonite at 1377.8, trace dark brown asphalt, numerous medium to dark gray pyrite blebs and streaks from 1379.0-1379.3.
1379.3	1385.0	Oil Shale, medium gray brown, even with streaked and trace contorted and offset bedding, fair to good competence, low to medium grade, numerous thin dark gray pyrite lamina, solution breccia zone with abundant asphalt and pyrite mineralization from 1381.5-1381.7, large .05 dark brown to black asphalt bleb at 1382.7, .05 asphaltic leached nahcolite vugs with associated contorted bedding at 1382.9, several scattered open planar kaolinite fractures and partings.

From	To	
1385.0	1391.5	Oil Shale, medium brown with light gray brown marly bands, massive with even and irregular bedding, fair competence, very low grade, argillaceous, white disseminated altered nahcolite, few open planar and irregular partings, trace dark gray pyrite streaks and lamina, trace gilsonite, few thin closed solution fracture zones, .10 light orange brown banded numerous pinpoint white calcite blebs, numerous dark gray pyrite lamina from 1389.7-1390.5, .20 zone with irregular asphaltic mineralization at 1391.3.
1391.5	1395.6	Marlstone, argillaceous, light brown gray massive with faint even and trace offset bedding, poor competence, white disseminated altered nahcolite common, slightly bentonitic, numerous open irregular shaly partings.
1395.6	1400.7	Oil Shale, argillaceous, dark gray, even with irregular bedding, fair to good competence, very low to low grade, grades to shale, light brown banding from 1396.5-1396.9, .50 leached nahcolite vug zone at 1396.3, light brown irregular banding with associated asphalt streaks from 1397.3-1397.8, few scattered dark brown to black asphalt streaks and stringers.
1400.7	1404.0	Marlstone, light brown to buff, even and irregular with offset bedding, poor competence, trace kerogen, white altered disseminated nahcolite common, argillaceous, dark gray pyrite streaks and stringers common, .40 zone with light orange brown tuffaceous with associated asphalt, rotated fragments and contorted bedding at 1400.7.
1404.0	1406.5	Oil Shale grades to shale, light gray, even with offset bedding, poor competence, very low to barren, very argillaceous, bentonitic, solution fractures with offset bedding common, white altered disseminated nahcolite .20 zone at 1404.8 and .10 zone at 1404.6.
1406.5	1415.0	Marlstone, argillaceous, light gray with light brown, massive with faint even irregular and offset bedding, poor competence, white altered disseminated nahcolite common, few scattered zones of closed very poorly cemented solution fractures, from 1410.0-1415.0 grades to light to medium blue gray with faint interbedded light brown banded breccia and recemented very argillaceous shale.
1415.0	1419.6	Oil Shale, argillaceous, medium to dark gray with light brown banding, even with trace offset bedding, poor to fair competence, very low grade, abundant solution fractures from 1415.0-1415.9, leached disseminated nahcolite vugs common, some with altered nahcolite, from 1418.9-1419.6 zone of contorted bedding partially brecciated with asphalt mineralization on top and bottom of contact.
1419.6	1424.1	Marlstone, light brown to buff, massive with faint even bedding, poor competence, trace kerogen, argillaceous, abundant solution fractures, from top to 1420.9 numerous interbedded thin dark gray clay bands, solution breccia common, disseminated nahcolite common, .10 asphaltic pod with associated contorted bedding at 1420.5.

From	To	
1424.1	1427.0	Oil Shale, medium to dark gray brown, even with irregular and trace offset bedding, poor competence, medium to high grade, close solution fracture zones from 1425.0-1426.3.
1427.0	1430.2	Marlstone, argillaceous, light brown to light gray brown, massive with offset bedding, very poor competence, trace kerogen, solution breccia common, .30 zone of white kaolinite altered tuffaceous at 1428.4, few scattered dark gray pyrite streaks and stringers.
1430.2	1440.8	Oil Shale, light to medium olive brown with dark gray banding, even with offset bedding, poor competence, very low to barren, argillaceous numerous zones of close solution breccia and solution fractures, from 1430.5-1431.4 medium grade streaked bedded oil shale, at 1431.2 dark brown asphalt stringer with associated contorted and irregular bedding, light brown to buff marlstone from 1433.6-1434.2 and 1436.0-1437.0, gradational contact with following oil shale.
1440.8	1442.9	Oil Shale, argillaceous, dark gray with faint light brown banding, even bedding, poor competence, very low grade, very bentonitic, greasy, .40 bed of light brown massive low to medium grade oil shale at 1441.5, few scattered planar shaly fractures and partings.
1442.9	1445.3	Oil Shale, medium to dark olive brown, streaked with even and trace offset bedding, good competence, high grade, numerous scattered light brown tuffaceous streaks and blebs, inclined and contorted bedding from 1444.1-1444.4.
1445.3	1453.3	Marlstone, argillaceous, light brown to buff with light gray, massive with faint even and irregular with trace offset bedding, very poor competence, trace kerogen, numerous zones of closed poorly cemented solution fractures and solution breccia, white altered disseminated nahcolite common.
1453.3	1455.0	Oil Shale, medium brown, streaked bedding, fair to good competence, high grade.
1455.0	1464.6	Marlstone, brecciated and recemented, argillaceous, light gray, trace faint irregular bedding, very poor competence, trace kerogen, few scattered medium to dark brown faint oil shale stringers, few thin dark gray pyrite streaks and stringers, abundant white disseminated altered nahcolite, .20 zone with light brown and buff .05-.10 tuffaceous bands from 1463.4 and .20 at 1464.4.
1464.6	1467.4	Oil Shale, dark brown to black, streaked bedding, good competence, high to very high grade, numerous scattered irregular dark brown to black asphaltic streaks, trace leached nahcolite, even with wavy bedding from 1466.8-1467.4.

From	To	
1467.4	1469.9	Oil Shale, light gray brown, even with irregular bedding, good competence, low grade from 1469.0-1469.8 solution fracture zone, very argillaceous, moderate to well cemented, few scattered dark gray pyrite streaks, trace leached nahcolite vugs, trace dark brown asphaltic streaks and blebs.
1469.9	1476.0	Oil Shale, medium to dark olive brown, streaked bedding, fair to good competence, high grade, few large leached nahcolite vugs, trace gilsonite, few scattered dark brown and black asphaltic streaks and stringers, 0.5 core loss from 1472.0-1472.5, 0.5 core loss from 1473.0-1473.5, .15 medium to dark brown asphaltic tuff band with abundant white disseminated altered nahcolite and trace pyrite streaks at 1474.2, .30 core loss from 1475.3-1475.6.
1476.0	1479.8	Oil Shale, medium gray brown with light brown bands, even bedding, good competence, low to medium grade, numerous thin dark gray pyrite streaks and stringers .05 zone with dark brown asphalt and light brown granular irregular tuffaceous stringer, large .10-.20 hackly leached nahcolite vugs at 1479.0 and 1479.6 and 1479.8, gradational contact with following oil shale.
1479.8	1482.0	Oil Shale, medium brown, streaked with trace contorted bedding, good competence, medium to high grade, leached nahcolite vugs at 1479.9, abundant large asphaltic pods and blebs, trace gilsonite.
1482.0	1487.0	Oil Shale, marly, light brown, even with trace wavy and offset bedding, fair competence, low grade, numerous scattered light brown marly bands, numerous scattered light brown granular tuffaceous blebs and streaks, small leached nahcolite vugs common, 0.3 zone of solution fractures with offset collapsed leached nahcolite vugs and associated contorted bedding at 1482.2.
1487.0	1495.0	Oil Shale, light olive brown, streaked bedding, good competence, medium grade, trace gilsonite, numerous scattered light to medium brown granular tuffaceous blebs and streaks, few scattered dark gray pyrite streaks and stringers, large hackly leached nahcolite vugs with core loss from 1492.8-1493.2, leached nahcolite vugs with hackly structure at 1494.0.
1495.0	1497.5	Oil Shale, medium olive brown, even with trace streaked and irregular bedding, fair competence, medium grade, numerous dark gray to black pyrite streaks and stringers, few scattered open planar parallel fractures with kaolinite mineralization, thin medium brown granular tuff stringers with associated asphaltic mineralization at 1496.7, large leached nahcolite vugs partings at 1497.1, moderate solution fracture with offset bedding .20 at 1497.3.
1497.5	1505.0	Oil Shale, marly, light brown to tan, even with wavy and contorted bedding, poor to fair competence, very low grade to barren, several scattered large hackly leached nahcolite vugs, several dark gray pyrite streaks and stringers, .70 zone with dark brown asphalt and dark gray pyrite irregular streaks and stringers and bands with associated closed solution fractures from 1499.8-1502.0 medium olive brown low grade even with contorted and offset bedded oil shale, from 1502.2-1505.0 numerous shaly

From	To	
		irregular open partings, numerous leached nahcolite vugs, numerous light brown brittle silty clay bands .20 solution fracture zones with heavy kaolinite mineralization at 1502.8.
1505.0	1509.0	Oil Shale, light olive brown, streaked bedding, fair to good competence, medium to high grade, numerous small disseminated leached nahcolite vugs, large light brown to buff slightly calcareous granular tuff pod at 1505.5, several open irregular partings along silty clay stringers, several light brown soft to brittle silty clay blebs and stringers from 1507.6-1509.0.
1509.0	1513.7	Oil Shale, light olive brown, even with trace offset bedding, fair to good competence, medium grade, several leached nahcolite vugs some with asphaltic mineralization from 1510.5-1510.9, open hackly leached nahcolite vugs with associated solution fractures core loss from 1512.3-1512.5, large .20 leached nahcolite vugs at 1513.4.
1513.7	1522.7	Oil Shale, medium olive brown, streaked bedding, good to excellent competence, high to very high grade, few scattered dark gray pyrite streaks, trace gilsonite, leached nahcolite vugs .10 with kaolinite mineralization at 1517.7 and .20 as parting with kaolinite mineralization at 1518.2 and .20 as parting at 1519.8 and .10 at 1520.0, few argillaceous pyrite clay stringers as partings at 1519.1 and 1519.7, dark gray pyrite stringer at 1520.0, open irregular to hackly leached nahcolite vugs as parting with associated dark gray pyrite mineralization at 1521.9.
1522.7	1527.6	Oil Shale, medium olive brown with light brown, even bedding, good competence, low to medium grade, leached nahcolite vugs as partings at 1522.9 and 1523.0 and 1527.4, large .15 leached nahcolite vugs with pyrite and asphalt mineralization at 1526.7.
1527.6	1534.3	Oil Shale, medium olive brown with light olive brown from top to 1529.0, streaked bedding, good competence, high grade, leached nahcolite vugs as partings at 1528.5 and with associated core loss from 1530.3-1531.7, several scattered dark gray to black pyrite streaks, several scattered dark brown asphaltic streaks, few open irregular 45 and 60° fractures with kaolinite, trace gilsonite.
1534.3	1536.0	Oil Shale, medium to dark olive brown, even bedding, fair competence, medium grade, few scattered dark gray pyrite blebs and streaks, several open planar partings with kaolinite.
1536.0	1539.0	Oil Shale, marly, light to medium brown with numerous dark gray to black pyrite streaks, massive with irregular bedding, poor competence, very low to low grade, silty, closed irregular and planar solution fractures common, .30 core loss at 1536.7, evidence collapsed leached nahcolite.

From	To	
1539.0	1546.4	Oil Shale, medium olive brown, streaked with even bedding, good to excellent competence, medium to high grade, fairly tough and elastic, fairly low density, leached nahcolite vugs as follows: .10 at 1539.9; .10 as parting at 1541.2, .15 with associated wavy bedding at 1542.7 with pyrite and asphalt mineralization, numerous dark gray pyrite blebs and streaks from 1539.1-1539.4 and with associated irregular slightly marly structure .20 at 1543.4 and .10 at 1544.6, few scattered gilsonite streaks and blebs, several scattered light brown and light gray tuff streaks and blebs, large irregular pyrite and asphaltic bleb at 1542.3, open and closed irregular and planar with evidence collapsed leached nahcolite and leached nahcolite vugs solution fracture zone from 1544.7-1545.0.
1546.4	1549.5	Oil Shale, light brown, even bedding, poor to fair competence, low grade, few open planar partings with kaolinite from 1546.7-1547.0, .20 zone with dark gray to black pyrite streaks and stringers with associated argillaceous altered tuff at 1547.1, .10 irregular leached nahcolite vug with associated wavy bedding at 1547.4 and .05 with pyrite and wavy bedding at 1549.3, several scattered dark gray pyrite stringers usually with associated thin shaly tuffaceous bands.
1549.5	1552.6	Oil Shale, medium olive brown, streaked with trace irregular and wavy bedding, good competence, medium grade, leached nahcolite vugs .10 at 1550.0, .15 as parting at 1550.7, .05 light brown slightly marly band at 1550.4, several scattered irregular dark green gray pyrite blebs and streaks with associated wavy bedding, trace gilsonite, .20 solution fracture zone with evidence hackly collapsed leached nahcolite vug at 1551.6, medium gray brown with irregular bedding oil shale with numerous open planar and irregular solution fractures from 1551.8-1552.6.
1552.6	1555.6	Oil Shale, light olive brown, wavy with even and trace offset bedding, very poor to poor competence, low grade, abundant open and closed irregular hackly and planar asphalt and pyrite mineralization solution fracture zones, .30 core loss from 1554.2-1554.5, trace leached nahcolite vug, few open planar shaly partings with kaolinite, .20 zone of solution breccia at 1555.4.
1555.6	1558.4	Oil Shale, medium brown, even with trace irregular and offset bedding, poor competence, low grade, silty, numerous open and closed planar poker chip partings, abundant solution fractures thru-out, even collapsed leached nahcolite, .20 zone of very poorly cemented of solution breccia at 1555.7, numerous dark gray irregular and planar pyrite streaks and stringers, several scattered small leached nahcolite vugs; several zones with light brown clay lamina and bands.
1558.4	1564.2	Oil Shale, medium olive brown, streaked with even and trace irregular and offset bedding, good to excellent competence, medium to high grade, streaked bedded from top to 1559.8, irregular and streaked from 1559.8-1562.1, even bedding from 1562.1-1564.2, numerous scattered dark green gray pyrite blebs and streaks, several scattered dark brown asphalt and light brown granular tuff blebs and streaks, trace leached nahcolite vugs, .20 zone with black irregular pyrite streaks and associated wavy and offset bedding at 1563.4.

From	To	
1564.2	1566.6	Oil Shale, light to medium olive brown, offset with even and trace wavy bedding, very poor competence, low grade, argillaceous, abundant irregular and hackly with evidence collapsed leached nahcolite and leached nahcolite vugs and solution fracture and solution breccia common, leached nahcolite vugs with hackly structure and asphalt and pyrite mineralization common.
1566.6	1576.0	Oil Shale, medium olive brown, streaked bedding, good to excellent competence, high grade, numerous scattered leached nahcolite vugs with hackly structure and some with asphalt and pyrite mineralization, several scattered light gray granular and dark brown asphaltic blebs and streaks, several light brown bands from 1571.5-1571.8 and .20 zone at 1572.2, even bedded with abundant planar and irregular partings from 1573.1-1573.5, .30 zone with pyrite and asphalt collapsed leached nahcolite solution fracture zone at 1573.4, leached nahcolite vugs as partings at 1568.3 and 1572.8, 1574.9 and 1575.4.
1576.0	1582.7	Oil Shale, light olive brown to tan, even with trace looped bedding, fair competence, low grade, slightly marly, numerous scattered faint light to medium gray pyritic clayey oil shale streaks and stringers, .40 zone with collapsed leached nahcolite solution breccia at 1578.1 and 1580.5 with associated solution fractures, several scattered open planar and irregular shaly and kaolinitic partings, large hackly with pyrite and asphalt leached nahcolite vugs 0.25 at 1579.7, several small scattered leached nahcolite vugs at 1580.8, gradational contact with following oil shale.
1582.7	1589.8	Oil Shale, medium to dark olive brown, streaked bedding, good to excellent competence, high grade, fairly tough, fairly elastic and low density, partly leached with some solution breccia dark brown to black and white nahcolite from 1583.6-1586.2, .10 core loss from 1584.5-1585.5, trace gilsonite streaks and blebs, trace dark brown asphaltic blebs.
1589.8	1593.3	Oil Shale, medium olive brown and medium brown, even with trace offset bedding, poor to fair competence, medium grade, numerous open planar shaly partings some with kaolinite, numerous faint medium to dark gray pyrite streaks and stringers, .40 zone with offset bedding evidence leached nahcolite vugs pyrite and asphalt mineralization solution fracture zone at 1591.6.
1593.3	1596.8	Oil Shale, medium olive brown, streaked bedding, good competence, high grade, fairly tough and elastic, fairly low density; two open planar 60° parallel fractures at 1593.9, leached hackly nahcolite vugs as partings at 1594.7, dark gray pyrite streaks at 1596.8, gilsonite streaks at 1596.7.
1596.8	1601.1	Oil Shale, medium to dark olive brown, irregular with trace streaked and even bedding, poor competence, medium grade, numerous open and closed planar and irregular solution fractures with evidence collapsed leached nahcolite and leached nahcolite vugs and some with kaolinite, .20 zone of collapsed leached nahcolite breccia with abundant dark gray pyrite mineralization, few scattered dark gray pyrite streaks and blebs,

From	To	
		.20 zone of light olive brown oil shale with wavy and irregular bedding at 1600.9.
1601.1	1604.0	Oil Shale, dark olive brown, streaked bedding, fair to good competence, high to very high grade, fairly tough and elastic, fairly low density, few open planar kaolinitic partings.
1604.0	1607.2	Oil Shale, dark olive brown, even bedding, fair competence, high grade, several open planar and irregular fractures with kaolinite at 1605.4, several scattered light brown gray granular tuffaceous bands and streaks, few medium brown asphalt bands and streaks some with associated dark green pyrite, trace gilsonite, gradational contact with following oil shale.
1607.2	1609.6	Oil Shale, light to medium gray brown, even bedding, fair competence, low grade, numerous scattered medium gray pyrite bands and stringers, numerous medium brown granular tuffaceous streaks and stringers from 1607.2-1607.6, trace gilsonite, .40 open irregular 85° fractures with kaolinite at 1607.2.
1609.6	1617.7	Oil Shale, light brown, irregular with wavy and offset bedding, very poor to poor competence, low grade, silty and argillaceous, abundant open and closed irregular and hackly solution fractures and solution breccia, abundant open and closed irregular partings, from 1613.8-1614.5 wavy and streaked bedded medium brown and medium grade oil shale bed, numerous scattered dark gray pyrite streaks and stringers.
1617.7	1624.1	Oil Shale, medium olive brown, streaked with trace irregular bedding, good competence, high grade, fairly tough and elastic, fairly low density, several scattered hackly leached nahcolite vugs, few as partings at 1619.3 and 1619.6 and 1621.7 and as fractures at 1621.8, several asphaltic streaks and blebs, several scattered dark gray pyrite streaks and blebs, several scattered light brown to tan granular tuffaceous blebs and streaks.
1624.1	1628.9	Oil Shale, light olive brown, even with streaked and irregular bedding, very poor to poor competence, low grade, numerous open and closed shaly with evidence of leached nahcolite and collapsed leached nahcolite, solution fractures and solution breccia zones, very argillaceous from 1626.6-1628.9, streaked bedded medium grade light to medium olive brown from 1626.0-1626.6, .10 zone with irregular asphalt and pyrite streaks at 1625.6.
1628.9	1632.0	Oil Shale, light to medium brown, streaked with irregular and trace offset bedding, good competence, medium grade, numerous dark gray pyrite and medium to dark brown asphaltic blebs and streaks, trace gilsonite, leached nahcolite vugs at 1630.4, .10 dark brown asphalt band at 1630.7, from 1630.9-1632.0 medium olive brown even bedded high grade oil shale with several 30-60° open planar and irregular fractures.

From	To	
1632.0	1639.0	Oil Shale, marly, light gray brown, even bedding, very poor competence, very low grade, very argillaceous from 1632.6-1634.6 and 1637.5-1639.0, open and closed planar and irregular shaly and pyritic poker chip partings common, trace leached nahcolite vugs, several scattered closed shaly solution fractures with offset bedding, dark gray pyritic streaks and stringers common.
1639.0	1643.6	Oil Shale, light olive brown, streaked with irregular bedding, fair to good competence, high grade solution fractures with collapsed leached nahcolite and leached nahcolite vugs from 1639.6-1640.3 and 1642.0-1642.4, several light to medium brown granular tuffaceous bands at 1640.4 and 1640.6, several leached nahcolite vugs as follows: 1639.3, 1641.2, .15 at 1641.7, 1642.5, 1642.6, 1643.2, several scattered dark gray pyritic streaks and stringers.
1643.6	1678.0	Oil Shale, light to medium gray brown, even with faint streaked and irregular bedding, fair to good competence, medium grade, from 1643.6-1644.3 numerous irregular dark gray pyritic streaks and stringers, medium dark brown very asphaltic tuff bed from 1644.6-1645.8 and numerous .20 bands from 1646.4-1647.2, few scattered leached nahcolite vugs, from 1656.0-1659.6 zone with light gray brown slightly argillaceous slightly marly and light olive brown poor competence oil shale beds with abundant open and closed irregular and planar poker chip partings and solution fractures with pyrite, kaolinite and asphalt mineralization, .15 pod with black pyrite and white kaolinite mineralization, from 1659.6-1662.2 numerous dark gray pyrite and dark brown asphaltic blebs and light brown to tan banded from 1665.7-1666.4, .20 medium olive brown high grade at 1667.6, gilsonite bleb at 1667.9, light brown to tan slightly marly from 1667.8-1669.8, numerous dark gray irregular streak of pyrite from 1668.4-1668.8, .20 zone of light orange brown oil shale with numerous dark gray pyrite and dark brown asphaltic streak at 1669.0, buff and dark brown asphaltic granular tuffaceous band at 1670.3, several scattered dark gray pyritic streaks and stringers from 1670.7-1672.2, several scattered open planar partings with kaolinite, from 1672.7-1675.0 and 1677.6-1678.0, several 60-85° open irregular shaly fractures from 1673.8-1675.7.
1678.0 678.0	1682.6	Oil Shale, marly, light gray brown to tan, even with faint irregular and trace wavy and offset bedding, poor competence, very low grade to barren, numerous scattered open irregular and planar shaly and pyritic partings, few scattered light brown to white granular tuffaceous blebs and streaks, numerous light to medium gray pyritic streaks and stringers, trace leached nahcolite vugs, zones with irregular and planar and offset bedded solution fractures from 1681.6-1682.6.
1682.6 682.6	1689.5	Oil Shale, light to medium brown, offset with trace even bedding, very poor competence, very low to low grade, argillaceous, solution fractures with evidence leached nahcolite vugs and collapsed leached nahcolite common, several scattered open and closed planar and irregular shaly partings, 0.7 core loss from 1684.3-1685.0.

	To	
1698.5 1698.5	1698.6	Oil Shale, light olive brown and light to medium gray brown, streaked with irregular and trace even bedding, fair competence, low to medium grade, hackly leached nahcolite vugs common, .20 solution fracture zones with leached nahcolite vugs at 1690.1, .20 zone with numerous pinpoint pyritic blebs at 1690.6, leached nahcolite vugs with asphalt and pyrite common as partings, several scattered zones with dark gray pyrite and dark brown asphalt mineralization, trace gilsonite, grade to light olive brown oil shale bed with abundant solution fractures from 1698.2-1698.6.
1698.6 698.6	1702.7	Oil Shale, light brown to light olive brown, irregular with trace contorted, streaked and even bedding, poor competence, low grade, leached nahcolite vugs some with pyrite and asphalt mineralization common, .20 zone with collapsed leached nahcolite solution fractures at 1699.2, numerous scattered irregular dark brown asphaltic streaks and stringers, trace irregular pyrite streaks.
1702.7 702.7	1709.8	Oil Shale, light olive brown, streaked bedding, poor to fair competence, medium to high grade, leached nahcolite vugs with hackly structure with asphalt and pyrite mineralization common, several scattered dark brown irregular asphaltic streak, from 1708.9-1709.8 zone with irregular and hackly asphalt and pyrite mineralized solution fractures.
1709.8 709.8	1713.4	Oil Shale, light to medium olive brown, even bedding, good competence, medium grade, few dark brown asphalt and dark gray pyrite streaks, trace gilsonite, leached nahcolite vugs as partings with pyrite at 1712.9, .30 solution fracture zone with evidence leached nahcolite at 1713.2.
1713.4 713.4	1716.7	Oil Shale, medium to dark olive brown, streaked with trace even and looped bedding, good to excellent competence, high to very high grade, fairly tough and elastic, fairly low density, trace medium gray pyrite streak, dark brown to black asphalt stringer at 1715.4, leached nahcolite vug at parting at 1716.6 and 1716.7.
1716.7 716.7	1720.1	Oil Shale, light to medium olive brown, streaked with even and trace looped bedding, good to excellent competence, medium grade, few dark brown oil shale stringer with associated asphalt tuff at 1718.1, light brown slightly marly stringer at 1720.1.
1720.1 720.1	1723.2	Oil Shale, light gray brown, even bedding, excellent competence, low to medium grade, trace gilsonite, trace dark gray pyrite streaks.
1723.2 723.2	1730.4	Oil Shale, light brown, even bedding, fair to good competence, low grade, leached nahcolite vugs as partings as follows: as 0.5 core loss at 1723.5-1724.0, at 1724.1 and 1724.5 and 1728.1 several scattered open planar shaly partings, leached nahcolite vugs at 1723.3, 1726.0 and 1726.7, medium olive brown, streaked bedded medium grade oil shale bed with associated dark brown asphalt and dark gray pyrite streaks.

From	To	
1730.4 1730.4	1735.2	Oil Shale, light to medium gray brown, even bedding, excellent competence, low to medium grade, few scattered medium to dark gray pyrite streaks and stringers, grades to light to medium olive brown from 1734.0-1735.2, several scattered light brown tuffaceous blebs and streaks.
1735.2 1735.2	1747.1	Oil Shale, medium to dark olive brown, streaked bedding, excellent competence, high to very high grade, fairly tough and elastic, fairly low density, partly leached nahcolite with abundant pyrite mineralization .30 at 1735.7, gilsonite streaks at 1737.5, dark gray irregular pyrite stringer .05 at 1739.3, medium to dark gray brown even bedded, high grade oil shale bed from 1741.7-1742.4, light to medium brown irregular bedded low grade oil shale bed from 1742.6-1743.1, grades to medium olive brown with few brown bands streaks and stringers from 1743.1-1747.1, .50 zone of irregular and contorted oil shale with abundant dark gray to black pyrite and light to medium brown granular tuffaceous streaks and stringers, trace even bedding.
1747.1 1747.1	1749.7	Oil Shale, medium to dark olive brown with dark gray brown, even with looped and wavy bedding, high grade, excellent competence, fairly tough and elastic, fairly low density, dark gray pyrite and light brown to buff granular tuffaceous streaks and stringers from 1748.2-1748.7; trace gilsonite streaks.
1749.7 1749.7	1751.1	Oil Shale, light brown to tan with dark brown, wavy with even and trace irregular bedding, excellent competence, low grade, light brown tuffaceous blebs and streaks common from 1750.7-1751.0; gradational contact with following oil shale.
1751.1 1751.1	1757.0	Oil Shale, medium olive brown, streaked bedding, excellent competence, high grade, dark gray pyrite and dark brown asphaltic tuffaceous blebs and stringers at 1752.0, 1752.8, 1754.6 and 1755.2, .05 light brown granular tuffaceous band at 1755.4.
1757.0 1757.0	1759.2	Oil Shale, medium olive brown, even bedding, excellent competence, medium grade.
1759.2 1759.2	1760.1	Oil Shale, dark brown to black, even with trace streaked bedding, very high grade, excellent competence, fairly tough and elastic, fairly low density, gilsonite streaks at 1759.2 and 1760.1.
1760.1 1760.1	1762.1	Oil Shale, light brown to tan with dark brown banded, wavy with trace streaked irregular and even bedding, excellent competence, low grade, trace looped bedding, few scattered small light brown and white tuff blebs and streaks, trace gilsonite.
1762.1	1770.3	Oil Shale, medium to dark olive brown, streaked bedding, high to very grade, excellent competence, fairly tough and elastic, fairly low density, trace gilsonite, few scattered light brown tuffaceous streaks and blebs.

From	To	
1770.3	1772.0	Oil Shale, dark gray brown, even with trace wavy bedding, excellent competence, high grade, thin white calcite streaks and stringers common, trace gilsonite, irregular light brown granular tuff .10 at 1771.3, trace dark gray pyrite streaks and stringers.
1772.0	1774.6	Oil Shale, medium to dark olive brown, even with faint streaked bedding, excellent competence, medium to high grade, light gray granular tuff streaks at 1772.1, trace gilsonite.
1774.6	1777.5	Oil Shale, dark brown to black, even with trace irregular bedding, excellent competence, medium to high grade, trace gilsonite, numerous very small white non calcareous blebs and streaks from 1775.2-1775.4; gradational contact with following oil shale.
1777.5	1782.6	Oil Shale, medium gray brown, even bedding, excellent competence, medium to high grade, trace looped bedding, trace gilsonite, light brown irregular oil shale stringers .05 at 1782.2, several small light brown to buff granular tuffaceous streaks and blebs .20 at 1782.4.
1782.6 1782.6	1792.3	Oil Shale, light olive brown, streaked with even and trace wavy bedding, good to excellent competence, medium grade, several scattered .10-.40 partly leached nahcolite with associated pyrite mineralization, light olive brown low grade oil shale with wavy and even bedding from 1782.6-1783.3 and 1784.0-1786.0, trace gilsonite.
1792.3 1792.3	1803.7	Oil Shale, light to medium gray brown, even with irregular and trace looped and wavy bedding, excellent competence, medium grade, abundant partly leached nahcolite with pyrite mineralization from top to 1792.9, trace dark brown asphalt blebs and stringers, several scattered light brown granular tuffaceous and light brown marly blebs, streaks and stringers.
1803.7 1803.7	1810.6	Oil Shale, light to medium olive brown, streaked with even and trace irregular bedding, good competence, low to medium grade, several partly leached nahcolite with dark green gray pyrite mineralization few scattered collapsed leached nahcolite vugs with abundant dark green gray pyrite, trace gilsonite, gradational contact with following oil shale.
1810.6 1810.6	1814.4	Oil Shale, dark brown, even bedding, good to excellent competence, high grade, fairly tough and elastic, fairly low density.
1814.4 1814.4	1830.6	Oil Shale, light olive brown with faint light gray brown banding from 1815.3-1817.6, even with irregular and streaked bedding, good to excellent competence, low grade, .40 partly leached nahcolite with trace dark green gray pyrite at 1817.0, trace scattered light brown granular tuffaceous streaks, leached nahcolite vugs at 1818.7, .20 zone with irregular dark green gray pyrite and light brown to buff altered nahcolite at 1820.6, dark brown even bedded high grade oil shale from 1822.9-1823.7, .10-.20 irregular dark gray pyrite patches and bands at 1823.7 and 1824.8, 1827.4 and 1827.6, trace gilsonite.

From	To	
1830.6	1834.8	Oil Shale, dark brown, even bedding, excellent competence, high grade, fairly tough and elastic, fairly low density, several dark brown irregular asphalt streaks and stringers with associated dark gray pyrite from 1830.6-1830.75, several light brown oil shale stringer from 1834.1-1834.6.
1834.8	1841.3	Oil Shale, light to medium olive brown, streaked with even and irregular bedding, excellent competence, low to medium grade, numerous light brown to buff granular and dark brown asphaltic tuff blebs and stringers, .40 zone of light brown very low grade oil shale at 1838.2.
1841.3	1845.0	Oil Shale, light to medium olive brown with dark brown to black, even with irregular bedding, good to excellent competence, medium grade, several dark gray pyrite and medium brown asphaltic tuff blebs and streaks, several zones with very small white non calcareous mineralized possibly gypsum, blebs and streaks, few light brown to buff tuffaceous blebs and streaks.
1845.0	1849.5	Oil Shale, dark brown to black, even bedding, good to excellent competence, high to very high grade, white non calcareous gypsum(?) streaks and stringers common, grades to medium to dark olive brown from 1848.0-1849.5, trace gilsonite.
1849.5	1854.2	Oil Shale, light to medium gray brown, streaked with irregular bedding, excellent competence, low to medium grade, light brown to tan clay blebs and streaks common, few dark green gray pyrite blebs and streaks.
1854.2	1857.0	Oil Shale, light olive brown to tan with light to medium gray bands, even with irregular and wavy bedding, good competence, low grade.
1857.0	1861.4	Oil Shale, medium to dark brown, even bedding, good competence, medium to high grade, several scattered dark brown asphalt and light brown granular tuffaceous blebs and streaks, gradational contact with following oil shale.
1861.4	1869.2	Oil Shale, medium to dark gray brown, even bedding, good to excellent competence, low to medium grade, trace offset bedding, trace dark brown asphalt blebs and streaks, trace dark gray pyrite streaks and stringers, light gray brown tuffaceous stringers at 1867.7, trace gilsonite, gradational contact with following oil shale.
1869.2	1884.6	Oil Shale, light gray brown and light olive brown, even with irregular bedding, good to excellent competence, low grade, few faint medium gray pyrite streaks and stringers, trace gilsonite, several dark gray irregular pyrite streaks and blebs from 1879.9-1880.4, .10 at 1881.2, .10 at 1883.4, .10 at 1883.8, gradational contact with following oil shale.

From	To	
1884.6	1893.3	Oil Shale, light gray brown, even with trace wavy bedding, fair competence, very low to low grade, numerous thin wavy oil shale streaks and stringers, numerous open 90° fractures with asphalt and few with light pale green fibrous calcite mineralization, 1.4 90° fracture with heavy dark brown to black asphalt mineralization, gas producing at 300 lbs psi closed surging pressure at 1885.0, numerous faint light to medium blue gray dolomite streaks and stringers, several black pyrite streaks, several scattered open planar partings some with asphalt.
1893.3	1919.7	Oil Shale, light olive brown to light gray brown, even with trace irregular and wavy bedding, good to excellent competence, low grade, 1.10 90° fractures with heavy black asphalt mineralization at 1896.9, several light brown granular tuffaceous blebs and streaks, few dark gray pyrite and dark brown asphalt streaks and stringers, .20 zone with abundant irregular dark gray to black pyrite streaks and stringers at 1899.7; trace streaked bedding, trace faint light brown gray banding and beds, from 1905.1-1919.7 numerous scattered light brown to white and medium brown altered irregular bladed nahcolite pods, bands streaks and stringers some with associated dark gray to black pyrite mineralization.
1919.7	1935.8	Oil Shale, light to medium olive brown, even with trace irregular and wavy bedding, good competence, low grade, numerous scattered light brown to white altered nahcolite pods, streaks and stringers few with dark gray pyrite mineralized rims and few with bladed structures, gradational contact with following oil shale.
1935.8	1941.5	Oil Shale, light olive brown, even with trace wavy bedding, fair to good competence, low grade, numerous scattered light brown altered root beer brown bladed nahcolite pods and bands several as open partings, gradational contact with following oil shale.
1941.5	1946.5	Oil Shale, light to medium olive brown with light gray brown, streaked bedding, good to excellent competence, low to medium grade, .30 zones of partly leached nahcolite vugs at 1941.9 and 1942.4, trace even bedding.
1946.5	1947.7	Nahcolite, root beer brown with trace light brown (altered), bladed structure, coarse crystalline, good competence.
1947.7	1956.1	Oil Shale, light to medium brown, streaked with trace irregular and even bedding, good competence, low to medium grade; several .20-.50 root beer brown bladed nahcolite pods and beds, few scattered dark gray pyrite bands and streaks associated with leached nahcolite.
1956.1 1956.7	1958.3	Nahcolite, root beer brown, bladed structure, coarse crystalline, good competence.

From	To	
1958.3	2003.7	Oil Shale, light to medium olive brown with light medium gray brown, even with streaked and trace irregular and wavy bedding, good competence, low grade, numerous large .10-.40 bladed coarse crystalline root beer brown nahcolite pods, bands and beds, some with dark gray to black pyrite rims and white altered nahcolite, numerous dark gray to black pyrite blebs and streaks from 1961.6-1961.9.
2003.7	2010.8	Oil Shale, medium to olive brown, even with streaked and irregular bedding, good to excellent competence, medium grade; .20 root beer brown, coarse crystalline bladed nahcolite bed at 2005.8 and .30 pod with associated pyrite rim at 2006.5.
2010.8	2017.4	Oil Shale, medium to dark olive brown, even to streaked bedding, good competence, medium grade; .15 root beer brown coarse crystalline bladed nahcolite band at 2010.8, .20 pod at 2011.2, .40 bed medium crystalline with pyrite rim at 2014.1, .20 pod at 2014.6; grades to dark olive brown high grade oil shale from 2015.3-2017.4.
2017.4	2019.5	Nahcolite, root beer brown, coarse crystalline, bladed structure, good competence; few scattered dark olive brown medium grade oil shale stringers.
2019.5	2026.8	Oil Shale, light to medium olive brown, even with irregular and wavy bedding, good competence, low to medium grade, .1-.3 root beer brown coarse crystalline bladed nahcolite bands, pods and beds, some with pyrite rims and altered white nahcolite; light gray granular calcareous tuff bleb .20 with associated dark brown asphalt stringer at 2022.6.
2026.8	2031.4	Oil Shale, medium to dark olive brown, streaked with irregular and trace wavy bedding, good to excellent competence, medium grade; several scattered light gray and light brown oil shale bands; small light gray calcareous tuff stringer at 2029.8; .20 zone with irregular bladed root beer brown and altered light brown, coarse crystalline nahcolite patch at 2030.3.
2031.4	2041.0	Oil Shale, light to medium olive brown and medium gray brown, even with streaked bedding, good to excellent competence, medium grade; few scattered dark gray granular calcareous tuff streaks from 2033.1-2033.4; trace looped bedding at 2033.5; several scattered small white calcareous streaks and stringers from 2033.8-2034.5 and 2035.4-2036.4; few open irregular partings with gilsonite and carbonate fish and wood fossils and pyrite at 2035.7 and 2036.4; from 2036.2-2036.9 several scattered black carbon and pyrite streaks; few scattered white calcareous streaks from 2039.6-2040.4 with associated black pyrite streaks.
2041.0	2060.2	Oil Shale, medium to dark olive brown, even with streaked bedding, excellent competence, medium to high grade; .05 dark brown irregular asphalt stringer at 2046.4, few scattered dark gray to black pyrite streaks from 2055.5 to 2056.5, trace wavy bedding, grade to slightly irregular bedding from 2059.7-2060.0; grades to medium gray brown from 2051.3-2060.2.

In	To	
2043.2 50.2	2078.5	Oil Shale, light to medium brown with light to medium gray banded, even with trace irregular bedding, fair to good competence, low grade; thin black irregular pyrite band at 2062.0; numerous light to medium gray pyrite streaks and bands from 2060.2-2062.0 and 2064.4-2078.5; numerous scattered white calcareous blebs and streaks from 2066.5-2074.3; numerous open asphaltic irregular and planar partings from 2066.5-2078.5; several open and closed 90° irregular fractures with asphalt and calcite mineralization from 2070.0-2075.0; trace looped bedding; inclined bedding 15° at 2072.6; .40 dark olive brown high grade oil shale at 2075.0.
2078.5	2094.2	Oil Shale, medium to dark olive brown with light gray banding, even with trace irregular bedding, good competence, medium grade; numerous scattered faint light gray pyrite streaks and stringers; grades to streaks and wavy bedding from 2089.5-2094.2; dark green gray pyrite stringer with associated light brown tuff at parting at 2092.2; numerous black pyrite streaks and stringers from 2093.7-2094.0.
2094.2	2113.5	Oil Shale, light to medium gray brown, irregular with even bedding, fair to good competence, low grade; numerous scattered dark brown asphalt and dark green gray pyrite mineralization open irregular and planar partings; several scattered white calcareous streaks, stringers and bands; few scattered leached vugs replaced with white calcite and dark brown asphalt; heavy dark brown asphaltic mineralization partings at 2096.6; few scattered dark gray pyrite streaks; numerous white calcite filled vugs from 2102.4-2104.2; large asphalt filled vug .10 at 2104.6; gradational contact with following oil shale.
2113.5	2123.1	Oil Shale, medium gray brown, even with irregular bedding, fair competence, low grade; several scattered light gray pyrite streaks and stringers; numerous dark brown asphalt open planar and irregular partings; 1.2 zone of disseminated pinpoint calcite at 2114.1; few scattered white calcite and dark gray pyrite filled vugs and stringers from 2116.5-2121.8.
2123.1	2128.1	Oil Shale, medium olive brown, even with trace irregular bedding, good competence, medium grade; large .10 dark gray pyrite blebs at 2123.5; trace streaked bedding from 2126.4-2127.1.
2128.1	2137.7	Oil Shale, light to medium gray brown, even with irregular and trace streaked bedding, excellent competence, low grade; dark gray pyrite stringers, at partings at 2127.5 and at 2130.5 with associated calcite; small tan granular tuffaceous streak at 2131.1; zone with numerous dark gray pyrite streaks and bands from 2132.5-2137.7, .10 zone with dark green gray irregular pyrite streaks and stringers at 2136.2, gradational contact with following oil shale.
2137.7 7.7	2156.4	Oil Shale, light brown, even with trace streaked and irregular bedding, good competence, low grade, several scattered dark gray to black and dark brown pyrite and asphalt streaks and stringers, medium brown even with streaked bedded medium to high grade oil shale beds from 2149.1-2150.1 and 2152.2-2153.3, several scattered light gray tuffaceous blebs, several scattered irregular partings with pyrite mineralization, gradational contact with following oil shale.

m	To	
2156.4 6.4	2166.6	Oil Shale, medium to dark brown, streaked with even and trace irregular bedding, good to excellent competence, medium to high grade, light brown and dark brown to black irregular bedded low to medium grade oil shale from 2162.2-2163.8, thin black gilsonite stringers at 2162.2, few scattered light brown and medium to dark brown asphaltic granular tuffaceous streaks and stringers, trace offset bedding, gradational contact with following oil shale.
2166.6	2177.0	Oil Shale, light to medium gray brown, even bedding, poor to fair competence, low to medium grade, argillaceous, numerous open and closed planar shaly partings, light brown to tan banded slightly marly low grade oil shale from 2169.5-2171.3, slightly bentonitic and greasy, few scattered light brown granular tuffaceous blebs, streaks and stringers, gradational contact with following oil shale.
2177.0	2181.0	Oil Shale, medium to dark brown with light brown banding, even with irregular and trace streaked bedding, poor to fair competence, medium grade, several open planar shaly poker chip partings.
2181.0	2190.0	Oil Shale, light to medium brown, streaked with irregular bedding, good to excellent competence, low to medium grade, few scattered irregular dark gray pyrite and light brown tuffaceous streaks and stringers.
2190.0	2192.2	Oil Shale, medium brown, faint streaked with irregular and trace offset and wavy bedding, good competence, low grade, dark brown wavy oil shale streaks common from 2190.0-2190.9, .10 dark brown high grade oil shale band at 2191.05.
2192.2	2205.9	Oil Shale, dark brown to black, even bedding, poor to fair competence, low to medium grade, argillaceous, thin irregular medium to dark brown asphaltic tuff with associated light orange clay stringer at 2193.9, several scattered light brown granular and dark brown asphaltic tuff streaks and blebs, gilsonite stringers at 2194.2, few scattered light brown marly bands and stringers from 2198.1-2198.5 and medium green brown marly bands from 2199.1-2200.5, moderate dessication common.
2205.9	2214.2	Oil Shale, light gray brown tan and medium dark brown banded, irregular with looped and trace even bedding, good competence, low grade, marly, trace contorted bedding, few scattered light brown granular tuff blebs and streaks, trace gilsonite.
2214.2	2215.5	Oil Shale, light to medium brown and dark brown to black banded, even bedding, poor competence, very low to low grade, numerous open planar shaly poker chip partings.
2215.5	2218.0	Oil Shale, argillaceous, medium to dark gray brown dark brown on fresh breaks, very poor competence, low to medium grade, trace light brown banding, open planar and disked shaly partings common; bentonitic; trace pyrite on few scattered partings, contact with following oil shale.

	To	
2218.0	2226.2	Shale, argillaceous, medium to dark brownish gray, medium greenish gray on fresh break, very poor competence, trace kerogen, oil shale lamina common, dessication common; very bentonitic; abundant open, planar shaly partings; soft and greasy; trace few scattered light brown and light gray marly bands; .20 light brownish gray granular tuffaceous bands with calcite at 2218.8; gilsonite fossils on few partings; gilsonite stringers common 2222.3-2222.6; trace scattered shaly fractures with slickensided; .20 zones of light brown marly very low grade to barren oil shale at 2225.6 and 2225.9.
2226.2	2230.0	Core loss
2230.0	2236.0	Oil Shale, medium to dark brown black, even bedding with trace offset, very poor competence, low grade, argillaceous, open and closed planar and disked shaly partings common, several scattered light brown marly and tuffaceous bands and stringers, slightly greasy and bentonitic, trace wavy and contorted bedding, gradational contact with following oil shale.
2236.0	2239.4	Oil Shale, argillaceous, medium brown with light to medium blue gray banding, even with contorted bedding from 2238.3-2239.4, very poor competence, low grade, open and closed planar and disked shaly partings common, slightly greasy and bentonitic.
2239.4	2242.4	Oil Shale, dark brown to black, even bedding, fair competence, medium to high grade, dark brown to black granular asphaltic tuff stringers at 2239.9, slightly argillaceous, slightly greasy and bentonitic from 2241.7-2242.4, dark gray and light brown thin granular tuffaceous stringer at 2242.2.
2242.4	2245.7	Oil Shale, light brown and dark brown to black banded, even with irregular bedding, very poor competence, low grade, slightly argillaceous, open and closed planar and disked shaly partings common, slightly greasy and bentonitic, trace light brown granular tuffaceous blebs, several scattered light to medium granular gray shaly bands and stringers.
2245.7	2247.9	Oil Shale, argillaceous, medium brown with light to medium gray, contorted bedding, very poor competence, very low grade, slightly greasy and bentonitic, open and closed planar and disked shaly partings common, .30 dark brown low to medium grade even bedded oil shale band with trace gilsonite at 2247.6.
2247.9	2250.9	Shale, bentonitic, light to medium blue gray, even to nearly massive, very poor competence, trace kerogen, open and closed planar and disked shaly poker chip partings, several scattered light brown to tan marly bands and stringers.
2250.9	2257.3	Oil Shale, argillaceous to medium dark gray brown, even bedding, very poor competence, low grade, bentonitic, greasy, open and closed planar and disked shaly partings common, numerous light to medium gray brown bands from 2254.4 to 2255.6; dark brown to black asphalt streaks at 2256.0, several scattered light brown marly and granular tuff streaks and bands.

From	To	
2257.3	2269.2	Oil Shale, very argillaceous, light to medium brown gray, even with contorted and irregular bedding, very poor competence, very low grade to barren, greasy and bentonitic, trace offset bedding, open and closed planar and disked shaly partings common, contorted bedding from 2260.8 to 2262.0, .20' light brown marlstone bands at 2262.5 and 2267.1, .10 zone of medium gray brown granular tuffaceous stringers with associated wavy bedding and 15° fractures with asphalt at 2265.3, gradational contact with following oil shale.
2269.2	2272.0	Oil Shale, medium to dark brown with light gray banding, even bedding, very poor competence, very low grade, argillaceous, bentonitic, greasy, trace wavy and offset bedding, trace gilsonite, open and closed planar and disked shaly poker chip partings common.
2272.0	2275.6	Oil Shale, dark gray brown, even bedding, very poor competence, low grade, argillaceous, bentonitic, greasy, open and closed planar and disked shaly poker chip partings common, gilsonite streaks at 2274.2, few scattered light to medium brown bands, gradational contact with following oil shale.
2275.6	2289.9	Oil Shale, dark gray brown to black with light brown banding, even bedding, very poor competence, low to medium grade, argillaceous, slightly bentonitic and greasy, open and closed planar and disked shaly poker chip partings common, numerous scattered light brown to tan marly bands and stringers, trace small leached vugs with asphalt mineralization, trace gilsonite, gradational contact with following oil shale.
2289.9	2296.3	Oil Shale, medium gray brown, even bedding, poor competence, low grade, slightly argillaceous and greasy and bentonitic, light brown to tan marly bands and stringers common from 2294.2-2295.4, gilsonite streaks at 2290.4 blebs at 2292.9 stringers at 2293.6, trace looped and irregular bedding, grades to dark gray brown to black medium grade oil shale from 2295.7-2296.3, several zones of open and closed planar and disked shaly partings.
2296.3	2298.8	Oil Shale, medium to dark gray brown with light blue gray, even with trace offset and wavy bedding, very poor to poor competence, very low to low grade, argillaceous, bentonitic, greasy, numerous open and closed planar and irregular shaly partings, numerous light blue gray clay bands and stringers with disseminated pyrite from 2297.0-2298.0, .15 zone with light brown to tan thin marly lamina with associated granular tuffaceous stringers at 2298.5, trace gilsonite, gradational contact with following oil shale.
2298.8	2300.4	Oil Shale, dark gray brown to black, even bedding, poor to fair competence, medium grade, slightly argillaceous bentonitic and greasy, several open planar shaly partings.

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2300.4 2305.3	2305.3	Oil Shale, medium gray brown, even with trace offset bedding, very poor competence, very low to low grade, argillaceous, greasy, bentonitic, open and closed planar and irregular shaly poker chip partings common, .20 zone of medium to dark brown asphalt with associated gilsonite and pyrite mineralization at 2300.4, numerous scattered light to medium marly bands and stringers, gradational contact with following oil shale.
2305.3	2307.6	Oil Shale, dark gray brown, even bedding, fair to good competence, medium grade, trace looped bedding, gradational contact with following oil shale.
2307.6	2313.5	Oil Shale, medium gray brown, even with trace offset bedding, fair to good competence, low to medium grade, few scattered dark brown to black asphaltic tuff stringers and streaks, dark gray very fine grade porous hydrocarbon with strong sour gas odor from 2310.3-2310.5, several scattered open planar shaly partings, thin light gray green bentonitic clay band at 2312.7.
2313.5	2321.4	Oil Shale, medium to dark gray brown, even bedding, poor to fair competence, low to medium grade, slightly argillaceous, bentonitic and elastic, few scattered medium to dark brown asphaltic tuff blebs, stringers, bands, numerous dark brown to black oil shale bands from 2313.5-2314.7, several scattered open planar shaly partings, numerous white calcite stringers and streaks from 2316.5-2316.8 and .15 zone of white calcite blebs at 2317.5.
2321.4	2353.5	Siltstone, argillaceous, light to medium gray with light to medium gray brown, massive with even and irregular oil shale bands and beds, poor to fair competence, trace kerogen, several scattered open and closed planar and irregular partings and fractures, several zones with numerous medium gray pyrite or asphalt mineralized hairline close fractures with offset bedding, irregular even bedded medium to dark brown medium grade oil shale fragments beds and bands common, few tectonic fracture zones with kaolinite and asphalt mineralization, .50 zone with abundant light brown and light gray granular tuffaceous blebs and streaks at 2341.4.
2353.5	2358.9	Oil Shale, argillaceous, light gray brown with several light gray clay bands, even bedding, very poor competence, very low grade, bentonitic, greasy, elastic, open planar shaly partings some with pyrite and slickenside common, few open irregular and undulatory shaly slickenside fractures, trace offset bedding, trace scattered dark brown to black asphalt streaks and blebs, gradational contact with following oil shale.
2358.9	2361.9	Oil Shale, dark gray brown, even bedding, fair competence, medium to high grade, several light brown marly bands and stringers from top to 2360.4, trace gilsonite, inclined bedding 15-30° common.
2361.9	2366.0	Shale, bentonitic with oil shale bands and beds, light gray with medium gray brown, nearly massive with even bedding, very poor to poor competence, several scattered beds and bands of medium to dark gray brown low to medium grade oil shale, greasy, open irregular shaly partings common and with few fractures.

m 2372.4 5.0	To 2372.4	Oil Shale, argillaceous, medium to dark gray brown, even bedding, very poor to poor competence, low grade, open planar shaly partings and fractures common with several poker chip zones, 1.5 core loss from 2366.0-2367.5, trace gilsonite, gradational contact with following oil shale.
2372.4 372.4	2374.9	Oil Shale, dark gray brown to black, even with trace wavy bedding, fair competence, medium to high grade, several scattered open planar and irregular shaly partings and fractures few with slickenside, several scattered asphalt streaks and blebs from 2373.9-2374.8 with associated wavy and contorted bedding.
2374.9 374.9	2378.0	Oil Shale, dark gray brown with light brown and light brown gray banding, even bedding, fair competence, medium grade, argillaceous, bentonitic, trace gilsonite, few scattered open planar shaly partings, thin dark gray pyrite band at 2376.3.
2378.0	2384.0	Oil Shale, argillaceous, medium brown gray and medium to dark gray brown, even bedding, poor to fair competence, low grade, several zones with open planar shaly poker chip partings, trace gilsonite, few scattered black asphalt blebs and streaks, few scattered light brown marly bands and stringers, greasy, bentonitic, gradational contact with following oil shale.
2384.0	2394.3	Oil Shale, very argillaceous, light to medium brown gray, even bedding very poor to poor competence, very low grade to barren, very bentonitic and greasy, zones with open planar shaly poker chip partings common, few scattered open undulatory shaly slickenside fractures, numerous light gray brown slightly marly bands and stringers from top to 2385.9, few scattered black asphalt and gilsonite streaks and blebs, dessication common, gradational contact with following oil shale.
2394.3	2398.0	Oil Shale, medium gray brown, with dark gray brown to black, even bedding, poor to fair competence, medium grade, slightly argillaceous, bentonitic and greasy, several scattered light brown granular tuffaceous streaks from 2394.3-2394.5, trace gilsonite; high grade dark gray brown to black oil shale from 2395.1-2396.7; few scattered open planar shaly partings; gradational contact with following oil shale.
2398.0	2401.7	Oil Shale, light to medium gray brown, even bedding, poor to fair competence, low grade, slightly argillaceous, slightly greasy and bentonitic, numerous scattered open planar shaly partings.
2401.7	2423.8	Oil Shale, dark gray brown to black, even bedding, fair competence, medium to high grade, several scattered open planar shaly partings, few open undulatory shaly slickenside fractures, dark green gray irregular pyrite streaks at 2408.4, trace gilsonite, zones of medium to dark gray brown slightly argillaceous even bedded medium grade oil shale with gradational contact and planar shaly poker chip partings common from 2410.0-2412.4 and 2419.4-2421.1, several scattered very small light brown granular and light green gray pyrite blebs and streaks several scattered thin light brown marly bands and stringers, light brown

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		to tan tuffaceous stringer with associated gilsonite at 2416.4 and with offset bedding at 2417.3 and 2418.4 and at 2421.3, gradational contact with following oil shale.
2423.8	2432.6	Shale, bentonitic, medium green gray, massive with trace even bedding, very poor competence, trace kerogen, greasy, open and closed planar shaly poker chip partings common, few open shaly slickenside fractures, trace gilsonite, gradational contact with following oil shale.
2432.6	2441.2	Oil Shale, argillaceous, dark gray brown, even bedding, very poor competence, very low to low grade, bentonitic, greasy, open and closed planar shaly partings common, few open undulatory shaly slickenside fractures, dark gray brown medium grade oil shale with gradational contact from 2432.6-2435.4, zones with light brown marlstone .05 at 2440.5 and .30 at 2440.7, gradational contact with following oil shale.
2441.2	2448.1	Oil Shale, very argillaceous, medium green gray, even bedding to nearly massive, very poor competence, very low to barren, open and closed planar shaly poker chip partings common, few open shaly slickenside fractures, very greasy and bentonitic, light brown marly clay bands common, gradational contact with following oil shale.
2448.1	2459.9	Oil Shale, medium to dark gray brown, even bedding, fair competence, low to medium grade, several .20-30 zones of light gray brown low grade oil shale, several scattered dark brown to black asphalt blebs and streaks, several scattered light green gray pyrite blebs and streaks, light brown marly very low grade to barren oil shale from 2451.5-2453.0, .10 light brown granular tuffaceous band at 2454.4, few open planar shaly partings at 15°, inclined bedding at 15° from 2453.3-2459.5, .30 zone with abundant light to dark brown tuffaceous blebs and stringers some with asphalt at 2456.0, slightly argillaceous, bentonitic and greasy, thin light brown granular tuffaceous band 15° at 2457.3.
2459.9	2465.0	Oil Shale, dark gray brown, even bedding, poor competence, low to medium grade, several open planar and few irregular shaly and pyrite partings, large .05 gilsonite bleb at 2460.6, numerous scattered light green pyrite clay streaks and bands, numerous scattered small gilsonite blebs and streaks, gradational contact with following oil shale.
2465.0	2469.0	Oil Shale, dark gray brown black, even bedding, fair to good competence, medium grade, few scattered open planar and irregular partings with trace pyrite, several scattered light green pyrite clay streaks and stringers, trace gilsonite.
2469.0	2471.2	Oil Shale, medium brown, even bedding, fair to good competence, low grade, several scattered light green pyrite blebs and streaks.
2471.2	2474.9	Oil Shale, dark gray brown to black, even bedding, fair to good competence, medium grade, trace gilsonite, from 2472.4-2473.4 medium brown, low grade, poor competence, slightly argillaceous oil shale bed.

m	To	
2474.9	2479.2	Oil Shale, light to medium gray brown, even bedding, fair to good competence, very low to low grade, slightly argillaceous, bentonitic, greasy.
2479.2	2497.0	Oil Shale, dark gray brown, even bedding, poor to fair competence, medium grade, slightly argillaceous, bentonitic, greasy, several zones with open planar shaly poker chip partings, few open planar and undulatory fractures few with pyrite, .025 gilsonite band at 2480.6, dessication common, .30 zone of light gray brown an tan granular tuffaceous streaks, stringers and bands, argillaceous with numerous poker chip partings from 2489.8-2491.7, .05 light brown marly and light gray pyrite clay bands at 2491.7 and 2492.8, light brown marly banding common from 2493.4-2497.0, several scattered light green gray pyrite blebs and streaks, few scattered light brown granular tuffaceous streaks and bands.
2497.0	2508.0	Oil Shale, medium to dark gray brown, even bedding, poor to fair competence, medium grade, several open planar shaly partings, light brown marly banding common with .30 bed at 2503.2; .20 zone of massive with irregular and dark green gray and dark greasy pyrite band at 2501.5, light to medium gray brown low grade oil shale from 2505.9-2507.2, trace offset bedding, gradational contact with following oil shale.
2508.0	2527.0	Oil Shale, light to medium gray brown, even bedding, poor to fair competence, medium grade, several scattered dark green gray pyrite streaks and stringers, several scattered dark brown asphalt streaks, light brown slightly marly faint banding common, slightly argillaceous greasy and bentonitic, open planar shaly partings common, few with pyrite, medium brown gray even bedded, argillaceous, very low grade oil shale with .20 light brown marly band at top from 2516.5-2517.3, .15 zone with massive and irregular light brown and light gray granular tuff at 2518.2 and .10 at 2521.4, few scattered open undulatory shaly slickenside fractures, .30 light brown marly bands at 2524.9 and 2526.5, open 90° planar fractures with asphalt at 2526.5.
2527.0	2533.1	Shale, bentonitic, medium gray, massive with trace even bedding, very poor competence, open and closed planar and disked shaly poker chip partings common, light brown marly bands common from top to 2530.3, trace pyrite, greasy, trace offset bedding.
2533.1	2535.2	Oil Shale, dark gray brown, even bedding, poor competence, medium grade, argillaceous, greasy, bentonitic, open planar shaly partings common, gradational contact with following oil shale.
2535.2	2551.1	Oil Shale, argillaceous, medium green gray, even bedding to nearly massive, very poor competence, low grade, medium to dark gray brown low to medium grade even bedded oil shale from top to 2536.0, open and closed planar and disked poker chip partings common few scattered light brown marly bands with beds as follows: from 2537.0-2537.6 with 85° open irregular fractures with asphalt, from 2539.1-2539.6 with open planar 90° fractures with asphalt, from 2542.4-2543.0, .30 at 2544.7, medium to dark gray brown even bedded very low to low grade

	To	
		oil shale with gradational contact from 2546.1-2546.9, several scattered open undulatory shaly slickenside fractures.
2551.1 -51.1	2553.5	Oil Shale, medium gray brown, even bedding, poor to fair competence, very low grade, light brown marly bands and stringers common, slightly argillaceous greasy and bentonitic, gradational contact with following oil shale.
2553.5 553.5	2557.8	Oil Shale, argillaceous, medium brown gray, poor competence, very low grade to barren, greasy, bentonitic, open planar and disked shaly partings common, .20 light brown marly band at 2557.6 gradational contact with following oil shale.
2557.8 557.8	2560.7	Oil Shale, medium to dark brown, poor to fair competence, even bedding, low to medium grade, few open planar shaly partings, trace dark green gray pyrite blebs and streaks, few light brown and tan marly bands from 2559.9-2560.6, slightly argillaceous in part.
2560.7 560.7	2562.0	Oil Shale, argillaceous, light to medium brown, even bedding, poor competence, very low to low grade, bentonitic, greasy, open planar poker chip partings common with few open undulatory shaly slickenside fractures, .20 light to medium green gray pyrite clay band with trace associated gilsonite at 2560.7.
2562.0	2567.1	Oil Shale, light brown, even with trace streaked bedding, fair competence, low grade, few open planar shaly partings, light brown marly bands and stringers common, poor competence from 2565.2-2566.6, .05 light gray clay band with offset bedding at 2565.5, several open irregular fractures with pyrite clay mineralization, grades to slightly argillaceous with medium gray from 2565.2-2566.6, gradational contact with following oil shale.
2567.1	2568.9	Oil Shale, medium gray brown, even bedding, very poor competence, very low grade, argillaceous, greasy and bentonitic, open planar and disked shaly poker chip partings common, gradational contact with following oil shale.
2568.9	2571.0	Oil Shale, medium brown, even bedding, fair to good competence, low grade, gradational contact with following oil shale.
2571.0	2572.6	Oil Shale, medium gray brown, even bedding, fair competence, low grade, slightly argillaceous, bentonitic and greasy, gradational contact with following oil shale.
572.6	2575.9	Oil Shale, argillaceous, medium gray brown, even bedding, very poor competence, very low grade, open and closed planar shaly poker chip partings common, fair competence from 2575.0-2575.9.
2575.9	2580.0	Oil Shale, light to medium brown, even with trace streaked bedding, good competence, low to medium grade, trace dark brown asphalt blebs, faint gray tint.
	TD	2580.0