Appendix A

Drill-cuttings descriptions

APPENDIX A--DRILL-CUTTINGS DESCRIPTIONS

Appendix A contains descriptions of drill cuttings for eight key wells used in this study. Locations of these wells are shown in Fig. 3 of the main text. Summary illustrations which show these descriptions plotted against lithologic columns and gamma-ray and resistivity borehole logs appear in the main text. Tables A-1 through A-8 are analytical descriptions of drill cuttings for each of the eight key wells. Each table begins with a paragraph stating the well's location, elevation, total depth, completion date, and completion status. Detailed core descriptions from four additional key wells are given in Appendix B. Petrographic thin-section descriptions of drill cuttings and core samples are given in Appendix C.

Cuttings for each well were collected originally in 10-ft intervals at the wellsite. Each 10-ft interval was analyzed separately. Analyses begin 100-300 ft (30-90 m) above the top of the Abo and continue down to 100-400 ft (30-120 m) below the base of the Abo. Formation tops were picked with gamma-ray and resistivity logs where possible but only after the logs were compared with lithologic analyses of the cuttings.

Cuttings were analyzed in the laboratory with a Bausch & Lomb Stereozoom Binocular Microscope that has a magnification range of 7x to 30x. Cuttings were placed in a small dish and completely covered with water during analysis. Immersion in water minimizes light refraction and also removes dust which accumulates on samples during storage, thus bringing out details not generally observed during examination of dry cuttings. Also, color descriptions of wet rocks are more useful than dry-rock colors because wellsite descriptions are generally of wet rocks.

Each rock type present in each 10-ft interval is the subject of a separate paragraph. The paragraph begins with a general rock name which is followed by the percentage of that rock type within the 10-ft sample interval. The rock classification used in this study is discussed in the main text. Percentage of rock type was determined with a standard visual comparator chart (Swanson, 1981, fig. 12.1) and was estimated to the nearest 10%; if a rock type was judged to be less than 10% of a sample it was assigned a trace percentage (abbreviated tr). Color follows the percentage estimate and was described using the GSA Rock Color Chart (Goddard and others, 1980) at 7x magnification. Textural and compositional attributes of the rock follow the color: grain size of the clastic rocks, crystal size of nonclastic rocks, sorting, roundness, and mineralogic composition. Grain size was determined with a visual comparator obtained from the American/Canadian Stratigraphic Corp. and sorting was determined with a comparator chart (Compton, 1962, p. 214); angularity of sand grains was determined with the chart of Powers (1953, p. 118). Mineralogic composition is expressed with adjectival modifiers (e.g., calcareous, anhydritic) where a mineral is accessory and present in undetermined amounts of less than 50% of the rock; following the adjectival modifiers are percentages of the cuttings of a particular rock type which contain that mineral. Percentages following nouns (e.g., clay matrix)

indicate the percentage of that component present in a particular rock type. The presence of calcite was determined by strong effervescence in a 10% dilute HCl solution; the presence of dolomite was determined by weak effervescence in a 10% dilute HCl solution. Following the compositional modifiers is a more specific rock name for the sandstones and limestones (e.g., arkosic arenite, fusulinid wackestone); the classifications used for the specific rock names are discussed in the main text. A description of rock induration follows the specific rock name; well-indurated rocks are those which are crushed with only great difficulty with tweezers; poorly indurated rocks are those which are crushed easily; moderately indurated rocks fall somewhere in between. Rock induration is an important lithologic variable because it significantly affects drill time and also affects the way the rock responds to artificial fracturing. Any additional descriptive information follows the statement on induration.

Generally, detailed descriptions of rock types are given every 100-300 ft (30-90 m). The description of a rock type in a 10-ft interval is similar to the description of that same rock type in the preceding interval unless noted differently.

TABLE A-1--Descriptions of drill cuttings, Humble Oil and Refining Co. No. 1 State U (660' FSL, 1980' FEL, sec. 10, T. 12 S., R. 27 E., Chaves County, New Mexico). Elevation 3,672 ft (1,119 m), ground level. Total depth 7,852 ft (2,393 m). Plugged and abandoned 8/23/48. Descriptions from 4,700 to 5,100 ft (1,433 to 1,544 m) taken from sample descriptions of R.C. Northrup on file at New Mexico Bureau of Mines and Mineral Resources.

Depth Interval (ft)	Description	Thickness ft (m)
	Description starts in Yeso Formation	
	Yeso Formation (Permian), total described	120 (37)
4700-4710	Dolostone (70%) Anhydrite (30%) Gray mudstone (tr)	
4710-4720	No sample	
4720-4730	Dolostone (70%) Anhydrite (30%) Sandstone (tr)	
4730-4740	Dolostone (70%) Anhydrite (30%)	
4740-4750	Dolostone (70%) Anhydrite (30%)	
4750-4760	Dolostone (60%) Anhydrite (40%)	
4760-4770	Dolostone (50%) Anhydrite (50%) Red mudstone (tr)	
4770-4780	Anhydrite (70%) Dolostone (30%) Sandstone (tr)	
4780-4790	Anhydrite (70%) Dolostone (30%) Gray mudstone (tr)	
4790-4800	Anhydrite (80%) Dolostone (10%) Gray mudstone (10%)	
4800-4810	Anhydrite (70%) Dolostone (20%) Gray mudstone (10%)	
4810-4820	Dolostone (60%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Anhydrite (30%) Gray mudstone (10%)	
	Abo Formation (Permian)	930 (283)
	Upper unit of Abo Formation	360 (109)
4820-4830	Anhydrite (50%) Dolostone (40%) Gray mudstone (10%)	
4830-4840	Anhydrite (50%) Dolostone (50%) Gray mudstone (tr)	
4840-4850	Anhydrite (50%) Dolostone (40%) Gray mudstone (10%)	
4850-4860	Red mudstone (50%) Gray mudstone (30%) Dolostone (10%) Anhydrite (10%)	
4860-4870	Red mudstone (50%) Gray mudstone (30%) Dolostone (10%) Anhydrite (10%)	
4870-4880	No sample	
4880-4890	No sample	
4890-4900	Red mudstone (60%) Dolostone (30%) Gray mudstone (10%) Anhydrite (tr)	
4900-4910	Red mudstone (50%) Dolostone (30%) Gray mudstone (20%)	
4910-4920	Red mudstone (70%) Dolostone (30%) Gray mudstone (tr)	
4920-4930	Red mudstone (60%) Dolostone (20%) Gray mudstone (10%) Anhydrite (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
4930-4940	No sample	
4940-4950	Red mudstone (60%) Dolostone (20%) Gray mudstone (10%) Anhydrite (10%)	
4950-4960	Red mudstone (100%) Dolostone (tr) Anhydrite (tr)	
4960-4970	Red mudstone (100%) Dolostone (tr) Gray mudstone (tr) Anhydrite (tr)	
4970-4980	Red mudstone (100%) Dolostone (tr) Gray mudstone (tr) Anhydrite (tr)	
4980-4990	Red mudstone (90%) Gray mudstone (10%) Dolostone (tr) Anhydrite (tr)	
4990-5000	Red mudstone (90%) Gray mudstone (10%) Dolostone (tr)	
5000-5010	Red mudstone (90%) Dolostone (10%) Gray mudstone (tr)	
5010-5020	Red mudstone (100%) Dolostone (tr) Gray mudstone (tr)	
5020-5030	Red mudstone (80%) Dolostone (20%) Gray mudstone (tr)	
5030-5040	Red mudstone (80%) Dolostone (20%) Gray mudstone (tr)	
5040-5050	Red mudstone (90%) Dolostone (10%) Gray mudstone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
5050-5060	Red mudstone (90%) Dolostone (10%) Gray mudstone (tr)	
5060-5070	Red mudstone (100%) Dolostone (tr) Gray mudstone (tr)	
5070-5080	Red mudstone (100%) Dolostone (tr) Gray mudstone (tr)	
5080-5090	Red mudstone (90%) Dolostone (10%) Gray mudstone (tr)	
5090-5100	Red mudstone (100%) Dolostone (tr) Gray mudstone (tr)	
5100-5110	Red mudstone (100%): calcareous (10%) Dolostone (tr) Gray mudstone (tr)	
5110-5120	Red mudstone (90%): calcareous (tr) Gray mudstone (10%) Anhydrite (tr)	
5120-5130	Red mudstone (70%): moderate reddish orange (10R6/6) to pale reddish brown (10R5/4) to moderate reddish brown (10R4/6); argillaceous; anhydrite (tr): very light gray (N8) in veins and lenses less than 1 mm thick; thinly to very thinly fissile. Poorly indurated Dolostone (20%): very light gray (N8); microcrystalline; calcareous, anhydritic Gray mudstone (10%): pale blue green (5BG7/2); argillaceous, anhydritic; very thinly laminated. Poorly indurated	
5130-5140	Red mudstone (80%): calcareous (tr) Gray mudstone (20%): medium light gray (N6) to medium gray (N5), mottled and interlaminated with red mudstone; slightly calcareous. Poorly indurated Dolostone (tr)	
5140-5150	Red mudstone (80%): not calcareous Dolostone (10%): medium light gray (N6); microcrystalline Gray mudstone (10%) Anhydrite (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
5150-5160	Red mudstone (90%) Gray mudstone (10%) Dolostone (tr)	
5160-5170	Red mudstone (100%): calcareous (tr) Gray mudstone (tr)	
5170-5180	Red mudstone (80%): not calcareous Gray mudstone (20%) Sandstone (tr): moderate reddish orange (10R6/6); very fine grained, hematitic, anhydritic; arkosic arenite Dolostone (tr): light gray (N7); microcrystalline; anhydritic. Moderately indurated	
	Abo dolostone facies	570 (177)
5180-5190	Red mudstone (70%) Sandstone (10%) Dolostone (10%) Gray mudstone (10%)	
5190-5200	Red mudstone (70%) Sandstone (10%) Dolostone (10%) Gray mudstone (10%)	
5200-5210	Red mudstone (90%): calcareous (tr) Anhydrite (10%) Sandstone (tr) Dolostone (tr) Gray mudstone (tr)	
5210-5220	Red mudstone (90%): not calcareous Dolostone (10%): brownish gray (5YR4/1); microcrystalline. Well indurated Gray mudstone (tr) Anhydrite (tr)	
5220-5230	Red mudstone (70%) Dolostone (20%) Gray mudstone (10%)	
5230-5240	Red mudstone (80%): calcareous (tr) Dolostone (20%): light olive gray (5Y6/1); microcrystalline. Well indurated Gray mudstone (tr)	
5240-5250	Red mudstone (90%): not calcareous Gray mudstone (10%) Dolostone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
	Anhydrite (tr)	
5250-5260	Red mudstone (50%) Gray mudstone (40%): medium light gray (N6) to medium gray (N5); argillaceous; thinly fissile to nonfissile. Poorly indurated Dolostone (10%): brownish gray (5YR3/1); microcrystalline Well indurated	
5260-5270	Red mudstone (70%): bimodal color distribution: grayish red (5R4/2) to blackish red (5R2/2) (60%): mottled and burrowed; moderate reddish orange (10R6/6) to moderate reddish brown (10R4/6) (40%) Dolostone (20%) Gray mudstone (10%) Anhydrite (tr)	
5270-5280	No sample	
5280-5290	No sample	
5290-5300	Red mudstone (70%): calcareous (10%) Gray mudstone (20%) Dolostone (10%) Sandstone (tr) Anhydrite (tr)	
5300-5310	Red mudstone (40%): moderate reddish orange (10R6/6) to dark reddish brown (10R3/4); argillaceous; anhydritic: laminae and irregular blebs of anhydrite 0.5 mm thick; wood fragments (tr): elongate, as long as 1 mm; very thinly fissile to nonfissile. Poorly to moderately indurated Dolostone (30%): light olive gray (5Y6/1) to light gray (N7); microcrystalline; wood fragments (tr): elongate, as long as 0.5 mm. Contains many microfractures filled with dolomite. Moderately indurated Gray mudstone (20%): mottled greenish gray (5G6/1) and brownish black (5YR2/1); argillaceous; anhydritic: small nodules of anhydrite as large as 0.5 mm in diameter; wood fragments (tr): black, less than 0.5 mm long. Poorly indurated Anhydrite (10%): very light gray (N8); microcrystalline; calcareous	
5310-5320	Red mudstone (80%): moderate reddish orange (10R6/6) to moderate reddish brown (10R4/6) Dolostone (10%) Gray mudstone (10%): medium light gray (N6) to black (N1); argillaceous, very thinly laminated; anhydritic:	

Depth Interval (ft)	Description	Thickness ft (m)
	irregularly shaped anhydrite lenses as long as 2 mm; parallel lamination; thinly fissile to nonfissile. Poorly indurated Anhydrite (tr)	
5320-5330	Red mudstone (40%) Gray mudstone (40%) Dolostone (20%) Anhydrite (tr)	
5330-5340	Red mudstone (60%) Dolostone (20%) Gray mudstone (20%)	
5340-5350	Red mudstone (60%) Gray mudstone (30%) Dolostone (10%)	
5350-5360	Red mudstone (60%): calcareous (10%) Dolostone (30%): similar to 5170-5180 ft but contains ghosts of fossils Gray mudstone (10%) Anhydrite (tr)	
5360-5370	Red mudstone (50%): calcareous (tr) Dolostone (40%): similar to 5170-5180 ft Gray mudstone (10%)	
5370-5380	Red mudstone (70%): not calcareous Dolostone (20%) Gray mudstone (10%)	
5380-5390	Red mudstone (60%) Dolostone (30%) Gray mudstone (10%)	
5390-5400	Red mudstone (70%): calcareous (50%) Dolostone (20%) Gray mudstone (10%)	
5400-5410	Red mudstone (80%): not calcareous Dolostone (10%) Gray mudstone (10%)	
5410-5420	Red mudstone (50%) Gray mudstone (30%) Dolostone (20%)	
5420-5430	Red mudstone (50%): calcareous (tr) Dolostone (40%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Gray mudstone (10%)	
5430-5440	Red mudstone (60%): not calcareous Dolostone (30%) Gray mudstone (10%) Anhydrite (tr)	
5440-5450	Red mudstone (80%) Dolostone (10%) Gray mudstone (10%)	
5450-5460	Red mudstone (60%) Dolostone (30%) Gray mudstone (10%) Sandstone (tr)	
5460-5470	Red mudstone (50%) Dolostone (30%) Gray mudstone (20%)	
5470-5480	Dolostone (50%) Red mudstone (40%) Gray mudstone (10%)	
5480-5490	Red mudstone (50%) Dolostone (30%): white (N9) to dark gray (N3); microcrystalline; anhydritic, argillaceous; wood fragments (tr) Gray mudstone (20%)	
5490-5500	No sample	
5500-5510	Red mudstone (50%) Gray mudstone (40%) Dolostone (10%) Anhydrite (tr)	
5510-5520	Dolostone (40%) Red mudstone (40%) Gray mudstone (20%) Sandstone (tr)	
5520-5530	Red mudstone (60%) Dolostone (30%): grayish black (N2) to dark gray (N3); microcrystalline; anhydritic. Well indurated Gray mudstone (10%) Anhydrite (tr)	
5530-5540	Red mudstone (60%) Dolostone (30%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Gray mudstone (10%) Anhydrite (tr)	
5540-5550	Red mudstone (50%) Dolostone (30%) Gray mudstone (20%) Anhydrite (tr)	
5550-5560	Red mudstone (50%) Dolostone (30%) Gray mudstone (20%)	
5560-5570	Red mudstone (40%) Dolostone (30%) Gray mudstone (30%)	
5570-5580	No sample	
5580-5590	No sample	
5590-5600	Red mudstone (40%) Dolostone (30%) Gray mudstone (30%)	
5600-5610	Red mudstone (60%): moderate reddish orange (10R6/6) to dusky red (5R3/4) (70%); very dusky red (10R2/2) to grayish red purple (5RP4/2) (30%); argillaceous; thinly fissile to nonfissile. Poorly indurated Dolostone (20%): olive gray (5Y5/1); microcrystalline Gray mudstone (20%): greenish gray (5G6/1) to light greenish gray (5G8/1) (20%); dark gray (N3) (80%); argillaceous to silty. Poorly indurated	
5610-5620	Red mudstone (50%) Dolostone (30%) Gray mudstone (20%)	
5620-5630	Dolostone (40%) Red mudstone (40%) Gray mudstone (20%) Anhydrite (tr)	
5630-5640	No sample	
5640-5650	Red mudstone (60%): mottled with gray mudstone. Calcareous (tr) Dolostone (20%) Gray mudstone (20%)	
5650-5660	Dolostone (40%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Red mudstone (30%): similar to 5600-5610 ft Gray mudstone (30%)	
5660-5670	Red mudstone (50%): calcareous (tr) Gray mudstone (30%) Dolostone (20%)	
5670-5680	No sample	
5680-5690	No sample	
5690-5700	Dolostone (60%) Red mudstone (30%) Gray mudstone (10%) Anhydrite (tr)	
5700-5710	Gray mudstone (40%) Dolostone (30%) Red mudstone (30%): not calcareous Sandstone (tr) Anhydrite (tr)	
5710-5720	Gray mudstone (40%) Dolostone (30%) Red mudstone (30%) Sandstone (tr) Anhydrite (tr)	
5720-5730	Dolostone (50%) Gray mudstone (40%) Red mudstone (10%) Anhydrite (tr)	
5730-5740	Dolostone (50%) Red mudstone (30%) Gray mudstone (20%)	
5740-5750	Red mudstone (50%) Gray mudstone (40%) Dolostone (10%) Limestone (tr) Anhydrite (tr)	
	Hueco Formation (Permian), total described	150 (46)
5750-5760	Red mudstone (60%) Gray mudstone (30%) Limestone (10%) Dolostone (tr) Anhydrite (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
5760-5770	Red mudstone (70%) Gray mudstone (20%) Limestone (10%) Dolostone (tr)	
5770-5780	Red mudstone (50%) Limestone (30%) Gray mudstone (20%)	
5780-5790	Red mudstone (50%) Limestone (20%): white (N9) to light gray (N7); microcrystalline; dolomitic; lime mudstone. Well indurated Gray mudstone (20%) Dolostone (10%) Anhydrite (tr)	
5790-5800	Red mudstone (50%) Limestone (20%) Gray mudstone (20%) Dolostone (10%)	
5800-5810	Gray mudstone (40%): mottled grayish black (N2), medium light gray (N6), and pale blue green (5BG7/2); silty. Poorly indurated Limestone (30%): white (N9) to black (N1); skeletal: recrystallized brachiopods, ostracods, and fusulinids in a microcrystalline matrix; fossiliferous lime mudstones and wackestones. Well indurated Red mudstone (30%): moderate reddish orange (10R6/6) to moderate reddish brown (10R4/6); argillaceous, sandy; thinly fissile to nonfissile. Poorly indurated	
5810-5820	Limestone (50%) Red mudstone (30%) Gray mudstone (20%) Anhydrite (tr): calcareous, dolomitic	
5820-5830	Limestone (50%) Red mudstone (30%) Gray mudstone (20%) Anhydrite (tr)	
5830-5840	Limestone (50%) Red mudstone (30%) Gray mudstone (20%) Sandstone (tr) Anhydrite (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
5840-5850	Red mudstone (40%): calcareous (50%) Gray mudstone (30%) Anhydrite (20%): white (N9) to dark gray (N3); microcrystalline to macrocrystalline, nodular Limestone (10%)	
5850-5860	Gray mudstone (40%) Red mudstone (30%): calcareous (20%) Limestone (20%) Anhydrite (10%) Dolostone (tr)	
5860-5870	Limestone (50%) Red mudstone (30%): not calcareous Gray mudstone (20%)	
5870-5880	Red mudstone (70%) Gray mudstone (30%) Sandstone (tr) Limestone (tr) Dolostone (tr) Anhydrite (tr)	
5880-5890	Gray mudstone (50%) Red mudstone (40%) Limestone (10%) Anhydrite (tr)	
5890-5900	Red mudstone (40%) Limestone (30%) Gray mudstone (30%) Dolostone (tr) Anhydrite (tr)	

TABLE A-2--Descriptions of drill cuttings, Honolulu Oil Corp. No. 1 McConkey Estate (660' FNL, 660' FWL, sec. 10, T. 9 S., R. 26 E., Chaves County, New Mexico). Elevation 3,833 ft (1,168 m), ground level. Total depth 6,371 (1,942 m) ft. Plugged and abandoned 2/15/51. Recompleted 9/6/77 by Yates Petroleum Corp. as Abo producer through perforations from 4,764 ft (1,452 m) through 4,782 ft (1,458 m).

Depth Interval (ft)	Description	Thickness ft (m)
	Description starts in Yeso Formation	
	Yeso Formation (Permian), total described	210 (64)
4200-4210	Red mudstone (40%): moderate reddish brown (10R4/6); argillaceous, micaceous, anhydritic; fissile to nonfissile. Poorly indurated Anhydrite (30%): white (N9) to medium gray (N5); macrocrystalline to microcrystalline; opaque to translucent. Darker varieties are argillaceous Sandstone (10%): white (N9); fine grained, well sorted, subangular, hematitic; quartz arenite Gray mudstone (10%): dark gray (N3); argillaceous, anhydritic, pyritic, and micaceous. Poorly indurated Dolostone (10%): dark yellowish brown (10YR4/2) to dusky yellowish brown (10YR2/2), microcrystalline; anhydritic. Well to moderately indurated Limestone (tr): moderate olive brown (5Y4/4); microcrystalline to cryptocrystalline; lime mudstone	
4210-4220	Red mudstone (40%) Anhydrite (30%) Sandstone (10%) Gray mudstone (10%): grayish brown (5YR3/2); argillaceous. Poorly indurated Dolostone (10%) Limestone (tr)	
4220-4230	Red mudstone (60%) Anhydrite (30%) Gray mudstone (10%) Dolostone (tr)	
4230-4240	Red mudstone (50%) Anhydrite (50%) Sandstone (tr) Gray mudstone (tr) Dolostone (tr) Limestone (tr)	
4240-4250	Anhydrite (50%) Red mudstone (40%) Dolostone (10%) Sandstone (tr) Gray mudstone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
4250-4260	Anhydrite (40%) Red mudstone (30%) Gray mudstone (20%) Dolostone (10%) Sandstone (tr)	
4260-4270	Red mudstone (30%) Gray mudstone (20%) Anhydrite (20%) Dolostone (20%) Sandstone (10%)	
4270-4280	Anhydrite (60%) Sandstone (10%) Red mudstone (10%) Gray mudstone (10%) Dolostone (10%)	
4280-4290	Dolostone (40%) Red mudstone (20%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%)	
4290-4300	Dolostone (30%) Anhydrite (30%) Red mudstone (20%) Sandstone (10%) Gray mudstone (10%)	
4300-4310	Anhydrite (30%): white (N9) to medium light gray (N6); microcrystalline to macrocrystalline; calcareous; darker varieties are argillaceous Sandstone (20%) Red mudstone (20%): moderate reddish brown (10RY4/6) to grayish red (5R4/2); anhydritic. Poorly indurated Dolostone (20%) Gray mudstone (10%)	
4310-4320	Anhydrite (30%) Sandstone (20%) Red mudstone (20%) Dolostone (20%) Gray mudstone (10%)	
4320-4330	Dolostone (30%) Red mudstone (20%) Gray mudstone (20%) Anhydrite (20%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Sandstone (10%): moderate reddish brown (10R4/6); fine to medium grained, moderately sorted, angular to subangular, hematitic; arkosic arenite. Poorly indurated. Porosity (tr): intergranular	
4330-4340	Dolostone (30%) Red mudstone (20%) Gray mudstone (20%) Anhydrite (20%) Sandstone (10%)	
4340-4350	Dolostone (30%) Sandstone (20%) Gray mudstone (20%) Anhydrite (20%) Red mudstone (10%)	
4350-4360	Dolostone (30%) Sandstone (20%) Gray mudstone (20%) Anhydrite (20%) Red mudstone (10%)	
4360-4370	Dolostone (30%) Sandstone (20%): moderate reddish orange (10R6/6) to pale reddish brown (10R5/4); very fine to coarse grained, poorly sorted, angular to subangular; anhydritic; arkosic arenite Gray mudstone (20%) Anhydrite (20%) Red mudstone (10%)	
4370-4380	Dolostone (30%): olive gray (5Y4/1); microcrystalline; anhydritic. Well to moderately indurated Sandstone (20%) Gray mudstone (20%) Anhydrite (20%) Red mudstone (10%)	
4380-4390	Red mudstone (50%) Anhydrite (50%) Gray mudstone (tr): dark gray (N3) to grayish brown (5YR3/2) to light bluish gray (5B7/1); argillaceous, anhydritic; very thinly fissile. Poorly indurated Sandstone (tr)	
4390-4400	Red mudstone (50%) Anhydrite (50%) Gray mudstone (tr) Sandstone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
4400-4410	Dolostone (40%): dark yellowish brown (10YR4/2) to dusky yellowish brown (10YR2/2); microcrystalline; anhydritic. Well to moderately indurated Red mudstone (20%): pale reddish brown (10R5/4); argillaceous; contains thin (<1 mm thick) discontinuous laminae of anhydrite Anhydrite (20%): white (N9) to very light gray (N8); microcrystalline to macrocrystalline; euhedral to subhedral anhydrite crystals; calcareous Sandstone (10%): moderate reddish orange (10R6/6); fine to very fine grained, well sorted, angular to very angular; calcareous, hematitic; arkosic arenite. Porosity (tr): intergranular	
	Abo Formation (Permian)	690 (210)
	Upper unit of Abo Formation	580 (177)
4410-4420	Red mudstone (40%): similar to 4400-4410 ft except color is moderate reddish orange (10R6/6) to pale reddish brown (10R5/4) Dolostone (40%) Anhydrite (10%) Gray mudstone (10%) Sandstone (tr)	
4420-4430	Red mudstone (40%) Gray mudstone (20%) Dolostone (20%) Sandstone (10%) Anhydrite (10%)	
4430-4440	Red mudstone (30%) Gray mudstone (20%) Dolostone (20%) Anhydrite (20%) Sandstone (10%)	
4440-4450	Red mudstone (50%) Gray mudstone (20%) Sandstone (10%) Dolostone (10%) Anhydrite (10%) Limestone (tr): light olive gray (5Y6/1); microcrystalline; lime mudstone	
4450-4460	Red mudstone (40%): pale reddish brown (10R5/4) to moderate reddish orange (10R6/6); argillaceous to silty; very thinly fissile to nonfissile. Poorly indurated Sandstone (30%): moderate reddish orange (10R6/6); fine to very fine grained, moderately sorted, angular;	

Depth Interval (ft)	Description	Thickness ft (m)
	hematitic; arkosic wacke. Poorly indurated. Porosity (tr): intergranular Anhydrite (20%): white (N9) to light gray (N7); microcrystalline Gray mudstone (10%): light bluish gray (5B7/1); silty, very thinly laminated, anhydritic. Poorly indurated	
4460-4470	Red mudstone (40%) Anhydrite (40%) Sandstone (10%) Gray mudstone (10%) Dolostone (tr)	
4470-4480	Red mudstone (40%) Sandstone (30%): similar to 4450-4460 ft but with a trace of intergranular calcite cement. Well indurated Anhydrite (20%) Gray mudstone (10%)	
4480-4490	Red mudstone (50%) Gray mudstone (20%): medium dark gray (N3) to light bluish gray (5B7/1); silty, very thinly laminated, anhydritic. Poorly indurated Anhydrite (20%) Sandstone (10%)	
4490-4500	No sample	
4500-4510	Red mudstone (50%) Gray mudstone (20%) Anhydrite (20%) Sandstone (10%)	
4510-4520	Anhydrite (40%) Sandstone (30%) Red mudstone (20%) Gray mudstone (10%) Dolostone (tr)	
4520-4530	Red mudstone (60%) Gray mudstone (20%) Anhydrite (20%) Sandstone (tr)	
4530-4540	Red mudstone (60%) Gray mudstone (20%) Sandstone (10%) Anhydrite (10%) Limestone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
4540-4550	Red mudstone (90%) Sandstone (10%): moderate reddish orange (10R6/6); fine to medium grained, moderately sorted, subangular; arkosic arenite. Well indurated	
4550-4560	Red mudstone (70%) Anhydrite (20%) Dolostone (10%) Sandstone (tr) Gray mudstone (tr)	
4560-4570	Red mudstone (70%) Sandstone (10%) Anhydrite (10%) Limestone (10%) Dolostone (tr): very light gray (N8); microcrystalline Gray mudstone (tr)	
4570-4580	Red mudstone (90%): calcareous (100%) Gray mudstone (10%) Sandstone (tr)	
4580-4590	Red mudstone (80%): not calcareous Dolostone (10%) Anhydrite (10%) Gray mudstone (tr) Limestone (tr)	
4590-4600	Red mudstone (70%) Dolostone (10%) Gray mudstone (10%) Anhydrite (10%)	
4600-4610	Red mudstone (80%) Gray mudstone (10%) Anhydrite (10%) Dolostone (tr)	
4610-4620	Red mudstone (80%): calcareous (100%) Dolostone (10%) Gray mudstone (10%) Anhydrite (tr)	
4620-4630	Red mudstone (70%): not calcareous Dolostone (10%) Gray mudstone (10%) Anhydrite (10%) Chert (tr): white (N9) to very light gray (N8); microcrystalline to cryptocrystalline; indistinctly preserved fossils	

Depth Interval (ft)	Description	Thickness ft (m)
4630-4640	Red mudstone (80%): moderate reddish brown (10R4/6) to pale reddish brown (10R5/4); calcareous (50%) Dolostone (10%) Anhydrite (10%) Sandstone (tr) Gray mudstone (tr)	
4640-4650	Red mudstone (80%): calcareous (100%) Dolostone (10%) Gray mudstone (10%) Sandstone (tr) Anhydrite (tr)	
4650-4660	Red mudstone (80%): calcareous (100%) Dolostone (10%) Gray mudstone (10%) Sandstone (tr) Anhydrite (tr)	
4660-4670	Red mudstone (80%): calcareous (50%) Gray mudstone (10%) Anhydrite (10%) Dolostone (tr)	
4670-4680	Red mudstone (90%): calcareous (50%) Anhydrite (10%) Gray mudstone (tr)	
4680-4690	Red mudstone (90%): calcareous (80%) Dolostone (10%) Gray mudstone (tr) Anhydrite (tr)	
4690-4700	Red mudstone (100%): calcareous (70%) Gray mudstone (tr)	
4700-4710	Red mudstone (100%) Sandstone (tr) Dolostone (tr) Anhydrite (tr): white (N9) to very light gray (N8); microcrystalline; slightly calcareous; very thinly interlaminated with red mudstone	
4710-4720	Red mudstone (100%) Dolostone (tr)	
4720-4730	Red mudstone (90%): calcareous (50%) Dolostone (10%) Gray mudstone (tr) Anhydrite (tr): mottled white (N9), very light gray (N8)	

Depth Interval (ft)	Description	Thickness ft (m)
	and medium bluish gray (5B5/1); slightly calcareous; darker colored anhydrite is argillaceous	
4730-4740	Red mudstone (90%): calcareous (50%) Anhydrite (10%): white (N9); macrocrystalline to microcrystalline Dolostone (tr)	
4740-4750	No sample	
4750-4760	No sample	
4760-4770	Red mudstone (100%): calcareous (100%); swells in water Gray mudstone (tr) Anhydrite (tr)	
4770-4780	Red mudstone (90%): calcareous (60%) Anhydrite (10%) Dolostone (tr)	
4780-4790	Red mudstone (70%): calcareous (20%) Sandstone (20%): moderate reddish orange (10R6/6); fine grained, well sorted, angular, calcareous; arkosic arenite. Well indurated Dolostone (10%) Gray mudstone (tr) Anhydrite (tr)	
4790-4800	Red mudstone (60%): calcareous (20%) Sandstone (30%) Dolostone (10%) Gray mudstone (tr) Anhydrite (tr)	
4800-4810	Red mudstone (80%): moderate reddish orange (10R6/6) to pale reddish brown (10R5/4); calcareous red mudstone (50%): argillaceous, very thinly fissile, swells in water; noncalcareous red mudstone (50%): argillaceous, thinly to very thinly fissile Gray mudstone (10%): medium bluish gray (5B5/1); argillaceous, anhydritic; fissile. Poorly indurated Dolostone (10%) Anhydrite (tr): white (N9) to very light gray (N8) to light bluish gray (5B7/1); argillaceous; very thin alternating white and bluish-gray laminae. Poorly indurated	
4810-4820	Red mudstone (60%): calcareous (80%) Sandstone (30%): moderate reddish orange (10R6/6); fine to medium grained, moderately sorted, angular to	

Depth Interval (ft)	Description	Thickness ft (m)
	subangular; arkosic arenite. Poorly indurated Porosity (tr): intergranular Gray mudstone (10%) Anhydrite (tr)	
4820-4830	Red mudstone (70%): calcareous (40%) Anhydrite (20%) Sandstone (10%) Gray mudstone (tr)	
4830-4840	Red mudstone (70%): calcareous (10%) Gray mudstone (10%) Dolostone (10%) Anhydrite (10%)	
4840-4850	Red mudstone (70%): calcareous (50%) Anhydrite (20%) Sandstone (10%) Chert (tr)	
4850-4860	Red mudstone (50%): calcareous (60%) Sandstone (30%) Dolostone (10%) Anhydrite (10%) Gray mudstone (tr)	
4860-4870	Red mudstone (60%): calcareous (70%) Dolostone (20%) Sandstone (10%) Gray mudstone (10%) Anhydrite (tr)	
4870-4880	Red mudstone (60%): calcareous (70%) Dolostone (20%) Sandstone (10%) Gray mudstone (10%) Anhydrite (tr)	
4880-4890	Red mudstone (70%): calcareous (80%) Gray mudstone (20%) Anhydrite (10%) Dolostone (tr)	
4890-4900	Red mudstone (90%): calcareous (60%) Dolostone (10%) Sandstone (tr) Gray mudstone (tr) Anhydrite (tr)	
4900-4910	Red mudstone (70%): calcareous (40%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Sandstone (20%): similar to 4810 to 4820 ft, but well indurated Gray mudstone (10%) Anhydrite (tr)	
4910-4920	Red mudstone (70%): calcareous (60%); mottled with light-gray (N8) mudstone. Similar to 4800-4810 ft Sandstone (10%) Dolostone (10%) Gray mudstone (10%) Anhydrite (tr)	
4920-4930	Red mudstone (60%): calcareous (50%) Sandstone (20%) Dolostone (10%) Gray mudstone (10%)	
4930-4940	Red mudstone (70%): calcareous (60%) Dolostone (20%) Sandstone (10%) Gray mudstone (tr)	
4940-4950	Red mudstone (60%): calcareous (60%) Sandstone (20%): grayish red (10R4/2); very fine to fine grained, moderately to well sorted; arkosic arenite. Well indurated Dolostone (20%) Gray mudstone (tr) Anhydrite (tr)	
4950-4960	Red mudstone (60%): calcareous (60%) Sandstone (20%) Dolostone (20%) Gray mudstone (tr) Anhydrite (tr)	
4960-4970	Red mudstone (70%): calcareous (80%) Sandstone (10%) Dolostone (10%) Gray mudstone (10%) Anhydrite (tr)	
4970-4980	Red mudstone (90%) Sandstone (10%) Gray mudstone (tr) Anhydrite (tr)	
4980-4990	Red mudstone (80%): calcareous (80%) Sandstone (10%) Gray mudstone (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Anhydrite (tr)	
	Middle unit of Abo Formation	110 (34)
4990-5000	Red mudstone (70%): calcareous (40%) Dolostone (20%) Sandstone (10%) Gray mudstone (tr)	
5000-5010	Red mudstone (70%) Sandstone (20%) Dolostone (10%) Gray mudstone (tr)	
5010-5020	Red mudstone (90%): calcareous (80%) Gray mudstone (10%) Sandstone (tr) Dolostone (tr) Anhydrite (tr)	
5020-5030	Red mudstone (90%): calcareous (60%) Anhydrite (10%) Gray mudstone (tr) Limestone (tr): medium dark gray (N4) to white (N9); microcrystalline; anhydritic; lime mudstone	
5030-5040	Red mudstone (90%): calcareous (80%) Gray mudstone (10%)	
5040-5050	Red mudstone (90%) Gray mudstone (10%) Limestone (tr)	
5050-5060	Red mudstone (100%): calcareous (90%) Anhydrite (tr)	
5060-5070	Red mudstone (80%): calcareous (100%) Sandstone (10%): grayish red (5R4/2); very fine grained, well sorted, angular to subangular; arkosic arenite. Well indurated Gray mudstone (10%) Limestone (tr)	
5070-5080	Red mudstone (90%): calcareous (80%) Dolostone (10%) Sandstone (tr) Gray mudstone (tr)	
5080-5090	Red mudstone (90%) Dolostone (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Sandstone (tr) Gray mudstone (tr)	
5090-5100	Red mudstone (90%) Dolostone (10%) Sandstone (tr) Gray mudstone (tr): brownish black (5YR2/1); contains jagged fractures 0.5 mm wide, filled with calcite	
	Hueco Formation (Permian), total described	200 (61)
5100-5110	Red mudstone (90%): calcareous (80%) Dolostone (10%) Limestone (tr): medium dark gray (N4) to light olive gray (5Y6/1); microcrystalline; contains nodular chert; lime mudstone Gray mudstone (tr)	
5110-5120	Red mudstone (80%): calcareous (50%) Limestone (20%)	
5120-5130	Red mudstone (70%): calcareous (60%) Limestone (20%): medium dark gray (N4) to grayish black (N2); microcrystalline; pyritic; lime mudstone Contains trace amount of elongate vitreous wood fragments less than 1 mm long Gray mudstone (10%)	
5130-5140	Red mudstone (50%): calcareous (50%) Limestone (20%) Gray mudstone (20%) Sandstone (10%)	
5140-5150	Limestone (60%) Red mudstone (40%): calcareous (tr)	
5150-5160	Limestone (60%) Red mudstone (40%)	
5160-5170	Limestone (50%) Red mudstone (40%): calcareous (50%) Gray mudstone (10%)	
5170-5180	Limestone (50%): similar to 5120-5130 ft but contains fusulinids (tr); lime mudstone Red mudstone (40%): calcareous (20%) Gray mudstone (10%)	
5180-5190	Limestone (60%) Red mudstone (40%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Gray mudstone (tr)	
5190-5200	Limestone (60%) Red mudstone (40%) Gray mudstone (tr)	
5200-5210	Red mudstone (70%): calcareous (50%) Limestone (20%): dark gray (N3) to white (N9); microcrystalline; pyritic, fusulinids (tr); fusulinid mudstone Gray mudstone (10%)	
5210-5220	Red mudstone (70%) Limestone (20%): dark gray (N3) to white (N9), microcrystalline; pyritic, fusulinids (tr-30%); fusulinid mudstones and fusulinid wackestones Gray mudstone (10%)	
5220-5230	Limestone (50%) Red mudstone (50%): calcareous (70%)	
5230-5240	Limestone (70%) Red mudstone (20%) Gray mudstone (10%)	
5240-5250	Limestone (70%) Red mudstone (20%) Gray mudstone (10%)	
5250-5260	Limestone (70%) Red mudstone (20%) Gray mudstone (10%)	
5260-5270	Limestone (70%): similar to 5210-5220 ft but contains disarticulated ostracod valves (tr) Red mudstone (20%) Gray mudstone (10%)	
5270-5280	Limestone (70%) Red mudstone (20%) Gray mudstone (10%)	
5280-5290	Limestone (50%) Red mudstone (30%) Gray mudstone (20%)	
5290-5300	Limestone (50%) Red mudstone (30%): similar to 4800-4810 ft but contains poorly preserved brachiopods (tr).§ Gray mudstone (20%)	

TABLE A-3--Descriptions of drill cuttings, Yates Petroleum Corp. No. 1 Willow Creek Unit (1980' FNL, 1980' FEL, sec. 16, T. 4 S., R. 25 E., Chaves County, New Mexico). Elevation 3,840 ft (1,170 m), ground level. Total depth 6,670 ft (2,033 m). Plugged and abandoned 1/4/80.

Depth Interval (ft)	Description	Thickness ft (m)
	Description starts in Yeso Formation	
	Yeso Formation (Permian), total described	220 (67)
3500-3510	Anhydrite (50%): white (N9) to medium light gray (N6) to light olive gray (5Y6/1); macrocrystalline to microcrystalline; darker colored anhydrite is dolomitic and argillaceous. Poorly indurated Sandstone (30%): light gray (N7) to olive gray (5Y5/1) (60%): fine grained, well sorted, angular to subangular; anhydritic; arkosic arenite. Porosity (tr): intergranular. Moderate reddish orange (10R6/6) to moderate orange pink (10R7/4) (40%): fine to very fine grained, well sorted, angular; hematitic, anhydritic; arkosic arenite. Hematite and anhydrite are intergranular cement Red mudstone (20%): pale reddish brown (10R5/4); argillaceous, anhydritic. Poorly indurated Dolostone (tr): grayish orange (10YR7/4) to pale yellowish brown (10YR6/2); microcrystalline; anhydritic; quartz (tr): detrital, fine to very fine sand size. Moderately indurated. Porosity (tr): pinpoint, secondary	
3510-3520	Anhydrite (40%) Red mudstone (30%) Dolostone (20%): grayish orange (10YR7/4) to yellowish brown (10YR6/2) to medium light gray (N6); microcrystalline, anhydritic. Moderately indurated. Porosity (tr-10%): secondary, vuggy Sandstone (10%): similar to 3500-3510 ft but all is moderate reddish orange (10R6/6) to moderate orange pink (10R7/4)	
3520-3530	Red mudstone (30%) Dolostone (30%) Sandstone (20%) Anhydrite (20%) Limestone (tr): brownish black (5YR2/1); microcrystalline; lime mudstone	
3530-3540	Dolostone (40%) Anhydrite (30%) Sandstone (20%) Red mudstone (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
3540-3550	Dolostone (40%) Anhydrite (30%) Sandstone (20%) Red mudstone (10%) Gray mudstone (tr): light bluish gray (5B7/1); argillaceous, anhydritic. Poorly indurated	
3550-3560	Dolostone (40%) Anhydrite (30%) Sandstone (20%) Red mudstone (10%) Gray mudstone (tr)	
3560-3570	Sandstone (30%) Dolostone (30%) Anhydrite (20%) Red mudstone (10%) Gray mudstone (10%)	
3570-3580	Dolostone (40%) Sandstone (30%) Anhydrite (20%) Red mudstone (10%) Gray mudstone (tr)	
3580-3590	Dolostone (40%) Sandstone (20%) Red mudstone (20%) Anhydrite (20%)	
3590-3600	Dolostone (40%) Sandstone (20%) Red mudstone (20%) Anhydrite (20%)	
3600-3610	Dolostone (30%) Anhydrite (30%) Sandstone (20%): similar to 3500-3510 ft but also contains intergranular calcite cement. Anhydrite present as intergranular poikilotopic cement Red mudstone (20%) Gray mudstone (tr)	
3610-3620	Dolostone (30%) Anhydrite (30%) Sandstone (20%) Red mudstone (20%) Gray mudstone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
	Anhydrite (30%)	
3620-3630	Dolostone (40%) Red mudstone (20%) Sandstone (10%): moderate reddish orange (10R6/6) to moderate orange pink (10R7/4) Gray mudstone (tr)	
3630-3640	Anhydrite (40%) Red mudstone (20%) Dolostone (20%) Sandstone (10%) Gray mudstone (10%)	
3640-3650	Dolostone (50%) Red mudstone (20%) Anhydrite (20%) Sandstone (10%) Gray mudstone (tr): light bluish gray (5B7/1) to black (N1); argillaceous, anhydritic. Poorly indurated	
3650-3660	Dolostone (40%) Anhydrite (30%) Red mudstone (20%) Sandstone (10%)	
3660-3670	Dolostone (30%): dark yellowish brown (10YR4/2) to dusky yellowish brown (10YR2/2); microcrystalline to macrocrystalline; some is stained brown with hydrocarbons. Moderately indurated. Porosity (0-10%): intercrystalline and vuggy Sandstone (20%): pale reddish brown (10R5/4); fine to very fine grained, well sorted, anhydritic, calcareous, hematitic; arkosic arenite. Poorly indurated Red mudstone (20%): moderate reddish orange (10R6/6); argillaceous, anhydritic; thinly to very thinly fissile. Anhydrite present as "birdseye" lenses as long as 3 mm. Contains trace amounts of muscovite and elongate, silt-size wood fragments. Poorly indurated. Anhydrite (20%): white (N9) to medium light gray (N6); microcrystalline; dolomitic. Poorly indurated Darker colored anhydrite argillaceous Gray mudstone (10%): black (N1) to dark gray (N3); argillaceous, pyritic, anhydritic. Poorly indurated	
3670-3680	Dolostone (40%) Anhydrite (40%) Red mudstone (20%) Sandstone (tr) Gray mudstone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
3680-3690	Red mudstone (30%): similar to 3660-3670 ft but also contains desiccation(?) cracks as wide as 1 mm and as long as 4 mm filled with white (N9) microcrystalline anhydrite Dolostone (30%) Anhydrite (30%) Sandstone (10%) Gray mudstone (tr)	
3690-3700	Dolostone (50%) Anhydrite (20%) Sandstone (10%) Red mudstone (10%) Gray mudstone (10%)	
3700-3710	Red mudstone (30%) Dolostone (30%) Sandstone (20%) Anhydrite (20%) Gray mudstone (tr)	
3710-3720	Anhydrite (30%) Sandstone (20%) Red mudstone (20%) Dolostone (20%): brownish gray (5YR5/1) to light gray (N7); microcrystalline; anhydritic. Moderately indurated Gray mudstone (10%): medium gray (N5) to dark gray (N3), argillaceous. Poorly indurated	
	Abo Formation (Permian) at 3,720 ft (1,134 m) by electric log pick. Cuttings badly caved; sample top not picked until 3,790 ft (1,155 m)	670 (204)
	Upper unit of Abo Formation	540 (165)
3720-3730	Anhydrite (30%) Sandstone (20%) Red mudstone (20%) Dolostone (20%) Gray mudstone (10%)	
3730-3740	Anhydrite (30%) Sandstone (20%) Red mudstone (20%) Dolostone (20%) Gray mudstone (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
3740-3750	Sandstone (30%) Dolostone (30%) Red mudstone (20%) Anhydrite (20%) Gray mudstone (tr)	
3750-3760	Anhydrite (40%) Limestone (30%): pale yellowish brown (10R6/2) to dark yellowish brown (10R4/2); microcrystalline; skeletal (30%): fragments of foraminifers, brachiopods, ostracods, and disarticulated crinoid columnals in a lime mud matrix; fossiliferous wackestone. Well indurated Red mudstone (20%) Dolostone (10%) Sandstone (tr)	
3760-3770	Red mudstone (30%) Anhydrite (30%) Limestone (20%) Sandstone (10%) Dolostone (10%)	
3770-3780	Red mudstone (30%) Anhydrite (30%) Limestone (20%) Sandstone (10%) Dolostone (10%)	
3780-3790	Red mudstone (30%) Dolostone (30%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%)	
3790-3800	Anhydrite (40%) Sandstone (20%) Red mudstone (20%) Gray mudstone (20%) Dolostone (tr)	
3800-3810	Sandstone (40%) Red mudstone (40%) Gray mudstone (10%) Anhydrite (10%) Dolostone (tr)	
3810-3820	Sandstone (40%) Red mudstone (40%) Gray mudstone (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Anhydrite (10%) Dolostone (tr)	
3820-3830	Red mudstone (50%) Sandstone (20%) Anhydrite (20%) Gray mudstone (10%)	
3830-3840	Red mudstone (40%) Sandstone (20%) Gray mudstone (20%) Anhydrite (20%) Limestone (tr): white (N9), microcrystalline	
3840-3850	Sandstone (40): pale reddish brown (10R5/4) to moderate reddish brown (10R4/6); fine to very fine grained, well sorted, subangular to subrounded; calcareous, anhydritic; arkosic arenite. Calcite and anhydrite are microcrystalline intergranular cement. Well indurated. Porosity (tr): intergranular Red mudstone (20%): pale reddish brown (10R5/4) to dark reddish brown (10R3/4); argillaceous, anhydritic, micaceous; anhydrite occurs as blebs less than 0.1 mm in diameter. Thinly to very thinly fissile. Poorly indurated Gray mudstone (20%): light bluish gray (5B7/1) to medium light gray (N6), argillaceous, pyritic, hematitic. Poorly indurated. Some gray mudstone occurs as reducted nodules in red mudstone Anhydrite (20%): white (N9) to medium light gray (N6), mottled with red and gray mudstone; microcrystalline. Poorly indurated Dolostone (tr): pale olive (10Y6/2) to light olive gray (5Y6/1); microcrystalline; calcareous	
3850-3860	Red mudstone (40%) Sandstone (20%) Gray mudstone (20%) Anhydrite (20%) Limestone (tr): olive gray (5Y4/1), microcrystalline; lime mudstone	
3860-3870	Red mudstone (50%) Gray mudstone (20%) Anhydrite (20%) Sandstone (10%) Dolostone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
3870-3880	Sandstone (30%) Red mudstone (30%) Dolostone (20%) Gray mudstone (10%) Anhydrite (10%)	
3880-3890	Red mudstone (50%) Sandstone (20%) Gray mudstone (20%) Anhydrite (10%) Dolostone (tr)	
3890-3900	Red mudstone (50%) Sandstone (20%) Gray mudstone (20%) Anhydrite (10%) Dolostone (tr)	
3900-3910	Sandstone (30%) Red mudstone (30%) Gray mudstone (20%) Anhydrite (20%)	
3910-3920	Red mudstone (50%) Sandstone (20%) Dolostone (10%) Gray mudstone (10%) Anhydrite (10%)	
3920-3930	Sandstone (40%) Red mudstone (40%) Gray mudstone (10%) Anhydrite (10%) Dolostone (tr)	
3930-3940	Red mudstone (50%) Sandstone (20%) Gray mudstone (20%) Anhydrite (10%)	
3940-3950	Red mudstone (70%) Sandstone (10%) Gray mudstone (10%) Anhydrite (10%) Dolostone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
3950-3960	Red mudstone (60%) Sandstone (20%) Gray mudstone (10%) Anhydrite (10%)	
3960-3970	Red mudstone (40%) Sandstone (30%): similar to 3840-3850 ft but trace of sandstone is fine to coarse grained and moderately sorted Dolostone (10%) Gray mudstone (10%) Anhydrite (10%)	
3970-3980	Red mudstone (60%) Sandstone (10%) Dolostone (10%) Gray mudstone (10%) Anhydrite (10%)	
3980-3990	Red mudstone (60%) Gray mudstone (20%) Sandstone (10%) Anhydrite (10%)	
3990-4000	Red mudstone (40%) Anhydrite (30%) Sandstone (20%) Gray mudstone (10%) Dolostone (tr)	
4000-4010	Red mudstone (50%) Sandstone (20%) Anhydrite (20%) Gray mudstone (10%)	
4010-4020	Red mudstone (60%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%)	
4020-4030	Red mudstone (60%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%)	
4030-4040	Red mudstone (60%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
4040-4050	Red mudstone (40%) Anhydrite (30%) Sandstone (20%) Gray mudstone (10%) Dolostone (tr)	
4050-4060	Red mudstone (60%) Anhydrite (30%) Gray mudstone (10%) Sandstone (tr)	
4060-4070	Red mudstone (60%) Anhydrite (30%) Gray mudstone (10%) Sandstone (tr)	
4070-4080	Red mudstone (60%) Anhydrite (30%) Gray mudstone (10%) Sandstone (tr)	
4080-4090	Red mudstone (60%) Anhydrite (30%) Gray mudstone (10%) Sandstone (tr)	
4090-4100	Red mudstone (80%) Anhydrite (20%) Gray mudstone (tr) Dolostone (tr): white (N9) to light brownish gray (5YR6/1); microcrystalline. Porosity (tr) Limestone (tr): white (N9) to moderate reddish orange (10R6/6); microcrystalline; contains streaks of red clay; lime mudstone	
4100-4110	Red mudstone (70%): similar to 3840-3850 ft but contains blebs (tr) less than 2 mm in diameter of microcrystalline calcite Anhydrite (20%) Gray mudstone (10%) Sandstone (tr)	
4110-4120	Red mudstone (70%) Sandstone (10%) Gray mudstone (10%) Anhydrite (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
4120-4130	Red mudstone (70%) Sandstone (10%): pale reddish brown (10R5/4) to dark reddish brown (10R3/4); fine to medium grained, moderately sorted, subangular, argillaceous, hematitic; arkosic arenite. Poorly indurated Gray mudstone (10%) Anhydrite (10%) Dolostone (tr)	
4130-4140	Red mudstone (60%) Sandstone (20%) Gray mudstone (10%) Anhydrite (10%)	
4140-4150	Red mudstone (40%) Sandstone (30%): similar to 4120-4130 ft but contains traces of microcrystalline anhydrite and calcite cement Anhydrite (20%) Gray mudstone (10%)	
4150-4160	Red mudstone (60%) Sandstone (20%) Gray mudstone (10%) Anhydrite (10%)	
4160-4170	Red mudstone (70%) Sandstone (20%) Anhydrite (10%) Gray mudstone (tr)	
4170-4180	Red mudstone (70%): moderate reddish orange (10R6/6) to pale reddish brown (10R5/4); argillaceous, anhydritic. Poorly indurated Sandstone (20%) Anhydrite (10%) Gray mudstone (tr)	
4180-4190	Red mudstone (60%) Sandstone (20%) Gray mudstone (10%) Anhydrite (10%) Limestone (tr)	
4190-4200	Red mudstone (70%) Anhydrite (20%) Sandstone (10%) Gray mudstone (tr) Limestone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
4200-4210	Red mudstone (70%): moderate reddish orange (10R6/6) to moderate reddish brown (10R4/6) to grayish red (10R4/2); argillaceous, anhydritic. Poorly to moderately indurated Sandstone (20%): pale reddish brown (10R5/4) to moderate reddish orange (10R6/6); very fine to medium grained, poorly to moderately sorted, angular to subangular; calcareous, hematitic; arkosic arenite. Moderately indurated. Calcite and hematite are microcrystalline intergranular cements. Porosity (tr): intergranular Anhydrite (10%): white (N9) to light gray (N7); microcrystalline to cryptocrystalline; calcareous Poorly indurated Dolostone (tr) Gray mudstone (tr)	
4210-4220	Red mudstone (60%) Sandstone (30%): similar to 4200-4210 ft but also contains trace of anhydrite cement Anhydrite (10%) Gray mudstone (tr)	
4220-4230	Red mudstone (60%): calcareous (tr) Sandstone (30%) Anhydrite (10%) Gray mudstone (tr)	
4230-4240	Red mudstone (70%) Sandstone (20%) Anhydrite (10%) Gray mudstone (tr)	
4240-4250	Red mudstone (70%) Sandstone (20%) Anhydrite (10%) Gray mudstone (tr)	
4250-4260	Red mudstone (70%) Sandstone (20%) Anhydrite (10%) Gray mudstone (tr)	
	Middle unit of Abo Formation	130 (40)
4260-4270	Red mudstone (60%): not calcareous Sandstone (30%) Anhydrite (10%) Gray mudstone (tr)	
4270-4280	Red mudstone (70%) Sandstone (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Gray mudstone (10%) Anhydrite (10%) Dolostone (tr) Limestone (tr)	
4280-4290	Red mudstone (70%) Sandstone (10%) Gray mudstone (10%) Anhydrite (10%) Dolostone (tr) Limestone (tr)	
4290-4300	Red mudstone (60%): calcareous (10%) Sandstone (30%) Anhydrite (10%) Gray mudstone (tr)	
4300-4310	Red mudstone (80%): not calcareous Sandstone (20%) Gray mudstone (tr) Anhydrite (tr)	
4310-4320	Red mudstone (80%) Sandstone (20%) Gray mudstone (tr) Anhydrite (tr)	
4320-4330	Red mudstone (80%) Sandstone (20%) Gray mudstone (tr) Anhydrite (tr)	
4330-4340	Red mudstone (80%) Sandstone (20%) Gray mudstone (tr) Anhydrite (tr)	
4340-4350	Red mudstone (80%): calcareous (10%) Sandstone (10%) Gray mudstone (10%) Anhydrite (tr)	
4350-4360	Red mudstone (80%): calcareous (tr) Sandstone (10%) Anhydrite (10%) Gray mudstone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
4360-4370	Red mudstone (80%): calcareous (10%) Sandstone (10%) Anhydrite (10%) Gray mudstone (tr)	
4370-4380	Red mudstone (60%): not calcareous Anhydrite (30%) Gray mudstone (10%) Sandstone (tr)	
4380-4390	Red mudstone (60%): calcareous (10%) Sandstone (20%): white (N9) to dark reddish brown (10R3/4); fine to very fine grained, well sorted, micaceous; arkosic arenite. White sandstone cemented by microcrystalline intergranular calcite; red sandstone cemented by microcrystalline intergranular hematite. Porosity (tr): intergranular Anhydrite (20%) Gray mudstone (tr)	
	Hueco Formation (Permian), total described	210 (64)
4390-4400	Red mudstone (80%) Sandstone (10%) Anhydrite (10%) Gray mudstone (tr) Limestone (tr)	
4400-4410	Red mudstone (90%): calcareous (20%) Gray mudstone (10%) Sandstone (tr)	
4410-4420	Red mudstone (90%): calcareous (70%) Sandstone (10%) Gray mudstone (tr) Anhydrite (tr)	
4420-4430	Red mudstone (90%) Sandstone (10%) Gray mudstone (tr) Anhydrite (tr)	
4430-4440	Red mudstone (90%): calcareous (60%) Anhydrite (10%) Sandstone (tr) Gray mudstone (tr)	
4440-4450	Red mudstone (90%): calcareous (80%) Gray mudstone (10%) Sandstone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
	Anhydrite (tr)	
4450-4460	Red mudstone (90%) Gray mudstone (10%) Sandstone (tr) Anhydrite (tr)	
4460-4470	Red mudstone (90%): calcareous (90%) Gray mudstone (10%) Sandstone (tr) Anhydrite (tr)	
4470-4480	Red mudstone (80%): calcareous (80%) Gray mudstone (10%) Anhydrite (10%)	
4480-4490	Red mudstone (80%) Gray mudstone (10%) Anhydrite (10%)	
4490-4500	Red mudstone (90%): calcareous (70%) Gray mudstone (10%) Anhydrite (tr)	
4500-4510	Red mudstone (90%): calcareous (50%) Anhydrite (10%) Sandstone (tr) Gray mudstone (tr)	
4510-4520	Red mudstone (90%): calcareous (20%) Gray mudstone (10%) Sandstone (tr) Limestone (tr): white (N9) to grayish yellow green (5GY7/2) to medium gray (N5); microcrystalline, silty, micaceous; lime mudstone	
4520-4530	Red mudstone (90%): calcareous (40%) Gray mudstone (10%) Limestone (tr): light gray (N7) to medium light gray (N6); microcrystalline; skeletal (tr-40%): fusulinids in a lime-mud matrix; fusulinid mudstones and fusulinid wackestones Sandstone (tr) Anhydrite (tr)	
4530-4540	Red mudstone (90%): calcareous (70%) Limestone (10%) Sandstone (tr) Gray mudstone (tr) Anhydrite (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
4540-4550	Red mudstone (80%): calcareous (90%) Limestone (20%): similar to 4520-4530 ft except limestone (tr) composed of fusulinids (80%) and intrapartical microcrystalline cement (20%): fusulinid grainstones Sandstone (tr) Gray mudstone (tr)	
4550-4560	Red mudstone (80%) Sandstone (10%): mottled dark reddish brown (10R3/4) and moderate reddish orange (10R6/6); fine to very fine grained; hematitic red clay matrix (10-20%); poorly sorted, angular; calcareous; arkosic wacke. Well indurated Anhydrite (10%) Limestone (tr) Gray mudstone (tr)	
4560-4570	Red mudstone (70%): calcareous (40%) Limestone (30%) Gray mudstone (tr) Anhydrite (tr)	
4570-4580	Red mudstone (60%): calcareous (50%) Limestone (40%) Gray mudstone (tr) Anhydrite (tr)	
4580-4590	Red mudstone (60%): calcareous (50%) Limestone (40%) Gray mudstone (tr) Anhydrite (tr)	
4590-4600	Red mudstone (60%): calcareous (50%) Limestone (40%) Sandstone (tr) Dolostone (tr) Gray mudstone (tr)	

TABLE A-4--Descriptions of drill cuttings, Spartan Drilling Company No. 1 Bonner & Thompson (660' FSL, 1980' FEL, sec. 25, T. 5 S., R. 29 E., Chaves County, New Mexico). Elevation 4,327 ft (1,319 m), ground level. Total depth 8,911 ft (2,716 m). Plugged and abandoned 12/23/50.

Depth Interval (ft)	Description	Thickness ft (m)
	Description starts in Yeso Formation	
	Yeso Formation (Permian), total described	140 (43)
5900-5910	Red mudstone (30%): pale reddish brown (10R5/4) to moderate reddish brown (10R4/6); silty to argillaceous. Poorly to moderately indurated	
	Sandstone (20%): moderate reddish orange (10R6/6); fine to very fine grained, well sorted; anhydritic, micaceous; arkosic arenite. Anhydrite fills vugs 4 mm long x 1 mm wide. Poorly indurated. Porosity (tr)	
	Dolostone (20%): light gray (N7) to pale red (5R6/2), microcrystalline; anhydritic, wood fragments (tr): elongate less than 1 mm long. Moderately indurated	
	Anhydrite (20%): mottled white (N9), very light gray (N8), and light brownish gray (5YR6/1); microcrystalline; calcareous. Moderately indurated	
	Limestone (10%): brownish gray (5YR4/1) to brownish black (5YR2/1); microcrystalline; skeletal (20%): recrystallized brachiopods, disarticulated crinoid columnals, and fusulinids; fossiliferous wackestones. Well indurated	
	Gray mudstone (tr): medium light gray (N6), silty. Poorly indurated	
5910-5920	Dolostone (60%): similar to 5900-5910 ft but mottled light gray (N7) and brownish gray (5YR4/1)	
	Red mudstone (20%)	
	Gray mudstone (10%)	
	Anhydrite (10%)	
	Sandstone (tr)	
	Limestone (tr)	
5920-5930	Dolostone (60%)	
	Red mudstone (20%)	
	Gray mudstone (10%)	
	Anhydrite (10%)	
	Sandstone (tr)	
5930-5940	Dolostone (40%)	
	Red mudstone (30%): similar to 5900-5910 ft but anhydritic	
	Gray mudstone (20%)	
	Anhydrite (10%)	
	Sandstone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
5940-5950	Red mudstone (30%) Anhydrite (30%) Dolostone (20%) Gray mudstone (20%) Sandstone (tr)	
5950-5960	Dolostone (40%) Red mudstone (20%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%)	
5960-5970	Dolostone (40%) Gray mudstone (20%) Anhydrite (20%) Sandstone (10%) Red mudstone (10%)	
5970- 980	Dolostone (30%) Red mudstone (20%) Gray mudstone (20%) Anhydrite (20%) Sandstone (10%)	
5980-5990	Gray mudstone (40%) Dolostone (30%) Anhydrite (20%) Red mudstone (10%) Sandstone (tr)	
5990-6000	Gray mudstone (30%) Red mudstone (20%) Dolostone (20%) Anhydrite (20%) Sandstone (10%)	
6000-6010	Gray mudstone (60%) Anhydrite (20%) Red mudstone (10%) Dolostone (10%) Sandstone (tr)	
6010-6020	Gray mudstone (70%) Anhydrite (30%) Sandstone (tr) Red mudstone (tr) Dolostone (tr)	
6020-6030	Gray mudstone (70%) Red mudstone (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Dolostone (10%) Anhydrite (10%) Sandstone (tr)	
6030-6040	Gray mudstone (40%) Anhydrite (40%) Red mudstone (20%) Sandstone (tr) Dolostone (tr)	
	Abo Formation (Permian)	800 (244)
	Upper unit of Abo Formation	630 (192)
6040-6050	Gray mudstone (50%) Anhydrite (30%) Red mudstone (10%) Dolostone (10%) Sandstone (tr)	
6050-6060	Gray mudstone (40%) Anhydrite (30%) Red mudstone (20%) Sandstone (10%)	
6060-6070	Gray mudstone (60%) Anhydrite (30%) Red mudstone (10%) Sandstone (tr) Dolostone (tr)	
6070-6080	Gray mudstone (50%) Red mudstone (20%) Anhydrite (20%) Dolostone (10%) Sandstone (tr)	
6080-6090	Red mudstone (30%) Gray mudstone (30%) Anhydrite (30%) Sandstone (10%)	
6090-6100	Red mudstone (40%) Gray mudstone (30%) Anhydrite (30%): white (N9) to medium light gray (N6); microcrystalline; argillaceous. Moderately indurated Sandstone (tr)	
6100-6110	Gray mudstone (50%) Sandstone (20%): moderate reddish orange (10R6/6) to grayish red (10R4/2); very fine grained, well	

Depth Interval (ft)	Description	Thickness ft (m)
	sorted, angular to subangular; arkosic arenite Poorly indurated. Porosity (tr): intergranular Red mudstone (20%) Anhydrite (10%) Dolostone (tr)	
6110-6120	Red mudstone (50%): calcareous (10%) Gray mudstone (30%) Sandstone (10%) Anhydrite (10%)	
6120-6130	Red mudstone (60%): moderate reddish orange (10R6/6) to moderate reddish brown (10R4/6); argillaceous. Poorly indurated Gray mudstone (30%): light gray (N79 to medium dark gray (N4); silty to argillaceous; anhydritic. Poorly to moderately indurated Anhydrite (10%) Sandstone (tr) Limestone (tr)	
6130-6140	Red mudstone (40%): calcareous (tr) Sandstone (20%) Gray mudstone (20%) Anhydrite (20%)	
6140-6150	Red mudstone (90%): not calcareous Anhydrite (10%) Sandstone (tr) Gray mudstone (tr)	
6150-6160	Red mudstone (80%) Gray mudstone (20%) Anhydrite (tr)	
6160-6170	Red mudstone (90%) Anhydrite (10%) Gray mudstone (tr)	
6170-6180	Red mudstone (90%): calcareous (tr) Gray mudstone (10%) Sandstone ((tr) Anhydrite (tr)	
6180-6190	Red mudstone (80%): calcareous (10%) Sandstone (10%) Anhydrite (10%) Gray mudstone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
6190-6200	Red mudstone (60%): calcareous (20%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%)	
6200-6210	Red mudstone (50%): calcareous (10%) Gray mudstone (30%) Anhydrite (20%) Sandstone (tr) Dolostone (tr)	
6210-6220	Red mudstone (50%): calcareous (30%) Gray mudstone (20%) Anhydrite (20%) Sandstone (10%) Dolostone (tr)	
6220-6230	Red mudstone (50%): calcareous (tr) Dolostone (30%) Gray mudstone (20%) Sandstone (tr) Anhydrite (tr)	
6230-6240	Red mudstone (70%): calcareous (20%) Anhydrite (20%) Sandstone (10%) Gray mudstone (tr) Dolostone (tr)	
6240-6250	Red mudstone (100%): calcareous (60%) Sandstone (tr) Gray mudstone (tr) Dolostone (tr) Anhydrite (tr)	
6250-6260	Red mudstone (90%): calcareous (30%) Gray mudstone (10%) Anhydrite (tr)	
6260-6270	Red mudstone (80%): calcareous (30%) Sandstone (10%): moderate reddish orange (10R6/6) to pale reddish brown (10R5/4); very fine grained, poorly sor ed, subangular; arkosic wacke. Poorly indurated Dolostone (10%) Gray mudstone (tr) Anhydrite (tr)	
6270-6280	Red mudstone (60%): calcareous (tr) Anhydrite (20%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Sandstone (10%) Gray mudstone (10%) Dolostone (tr)	
6280-6290	Red mudstone (90%): calcareous (20%) Dolostone (10%) Sandstone (tr) Gray mudstone (tr) Anhydrite (tr)	
6290-6300	Red mudstone (40%): calcareous (tr) Sandstone (20%) Gray mudstone (20%) Anhydrite (20%) Dolostone (tr) Limestone (tr)	
6300-6310	Red mudstone (80%) Gray mudstone (20%) Sandstone (tr) Anhydrite (tr)	
6310-6320	Red mudstone (60%): calcareous (10%) Sandstone (10%) Gray mudstone (10%) Dolostone (10%) Anhydrite (10%)	
6320-6330	Red mudstone (60%): calcareous (20%) Sandstone (10%) Gray mudstone (10%) Dolostone (10%) Anhydrite (10%)	
6330-6340	Red mudstone (40%): calcareous (tr) Dolostone (20%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%)	
6340-6350	Red mudstone (40%): calcareous (10%) Sandstone (20%) Gray mudstone (20%) Dolostone (10%) Anhydrite (10%)	
6350-6360	Red mudstone (30%): calcareous (20%) Sandstone (20%) Dolostone (20%) Anhydrite (20%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Gray mudstone (10%)	
6360-6370	Red mudstone (30%): calcareous (tr) Gray mudstone (30%) Sandstone (20%) Dolostone (10%) Anhydrite (10%)	
6370-6380	Red mudstone (30%): not calcareous Sandstone (20%) Gray mudstone (20%) Anhydrite (20%) Dolostone (10%)	
6380-6390	No sample	
6390-6400	Sandstone (30%) Red mudstone (30%): calcareous (10%) Gray mudstone (30%) Anhydrite (10%)	
6400-6410	Red mudstone (40%): calcareous (20%) Sandstone (30%) Gray mudstone (20%) Anhydrite (10%) Dolostone (tr) Chert (tr)	
6410-6420	Sandstone (30%): moderate reddish orange (10R6/6); fine to very fine grained, well sorted; arkosic arenite; cemented by intergranular microcrystalline hematite, calcite, and dolomite. Poorly to well indurated Red mudstone (30%): moderate reddish orange (10R6/6) to light red (5R6/6); argillaceous, calcareous (40%) Poorly indurated Gray mudstone (30%): medium dark gray (N4) to medium light gray (N6); silty, anhydritic; fissile to nonfissile. Poorly indurated Dolostone (10%): light olive gray (5Y5/2) to brownish gray (5YR4/1); microcrystalline; trace of fine to medium sand-size subrounded quartz. Well indurated Limestone (tr) Anhydrite (tr)	
6420-6430	Red mudstone (40%): calcareous (10%) Gray mudstone (30%) Sandstone (20%) Dolostone (10%): microcrystalline; calcareous (40%): microcrystalline calcite. Porosity (10%): vuggy, secondary	

Depth Interval (ft)	Description	Thickness ft (m)
	Anhydrite (tr)	
6430-6440	Sandstone (60%) Red mudstone (30%): calcareous (tr) Gray mudstone (10%) Anhydrite (tr)	
6440-6450	Sandstone (40%) Gray mudstone (30%) Red mudstone (20%) Anhydrite (10%) Chert (tr)	
6450-6460	Gray mudstone (40%) Red mudstone (30%): calcareous (50%) Sandstone (20%) Anhydrite (10%) Dolostone (tr)	
6460-6470	Sandstone (40%) Red mudstone (20%): calcareous (tr) Gray mudstone (20%) Anhydrite (10%) Chert (10%)	
6470-6480	Sandstone (50%) Red mudstone (30%) Gray mudstone (10%) Anhydrite (10%)	
6480-6490	Red mudstone (50%): calcareous (20%) Gray mudstone (30%) Sandstone (10%) Anhydrite (10%)	
6490-6500	Red mudstone (40%): calcareous (50%) Sandstone (20%) Gray mudstone (20%) Dolostone (10%) Anhydrite (10%)	
6500-6510	Red mudstone (40%): calcareous (10%) Gray mudstone (30%) Sandstone (20%) Anhydrite (10%)	
6510-6520	Red mudstone (50%): calcareous (20%) Sandstone (30%) Gray mudstone (20%)	

Depth Interval (ft)	Description	Thickness ft (m)
6520-6530	Red mudstone (60%): not calcareous Sandstone (20%) Gray mudstone (20%)	
6530-6540	Red mudstone (60%): calcareous (10%) Gray mudstone (20%) Sandstone (10%) Anhydrite (10%)	
6540-6550	Red mudstone (40%): not calcareous Sandstone (20%) Gray mudstone (20%) Anhydrite (20%)	
6550-6560	Red mudstone (70%) Sandstone (10%) Gray mudstone (10%) Anhydrite (10%)	
6560-6570	Red mudstone (70%) Sandstone (10%) Gray mudstone (10%) Anhydrite (10%)	
6570-6580	Red mudstone (30%) Sandstone (20%) Dolostone (20%) Limestone (10%): olive black (5Y2/1), microcrystalline; skeletal (30%): foraminifers, gastropods, brachiopods; fossiliferous wackestone Gray mudstone (10%) Anhydrite (10%)	
6580-6590	Red mudstone (50%): calcareous (20%) Sandstone (30%) Gray mudstone (10%) Anhydrite (10%) Dolostone (tr)	
6590-6600	Red mudstone (50%): calcareous (tr) Gray mudstone (20%) Anhydrite (20%) Sandstone (10%)	
6600-6610	Red mudstone (80%): not calcareous Gray mudstone (20%) Sandstone (tr) Chert (tr)	
6610-6620	Red mudstone (50%): moderate reddish orange (10R6/6)	

Depth Interval (ft)	Description	Thickness ft (m)
	to dusky red (5R3/4); silty to argillaceous Poorly indurated	
	Gray mudstone (30%): medium gray (N5) to light bluish gray (5B7/1); argillaceous to silty; nonfissile to thinly fissile. Poorly indurated Sandstone (10%): moderate reddish orange (10R6/6) to yellowish gray (5Y8/1) to light gray (N7); very fine grained, well sorted; arkosic arenite; cemented by microcrystalline intergranular hematite. Poorly indurated Anhydrite (10%): white (N9) to light gray (N7); microcrystalline; argillaceous. Poorly indurated Dolostone (tr): olive black (5Y2/1); microcrystalline Well indurated	
6620-6630	Red mudstone (40%) Gray mudstone (30%) Sandstone (20%) Anhydrite (10%) Dolostone (tr)	
6630-6640	Red mudstone (60%): calcareous (10%) Sandstone (20%) Gray mudstone (20%) Anhydrite (tr)	
6640-6650	Red mudstone (50%) Sandstone (20%) Gray mudstone (20%) Anhydrite (10%) Dolostone (tr)	
6650-6660	Red mudstone (40%): not calcareous Gray mudstone (30%) Sandstone (20%) Dolostone (10%) Anhydrite (tr)	
6660-6670	Red mudstone (40%): calcareous (10%) Sandstone (30%) Gray mudstone (20%) Anhydrite (10%)	
	Middle unit of Abo Formation	170 (52)
6670-6680	Red mudstone (60%): not calcareous Anhydrite (20%) Sandstone (10%) Gray mudstone (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
6680-6690	Red mudstone (50%) Gray mudstone (30%) Sandstone (20%)	
6690-6700	Red mudstone (50%): calcareous (tr) Sandstone (20%) Gray mudstone (10%) Dolostone (10%) Anhydrite (10%)	
6700-6710	Red mudstone (80%) Sandstone (10%) Anhydrite (10%) Gray mudstone (tr): medium gray (N5) to light bluish gray (5B7/1); argillaceous to silty, calcareous; nonfissile to thinly fissile. Poorly indurated Dolostone (tr)	
6710-6720	Red mudstone (90%): calcareous (10%) Anhydrite (10%) Sandstone (tr) Gray mudstone (tr) Dolostone (tr)	
6720-6730	Red mudstone (70%): calcareous (20%) Sandstone (10%) Gray mudstone (10%) Anhydrite (10%)	
6730-6740	Red mudstone (100%) Sandstone (tr) Gray mudstone (tr) Anhydrite (tr)	
6740-6750	Red mudstone (70%): calcareous (10%) Dolostone (20%) Sandstone (10%) Gray mudstone (tr) Anhydrite (tr)	
6750-6760	Red mudstone (60%): calcareous (tr) Dolostone (20%) Gray mudstone (10%) Anhydrite (10%) Sandstone (tr)	
6760-6770	Red mudstone (70%): not calcareous Dolostone (20%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Gray mudstone (10%)	
6770-6780	Red mudstone (60%): calcareous (10%) Dolostone (20%) Sandstone (10%) Gray mudstone (10%)	
6780-6790	Red mudstone (80%): not calcareous Dolostone (10%) Gray mudstone (10%) Sandstone (tr)	
6790-6800	Red mudstone (80%): calcareous (10%) Gray mudstone (20%) Dolostone (tr)	
6800-6810	Red mudstone (80%): calcareous (10%) Dolostone (10%) Gray mudstone (10%) Limestone (tr) Sandstone (tr)	
6810-6820	Red mudstone (50%): not calcareous Dolostone (20%) Gray mudstone (20%) Sandstone (10%)	
6820-6830	Red mudstone (50%): calcareous (30%) Sandstone (20%) Dolostone (20%) Gray mudstone (10%) Anhydrite (tr)	
6830-6840	Red mudstone (60%): calcareous (20%) Gray mudstone (20%) Sandstone (10%) Anhydrite (10%) Dolostone (tr)	
	Hueco Formation (Permian), total described	60 (18)
6840-6850	Red mudstone (60%): not calcareous Gray mudstone (30%) Limestone (10%) Sandstone (tr)	
6850-6860	Red mudstone (70%): calcareous (tr) Limestone (10%): white (N9) to very light gray (N8); microcrystalline; lime mudstone. Well indurated	

Depth Interval (ft)	Description	Thickness ft (m)
	Gray mudstone (10%) Dolostone (10%) Sandstone (tr)	
6860-6870	Red mudstone (60%): not calcareous Sandstone (20%) Limestone (10%) Gray mudstone (10%) Anhydrite (tr)	
6870-6880	Red mudstone (60%): calcareous (10%) Limestone (20%) Sandstone (10%) Dolostone (10%) Gray mudstone (tr) Anhydrite (tr)	
6880-6890	Red mudstone (60%): calcareous (50%) Limestone (40%): white (N9) to dark gray (N3); microcrystalline; skeletal: undetermined percentage of recrystallized fossils in lime-mud matrix; fossiliferous wackestone. Well indurated	
6890-6900	Red mudstone (50%): calcareous (10%) Limestone (30%) Gray mudstone (10%) Anhydrite (10%) Sandstone (tr)	

TABLE A-5--Descriptions of drill cuttings, Mesa Petroleum Co. No. 1 Gallo State (660' FNL, 1,650' FEL, sec. 3, T. 5 S., R. 18 E., Lincoln County, New Mexico). Elevation 4,805 ft (1,465 m), ground level. Total depth 3,176 ft (968 m). Plugged and abandoned 12/29/81.

Depth Interval (ft)	Description	Thickness ft (m)
	Description starts in Yeso Formation	
	Yeso Formation (Permian), total described	280 (85)
1600-1610	Sandstone (70%): moderate reddish orange (10R6/6) to moderate reddish brown (10R4/6); very fine to coarse grained, angular to subrounded, moderately sorted, anhydritic; arkosic arenite. Poorly indurated. Porosity (tr): intergranular Red mudstone (20%): moderate reddish brown (10R4/6); argillaceous, sandy; thinly fissile to nonfissile. Poorly indurated Anhydrite (10%): white (N9) to very light gray (N8); microcrystalline to macrocrystalline; dolomitic	
1610-1620	Sandstone (80%): similar to 1600-1610 ft but contains red clay matrix (10-40%); arkosic wacke Red mudstone (10%) Anhydrite (10%) Gray mudstone (tr): brownish gray (5YR4/1); silty, calcareous. Moderately indurated Limestone (tr): brownish gray (5YR4/1) to brownish black (5YR2/1); microcrystalline; dolomitic; lime mudstone	
1620-1630	Sandstone (90%): similar to 1600-1610 ft; arkosic arenite Red mudstone (10%) Gray mudstone (tr) Anhydrite (tr)	
1630-1640	Sandstone (90%) Red mudstone (10%) Gray mudstone (tr)	
1640-1650	Sandstone (60%) Red mudstone (30%): moderate reddish brown (10R4/6); silty to argillaceous. Poorly indurated Gray mudstone (10%)	
1650-1660	Sandstone (60%) Red mudstone (20%) Dolostone (10%): grayish brown (5YR3/2) to dusky brown (5YR2/2); finely to coarsely microcrystalline; anhydritic, calcareous. Moderately indurated Anhydrite (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Gray mudstone (tr)	
1660-1670	Sandstone (50%) Red mudstone (30%) Gray mudstone (20%)	
1670-1680	Sandstone (80%): similar to 1600-1610 ft but calcareous Red mudstone (10%) Anhydrite (10%) Gray mudstone (tr) Limestone (tr)	
1680-1690	Sandstone (90%): similar to 1600-1610 ft but anhydrite cement (tr-40%) extensively replaces detrital quartz and feldspar Red mudstone (10%)	
1690-1700	Sandstone (70%) Red mudstone (30%) Limestone (tr) Anhydrite (tr)	
1700-1710	Sandstone (80%) Red mudstone (20%) Anhydrite (tr)	
1710-1720	Red mudstone (60%): moderate reddish brown (10R4/6); silty, sandy, calcareous (100%). Poorly indurated Sandstone (20%) Gray mudstone (10%) Anhydrite (10%)	
1720-1730	Sandstone (60%): moderate reddish orange (10R6/6) to moderate reddish brown (10R4/6); very fine grained, angular, well sorted; arkosic arenite Red mudstone (40%): moderate reddish brown (10R4/6); silty. Poorly indurated Anhydrite (tr)	
1730-1740	Red mudstone (50%) Gray mudstone (30%) Sandstone (20%) Anhydrite (tr)	
1740-1750	Sandstone (70%) Gray mudstone (20%): light olive gray (5Y5/2); silty, calcareous. Moderately indurated Red mudstone (10%) Anhydrite (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
1750-1760	Sandstone (50%) Gray mudstone (40%) Red mudstone (10%) Anhydrite (tr)	
1760-1770	Gray mudstone (50%) Sandstone (30%) Red mudstone (20%) Anhydrite (tr)	
1770-1780	Sandstone (40%) Gray mudstone (30%) Red mudstone (20%) Anhydrite (10%)	
1780-1790	Gray mudstone (40%) Red mudstone (30%) Sandstone (20%) Anhydrite (10%)	
1790-1800	Sandstone (50%) Red mudstone (20%) Gray mudstone (20%) Anhydrite (10%)	
1800-1810	Sandstone (40%) Red mudstone (20%) Gray mudstone (20%) Anhydrite (20%)	
1810-1820	Sandstone (40%) Red mudstone (30%) Anhydrite (20%) Gray mudstone (10%)	
1820-1830	Anhydrite (50%) Sandstone (20%) Red mudstone (20%) Gray mudstone (10%) Limestone (tr)	
1830-1840	Red mudstone (40%) Anhydrite (40%) Sandstone (10%) Gray mudstone (10%)	
1840-1850	Red mudstone (50%) Sandstone (20%) Gray mudstone (20%) Anhydrite (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
1850-1860	Anhydrite (40%) Sandstone (30%) Gray mudstone (20%): light olive gray (5Y5/2); argillaceus, calcareous Red mudstone (10%) Dolostone (tr)	
1860-1870	Gray mudstone (30%) Anhydrite (30%) Sandstone (20%) Red mudstone (20%)	
1870-1880	Red mudstone (40%) Sandstone (20%) Gray mudstone (20%) Anhydrite (20%) Dolostone (tr): porosity (10%) is vuggy.	
	Abo Formation (Permian)	1,220 (372)
	Upper unit of Abo Formation	350 (107)
1880-1890	Red mudstone (80%) Sandstone (10%) Gray mudstone (10%) Anhydrite (tr)	
1890-1900	Anhydrite (50%) Sandstone (20%) Red mudstone (20%) Gray mudstone (10%)	
1900-1910	Gray mudstone (40%) Red mudstone (30%) Anhydrite (30%) Sandstone (tr)	
1910-1920	Gray mudstone (60%): calcareous (10%) Red mudstone (30%) Dolostone (10%) Anhydrite (tr)	
1920-1930	Red mudstone (60%): similar to 1720-1730 ft but contains thin calcite-filled fractures Gray mudstone (40%): silty, dolomitic, calcareous Dolostone (tr)	
1930-1940	Gray mudstone (50%) Red mudstone (40%): similar to 1720-1730 ft Anhydrite (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
1940-1950	Red mudstone (70%) Dolostone (20%) Anhydrite (10%) Gray mudstone (tr)	
1950-1960	Red mudstone (90%) Gray mudstone (10%)	
1960-1970	Red mudstone (90%) Dolostone (10%) Gray mudstone (tr) Anhydrite (tr)	
1970-1980	Red mudstone (90%) Sandstone (10%) Anhydrite (tr)	
1980-1990	Red mudstone (100%) Anhydrite (tr)	
1990-2000	Red mudstone (90%) Anhydrite (10%) Sandstone (tr)	
2000-2010	Red mudstone (90%) Anhydrite (10%) Gray mudstone (tr)	
2010-2020	Red mudstone (90%) Anhydrite (10%) Gray mudstone (tr)	
2020-2030	Gray mudstone (40%) Anhydrite (30%) Red mudstone (20%) Sandstone (10%) Dolostone (tr)	
2030-2040	Red mudstone (60%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%)	
2040-2050	Red mudstone (50%) Dolostone (20%): sandy. Porosity (10%): vuggy Gray mudstone (20%) Sandstone (10%) Anhydrite (tr)	
2050-2060	Red mudstone (50%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Dolostone (20%) Sandstone (10%) Gray mudstone (10%) Anhydrite (10%)	
2060-2070	Red mudstone (60%) Sandstone (20%) Dolostone (10%) Gray mudstone (10%) Anhydrite (tr)	
2070-2080	Red mudstone (70%) Sandstone (10%) Dolostone (10%) Anhydrite (10%)	
2080-2090	Red mudstone (70%) Sandstone (10%) Dolostone (10%) Anhydrite (10%) Gray mudstone (tr)	
2090-2100	Red mudstone (70%) Dolostone (20%) Sandstone (10%)	
2100-2110	Red mudstone (60%): moderate reddish orange (10R6/6) to dark reddish brown (10R3/4); silty, sandy; thinly fissile to nonfissile. Moderately indurated Sandstone (30%): moderate reddish orange (10R6/6) to pale reddish brown (10R5/4); fine to very fine grained, angular; poorly sorted, calcareous; red clay matrix (10-30%); arkosic wacke. Moderately indurated Dolostone (10%): very light gray (N8) to very pale blue (5B8/2); microcrystalline; calcareous. Moderately to well indurated Gray mudstone (tr) Anhydrite (tr)	
2110-2120	Red mudstone (100%): calcareous (10%) Sandstone (tr) Dolostone (tr) Gray mudstone (tr) Anhydrite (tr)	
2120-2130	Red mudstone (80%): calcareous (tr) Sandstone (10%) Dolostone (10%) Anhydrite (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
2130-2140	Red mudstone (90%): calcareous (60%) Dolostone (10%) Sandstone (tr) Anhydrite (tr)	
2140-2150	Red mudstone (90%): calcareous (50%) Dolostone (10%) Sandstone (tr) Gray mudstone (tr) Anhydrite (tr)	
2150-2160	Red mudstone (90%): calcareous (100%) Dolostone (10%) Sandstone (tr) Gray mudstone (tr) Anhydrite (tr)	
2160-2170	Red mudstone (80%): calcareous (10%) Sandstone (10%) Anhydrite (10%) Dolostone (tr)	
2170-2180	Red mudstone (100%): calcareous (60%) Sandstone (tr) Dolostone (tr) Anhydrite (tr)	
2180-2190	Red mudstone (100%): calcareous (20%), anhydritic Dolostone (tr) Anhydrite (tr)	
2190-2200	Red mudstone (100%): calcareous (30%) Dolostone (tr) Anhydrite (tr)	
2200-2210	Red mudstone (100%): moderate reddish orange (10R6/6) to dark reddish brown (10R3/4); silty to argillaceous, sandy; calcareous (30%). Moderately indurated Sandstone (tr) Dolostone (tr) Anhydrite (tr)	
2210-2220	Red mudstone (90%): calcareous (10%) Anhydrite (10%) Sandstone (tr)	
2220-2230	Red mudstone (90%): calcareous (30%) Sandstone (10%) Anhydrite (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
	Lower unit of Abo Formation	870 (265)
2230-2240	Red mudstone (100%): calcareous (10%). Trace of red mudstone is cobble sized, hematitic, concretionary Sandstone (tr): very fine to coarse grained, angular, poorly sorted; arkosic arenite	
2240-2250	Red mudstone (90%) Anhydrite (10%) Sandstone (tr) Dolostone (tr) Gray mudstone (tr)	
2250-2260	Red mudstone (80%): calcareous (30%) Sandstone (20%): dark reddish brown (10R3/4); fine to very coarse grained, angular, poorly to very poorly sorted, calcareous, micaceous; red clay matrix (10-50%); rock fragments (tr): granitic; arkosic wacke. Poorly indurated Anhydrite (tr)	
2260-2270	Red mudstone (60%): dark reddish brown (10R3/4) to moderate reddish brown (10R4/6); silty to argillaceous, sandy, micaceous, calcareous (10%). Poorly indurated Sandstone (40%) Anhydrite (tr)	
2270-2280	Red mudstone (60%): calcareous (30%) Sandstone (40%) Anhydrite (tr)	
2280-2290	Sandstone (50%) Red mudstone (50%): calcareous (10%) Anhydrite (tr)	
2290-2300	Sandstone (50%) Red mudstone (50%) Gray mudstone (tr) Anhydrite (tr)	
2300-2310	Sandstone (70%) Red mudstone (30%): calcareous (50%) Gray mudstone (tr)	
2310-2320	Red mudstone (70%): calcareous (10%) Sandstone (30%) Gray mudstone (tr) Anhydrite (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
2320-2330	Sandstone (60%) Red mudstone (40%): calcareous (tr) Anhydrite (tr)	
2330-2340	Sandstone (60%) Red mudstone (40%)	
2340-2350	Sandstone (70%) Red mudstone (30%)	
2350-2360	Sandstone (60%) Red mudstone (40%) Gray mudstone (tr)	
2360-2370	Red mudstone (60%): calcareous (60%) Sandstone (40%)	
2370-2380	Red mudstone (60%): calcareous (50%) Sandstone (40%)	
2380-2390	Sandstone (50%) Red mudstone (50%): calcareous (60%) Gray mudstone (tr)	
2390-2400	Red mudstone (60%) Sandstone (40%) Anhydrite (tr)	
2400-2410	Red mudstone (60%): moderate reddish orange (10R6/6) to dark reddish brown (10R3/4); silty to argillaceous; sand (tr-20%): very fine to coarse grained, angular quartz and feldspar; wood fragments (tr): elongate 0.5 mm to 1.0 mm long; micaceous; calcareous (20%). Silty mudstone is moderately indurated; argillaceous mudstone is poorly indurated Sandstone (30%): pale reddish brown (10R5/4) to very dusky red (10R2/2); very fine to very coarse grained, conglomeratic, subangular to very angular, poorly to very poorly sorted; red clay matrix (10-50%): red clay matrix seen in some cuttings and the low density porosity readings and high neutron porosity readings indicate that clay is present throughout most or all of this sandstone, which is mostly disaggregated; calcite cement (tr); hematite (tr): fine to coarse sand-size, subangular to subrounded, detrital grains; arkosic wacke. Poorly indurated Anhydrite (10%): white (N9); microcrystalline; slightly calcareous. Poorly indurated	

Depth Interval (ft)	Description	Thickness ft (m)
2410-2420	Sandstone (70%) Red mudstone (30%): calcareous (10%) Gray mudstone (tr): medium light gray (N6), silty. Poorly indurated	
2420-2430	Sandstone (50%) Red mudstone (50%): calcareous (tr) Gray mudstone (tr)	
2430-2440	Sandstone (60%) Red mudstone (40%): calcareous (20%) Gray mudstone (tr) Anhydrite (tr)	
2440-2450	Sandstone (60%) Red mudstone (40%) Gray mudstone (tr) Anhydrite (tr)	
2450-2460	Red mudstone (70%): calcareous (50%) Sandstone (30%)	
2460-2470	Sandstone (60%) Red mudstone (40%): calcareous (70%)	
2470-2480	Red mudstone (70%): calcareous (20%) Sandstone (30%): similar to 2400-2410 ft but contains lithic fragments (30%): medium sand to granule size, rounded to very angular granite; arkosic wackes and possibly some lithic wackes Anhydrite (tr)	
2480-2490	Red mudstone (70%) Sandstone (30%) Anhydrite (tr)	
2490-2500	Red mudstone (60%): calcareous (50%) Sandstone (40%) Gray mudstone (tr)	
2500-2510	Red mudstone (60%) Sandstone (40%) Gray mudstone (tr) Anhydrite (tr)	
2510-2520	Red mudstone (80%): calcareous (20%) Sandstone (20%) Limestone (tr) Anhydrite (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
2520-2530	Red mudstone (80%): calcareous (10%) Sandstone (20%) Gray mudstone (tr) Anhydrite (tr)	
2530-2540	Red mudstone (60%): calcareous (60%) Sandstone (40%)	
2540-2550	Sandstone (50%) Red mudstone (50%) Gray mudstone (tr)	
2550-2560	Sandstone (60%) Red mudstone (40%):calcareous (70%) Gray mudstone (tr)	
2560-2570	Sandstone (60%) Red mudstone (40%) Gray mudstone (tr)	
2570-2580	Sandstone (60%) Red mudstone (40%) Gray mudstone (tr)	
2580-2590	Sandstone (60%) Red mudstone (40%) Gray mudstone (tr)	
2590-2600	Sandstone (60%) Red mudstone (40%) Gray mudstone (tr)	
2600-2610	Sandstone (50%) Red mudstone (50%): calcareous (50%)	
2610-2620	Red mudstone (60%): calcareous (tr) Sandstone (40%)	
2620-2630	Red mudstone (60%) Sandstone (40%)	
2630-2640	Sandstone (50%) Red mudstone (40%): calcareous (10%) Gray mudstone (10%)	
2640-2650	Sandstone (60%) Red mudstone (40%)	
2650-2660	Sandstone (60%) Red mudstone (40%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Anhydrite (tr)	
2660-2670	Sandstone (60%) Red mudstone (40%) Gray mudstone (tr) Anhydrite (tr)	
2670-2680	Red mudstone (70%) Sandstone (30%) Dolostone (tr) Gray mudstone (tr)	
2680-2690	Red mudstone (60%): calcareous (70%) Sandstone (30%) Gray mudstone (10%)	
2690-2700	Red mudstone (80%): calcareous (10%) Sandstone (20%) Gray mudstone (tr)	
2700-2710	Red mudstone (100%) Sandstone (tr) Gray mudstone (tr) Anhydrite (tr)	
2710-2720	Red mudstone (90%): calcareous (30%) Sandstone (10%) Gray mudstone (tr)	
2720-2730	Red mudstone (70%): calcareous (10%) Sandstone (20%) Gray mudstone (10%)	
2730-2740	Red mudstone (80%): calcareous (20%) Sandstone (20%) Gray mudstone (tr)	
2740-2750	Red mudstone (90%) Sandstone (10%) Gray mudstone (tr)	
2750-2760	Red mudstone (80%): calcareous (tr) Sandstone (20%) Gray mudstone (tr)	
2760-2770	Red mudstone (70%): not calcareous Sandstone (20%) Gray mudstone (10%)	
2770-2780	Red mudstone (80%): calcareous (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
	Sandstone (20%) Gray mudstone (tr)	
2780-2790	Red mudstone (80%) Sandstone (20%) Gray mudstone (tr)	
2790-2800	Red mudstone (80%) Sandstone (20%)	
2800-2810	Red mudstone (70%) Sandstone (30%) Gray mudstone (tr)	
2810-2820	Red mudstone (80%): calcareous (60%) Sandstone (20%) Gray mudstone (tr)	
2820-2830	Red mudstone (70%): moderate reddish brown (10R4/6) to dark reddish brown (10R3/4); argillaceous to silty; sand (tr-30%): fine to very fine grained quartz and feldspar; micaceous, calcareous (20%), anhydritic; very thinly fissile to nonfissile. Poorly indurated Sandstone (30%): yellowish gray (5YB/1) to moderate reddish orange (10R6/6), very fine sand to granule-size quartz and feldspar grains and granitic rock fragments, very angular to subangular; red clay matrix: high neutron porosity readings indicate that a large amount of clay matrix is present; poorly sorted; arkosic wackes and lithic wackes. Poorly indurated Gray mudstone (tr) Anhydrite (tr)	
2830-2840	Red mudstone (70%): calcareous (tr) Sandstone (30%) Gray mudstone (tr) Anhydrite (tr)	
2840-2850	Red mudstone (60%): calcareous (10%) Sandstone (20%) Gray mudstone (20%)	
2850-2860	Red mudstone (80%): calcareous (20%) Sandstone (20%) Gray mudstone (tr)	
2860-2870	Red mudstone (70%): calcareous (10%) Sandstone (30%) Gray mudstone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
	Anhydrite (tr)	
2870-2880	Red mudstone (70%) Sandstone (30%) Gray mudstone (tr) Anhydrite (tr)	
2880-2890	Red mudstone (60%): calcareous (tr) Sandstone (30%) Gray mudstone (10%) Anhydrite (tr)	
2890-2900	Red mudstone (70%): calcareous (10%) Gray mudstone (20%) Sandstone (10%)	
2900-2910	Red mudstone (80%) Sandstone (20%) Gray mudstone (tr) Anhydrite (tr)	
2910-2920	Red mudstone (70%): calcareous (tr) Sandstone (20%) Gray mudstone (10%) Calcite (tr): nodular	
2920-2930	Red mudstone (70%): calcareous (10%) Sandstone (20%) Gray mudstone (10%)	
2930-2940	Red mudstone (60%): not calcareous Sandstone (30%) Gray mudstone (10%) Anhydrite (tr)	
2940-2950	Red mudstone (100%): calcareous (60%); calcite present as discrete nodules as long as 5 mm and as disseminated calcite Sandstone (tr)	
2950-2960	Red mudstone (100%): calcareous (30%) Sandstone (tr) Gray mudstone (tr)	
2960-2970	Red mudstone (100%): calcareous (100%); swells in water Sandstone (tr)	
2970-2980	Red mudstone (100%): calcareous (40%) Sandstone (tr) Gray mudstone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
	Anhydrite (tr)	
2980-2990	Red mudstone (70%): calcareous (50%) Sandstone (30%) Gray mudstone (tr) Anhydrite (tr)	
2990-3000	Red mudstone (80%): calcareous (10%) Sandstone (20%) Gray mudstone (tr) Anhydrite (tr)	
3000-3010	Red mudstone (70%) Sandstone (10%) Gray mudstone (10%) Calcite (10%): white (N9) to very light gray (N8); microcrystalline to cryptocrystalline; nodules and fracture fillings in mudstone	
3010-3020	Red mudstone (80%): similar to 2820-2830 ft, but has bimodal color distribution: moderate reddish brown (10R4/6) (60%) and grayish red purple (5RP4/2) (20%) Sandstone (10%) Gray mudstone (10%) Calcite (tr)	
3020-3030	Red mudstone (70%): calcareous (50%); contains light gray (N7) reduced blebs as large as 2 mm in diameter Sandstone (30%) Gray mudstone (tr) Anhydrite (tr) Calcite (tr)	
3030-3040	Red mudstone (70%): calcareous (20%) Sandstone (30%) Gray mudstone (tr) Anhydrite (tr)	
3040-3050	Red mudstone (70%): calcareous (tr) Sandstone (30%) Gray mudstone (tr) Anhydrite (tr)	
3050-3060	Red mudstone (70%) Sandstone (30%) Gray mudstone (tr) Anhydrite (tr)	
3060-3070	Red mudstone (80%): calcareous (30%) Sandstone (20%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Gray mudstone (tr)	
3070-3080	Red mudstone (60%): calcareous (10%) Sandstone (40%) Gray mudstone (tr) Anhydrite (tr) Calcite (tr)	
3080-3090	Red mudstone (60%): dark reddish brown (10R3/4) to pale reddish brown (10R5/4) to grayish orange pink (10R8/2); silty to argillaceous; anhydritic: disseminated and nodular anhydrite; mica (tr): muscovite; sand (10%): fine to very fine grained, angular quartz and feldspar Sandstone (30%): conglomeratic lithic wacke: rock fragments are rhyolite, granite, metamorphic quartzite, quartz-muscovite schist Gray mudstone (10%) Anhydrite (tr)	
3090-3100	Red mudstone (60%) Sandstone (40%) Gray mudstone (tr)	
	Precambrian schist, total described Samples to total depth much caved	85 (26)
3100-3110	Red mudstone (50%) Sandstone (30%) Schist (20%): quartz-muscovite schist; Precambrian basement	
3110-3120	Schist (100%): inferred from cuttings and gamma-ray log. Sample contains abundant cavings of red mudstone, sandstone, and gray mudstone; gray mudstone contains abraded, detrital fusulinids	
3120-3130	Schist (100%): inferred from cuttings and gamma-ray log, similar to 3110-3120 ft	
3130-3140	Schist (100%): similar to 3110-3120 ft	
3140-3150	Schist (100%): similar to 3110-3120 ft	
3150-3160	Schist (100%): similar to 3110-3120 ft	
3160-3170	Schist (100%): similar to 3110-3120 ft	
3170-3180	Schist (100%): similar to 3110-3120 ft	
3180-3185	Schist (100%): similar to 3110-3120 ft	

TABLE A-6--Descriptions of drill cuttings, J.D. Sandefer No. 1 Vaughn State (659' FNL, 658' FWL, sec. 21, T. 1 S., R. 26 E., De Baca County, New Mexico). Elevation 3,956 ft (1,206 m) ground level. Total depth 5,800 ft (1,708 m). Plugged and abandoned 8/12/74.

Depth Interval (ft)	Description	Thickness ft (m)
	Description starts in Yeso Formation	
	Yeso Formation (Permian), total described	110 (34)
3500-3510	Sandstone (70%): moderate reddish orange (10R6/6) to moderate orange pink (10R7/4); very fine to medium grained, moderately to poorly sorted, angular to subangular, hematitic; arkosic arenite. Moderately to well indurated Anhydrite (20%): white (N9) to medium light gray (N6); microcrystalline to macrocrystalline; dolomitic. Poorly indurated Red mudstone (10%): moderate red (5R5/4); argillaceous; anhydritic: small lenses of anhydrite as long as 1 mm; thinly to very thinly fissile. Poorly indurated Dolostone (tr): light brownish gray (5YR6/1); microcrystalline Gray mudstone (tr): medium light gray (N6); argillaceous, anhydritic; thinly fissile to nonfissile. Poorly indurated	
3510-3520	Sandstone (50%) Anhydrite (30%) Red mudstone (20%) Dolostone (tr) Gray mudstone (tr)	
3520-3530	Anhydrite (70%) Sandstone (20%) Red mudstone (10%) Limestone (tr): light olive gray (5R6/1) to olive gray (5Y4/1); microcrystalline; lime mudstone Dolostone (tr) Gray mudstone (tr)	
3530-3540	Anhydrite (40%) Red mudstone (30%) Sandstone (20%) Dolostone (10%) Limestone (tr)	
3540-3550	Red mudstone (50%) Anhydrite (40%) Sandstone (10%) Dolostone (tr) Gray mudstone (tr): medium light gray (N6) to black	

Depth Interval (ft)	Description	Thickness ft (m)
	(Nl); argillaceous; anhydritic. Poorly indurated	
3550-3560	Anhydrite (80%) Red mudstone (20%) Sandstone (tr) Limestone (tr) Dolostone (tr) Gray mudstone (tr)	
3560-3570	Red mudstone (60%) Anhydrite (40%) Sandstone (tr) Dolostone (tr) Gray mudstone (tr)	
3570-3580	No sample	
3580-3590	No sample	
3590-3600	No sample	
3600-3610	Red mudstone (50%) Sandstone (20%) Gray mudstone (20%) Anhydrite (10%) Dolostone (tr)	
	Abo Formation (Permian)	750 (229)
	Upper unit of Abo Formation	610 (186)
3610-3620	Red mudstone (50%) Sandstone (20%) Gray mudstone (20%) Anhydrite (10%) Dolostone (tr)	
3620-3630	No sample	
3630-3640	No sample	
3640-3650	Anhydrite (60%) Gray mudstone (30%) Red mudstone (10%) Dolostone (tr)	
3650-3660	Anhydrite (40%) Gray mudstone (30%): similar to 3500-3510 ft but slightly calcareous Sandstone (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Dolostone (10%): light gray (N7) to light olive gray (5Y6/1); microcrystalline Red mudstone (10%)	
3660-3670	Gray mudstone (60%) Red mudstone (20%) Anhydrite (20%) Dolostone (tr)	
3670-3680	Red mudstone (60%): similar to 3500-3510 ft but swells in water Gray mudstone (20%) Anhydrite (20%)	
3680-3690	Red mudstone (60%) Gray mudstone (20%) Anhydrite (20%)	
3690-3700	Red mudstone (60%) Gray mudstone (30%): similar to 3540-3550 ft but swells in water Anhydrite (10%)	
3700-3710	No sample	
3710-3720	No sample	
3720-3730	No sample	
3730-3740	No sample	
3740-3750	No sample	
3750-3760	No sample	
3760-3770	No sample	
3770-3780	No sample	
3780-3790	No sample	
3790-3800	No sample	
3800-3810	Red mudstone (90%): moderate reddish orange (10R6/6) to pale reddish brown (10R5/4); argillaceous, anhydritic, slightly calcareous, thinly to very thinly fissile. Poorly indurated Gray mudstone (10%) Anhydrite (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
3810-3820	Red mudstone (90%) Gray mudstone (10%) Anhydrite (tr)	
3820-3830	Red mudstone (90%) Anhydrite (10%) Dolostone (tr) Gray mudstone (tr)	
3830-3840	Red mudstone (80%) Gray mudstone (10%) Anhydrite (10%) Dolostone (tr)	
3840-3850	Red mudstone (70%) Sandstone (10%): pale reddish brown (10R5/4); very fine grained, well sorted; hematitic; arkosic arenite. Well indurated Dolostone (10%): light bluish gray (5B8/1); microcrystalline. Well indurated Gray mudstone (10%) Anhydrite (tr)	
3850-3860	Red mudstone (90%) Gray mudstone (10%) Sandstone (tr)	
3860-3870	Red mudstone (90%) Gray mudstone (10%): light bluish gray (5B7/1); argillaceous. Poorly indurated Sandstone (tr) Dolostone (tr) Anhydrite (tr)	
3870-3880	Red mudstone (90%) Sandstone (10%): similar to 3840-3850 ft but slightly dolomitic Anhydrite (tr)	
3880-3890	Red mudstone (90%): calcareous (10%) Sandstone (10%) Anhydrite (tr)	
3890-3900	No sample	
3900-3910	Red mudstone (80%): not calcareous Sandstone (20%)	

Depth Interval (ft)	Description	Thickness ft (m)
3910-3920	Red mudstone (90%): moderate reddish orange (10R5/6); argillaceous; anhydritic; very thinly fissile. Poorly indurated Anhydrite (10%) Dolostone (tr)	
3920-3930	Red mudstone (90%): moderate reddish orange (10R6/6) to dark reddish brown (10R3/4); argillaceous; micaceous, anhydritic; swells in water. Poorly to moderately indurated. Anhydrite occurs as irregularly shaped blebs as large as 2 mm in diameter Anhydrite (10%)	
3930-3940	Red mudstone (90%) Sandstone (10%): pale red (10R6/2) to grayish red (10R4/2); very fine grained, well sorted, very thinly laminated; slightly calcareous, hematitic; arkosic arenite. Poorly to well indurated Gray mudstone (tr) Anhydrite (tr)	
3940-3950	Red mudstone (70%) Sandstone (20%): similar to 3930-3940 ft but not laminated Anhydrite (10%) Gray mudstone (tr)	
3950-3960	Red mudstone (90%) Sandstone (10%) Dolostone (tr) Anhydrite (tr)	
3960-3970	Red mudstone (80%) Sandstone (10%) Dolostone (10%) Anhydrite (tr)	
3970-3980	Red mudstone (60%): calcareous (tr) Sandstone (30%): similar to 3930-3940 ft but contains anhydrite cement (tr) Dolostone (10%) Anhydrite (tr)	
3980-3990	Red mudstone (50%) Sandstone (30%) Dolostone (20%): yellowish gray (5Y8/1) to bluish white (5B9/1); microcrystalline. Moderately to well indurated Anhydrite (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
3990-4000	Red mudstone (70%): calcareous (10%) Sandstone (20%) Dolostone (10%)	
4000-4010	Red mudstone (60%): not calcareous Sandstone (30%) Anhydrite (10%) Gray mudstone (tr)	
4010-4020	Red mudstone (80%) Sandstone (20%) Gray mudstone (tr) Anhydrite (tr)	
4020-4030	Red mudstone (80%) Sandstone (20%) Dolostone (tr) Anhydrite (tr)	
4030-4040	Red mudstone (80%) Sandstone (20%) Gray mudstone (tr) Anhydrite (tr)	
4040-4050	Red mudstone (90%) Sandstone (10%)	
4050-4060	Red mudstone (80%) Sandstone (20%) Anhydrite (tr)	
4060-4070	Red mudstone (80%) Sandstone (20%) Dolostone (tr) Anhydrite (tr)	
4070-4080	Red mudstone (90%): calcareous (tr) Sandstone (10%) Dolostone (tr)	
4080-4090	Red mudstone (70%): not calcareous Sandstone (20%) Anhydrite (10%)	
4090-4100	Red mudstone (70%) Sandstone (30%) Anhydrite (tr)	
4100-4110	Red mudstone (90%): moderate reddish orange (10R6/6) to dark reddish brown (10R4/4); argillaceous;	

Depth Interval (ft)	Description	Thickness ft (m)
	anhydritic; swells in water; very thinly fissile. Poorly indurated Sandstone (10%): white (N9) to dark reddish brown (10R3/4); very fine to medium grained, moderately to poorly sorted, angular to very angular; micaceous, calcareous, hematitic; arkosic arenites and arkosic wackes. Poorly to well indurated Anhydrite (tr)	
4110-4120	Red mudstone (80%) Sandstone (20%): white (N9) to dark reddish brown (10R3/4); very fine to medium grained, moderately sorted, angular to very angular; calcareous, anhydritic; arkosic arenite. Anhydrite (tr-30%) is intergranular cement Dolostone (tr) Anhydrite (tr)	
4120-4130	Red mudstone (90%) Sandstone (10%) Dolostone (tr) Gray mudstone (tr) Anhydrite (tr)	
4130-4140	Red mudstone (90%): moderate reddish orange (10R6/6) to dark reddish brown (10R4/4) to grayish red (10R4/2); argillacous; anhydritic, calcareous (10%). Poorly indurated Sandstone (10%): white (N9) to dark reddish brown (10R3/4); very fine to medium grained, moderately to poorly sorted, angular to very angular; micaceous, argillacous, calcareous, hematitic; arkosic arenites and arkosic wackes. Poorly to well indurated	
4140-4150	Red mudstone (80%): not calcareous Sandstone (20%) Anhydrite (tr)	
4150-4160	Red mudstone (80%): calcareous (10%) Sandstone (10%) Dolostone (10%)	
4160-4170	Red mudstone (80%): not calcareous Sandstone (20%)	
4170-4180	Red mudstone (90%): moderate reddish orange (10R6/6) to pale reddish brown (10R5/4); silty to argillaceous; anhydritic. Poorly indurated Sandstone (10%) Dolostone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
	Anhydrite (tr)	
4180-4190	Red mudstone (90%) Dolostone (10%) Sandstone (tr)	
4190-4200	Red mudstone (90%): similar to 4170-4180 ft but swells in water; calcareous (10%) Sandstone (10%): similar to 4130-4140 ft but arkosic wackes swell in water Gray mudstone (tr) Anhydrite (tr)	
4200-4210	Red mudstone (100%): calcareous (20%) Sandstone (tr) Gray mudstone (tr)	
4210-4220	Red mudstone (80%): calcareous (tr) Sandstone (20%): similar to 4130-4140 ft Anhydrite (tr)	
	Middle unit of Abo Formation	140 (43)
4220-4230	Red mudstone (100%): moderate reddish orange (10R6/6) to pale reddish brown (10R5/4); silty to argillaceous; calcareous (60%). Poorly indurated Sandstone (tr) Anhydrite (tr)	
4230-4240	Red mudstone (100%) Sandstone (tr) Anhydrite (tr)	
4240-4250	Red mudstone (90%): calcareous (10%) Sandstone (10%): similar to 4130-4140 ft but all sandstone is arkosic arenite Gray mudstone (tr) Anhydrite (tr)	
4250-4260	Red mudstone (80%): calcareous (20%) Gray mudstone (10%) Anhydrite (10%) Sandstone (tr)	
4260-4270	Red mudstone (70%): calcareous (20%) Sandstone (30%) Dolostone (tr)	
4270-4280	Red mudstone (80%): calcareous (10%) Sandstone (20%)	

Depth Interval (ft)	Description	Thickness ft (m)
4280-4290	Red mudstone (100%): calcareous (60%) Sandstone (tr) Anhydrite (tr)	
4290-4300	Red mudstone (100%): calcareous (80%) Sandstone (tr) Anhydrite (tr)	
4300-4310	Red mudstone (100%): moderate reddish orange (10R6/6) to moderate reddish brown (10R4/6); silty to argillaceous; calcareous (20%): very thinly fissile. Poorly to moderately indurated Limestone (tr): light olive gray (5Y6/1); microcrystalline; argillaceous; lime mudstone Dolostone (tr): light gray (N7) to very light gray (N8); microcrystalline	
4310-4320	Red mudstone (100%): calcareous (80%) Sandstone (tr) Limestone (tr) Gray mudstone (tr)	
4320-4330	Red mudstone (100%): moderate reddish orange (10R5/6); argillaceous; anhydritic, calcareous (100%). Poorly indurated. Anhydrite occurs as lenses as long as 1 mm	
4330-4340	Red mudstone (100%): calcareous (80%) Sandstone (tr) Limestone (tr) Gray mudstone (tr)	
4340-4350	Red mudstone (100%): calcareous (100%) Limestone (tr) Anhydrite (tr)	
4350-4360	Red mudstone (100%) Anhydrite (tr)	
	Hueco Formation (Permian), total described	340 (104)
4360-4370	Red mudstone (100%) Sandstone (tr) Limestone (tr) Anhydrite (tr)	
4370-4380	Red mudstone (100%) Anhydrite (tr)	
4380-4390	Red mudstone (90%): calcareous (100%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Limestone (10%): mottled light gray (N7) and medium gray (N5); microcrystalline; lime mudstone. Well indurated Dolostone (tr)	
4390-4400	Red mudstone (100%): calcareous (100%) Limestone (tr) Anhydrite (tr)	
4400-4410	No sample	
4410-4420	No sample	
4420-4430	No sample	
4430-4440	No sample	
4440-4450	No sample	
4450-4460	No sample	
4460-4470	No sample	
4470-4480	No sample	
4480-4490	No sample	
4490-4500	No sample	
4500-4510	Red mudstone (70%): moderate reddish orange (10R6/6) to dark reddish brown (10R3/4); argillaceous to silty; calcareous (20%), micaceous. Poorly indurated Some red mudstone is mottled red and light gray (N7) Gray mudstone (20%): light gray (N7); argillaceous; micaceous, calcareous, pyritic; contains wood fragments (tr): elongate, less than 1 mm long, coaly Limestone (10%): dark gray (N3); microcrystalline; lime mudstone. Well indurated Sandstone (tr)	
4510-4520	Red mudstone (60%): calcareous (100%) Limestone (30%): very light gray (N8) to grayish black (N2); peloidal, fusulinids (tr); peloidal wackestones and packstones. Well indurated Gray mudstone (10%) Sandstone (tr)	
4520-4530	Limestone (70%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Red mudstone (20%): calcareous (100%) Gray mudstone (10%)	
4530-4540	Limestone (40%) Gray mudstone (40%) Red mudstone (20%):calcareous (50%)	
4540-4550	Red mudstone (40%): calcareous (90%) Limestone (30%) Gray mudstone (30%)	
4550-4560	Limestone (50%) Gray mudstone (30%) Red mudstone (20%): calcareous (100%)	
4560-4570	Red mudstone (60%): calcareous (80%) Limestone (20%) Gray mudstone (20%): medium light gray (N6) to dark gray (N3); silty to argillaceous, calcareous, micaceous. Poorly indurated. Contains wood fragments (tr) and disarticulated crinoid columnals (tr) Sandstone (tr)	
4570-4580	Red mudstone (40%): calcareous (100%) Limestone (30%) Gray mudstone (30%)	
4580-4590	Red mudstone (50%): calcareous (70%) Limestone (30%) Gray mudstone (20%)	
4590-4600	Red mudstone (60%): calcareous (100%) Limestone (30%) Gray mudstone (10%)	
4600-4610	Red mudstone (70%): moderate reddish orange (10R6/6) to dark reddish brown (10R3/4); argillacous to silty; calcareous (30%), fossiliferous: fusulinids (10%). Poorly indurated Gray mudstone (20%) Limestone (10%): grayish black (N2), microcrystalline, argillaceous; skeletal (tr-10%): fusulinids; fusulinid mudstones and wackestones. Well indurated Anhydrite (tr)	
4610-4620	Red mudstone (80%): similar to 4500-4510 ft but calcareous (100%) Limestone (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Gray mudstone (10%)	
4620-4630	Red mudstone (50%): calcareous (70%) Limestone (40%) Gray mudstone (10%)	
4630-4640	Limestone (40%): similar to 4600-4610 ft but contains bryozoans (tr). Well indurated Red mudstone (30%): calcareous (100%) Gray mudstone (30%)	
4640-4650	Red mudstone (60%): calcareous (100%) Gray mudstone (30%) Limestone (10%)	
4650-4660	Red mudstone (60%): calcareous (80%) Limestone (20%) Gray mudstone (20%)	
4660-4670	Red mudstone (50%): pale red (10R6/2) to moderate reddish brown (10R4/6); argillaceous; calcareous (100%) Gray mudstone (30%): light gray (N7) to dark gray (N3); micaceous, fossiliferous: foraminifera (tr); very thinly fissile. Poorly indurated Limestone (20%) Sandstone (tr)	
4670-4680	Red mudstone (50%): similar to 4660-4670 ft but burrowed. Gray mudstone (40%) Limestone (10%)	
4680-4690	Red mudstone (60%): similar to 4660-4670 ft but contains recrystallized shell material (tr) Gray mudstone (30%) Limestone (10%)	
4690-4700	Red mudstone (70%) Limestone (30%) Gray mudstone (tr)	

TABLE A-7--Descriptions of drill cuttings, Clayton W. Williams No. 1 Salado Dome (975' FNL, 990' FEL, sec. 11, T. 4 N., R. 19 E., Guadalupe County, New Mexico). Elevation 5,317 ft (1,621 m), ground level. Total depth 4,766 ft (1,453 m). Plugged and abandoned 4/14/77.

Depth Interval (ft)	Description	Thickness ft (m)
	Description starts in Yeso Formation	
	Yeso Formation (Permian), total described	230 (70)
2100-2110	Red mudstone (60%) Sandstone (20%) Anhydrite (20%) Gray mudstone (tr)	
2110-2120	Sandstone (30%): pale reddish brown (10R5/4); very fine to medium grained, moderately sorted; anhydritic, calcareous, hematitic; arkosic arenite. Anhydrite, calcite, and hematite are intergranular cements; anhydrite is poikilotopic. Moderately indurated Red mudstone (30%): pale reddish brown (10R5/4); silty, anhydritic. Poorly indurated. Anhydrite disseminated, forms birdseye lenses 0.5 mm wide and 1 mm long, and fills fractures which are less than 1 mm wide Anhydrite (30%): white (N9) to light gray (N7); microcrystalline. Poorly to moderately indurated Dolostone (10%): medium gray (N5) to brownish gray (5YR4/1); microcrystalline; calcareous, anhydritic. Moderately indurated. Porosity (0-10%): vuggy	
2120-2130	Red mudstone (50%) Sandstone (30%) Anhydrite (20%) Dolostone (tr)	
2130-2140	Red mudstone (40%) Sandstone (30%) Anhydrite (20%) Dolostone (10%)	
2140-2150	Red mudstone (60%): calcareous (tr) Sandstone (20%) Anhydrite (20%) Dolostone (tr)	
2150-2160	Red mudstone (50%): not calcareous Sandstone (40%) Anhydrite (10%) Dolostone (tr)	
2160-2170	Sandstone (40%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Red mudstone (20%) Dolostone (20%): similar to 2110-2120 ft but extensively replaced by anhydrite; contains ghosts of fossils: brachiopods, algae. No visible porosity Anhydrite (20%)	
2170-2180	Sandstone (60%) Red mudstone (20%) Anhydrite (20%) Dolostone (tr)	
2180-2190	Dolostone (40%): medium gray (N5) to medium light gray (N6); microcrystalline Sandstone (20%) Anhydrite (20%) Red mudstone (10%) Gray mudstone (10%)	
2190-2200	Sandstone (30%) Dolostone (30%) Red mudstone (20%) Anhydrite (20%) Limestone (tr): brownish black (5YR2/1); microcrystalline; silty; lime mudstone	
2200-2210	Dolostone (60%) Sandstone (20%) Red mudstone (20%) Gray mudstone (tr) Anhydrite (tr)	
2210-2220	Red mudstone (50%) Sandstone (30%) Dolostone (10%) Anhydrite (10%)	
2220-2230	Sandstone (30%) Red mudstone (30%): calcareous (tr) Anhydrite (30%) Gray mudstone (10%) Dolostone (tr)	
2230-2240	Red mudstone (70%) Sandstone (10%) Dolostone (10%) Anhydrite (10%) Gray mudstone (tr)	
2240-2250	Red mudstone (40%): not calcareous	

Depth Interval (ft)	Description	Thickness ft (m)
	Dolostone (30%) Anhydrite (30%) Sandstone (tr)	
2250-2260	Red mudstone (40%): calcareous (10%) Sandstone (30%) Anhydrite (30%) Dolostone (tr)	
2260-2270	Anhydrite (50%) Red mudstone (40%): not calcareous Sandstone (10%)	
2270-2280	Anhydrite (50%) Sandstone (30%) Red mudstone (10%) Dolostone (10%)	
2280-2290	Red mudstone (40%) Dolostone (30%) Anhydrite (20%) Sandstone (10%)	
2290-2300	Sandstone (40%) Red mudstone (30%) Anhydrite (20%) Dolostone (10%)	
2300-2310	Red mudstone (60%) Anhydrite (30%) Sandstone (10%) Dolostone (tr)	
2310-2320	No sample	
2320-2330	Red mudstone (70%): calcareous (tr) Sandstone (10%) Dolostone (10%) Anhydrite (10%)	
	Abo Formation (Permian)	1,420 (433)
	Upper unit of Abo Formation	830 (253)
2330-2340	Red mudstone (50%): calcareous (tr) Sandstone (40%) Anhydrite (10%)	
2340-2350	Sandstone (60%): moderate reddish brown (10R4/6); very fine grained, well sorted; micaceous, hematitic, anhydritic; arkosic arenite. Moderately indurated	

Depth Interval (ft)	Description	Thickness ft (m)
	Red mudstone (40%): moderate reddish brown (10R4/6); argillaceous, calcareous (10%). Poorly indurated	
2350-2360	Sandstone (60%): similar to 2340-2350 ft but calcareously cemented Red mudstone (40%) Anhydrite (tr)	
2360-2370	Sandstone (70%) Red mudstone (30%): not calcareous	
2370-2380	Sandstone (60%) Red mudstone (40%) Anhydrite (tr)	
2380-2390	Sandstone (70%) Red mudstone (30%) Anhydrite (tr)	
2390-2400	Sandstone (60%) Gray mudstone (30%): pale blue green (5BG7/2) to dark gray (N3); argillaceous. Poorly to moderately indurated Red mudstone (10%): calcareous (50%) Anhydrite (tr)	
2400-2410	Sandstone (100%) Red mudstone (tr): not calcareous	
2410-2420	No sample description	
2420-2430	No sample description	
2430-2440	No sample description	
2440-2450	No sample description	
2450-2460	No sample description	
2460-2470	Gray mudstone (70%) Sandstone (30%): medium light gray (N6); very fine grained, well sorted; arkosic arenite. Well indurated Red mudstone (tr)	
2470-2480	Gray mudstone (50%) Sandstone (30%): light gray (N7) to medium light gray (N6) to pale reddish brown (10R5/4); very fine grained, well sorted; arkosic arenite. Well indurated	

Depth Interval (ft)	Description	Thickness ft (m)
	Red mudstone (20%)	
2480-2490	Sandstone (80%) Red mudstone (10%) Gray mudstone (10%) Anhydrite (tr)	
2490-2500	Sandstone (60%) Red mudstone (30%) Gray mudstone (10%)	
2500-2510	Red mudstone (70%): moderate reddish brown (10R4/6); silty. Moderately indurated Sandstone (30%): very light gray (N8) to pale reddish brown (10R5/4); very fine grained, well sorted; arkosic arenite. Well indurated Gray mudstone (tr)	
2510-2520	Red mudstone (50%) Sandstone (40%): similar to 2500-2510 ft but calcareously cemented. Gray mudstone (10%)	
2520-2530	No sample	
2530-2540	No sample	
2540-2550	No sample	
2550-2560	No sample	
2560-2570	No sample	
2570-2580	Red mudstone (90%): moderate reddish brown (10R4/6); silty; micaceous. Poorly to moderately indurated Sandstone (10%)	
2580-2590	Red mudstone (80%) Sandstone (20%) Gray mudstone (tr)	
2590-2600	Sandstone (70%) Red mudstone (30%) Gray mudstone (tr)	
2600-2610	Red mudstone (70%) Sandstone (30%): moderate reddish orange (10R6/6) to moderate reddish brown (10R4/6); fine to very fine grained, well sorted; micaceous, hematitic; arkosic arenite. Poorly indurated	

Depth Interval (ft)	Description	Thickness ft (m)
	Gray mudstone (tr)	
2610-2620	Red mudstone (70%) Sandstone (30%) Gray mudstone (tr)	
2620-2630	Red mudstone (80%): calcareous (tr) Sandstone (20%) Gray mudstone (tr)	
2630-2640	Red mudstone (80%) Sandstone (20%) Gray mudstone (tr)	
2640-2650	Red mudstone (80%) Sandstone (20%) Gray mudstone (tr)	
2650-2660	Red mudstone (60%): not calcareous Sandstone (40%)	
2660-2670	Red mudstone (60%) Sandstone (40%) Gray mudstone (tr)	
2670-2680	Sandstone (50%) Red mudstone (50%)	
2680-2690	Red mudstone (70%) Sandstone (30%)	
2690-2700	Red mudstone (60%) Sandstone (40%): moderate reddish orange (10R6/6) to moderate reddish brown (10R4/6) (50%): fine to very fine grained, well sorted; micaceous; arkosic arenite. White (N9) (50%): fine to very fine grained, well sorted; dolomitic; arkosic arenite. Poorly indurated	
2700-2710	Red mudstone (80%) Sandstone (20%) Gray mudstone (tr) Anhydrite (tr)	
2710-2720	Red mudstone (80%): moderate reddish brown (10R4/6); silty; sand (tr-50%): subangular, very fine to coarse sand-size quartz. Moderately indurated Sandstone (20%): moderate reddish orange (10R6/6) to moderate reddish brown (10R4/6) to very light gray (N8); fine to medium grained, poorly to	

Depth Interval (ft)	Description	Thickness ft (m)
	moderately sorted; red clay matrix (0-50%); arkosic arenites and arkosic wackes. Poorly to moderately indurated	
2720-2730	Red mudstone (60%) Sandstone (40%)	
2730-2740	Sandstone (60%) Red mudstone (40%)	
2740-2750	Sandstone (60%) Red mudstone (40%)	
2750-2760	Sandstone (50%) Red mudstone (50%)	
2760-2770	Sandstone (60%) Red mudstone (40%) Anhydrite (tr)	
2770-2780	Sandstone (60%) Red mudstone (40%): moderate reddish brown (10R4/6); argillaceous. Moderately indurated Anhydrite (tr)	
2780-2790	Red mudstone (60%) Sandstone (40%): similar to 2710-2720 ft but dolomitically cemented Gray mudstone (tr)	
2790-2800	Red mudstone (80%) Sandstone (10%) Dolostone (10%): bluish white (5B9/1) to white (N9); microcrystalline, silty. Well indurated	
2800-2810	Red mudstone (100%) Anhydrite (tr)	
2810-2820	Red mudstone (100%) Sandstone (tr)	
2820-2830	Red mudstone (100%)	
2830-2840	Red mudstone (90%) Dolostone (10%)	
2840-2850	No sample	
2850-2860	Red mudstone (60%): moderate reddish orange (10R6/6) to moderate reddish brown (10R4/6); argillaceous to	

Depth Interval (ft)	Description	Thickness ft (m)
	silty, sandy. Poorly to moderately indurated Sandstone (40%): moderate reddish brown (10R4/6); fine to very fine grained, silty, well to moderately sorted; anhydritic, hematitic, micaceous; arkosic arenite. Moderately indurated Dolostone (tr): light gray (N7); microcrystalline	
2860-2870	Red mudstone (100%) Gray mudstone (tr): light greenish gray (5G8/1); argillaceous; anhydritic. Moderately indurated	
2870-2880	Sandstone (70%) Red mudstone (30%)	
2880-2890	Sandstone (50%) Red mudstone (50%)	
2890-2900	Sandstone (60%) Red mudstone (40%) Gray mudstone (tr)	
2900-2910	Red mudstone (70%): calcareous (tr) Sandstone (30%) Dolostone (tr)	
2910-2920	Red mudstone (90%): not calcareous Sandstone (10%)	
2920-2930	Red mudstone (70%) Sandstone (30%)	
2930-2940	Red mudstone (80%) Sandstone (20%) Gray mudstone (tr)	
2940-2950	Sandstone (60%) Red mudstone (40%)	
2950-2960	Sandstone (80%) Red mudstone (20%)	
2960-2970	Sandstone (80%) Red mudstone (20%)	
2970-2980	Sandstone (60%) Red mudstone (40%) Dolostone (tr)	
2980-2990	Red mudstone (60%) Sandstone (40%)	

Depth Interval (ft)	Description	Thickness ft (m)
2990-3000	Red mudstone (60%) Sandstone (40%)	
3000-3010	Red mudstone (60%) Sandstone (40%) Anhydrite (tr)	
3010-3020	Red mudstone (60%) Sandstone (40%) Anhydrite (tr)	
3020-3030	Red mudstone (80%) Sandstone (20%)	
3030-3040	Red mudstone (80%) Sandstone (20%)	
3040-3050	Red mudstone (60%) Sandstone (40%) Anhydrite (tr)	
3050-3060	Red mudstone (100%)	
3060-3070	Red mudstone (70%): calcareous (10%) Sandstone (30%) Dolostone (tr)	
3070-3080	Red mudstone (60%) Sandstone (40%)	
3080-3090	Red mudstone (90%): calcareous (20%) Sandstone (10%)	
3090-3100	Red mudstone (80%): calcareous (30%) Sandstone (20%)	
3100-3110	Red mudstone (80%): calcareous (40%) Sandstone (20%)	
3110-3120	Red mudstone (80%) Sandstone (10%) Limestone (10%)	
3120-3130	Red mudstone (90%): calcareous (50%) Sandstone (10%)	
3130-3140	Red mudstone (90%): not calcareous Dolostone (10%) Sandstone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
3140-3150	Red mudstone (90%): calcareous (20%) Sandstone (10%)	
3150-3160	Red mudstone (90%): calcareous (50%) Sandstone (10%)	
	Middle unit of Abo Formation	360 (110)
3160-3170	Red mudstone (100%): calcareous (20%) Sandstone (tr)	
3170-3180	Red mudstone (100%): not calcareous	
3180-3190	Red mudstone (100%)	
3190-3200	Red mudstone (100%): calcareous (80%)	
3200-3210	Red mudstone (100%): calcareous (90%)	
3210-3220	Red mudstone (100%)	
3220-3230	Red mudstone (90%) Gray mudstone (10%)	
3230-3240	Red mudstone (100%): calcareous (100%)	
3240-3250	Red mudstone (100%)	
3250-3260	Red mudstone (100%): moderate reddish orange (10R6/6) to pale reddish brown (10R5/4); argillaceous; sand (tr-30%): very fine to coarse grained, angular to subangular quartz and feldspar; calcareous (10%); very poorly sorted. Poorly to moderately indurated	
3260-3270	Red mudstone (100%): calcareous (40%)	
3270-3280	Red mudstone (100%): moderate reddish orange (10R6/6) to pale reddish brown (10R5/4); argillaceous; calcareous (60%). Poorly to moderately indurated	
3280-3290	Red mudstone (100%): calcareous (100%)	
3290-3300	Red mudstone (100%): calcareous (60%)	
3300-3310	Red mudstone (80%): calcareous (90%) Gray mudstone (20%): mottled medium light gray (N6) and pale reddish brown (10R5/4); argillaceous; calcareous; hematite (tr): rounded, sand-size concretions. Poorly indurated	

Depth Interval (ft)	Description	Thickness ft (m)
3310-3320	Red mudstone (100%): calcareous (60%)	
3320-3330	Red mudstone (90%): calcareous (40%) Sandstone (10%): reddish brown (10R4/4); fine to very fine grained, poorly sorted, rounded to subrounded; calcareous; red clay matrix (20%); arkosic wacke	
3330-3340	Red mudstone (100%): calcareous (70%)	
3340-3350	Red mudstone (100%)	
3350-3360	Sandstone (80%): similar to 3320-3330 ft but contains 50% clay matrix Red mudstone (20%): calcareous (50%)	
3360-3370	Red mudstone (80%): calcareous (40%) Sandstone (20%)	
3370-3380	Red mudstone (90%): calcareous (60%) Sandstone (10%)	
3380-3390	Red mudstone (100%): calcareous (100%)	
3390-3400	Red mudstone (100%): similar to above but contains lenses of anhydritically cemented sandstone as long as 2 mm	
3400-3410	Red mudstone (100%): calcareous (50%)	
3410-3420	Red mudstone (100%)	
3420-3430	Red mudstone (100%): calcareous (10%)	
3430-3440	Red mudstone (100%)	
3440-3450	Red mudstone (100%)	
3450-3460	Red mudstone (100%): calcareous (20%)	
3460-3470	Red mudstone (100%)	
3470-3480	Red mudstone (90%): calcareous (30%) Gray mudstone (10%)	
3480-3490	Red mudstone (90%) Gray mudstone (10%)	
3490-3500	Red mudstone (90%): similar to above but micaceous (20%) Gray mudstone (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
3500-3510	Red mudstone (100%): calcareous (20%)	
3510-3520	Red mudstone (80%): calcareous (10%), not micaceous Gray mudstone (20%)	
	Lower unit of Abo Formation	230 (70)
3520-3530	Sandstone (60%): reddish brown (10R4/4); fine to very coarse grained, argillaceous, poorly sorted, angular to subrounded; calcareous, anhydritic; blue clay matrix (tr-10%); arkosic arenites and arkosic wackes. Contains sand- to granule-size granitic rock fragments (tr) Red mudstone (40%): moderate reddish orange (10R6/6) to moderate reddish brown (10R4/6); silty to argillaceous, sandy; micaceous, calcareous (tr). Poorly to moderately indurated Dolostone (tr): light olive gray (5Y6/1); microcrystalline. Well indurated	
3530-3540	Red mudstone (60%): calcareous (60%) Sandstone (40%)	
3540-3550	Red mudstone (70%): calcareous (10%) Sandstone (30%)	
3550-3560	Red mudstone (70%) Sandstone (30%)	
3560-3570	Red mudstone (90%): calcareous (20%) Sandstone (10%)	
3570-3580	Red mudstone (80%): calcareous (30%) Sandstone (20%)	
3580-3590	Red mudstone (100%): calcareous (20%)	
3590-3600	Red mudstone (60%): calcareous (30%) Sandstone (40%)	
3600-3610	Red mudstone (100%): calcareous (20%) Sandstone (tr)	
3610-3620	Red mudstone (100%): calcareous (10%)	
3620-3630	Red mudstone (100%): calcareous (80%)	
3630-3640	Red mudstone (90%): calcareous (20%) Sandstone (10%)	

APPENDIX C

PETROGRAPHIC DATA

APPENDIX C--PETROGRAPHIC DATA

Appendix C contains a table with petrographic thin-section data for 10 key wells used in this study. Thin sections were made from core samples and drill cuttings. Sample numbers are bipartite; they consist first of a letter and then a number which refers to the well the sample is from (Fig. 3 and Table 1, main text); following the first two digits is the depth the sample comes from. For example, sample A1-5180 comes from 5180 ft in the Humble Oil and Refining Company No. 1 State U well. For drill cuttings, the sample depth refers to the top of the 10 ft interval; the depth is exact for cores.

The first two columns of data in Table C-1 contain sample numbers and rock names. The first rock name given is general; the general name is followed in parentheses by a specific rock name for sandstones and limestones.

The next nine columns contain compositional data. Percentages were estimated to the nearest 10% with visual comparator charts (Baccelle and Bosellini, 1965). Where a component was estimated as less than 10% it was noted as a trace (abbreviated t).

The last three columns in Table C-1 contain textural data. Textural data were determined only for the sandstones. The first of these three columns lists mean grain size in mm and was determined by measuring the longest diameters of 10 framework grains and averaging these 10 measurements; mean grain size was determined to the nearest hundredth of a mm. Sorting appears in the next column and was determined with a visual comparator chart (Compton, 1962, p. 214). The last column contains data on grain-to-grain contacts for framework grains in sandstones and uses the following abbreviations: F-floating grain, P-point contact, L-long contact, CC-concavo-convex contact, S-sutured contact; upper-case letters signify that type of contact is more than 10% of the grain contacts in a sample; lower-case letters signify that less than 10% of the grain contacts in a sample are of that type.

General descriptions of each rock type appear in the main text.

Depth Interval (ft)	Description	Thickness ft (m)
3640-3650	Red mudstone (80%) Sandstone (20%)	
3650-3660	Red mudstone (90%) Sandstone (10%)	
3660-3670	Red mudstone (80%) Sandstone (20%)	
3670-3680	Red mudstone (90%): calcareous (tr) Sandstone (10%)	
3680-3690	Red mudstone (80%): calcareous (20%) Sandstone (20%)	
3690-3700	Red mudstone (70%): calcareous (30%) Sandstone (20%) Gray mudstone (10%)	
3700-3710	Red mudstone (80%): calcareous (20%) Sandstone (10%) Gray mudstone (10%)	
3710-3720	Red mudstone (60%): grayish orange pink (10R8/2) to dark reddish brown (10R3/4); argillaceous; calcareous (30%). Poorly indurated Sandstone (20%): grayish red (10R4/2); very fine to medium grained, poorly sorted, subangular to subrounded, calcareous, micaceous, hematitic; arkosic wacke. Moderately indurated Gray mudstone (20%): medium gray (N5); argillaceous, calcareous; fossiliferous: poorly preserved orbiculoid brachiopods. Poorly indurated	
3720-3730	Sandstone (50%): similar to 3710-3720 ft except 20% of sandstone is ferruginous: angular to rounded, fine to medium sand-size detrital hematite cemented by microcrystalline calcite Red mudstone (50%): calcareous (20%) Gray mudstone (tr)	
3730-3740	Sandstone (90%): arkosic wacke, similar to 3710-3720 ft Red mudstone (10%): not calcareous	
3740-3750	Red mudstone (100%): calcareous (50%)	
	Hueco Formation (Permian), total described	450 (137)
3750-3760	Red mudstone (90%): calcareous (10%) Limestone (10%): yellowish gray (5Y7/2);	

Depth Interval (ft)	Description	Thickness ft (m)
	microcrystalline; lime mudstone	
3760-3770	Red mudstone (90%): calcareous (40%) Sandstone (10%) Limestone (tr)	
3770-3780	Red mudstone (80%): not calcareous Sandstone (20%)	
3780-3790	Red mudstone (80%) Sandstone (20%)	
3790-3800	Red mudstone (70%): calcareous (30%) Sandstone (30%)	
3800-3810	Red mudstone (80%): calcareous (20%) Sandstone (10%) Limestone (10%): light olive gray (5Y6/1); microcrystalline; skeletal: fusulinids, foraminifers, ostracods; bioclastic wackestone. Well indurated	
3810-3820	Red mudstone (90%) Sandstone (10%)	
3820-3830	Red mudstone (80%): calcareous (80%) Limestone (20%)	
3830-3840	Gray mudstone (50%) Red mudstone (40%): calcareous (50%) Limestone (10%)	
3840-3850	Red mudstone (60%): calcareous (40%) Limestone (30%) Gray mudstone (10%)	
3850-3860	Red mudstone (70%): calcareous (50%) Gray mudstone (30%) Limestone (tr)	
3860-3870	Red mudstone (80%): calcareous (20%) Limestone (10%) Gray mudstone (10%)	
3870-3880	Red mudstone (50%): calcareous (10%) Sandstone (30%) Limestone (10%) Gray mudstone (10%)	
3880-3890	Red mudstone (70%) Gray mudstone (30%)	

Depth Interval (ft)	Description	Thickness ft (m)
3890-3900	Red mudstone (70%): calcareous (20%) Limestone (20%) Gray mudstone (10%)	
3900-3910	Red mudstone (60%): pale reddish brown (10R5/4) to dark reddish brown (10R3/4); argillaceous to silty; calcareous (20%). Poorly indurated Limestone (30%): very light gray (N8) to medium gray (N5); microcrystalline, argillaceous, silty; lime mudstone. Well indurated Gray mudstone (10%): very light gray (N8) to medium gray (N4); mottled with red mudstone, argillaceous; calcareous. Poorly to well indurated	
3910-3920	Gray mudstone (50%) Red mudstone (40%): calcareous (30%) Limestone (10%)	
3920-3930	Gray mudstone (50%) Red mudstone (40%) Limestone (10%)	
3930-3940	Red mudstone (90%): calcareous (10%) Limestone (10%) Gray mudstone (tr)	
3940-3950	Red mudstone (90%) Limestone (10%) Gray mudstone (tr)	
3950-3960	Red mudstone (90%) Dolostone (10%): yellowish gray (5Y8/1); microcrystalline; mottled with red mudstone Gray mudstone (tr)	
3960-3970	Red mudstone (80%): not calcareous Gray mudstone (20%) Limestone (tr)	
3970-3980	Red mudstone (80%): calcareous (20%) Limestone (10%) Gray mudstone (10%)	
3980-3990	Red mudstone (80%) Limestone (10%) Gray mudstone (10%)	
3990-4000	Red mudstone (90%): calcareous (tr), sandy Sandstone (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
4000-4010	Red mudstone (70%): not calcareous Sandstone (20%): pale reddish brown (10R5/4); fine to very coarse grained, poorly sorted, angular to subangular, hematitic; red clay matrix (10-30%); arkosic wacke. Well indurated Limestone (10%)	
4010-4020	Red mudstone (80%): calcareous (tr) Sandstone (10%) Limestone (10%) Gray mudstone (tr)	
4020-4030	Red mudstone (70%): not calcareous Limestone (20%) Sandstone (10%) Gray mudstone (tr)	
4030-4040	Red mudstone (70%): calcareous (tr) Sandstone (10%) Limestone (10%) Gray mudstone (10%)	
4040-4050	No sample	
4050-4060	Red mudstone (60%): calcareous (20%) Limestone (20%) Sandstone (10%) Gray mudstone (10%)	
4060-4070	Red mudstone (60%) Limestone (20%) Sandstone (10%) Gray mudstone (10%)	
4070-4080	Red mudstone (90%): calcareous (tr) Sandstone (10%) Limestone (tr) Gray mudstone (tr)	
4080-4090	Red mudstone (90%) Sandstone (10%) Limestone (tr) Gray mudstone (tr)	
4090-4100	Red mudstone (60%): calcareous (10%) Sandstone (20%) Limestone (20%) Gray mudstone (tr)	
4100-4110	Red mudstone (90%): calcareous (50%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Sandstone (10%) Gray mudstone (tr)	
4110-4120	Sandstone (60%) Red mudstone (40%): calcareous (40%)	
4120-4130	Red mudstone (60%) Sandstone (20%) Limestone (20%) Gray mudstone (tr)	
4130-4140	Limestone (70%) Red mudstone (30%): not calcareous	
4140-4150	Limestone (60%) Red mudstone (40%): calcareous (50%)	
4150-4160	Red mudstone (60%): calcareous (20%) Limestone (20%) Gray mudstone (20%)	
4160-4170	Red mudstone (100%): calcareous (tr)	
4170-4180	Red mudstone (60%): calcareous (10%) Limestone (20%) Sandstone (10%) Gray mudstone (10%)	
4180-4190	Red mudstone (80%) Sandstone (10%) Gray mudstone (10%)	
4190-4200	Red mudstone (80%) Limestone (10%) Gray mudstone (10%)	

TABLE A-8--Descriptions of drill cuttings, Abercrombie & Hawkins No. 1 Nappier (1980' FSL, 1980' FWL, sec. 22, T. 5 N., R. 26 E., De Baca County, New Mexico). Elevation 4,507 ft (1,374 m), ground level. Total depth 7,137 ft (2,175 m). Plugged and abandoned 10/4/49.

Depth Interval (ft)	Description	Thickness ft (m)
	Description starts in Yeso Formation Yeso Formation (Permian), total described	200 (61)
3800-3810	Red mudstone (60%): pale red (10R6/2) to moderate reddish brown (10R4/6); silty; anhydritic. Poorly indurated Anhydrite (20%): white (N9) to olive gray (5Y5/1); microcrystalline, nodular. Darker colored anhydrite argillaceous. Moderately indurated Sandstone (10%): moderate reddish orange (10R6/6) to pinkish gray (5YR8/1); fine to very fine grained, well sorted, angular to subangular; anhydritic; arkosic arenite. Poorly indurated Gray mudstone (10%): medium light gray (N6) to dark gray (N3) to light bluish gray (5B7/1); silty; anhydritic, slightly calcareous. Alternating lighter and darker colored, discontinuous, thin to very thin laminae. Poorly indurated Dolostone (tr): yellowish gray (5Y8/1); microcrystalline; anhydritic. Moderately indurated	
3810-3820	Red mudstone (60%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%) Dolostone (tr)	
3820-3830	Red mudstone (50%) Sandstone (20%) Anhydrite (20%) Gray mudstone (10%)	
3830-3840	Red mudstone (40%): similar to 3800-3810 ft but contains salt casts Sandstone (30%) Anhydrite (20%) Gray mudstone (10%) Dolostone (tr)	
3840-3850	Red mudstone (40%) Sandstone (30%) Anhydrite (20%) Gray mudstone (10%) Dolostone (tr)	
3850-3860	Red mudstone (50%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Sandstone (20%): similar to 3800-3810 ft but contains halite (tr): medium sand-size euhedral crystals Anhydrite (20%) Gray mudstone (10%) Dolostone (tr)	
3860-3870	Red mudstone (40%) Sandstone (30%): similar to 3800-3810 ft Anhydrite (20%) Gray mudstone (10%) Dolostone (tr)	
3870-3880	Red mudstone (50%) Sandstone (20%) Anhydrite (20%) Gray mudstone (10%) Dolostone (tr)	
3880-3890	Red mudstone (60%) Sandstone (20%) Gray mudstone (10%) Anhydrite (10%)	
3890-3900	Red mudstone (40%) Sandstone (30%): similar to 3800-3810 ft but quartz wacke Anhydrite (20%) Gray mudstone (10%)	
3900-3910	Red mudstone (90%) Sandstone (10%): similar to 3800-3810 ft Dolostone (tr) Gray mudstone (tr)	
3910-3920	Sandstone (40%) Red mudstone (40%) Gray mudstone (10%) Anhydrite (10%) Dolostone (tr)	
3920-3930	Red mudstone (70%) Sandstone (20%) Anhydrite (10%) Dolostone (tr) Gray mudstone (tr)	
3930-3940	Red mudstone (70%) Sandstone (20%) Anhydrite (10%) Dolostone (tr) Gray mudstone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
3940-3950	Sandstone (50%) Red mudstone (30%) Anhydrite (20%) Dolostone (tr) Gray mudstone (tr)	
3950-3960	Red mudstone (50%) Sandstone (30%) Gray mudstone (10%) Anhydrite (10%)	
3960-3970	Red mudstone (50%) Sandstone (20%) Anhydrite (20%) Gray mudstone (10%) Dolostone (tr)	
3970-3980	Red mudstone (50%) Sandstone (20%) Anhydrite (20%) Gray mudstone (10%) Dolostone (tr)	
3980-3990	Red mudstone (50%) Sandstone (20%) Anhydrite (20%) Gray mudstone (10%) Dolostone (tr)	
3990-4000	Red mudstone (40%): calcareous (10%) Sandstone (30%) Gray mudstone (20%) Anhydrite (10%) Dolostone (tr)	
	Abo Formation (Permian)	1,120 (341)
	Upper unit of Abo Formation	920 (280)
4000-4010	Red mudstone (50%): moderate reddish brown (10R4/6); silty, sandy; halite (tr). Poorly indurated Sandstone (20%): white (N9) to moderate reddish orange (10R6/6); fine to very fine grained, moderately to well sorted; arkosic arenite. Poorly indurated Dolostone (10%): very pale orange (10YR8/2) to yellowish gray (5Y8/1); microcrystalline; anhydritic. Moderately indurated Gray mudstone (10%): light gray (N7) to medium dark gray (N4); silty, anhydritic. Poorly indurated Anhydrite (10%): white (N9) to light gray (N7) to	

Depth Interval (ft)	Description	Thickness ft (m)
	pinkish gray (5YR8/1); microcrystalline to macrocrystalline. Poorly to moderately indurated	
4010-4020	Red mudstone (40%) Sandstone (20%) Gray mudstone (20%) Dolostone (10%) Anhydrite (10%)	
4020-4030	Red mudstone (60%) Sandstone (20%): similar to 4000-4010 ft but calcareously cemented Gray mudstone (10%) Anhydrite (10%) Dolostone (tr)	
4030-4040	Red mudstone (60%) Sandstone (20%) Gray mudstone (10%) Anhydrite (10%) Dolostone (tr)	
4040-4050	Red mudstone (50%) Sandstone (20%) Anhydrite (20%) Gray mudstone (10%)	
4050-4060	Red mudstone (50%) Sandstone (30%) Anhydrite (20%) Gray mudstone (tr)	
4060-4070	Red mudstone (70%) Sandstone (20%) Anhydrite (10%) Dolostone (tr) Gray mudstone (tr)	
4070-4080	Red mudstone (50%) Sandstone (40%) Anhydrite (10%) Gray mudstone (tr)	
4080-4090	Sandstone (40%) Red mudstone (40%) Gray mudstone (10%) Anhydrite (10%)	
4090-4100	Red mudstone (50%) Sandstone (30%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Gray mudstone (10%) Anhydrite (10%) Dolostone (tr)	
4100-4110	Sandstone (50%) Red mudstone (40%) Anhydrite (10%) Gray mudstone (tr)	
4110-4120	Red mudstone (50%) Sandstone (30%) Gray mudstone (10%) Anhydrite (10%) Dolostone (tr)	
4120-4130	Sandstone (60%) Red mudstone (20%): calcareous (tr) Gray mudstone (10%) Anhydrite (10%)	
4130-4140	Sandstone (50%) Red mudstone (30%): not calcareous Anhydrite (20%) Gray mudstone (tr)	
4140-4150	Sandstone (60%) Red mudstone (20%) Anhydrite (20%) Dolostone (tr) Gray mudstone (tr)	
4150-4160	Sandstone (40%) Red mudstone (40%) Anhydrite (20%) Gray mudstone (tr)	
4160-4170	Red mudstone (40%) Sandstone (30%) Anhydrite (20%) Gray mudstone (10%) Dolostone (tr)	
4170-4180	Sandstone (40%) Red mudstone (30%) Anhydrite (20%) Gray mudstone (10%)	
4180-4190	Red mudstone (60%) Sandstone (20%) Anhydrite (20%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Gray mudstone (tr)	
4190-4200	Sandstone (40%) Red mudstone (40%) Gray mudstone (10%) Anhydrite (10%)	
4200-4210	Sandstone (50%) Red mudstone (30%) Gray mudstone (10%) Anhydrite (10%)	
4210-4220	Sandstone (40%) Red mudstone (40%) Gray mudstone (10%) Anhydrite (10%) Halite (tr): euhedral crystals as large as 0.5 mm in diameter	
4220-4230	Sandstone (40%) Red mudstone (40%) Gray mudstone (10%) Anhydrite (10%) Halite (tr)	
4230-4240	Sandstone (40%) Red mudstone (40%) Gray mudstone (10%) Anhydrite (10%) Halite (tr)	
4240-4250	Sandstone (50%) Red mudstone (40%) Anhydrite (10%) Gray mudstone (tr)	
4250-4260	Red mudstone (50%) Sandstone (40%) Anhydrite (10%) Gray mudstone (tr)	
4260-4270	Red mudstone (60%) Sandstone (30%) Anhydrite (10%) Dolostone (tr) Gray mudstone (tr) Halite (tr)	
4270-4280	Red mudstone (50%) Sandstone (20%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Anhydrite (20%) Gray mudstone (10%) Dolostone (tr)	
4280-4290	Red mudstone (50%): similar to 4000-4010 ft but contains small anhydrite nodules as large as 2 mm in diameter Sandstone (20%) Anhydrite (20%) Gray mudstone (10%) Dolostone (tr)	
4290-4300	Red mudstone (60%): similar to 4000-4010 ft Sandstone (20%) Anhydrite (20%) Gray mudstone (tr)	
4300-4310	Red mudstone (60%): moderate reddish orange (10R6/6) to dark reddish brown (10R3/4); silty; anhydritic, calcareous (tr). Poorly indurated Sandstone (30%): white (N9) to pale reddish brown (10R5/4); fine to very fine grained, moderately to well sorted, angular to subangular; arkosic arenite Anhydrite (10%): white (N9) to medium light gray (N6); microcrystalline to macrocrystalline, nodular, argillaceous. Poorly indurated Gray mudstone (tr): medium gray (N5); silty; anhydritic. Poorly indurated	
4310-4320	Red mudstone (50%) Sandstone (30%) Gray mudstone (10%) Anhydrite (10%)	
4320-4330	Red mudstone (50%) Sandstone (30%) Gray mudstone (10%) Anhydrite (10%)	
4330-4340	Red mudstone (40%) Sandstone (30%) Anhydrite (20%) Gray mudstone (10%) Dolostone (tr)	
4340-4350	Red mudstone (60%): calcareous (10%) Sandstone (20%) Gray mudstone (10%) Anhydrite (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Dolostone (tr)	
4350-4360	Red mudstone (50%): not calcareous Sandstone (30%) Gray mudstone (10%) Anhydrite (10%) Dolostone (tr)	
4360-4370	Sandstone (50%) Red mudstone (40%) Anhydrite (10%) Gray mudstone (tr)	
4370-4380	Red mudstone (50%) Sandstone (30%) Anhydrite (20%) Gray mudstone (tr)	
4380-4390	Red mudstone (60%) Sandstone (20%) Anhydrite (20%) Gray mudstone (tr)	
4390-4400	Red mudstone (60%) Sandstone (20%) Anhydrite (20%) Gray mudstone (tr)	
4400-4410	Red mudstone (70%): moderate reddish brown (10R4/6); silty, sandy; anhydritic; halite (tr): euhedral crystals as large as 0.5 mm in diameter. Poorly indurated Sandstone (20%): moderate reddish brown (10R4/6) to moderate reddish orange (10R6/6) to white (N9); very fine to medium grained, well to moderately sorted; calcareous; mica (10%): detrital biotite and muscovite; red clay matrix (tr-20%); arkosic arenites and arkosic wackes. Poorly to moderately indurated Anhydrite (10%): white (N9) to medium light gray (N6); microcrystalline, nodular, argillaceous, calcareous, dolomitic. Poorly indurated Gray mudstone (tr): medium light gray (N6) to light bluish gray (5B7/1); argillaceous to silty; anhydritic. Poorly indurated Halite (tr): euhedral crystals as large as 0.5 mm in diameter	
4410-4420	No sample	

Depth Interval (ft)	Description	Thickness ft (m)
4420-4430	Red mudstone (70%): calcareous (tr) Sandstone (20%) Anhydrite (10%) Gray mudstone (tr) Halite (tr)	
4430-4440	Red mudstone (50%): calcareous (tr) Sandstone (20%) Anhydrite (20%) Gray mudstone (10%)	
4440-4450	Red mudstone (80%): calcareous (tr). Sandstone (10%): similar to 4400-4410 ft but grain size is very fine to very coarse Anhydrite (10%) Gray mudstone (tr)	
4450-4460	Red mudstone (70%): not calcareous Sandstone (20%) Anhydrite (10%) Gray mudstone (tr)	
4460-4470	Red mudstone (70%) Sandstone (20%) Anhydrite (10%) Gray mudstone (tr)	
4470-4480	Red mudstone (70%) Sandstone (20%) Anhydrite (10%) Gray mudstone (tr)	
4480-4490	Red mudstone (60%) Sandstone (20%) Anhydrite (20%) Dolostone (tr) Gray mudstone (tr) Halite (tr)	
4490-4500	Red mudstone (60%) Sandstone (20%) Anhydrite (20%) Gray mudstone (tr) Halite (tr)	
4500-4510	Red mudstone (70%): moderate reddish orange (10R6/6) to moderate reddish brown (10R4/6); silty to argillaceous; calcareous (tr); mica (tr); salt casts (tr). Poorly indurated Sandstone (10%): white (N9) to moderate reddish	

Depth Interval (ft)	Description	Thickness ft (m)
	orange (10R6/6) to grayish red (10R4/2); fine to very fine grained, well to moderately sorted, subrounded to very angular; calcareous; red clay matrix (tr-20%); mica (tr): biotite and muscovite; arkosic arenites and arkosic wackes. Poorly indurated Gray mudstone (10%): medium light gray (N6) to medium dark gray (N4); argillaceous; anhydritic; salt casts (tr). Poorly indurated Anhydrite (10%): white (N9) to light gray (N7); microcrystalline to macrocrystalline, nodular, argillaceous; silty, calcareous, dolomitic; salt casts (tr). Poorly to moderately indurated Dolostone (tr)	
4510-4520	Red mudstone (70%) Sandstone (10%) Gray mudstone (10%) Anhydrite (10%) Dolostone	
4520-4530	Red mudstone (80%): not calcareous Sandstone (10%) Anhydrite (10%) Gray mudstone (tr)	
4530-4540	Red mudstone (60%) Sandstone (20%) Gray mudstone (10%) Anhydrite (10%)	
4540-4550	Red mudstone (80%) Sandstone (10%) Anhydrite (10%) Gray mudstone (tr)	
4550-4560	Red mudstone (60%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%)	
4560-4570	Red mudstone (60%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%)	
4570-4580	Red mudstone (60%) Sandstone (30%) Anhydrite (10%) Gray mudstone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
4580-4590	Sandstone (60%): white (N9) to moderate reddish orange (10R6/6) to grayish red (10R4/2); very fine to medium grained; moderately to well sorted, angular to subangular, anhydritic, calcareous; arkosic arenite. Poorly to moderately indurated Red mudstone (30%) Anhydrite (10%) Gray mudstone (tr)	
4590-4600	Red mudstone (50%): calcareous (tr) Sandstone (30%) Anhydrite (20%) Gray mudstone (tr)	
4600-4610	Red mudstone (80%): calcareous (tr) Sandstone (10%): white (N9) to moderate reddish orange (10R6/6); very fine to medium grained, well to poorly sorted, angular; anhydritic, calcareous; red clay matrix (0-40%); arkosic arenites and arkosic wackes. Poorly to moderately indurated Anhydrite (10%) Gray mudstone (tr)	
4610-4620	Red mudstone (60%): not calcareous Anhydrite (20%) Sandstone (10%) Gray mudstone (10%)	
4620-4630	Red mudstone (70%) Anhydrite (20%) Gray mudstone (10%) Sandstone (tr)	
4630-4640	Red mudstone (70%) Anhydrite (20%) Gray mudstone (10%) Sandstone (tr)	
4640-4650	Red mudstone (100%) Sandstone (tr) Gray mudstone (tr) Anhydrite (tr)	
4650-4660	Red mudstone (90%) Anhydrite (10%) Sandstone (tr) Dolostone (tr) Gray mudstone (tr)	
4660-4670	Red mudstone (90%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Anhydrite (10%) Sandstone (tr) Gray mudstone (tr)	
4670-4680	Red mudstone (80%) Anhydrite (20%) Sandstone (tr) Gray mudstone (tr) Halite (tr)	
4680-4690	Red mudstone (80%) Sandstone (10%) Anhydrite (10%) Gray mudstone (tr)	
4690-4700	Red mudstone (80%): calcareous (tr) Anhydrite (20%) Sandstone (tr) Gray mudstone (tr)	
4700-4710	Red mudstone (80%) Anhydrite (20%) Sandstone (tr) Gray mudstone (tr)	
4710-4720	Red mudstone (70%): calcareous (10%) Sandstone (10%) Gray mudstone (10%) Anhydrite (10%)	
4720-4730	Red mudstone (70%) Sandstone (10%) Gray mudstone (10%) Anhydrite (10%)	
4730-4740	Red mudstone (80%) Sandstone (10%) Anhydrite (10%) Gray mudstone (tr)	
4740-4750	Red mudstone (70%): calcareous (tr) Sandstone (20%) Gray mudstone (10%) Anhydrite (tr)	
4750-4760	Red mudstone (90%) Sandstone (10%) Gray mudstone (tr) Anhydrite (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
4760-4770	Red mudstone (80%): calcareous (10%) Sandstone (10%) Anhydrite (10%) Gray mudstone (tr)	
4770-4780	Red mudstone (60%): calcareous (20%) Sandstone (30%) Anhydrite (10%) Gray mudstone (tr)	
4780-4790	Red mudstone (60%) Sandstone (20%) Anhydrite (20%) Gray mudstone (tr)	
4790-4800	Red mudstone (60%): calcareous (30%) Sandstone (20%) Anhydrite (20%) Gray mudstone (tr)	
4800-4810	Red mudstone (80%): moderate reddish brown (10R4/6); argillaceous to silty, sandy; micaceous, calcareous (10%); very thinly fissile to nonfissile. Poorly to moderately indurated Sandstone (10%): moderate reddish brown (10R4/6) to very light gray (N8); fine to very fine grained, well sorted; anhydritic, calcareous; arkosic arenite. Poorly to moderately indurated Anhydrite (10%): white (N9) to moderate orange pink (10R7/4); microcrystalline, nodular, argillaceous. Poorly to moderately indurated Gray mudstone (tr): light gray (N7) to dark gray (N3); silty to argillaceous; anhydritic. Poorly indurated	
4810-4820	Red mudstone (70%) Sandstone (20%) Anhydrite (10%) Gray mudstone (tr)	
4820-4830	Red mudstone (60%) Sandstone (20%) Gray mudstone (10%) Anhydrite (10%)	
4830-4840	Red mudstone (70%): calcareous (tr) Anhydrite (20%) Sandstone (10%) Gray mudstone (tr)	
4840-4850	Red mudstone (60%): calcareous (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Anhydrite (20%) Sandstone (10%) Gray mudstone (10%) Dolostone (tr)	
4850-4860	Red mudstone (80%) Anhydrite (20%) Sandstone (tr) Dolostone (tr): very light gray (N8) to light olive gray (5Y6/1); microcrystalline; anhydritic. Moderately indurated Gray mudstone (tr)	
4860-4870	Red mudstone (70%) Sandstone (20%) Anhydrite (10%) Gray mudstone (tr)	
4870-4880	Red mudstone (60%): calcareous (50%) Sandstone (30%): similar to 4800-4810 ft but quartz arenites and quartz wackes Anhydrite (10%) Gray mudstone (tr)	
4880-4890	Red mudstone (60%) Sandstone (30%) Anhydrite (10%) Gray mudstone (tr)	
4890-4900	Red mudstone (60%): calcareous (20%) Sandstone (20%) Anhydrite (20%) Gray mudstone (tr)	
4900-4910	Red mudstone (40%): calcareous (10%) Sandstone (30%) Anhydrite (20%) Gray mudstone (10%)	
4910-4920	Red mudstone (70%): calcareous (20%) Anhydrite (20%) Sandstone (10%) Gray mudstone (tr)	
	Middle unit of Abo Formation	200 (61)
4920-4930	Red mudstone (80%): calcareous (10%) Sandstone (10%) Anhydrite (10%) Limestone (tr): variegated very light gray (N8) and	

Depth Interval (ft)	Description	Thickness ft (m)
	grayish black (N2); microcrystalline; lime mudstone. Poorly indurated Gray mudstone (tr)	
4930-4940	Red mudstone (60%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%): similar to 4800-4810 ft but calcareous	
4940-4950	Red mudstone (60%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%) Dolostone (tr)	
4950-4960	Red mudstone (60%): calcareous (tr) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%) Dolostone (tr)	
4960-4970	No sample	
4970-4980	No sample	
4980-4990	No sample	
4990-5000	No sample	
5000-5010	Red mudstone (70%) Sandstone (10%) Gray mudstone (10%) Anhydrite (10%)	
5010-5020	Red mudstone (70%) Anhydrite (20%) Sandstone (10%) Limestone (tr) Gray mudstone (tr)	
5020-5030	Red mudstone (70%) Anhydrite (20%) Sandstone (10%) Limestone (tr) Gray mudstone (tr)	
5030-5040	Red mudstone (50%) Gray mudstone (20%) Anhydrite (20%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Sandstone (10%)	
5040-5050	Red mudstone (80%) Gray mudstone (10%) Anhydrite (10%) Sandstone (tr) Limestone (tr) Halite (tr)	
5050-5060	Red mudstone (60%) Gray mudstone (20%) Sandstone (10%) Anhydrite (10%) Halite (tr)	
5060-5070	Red mudstone (60%) Gray mudstone (30%) Sandstone (10%) Limestone (tr) Anhydrite (tr)	
5070-5080	Red mudstone (60%) Gray mudstone (30%) Sandstone (10%) Limestone (tr) Anhydrite (tr)	
5080-5090	Red mudstone (90%): calcareous (20%) Gray mudstone (10%) Sandstone (tr) Anhydrite (tr)	
5090-5100	Red mudstone (80%): calcareous (tr) Sandstone (10%) Anhydrite (10%) Gray mudstone (tr)	
5100-5110	Red mudstone (70%): calcareous (10%) Sandstone (20%) Gray mudstone (10%) Anhydrite (tr)	
5110-5120	Red mudstone (70%) Sandstone (10%) Gray mudstone (10%) Anhydrite (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Hueco Formation (Permian), total described	380 (116)
5120-5130	Red mudstone (50%): not calcareous Anhydrite (20%) Limestone (10%): greenish gray (5G6/1); microcrystalline; lime mudstone Sandstone (10%) Gray mudstone (10%)	
5130-5140	Red mudstone (70%): calcareous (20%) Gray mudstone (20%) Sandstone (10%) Limestone (tr) Anhydrite (tr)	
5140-5150	Red mudstone (50%): calcareous (10%) Limestone (20%) Gray mudstone (20%) Anhydrite (10%) Sandstone (tr)	
5150-5160	Red mudstone (40%): calcareous (20%) Sandstone (20%) Gray mudstone (20%) Limestone (10%) Anhydrite (10%)	
5160-5170	Red mudstone (40%): calcareous (50%) Sandstone (20%) Gray mudstone (20%) Limestone (10%) Anhydrite (10%)	
5170-5180	Red mudstone (80%): calcareous (90%) Sandstone (10%): similar to 4800-4810 ft but contains rounded coarse sand to granule-size fragments of granite; conglomeratic Gray mudstone (10%) Limestone (tr) Anhydrite (tr)	
5180-5190	Red mudstone (70%) Sandstone (10%): similar to 4800-4810 ft Gray mudstone (10%) Anhydrite (10%)	
5190-5200	Red mudstone (60%): calcareous (30%) Sandstone (20%) Gray mudstone (10%) Anhydrite (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Limestone (tr)	
5200-5210	Red mudstone (90%): calcareous (90%) Gray mudstone (10%) Limestone (tr) Sandstone (tr): similar to 5170-5180 ft Anhydrite (tr)	
5210-5220	Red mudstone (90%) Gray mudstone (10%) Limestone (tr) Sandstone (tr) Anhydrite (tr)	
5220-5230	Red mudstone (80%): calcareous (100%) Gray mudstone (10%) Anhydrite (10%) Limestone (tr) Sandstone (tr)	
5230-5240	Red mudstone (90%): calcareous (100%) Gray mudstone (10%) Limestone (tr) Sandstone (tr) Anhydrite (tr)	
-40-5250	Red mudstone (70%): calcareous (20%) Sandstone (20%) Gray mudstone (10%) Anhydrite (tr)	
5250-5260	Red mudstone (80%) Sandstone (10%) Gray mudstone(10%) Limestone (tr) Anhydrite (tr)	
5260-5270	Red mudstone (70%): calcareous (30%) Limestone (10%) Sandstone (10%) Gray mudstone (10%) Anhydrite (tr)	
5270-5280	Red mudstone (70%) Anhydrite (20%) Gray mudstone (10%) Limestone (tr) Sandstone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
5280-5290	Red mudstone (80%): calcareous (60%) Sandstone (10%) Gray mudstone (10%) Limestone (tr) Anhydrite (tr)	
5290-5300	Red mudstone (60%): calcareous (tr) Sandstone (20%) Gray mudstone (10%) Anhydrite (10%) Limestone (tr)	
5300-5310	Red mudstone (60%): moderate reddish brown (10R4/6) to dark reddish brown (10R3/4) mottled with grayish orange pink (10R8/2) (tr); argillaceous to silty; anhydritic, calcareous (tr); mica (tr): muscovite; nonfissile to very thinly fissile. Poorly indurated Gray mudstone (20%): light gray (N7) to dark gray (N3); silty to argillaceous; calcareous (10%); wood fragments (tr); nonfissile to very thinly fissile. Poorly indurated Limestone (10%): light gray (N7) to olive gray (5Y4/1); microcrystalline; skeletal (tr): ghosts of unidentified fossils; fossiliferous lime mudstone. Moderately indurated Anhydrite (10%): white (N9) to very light gray (N8); microcrystalline to macrocrystalline, nodular; silty to argillaceous; slightly calcareous. Poorly to moderately indurated Sandstone (tr)	
5310-5320	Red mudstone (60%): calcareous (40%) Limestone (10%) Sandstone (10%): light gray (N7) to moderate reddish orange (10R6/6); fine to very fine grained, well sorted, angular to very angular; arkosic arenite. Poorly indurated Gray mudstone (10%) Anhydrite (10%) Dolostone (tr): dusky red (5R3/4); microcrystalline	
5320-5330	Red mudstone (60%): calcareous (20%) Limestone (10%): light gray (N7) to medium dark gray (N4); microcrystalline; fossils (30%): recrystallized fragments of brachiopods, fusulinids, and crinoid columnals; bioclastic wackestone Sandstone (10%) Gray mudstone (10%) Anhydrite (10%)	

Depth Interval (ft)	Description	Thickness ft (m)
5330-5340	Red mudstone (70%): calcareous (tr) Limestone (10%) Gray mudstone (10%) Anhydrite (10%) Sandstone (tr)	
5340-5350	Red mudstone (60%): calcareous (20%) Limestone (20%) Gray mudstone (20%) Sandstone (tr) Anhydrite (tr)	
5350-5360	Red mudstone (60%): calcareous (60%) Gray mudstone (20%) Limestone (10%) Anhydrite (10%) Sandstone (tr)	
5360-5370	Red mudstone (60%): calcareous (20%) Gray mudstone (20%) Limestone (10%) Anhydrite (10%) Sandstone (tr)	
5370-5380	Red mudstone (60%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%) Limestone (tr)	
5380-5390	Red mudstone (60%): calcareous (30%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%) Limestone (tr)	
5390-5400	Red mudstone (60%) Anhydrite (20%) Sandstone (10%) Gray mudstone (10%) Limestone (tr)	
5400-5410	Red mudstone (60%): calcareous (50%) Gray mudstone (20%) Sandstone (10%) Anhydrite (10%) Limestone (tr)	
5410-5420	Red mudstone (60%) Gray mudstone (20%)	

Depth Interval (ft)	Description	Thickness ft (m)
	Sandstone (10%) Anhydrite (10%) Limestone (tr)	
5420-5430	Red mudstone (60%) Gray mudstone (20%) Sandstone (10%) Anhydrite (10%) Limestone (tr)	
5430-5440	Red mudstone (70%) Sandstone (20%): moderate reddish orange (10R6/6); very fine to very coarse grained; conglomeratic: rounded, elongate mudstone clasts as long as 2.5 mm; poorly sorted, subrounded to angular; calcite cement (tr); hematite (tr); arkosic arenite Gray mudstone (10%) Limestone (tr) Anhydrite (tr) Halite (tr)	
5440-5450	Red mudstone (80%): calcareous (40%) Sandstone (10%) Gray mudstone (10%) Limestone (tr) Anhydrite (tr)	
5450-5460	Red mudstone (50%): calcareous (20%) Gray mudstone (20%) Limestone (10%) Sandstone (10%) Anhydrite (10%)	
5460-5470	Red mudstone (50%) Gray mudstone (20%) Limestone (10%) Sandstone (10%) Anhydrite (10%)	
5470-5480	Red mudstone (50%) Gray mudstone (20%) Limestone (10%) Sandstone (10%) Anhydrite (10%)	
5480-5490	Red mudstone (70%): calcareous (40%) Sandstone (10%) Gray mudstone (10%) Anhydrite (10%) Limestone (tr)	

Depth Interval (ft)	Description	Thickness ft (m)
5490-5500	Red mudstone (60%): calcareous (20%) Gray mudstone (20%) Sandstone (10%) Anhydrite (10%) Limestone (tr)	

APPENDIX B

CORE DESCRIPTIONS

APPENDIX B--CORE DESCRIPTIONS

Appendix B contains core descriptions of four key wells used in this study. Locations of the key wells are shown in Fig. 3 of the main text. Summary illustrations that show general descriptions plotted against lithologic columns and gamma-ray and resistivity borehole logs appear in the main text. Tables B-1 through B-4 are analytical descriptions of cores for each of the four key wells. Each table begins with a paragraph stating the well's location, elevation, total depth, completion date, and completion status. Detailed descriptions of drill cuttings from eight additional key wells are given in Appendix A. Petrographic thin-section descriptions of drill cuttings and core samples are given in Appendix C.

Cores for each well were analyzed on a bed-by-bed basis. During analysis, however, beds generally could be grouped into units on the basis of similar thickness or lithology. The lithologic descriptions in Tables B-1 through B-4 are grouped according to units. Each unit is described by the depth interval in which that unit occurs.

Each rock type present in each unit is the subject of a separate paragraph. The paragraph begins with a general rock name which is followed by the percentage of that rock type within the unit. The rock classification used in this study is discussed in the main text. Percentage of rock type was determined directly with a measuring tape for most units and calculated to the nearest 5% but was estimated to the nearest 10% for a few of the thicker units where a large core loss appeared to render exact measurement useless. Color follows the percentage and was described using the GSA Rock Color Chart (Goddard and others, 1980) under natural light; colors of wet and dry rock are described separately. Textural and compositional attributes follow color: grain size of the clastic rocks, crystal size of the nonclastic rocks, sorting, roundness, and mineralogic composition. Grain size was determined with a visual comparator obtained from the American/Canadian Stratigraphic Corp., and sorting was determined with a comparator chart (Compton, 1962, p. 214); roundness was determined with the chart of Powers (1953, p. 118). Mineralogic composition is expressed with adjectival modifiers (e.g., calcareous, anhydritic) where the mineral is accessory and present in undetermined amounts of less than 50% of the rock; following the adjectival modifiers are percentages of that rock type that contains that mineral; this percentage is not given where 100%. Percentages following nouns (e.g., fossils) indicate the percentage of that component present in a particular rock type. The presence of calcite was determined by strong effervescence in a 10% dilute HCl solution; the presence of dolomite was determined by weak effervescence in a 10% dilute HCl solution. Following the compositional modifiers is a more specific rock name for the sandstones and limestone (e.g., arkosic arenite, fusulinid wackestone); the classifications used for the specific rock names are discussed in the main text. Following the specific rock name is the range of bed thicknesses for the rock type and a list of sedimentary structures found in

that rock type. The nature of the bedding contacts with overlying and underlying rocks is then stated. A description of rock induration finishes each paragraph; well-indurated rocks are crushed or dissaggregated with only great difficulty while poorly indurated rocks are crushed easily; moderately indurated rocks fall somewhere between. Rock induration is an important lithologic variable because it significantly affects drill time and also affects the way the rock responds to artificial fracturing.

TABLE B-1--Core description, Yates Petroleum Corp. No. 1 Papalote State OI (660' FNL, 660' FEL, sec. 16, T. 7 S., R. 25 E., Chaves County, New Mexico). Elevation 3,882 ft (1,183 m), ground level. Total depth 4,475 ft (1,364 m). Completed 2/2/81 as Abo producer through perforations from 4,052-4,062 ft (1,235-1,238 m).

Depth Interval (ft)	Description
	Description starts and ends in Abo Formation (Permian). Abo top at 3,671 ft (1,119 m) by electric log; Abo thickness 676 ft (206 m). Core in upper unit of Abo Formation
3690.0-3716.2	Mudstone (100%): grayish red (10R5/2) when dry, with 10% spherical to irregularly shaped, greenish-gray (5G7/1) zones and color bands 4-21 mm in diameter. Silty; anhydritic, dolomitic. Mottled and contains abundant root traces and closed vertical to horizontal fractures, some filled with microcrystalline dolomite. Thinly to thickly laminated. Sharp base. Moderately indurated.
3716.2-3733.2	Sandstone (100%): grayish red (10R4/2) to dark reddish brown (10R3/4) when dry, with 20% irregular light-gray (N7) to greenish-gray (5G6/1) color bands. Very fine grained, well sorted, anhydritic; arkosic arenite, Poorly sorted intraformational conglomerate below 3727.7 ft composed of angular to subangular, medium sand- to pebble-size clasts of red mudstone floating in a fine sand matrix. Planar laminated and trough cross-laminated Sharp base. Well indurated.
3733.2-3736.0	Mudstone (100%): grayish red (10R5/2) when dry. Silty. Sharp base. Poorly indurated.
3736.0-3751.0	Sandstone (100%): grayish red (10R4/2) when dry. Very fine grained, well sorted, some 0.1 ft thick beds of intraformational granule conglomerate below 3742.0 ft. Medium-scale trough cross-laminated bedding convoluted below 3744.0 ft. Contains closed vertical and horizontal fractures. Well indurated.

TABLE B-2--Core description, Yates Petroleum Corp. No. 2 Thorpe Federal MI (1980' FSL, 660' FWL, sec. 3, T. 7 S., R. 25 E., Chaves County, New Mexico). Elevation 3,812 ft (1,162 m), ground level. Total depth 4,150 ft (1,265 m). Completed 2/23/81 as Abo producer through perforations from 3,958-3,964 ft (1,206-1,208 m).

Depth Interval (ft)	Description

Description starts and ends in Abo Formation (Permian). Abo top at 3,598 ft (1,097 m) by electric log; Abo thickness 656 ft (200 m).
Core in upper unit of Abo Formation

3629.0-3638.7
Mudstone (100%): grayish red (5R4/2) when dry, with a trace of spherical to irregularly shaped greenish-gray (5G6/1) zones 1-2 mm in diameter. Silty; anhydritic. Gradational base. Poorly indurated.

3638.7-3644.9
Sandstone (90%): grayish red (5R4/2) when dry. Very fine grained, silty, conglomeratic, moderately sorted; dolomitic, anhydritic; arkosic arenite. Composed of angular to rounded, coarse sand to granule-size clasts of red mudstone and very fine grained sandstone floating in a very fine sand matrix. Beds 5 ft thick, small-scale cross-laminated, contain desiccation cracks and soft-sediment faults. Contacts with interbedded mudstones gradational. Moderately indurated.
Mudstone (10%): grayish red (5R4/2) when dry. Silty. Beds 0.1-0.4 ft thick. Poorly indurated.

3644.9-3646.0
Dolostone (100%): light gray (N7) when dry. Microcrystalline, syneresis cracks throughout. Gradational upper and lower contacts. Well indurated.

3646.0-3665.0
Sandstone (65%): dusky red (10R3/2) when dry. Very fine grained, well sorted; anhydritic, dolomitic; arkosic arenite. Beds 1.0-7.8 ft thick, small- to medium-scale trough cross-laminated, contain desiccation cracks and root traces. Contacts with interbedded mudstones gradational. Well indurated.
Mudstone (35%): grayish red (5R4/2) when dry. Silty, anhydritic. Beds 0.5-3.0 ft thick. Poorly indurated.

3665.0-3945.0
No core

Depth Interval (ft)	Description

3945.0-3963.0
Sandstone (100%): grayish red (10R4/2) when dry. Very fine grained, well sorted; anhydritic, calcareous; arkosic arenite. Poorly sorted intraformational conglomerate from 3954.0-3956.4 ft composed of angular to subrounded, coarse-sand to pebble-size clasts of red mudstone and very fine grained sandstone (50%) and very fine sand and silt matrix (50%), medium-scale cross-laminated, has erosional base. Sandstone planar laminated and cross-laminated; contains abundant root traces. Well indurated.

3963.0-3974.0
No core

3974.0-3974.3
Sandstone (100%): pale red (5R6/2) when dry. Very fine grained, well sorted; calcareous; arkosic arenite. Crossbedded. Contains vertical fractures filled with macrocrystalline sparry calcite. Sharp base. Well indurated.

3974.3-3984.0
Mudstone (100%): grayish red (10R4/2) when dry. Argillaceous. Sharp base. Poorly indurated.

3984.0-3986.0
Dolostone (100%): light gray (N7) to medium light gray (N6) when dry. Microcrystalline, sandy, planar to wavy laminated, contains syneresis cracks. Gradational base. Well indurated.

3986.0-3994.0
Mudstone (100%): mottled dusky red (10R3/2) (90%) and greenish gray (5GY6/1) (10%) when dry. Silty; calcareous. Planar to wavy laminated and small-scale cross-laminated. Poorly to well indurated.

TABLE B-3--Core description, Amoco Production Co. No. 1 State GK (1980' FNL, 1980' FWL, sec. 32, T. 1 N., R. 26 E., De Baca County, New Mexico). Elevation 3,956 ft (1,206 m), ground level. Total depth 4,900 ft (1,494 m). Plugged and abandoned 1/12/80.

Depth Interval (ft)	Description

Description starts in Abo Formation (Permian).
Abo top at 3,610 ft (1,100 m) by electric log;
Abo thickness 818 ft (249 m).
Core in upper unit of Abo Formation

3923.0-3955.2

Mudstone (65%): dark reddish brown (10R3/4) when wet, pale reddish brown (10R4/4) to grayish red (10R4/2) when dry, contains 0-30% irregular to spherical light-gray (N7) to greenish-gray (5GY6/1) color bands 0.1-0.5 ft thick. Silty. Beds 0.4-14.3 ft thick, bioturbated, contain desiccation cracks. Closed fractures present throughout. Poorly to moderately indurated.

Sandstone (35%): dark reddish brown (10R3/4) to very dark red (5R2/6) when wet, pale red (10R6/2) to grayish red (10R4/2) when dry, contains tr-100% greenish-gray (5G6/1) irregular to spherical color bands 0.1-0.5 ft thick which cut across primary sedim[illegible]ry structures. Fine to very fine grained, conglomeratic [illegible]oderately sorted; composed of angular, coarse-sa[illegible] granule-size rip-up clasts of red mudstone and very fir[illegible] grained sandstone floating in a fine to very fine sand matrix; grain size fines upward in most beds. Beds 0.8-4.7 ft thick, planar laminated and small- to medium-scale cross-laminated, contain soft-sediment faults and in upper parts of beds desiccation cracks. Contacts with interbedded mudstones sharp. Well indurated.

3955.2-4177.0

No core

4177.0-4187.6

Mudstone (100%): dark reddish brown (10R3/4) to dusky red (10R3/2) when wet, grayish red (10R4/2) to dusky red (10R3/2) when dry. Silty, contains a trace of subangular to rounded, granule to pebble-size clasts of greenish-gray and red mudstone and very fine grained sandstone. Sharp base. Poorly indurated.

4187.6-4193.0

Sandstone (100%): dark reddish brown (10R3/4) when wet and dry, contains 10% irregular, greenish-gray (5G6/1), calcareous color bands 0.1-0.3 ft thick. Very fine grained, well sorted, contains a trace of angular, coarse-sand to granule-size red mudstone flakes. Wavy bedded, planar laminated and small- to medium-scale cross-laminated; some

Depth Interval (ft)	Description

lamination convoluted. Sharp base. Well indurated.

4193.0-4196.6
Mudstone (100%): dark reddish brown (10R3/4) when wet, grayish red (10R4/2) to dark reddish brown (10R3/4) when dry. Silty, contains a trace of subangular to subrounded, coarse-sand to granule-size clasts of greenish-gray and red mudstone and very fine grained sandstone floating in a mud matrix; fossils (tr): calcareous, sand-size fragments of fusulinids, brachiopods, and ostracods. Poorly indurated.

4196.6-4497.4
No core

Hueco Formation (Permian), top at 4,428 ft (1,350 m) by electric log

4497.4-4511.5
Limestone (65%): olive gray (5Y4/1) when wet, medium gray (N5) when dry. Microcrystalline (20-60%); fossils (40-80%): sand-size fragments of ostracods, gastropods, and brachiopods; intraclasts (10-40%): rounded to subangular microcrystalline limestone; intraclastic bioclastic packstones and wackestones. Beds 0.2-3.2 ft thick. Contacts with interbedded mudstones gradational. Well indurated.
Mudstone (35%): dark gray (N3) to grayish black (N2) when wet, medium gray (N5) to medium dark gray (N4) when dry. Argillaceous; calcareous; fossils (tr): brachiopod fragments; intraclasts (tr): angular to rounded, granule- to cobble-size fragments of fossiliferous limestone. Thinly to very thinly fissile. Poorly indurated.

4511.5-4535.9
Limestone (95%): grayish black (N2) when wet, medium dark gray (N4) when dry. Microcrystalline (80%); fossils (20%): disarticulated crinoid columnals, echinoid spines, brachiopods, bryozoans, ostracods, and calcareous algae; crinoidal wackestones; locally intraclastic: composed 90% of angular, granule- to cobble-size limestone intraclasts. Contains abundant syneresis cracks filled with gray siliciclastic mudstone. Beds 5.7-10.5 ft thick. Contacts with interbedded mudstones gradational. Well indurated.
Mudstone (5%): grayish black (N2) to olive black (5Y2/1) when wet, medium dark gray (N4) to dark gray (N3) when dry. Argillaceous; calcareous; fossils (tr): sand-size, recrystallized. Beds 0.3-0.6 ft thick. Thinly fissile. Poorly indurated.

Depth Interval (ft)	Description

4535.9-4559.0
Limestone (50%): grayish black (N2) to olive gray (5Y4/1) when wet, medium gray (N5) to medium dark gray (N4) when dry. Microcrystalline (70-90%); fossils, peloids, siliciclastic mudstone clasts (10-30%): fossils are partially to completely recrystallized fusulinids, brachiopods, disarticulated crinoid columnals, and foraminifers; mudstone clasts are sand to granule size; crinoidal and brachiopodal wackestones. Beds 0.3-4.8 ft thick, planar laminated, contain high-angle desiccation cracks. Most contacts with interbedded mudstones gradational, some sharp. Well indurated.
Mudstone (50%): medium dark gray (N4) to grayish black (N2) when wet, medium gray (N5) to dark gray (N3) when dry. Argillaceous, calcareous; fossils (tr): crinoid fragments. Beds 0.3-3.0 ft thick. Thinly fissile to nonfissile. Poorly indurated.

4559.0-4565.4
Limestone (100%): dark gray (N3) when wet, medium dark gray (N4) when dry. Microcrystalline (100%); lime mudstone, grades downward to intraclastic packstone. Gradational base. Well indurated.

4565.4-4571.4
Mudstone (100%): dark reddish brown (10R3/4) when wet, grayish red (5R4/2) when dry. Argillaceous; calcareous; intraclasts (40%): rounded to angular, coarse-sand to cobble-size clasts of fossiliferous microcrystalline limestone, decrease in abundance toward center of bed, medium dark gray (N4) to greenish gray (5GY6/1) when wet, medium gray (N5) when dry. Contacts with overlying and underlying beds gradational. Poorly to moderately indurated.

4571.4-4580.9
Limestone (100%): olive gray (5Y4/1) when wet, olive gray (5Y5/1) when dry. Microcrystalline (100%); fossils (tr): brachiopod fragments, disarticulated crinoid columnals; lime mudstone. Lightly burrowed: vertical to horizontal, tubular to irregularly shaped burrows 1-5 mm in diameter filled with red siliciclastic mudstone; vertical burrows contain spreite. Syneresis polygons present, separated by dark-gray siliciclastic mudstone. Gradational base. Well indurated.

4580.9-4591.0
Limestone (70%): thinly laminated grayish black (N2) and olive gray (5Y4/1) when wet, dark gray (N3) when dry. Microcrystalline (100%); fossils (tr): fusulinids; lime mudstone. Beds 0.8-3.1 ft thick, contain vertical to

Depth Interval (ft)	Description
	horizontal syneresis cracks throughout. Limestones intraclastic near contacts with interbedded mudstones; contacts gradational. Well indurated. Mudstone (30%): dark gray (N3) to grayish black (N2) when wet, medium dark gray (N4) to dark gray (N3) when dry. Argillaceous; calcareous; fossils (tr): sand-size fragments; burrows: horizontal, tubular burrows 15-30 mm in diameter filled with microcrystalline calcite. Beds 0.4-1.0 ft thick. Thinly fissile to nonfissile. Poorly indurated.
4591.0-4601.6	Mudstone (100%): olive black (5Y2/1) when wet, medium dark gray (N4) when dry. Argillaceous; calcareous. Gradational base. Thinly fissile to nonfissile. Poorly indurated.
4601.6-4655.0	Limestone (80%): dark gray (N3) to grayish black (N2) when wet, medium gray (N5) when dry. Microcrystalline (80-100%); fossils (tr-20%): brachiopod fragments and disarticulated crinoid columnals; lime mudstones and brachiopod wackestones grade to intraclastic packstones near contacts with interbedded siliciclastic mudstones. Beds 0.2-6.1 ft thick, planar laminated to ripple laminated. Contacts with interbedded mudstone gradational. Well indurated. Mudstone (20%): brownish black (5YR2/1) when wet and dry. Argillacous; calcareous. Beds 0.1-0.9 ft thick. Poorly indurated.
4655.0-4669.0	No core
4669.0-4736.4	Limestone (100%): brownish gray (5YR4/1) when wet, brownish gray (5YR5/1) when dry, mottled with dark reddish brown (10R3/4) siliciclastic mudstone. Intraclastic packstone: angular, sand- to cobble-size intraclasts of lime mudstone and crinoidal brachiopodal wackestone separated by siliciclastic mudstone. Gradational base. Moderately indurated.
4736.4-4748.5	Limestone (100%): grayish black (N2) when wet, dark gray (N4) when dry. Microcrystalline (70-100%); fossils (tr-30%): brachiopods, disarticulated crinoid columnals; lime mudstones and bioclastic wackestones. Wavy to ripple laminated, syneresis cracks abundant. Well indurated. Mudstone (tr): dark gray (N3) to grayish black (N2) when wet, medium dark gray (N4) to dark gray (N3) when dry. Argillaceous; calcareous. Beds less than 0.1 ft thick, wavy. Poorly indurated.

Depth Interval (ft)	Description

4748.5-4760.0

Mudstone (85%): grayish black (N2) when wet, medium dark gray (N4) when dry. Argillaceous, calcareous; fossils (tr): brachiopod fragments; intraclasts (tr): rounded, sand- to pebble-size lime mudstone. Beds 1.6-5.6 ft thick. Contacts with interbedded limestone sharp to gradational. Poorly indurated.

Limestone (15%): grayish black (N2) when wet, medium dark gray (N4) when dry. Microcrystalline (30-100%); fossils (tr-70%): brachiopods, disarticulated crinoid columnals; lime mudstones and bioclastic wackestones and packstones. Beds 0.5-1.3 ft thick. Well indurated.

4760.0-4762.2

Mudstone (100%): dark reddish brown (10R3/4) when wet, grayish red (5R4/2) when dry. Argillaceous; calcareous; intraclasts (30%): angular, coarse-sand to granule-size clasts of fossiliferous microcrystalline limestone, medium dark gray (N4) to greenish gray (5GY6/1) when wet, medium gray (N5) when dry. Poorly to moderately indurated.

4762.2-4771.5

No core

4771.5-4794.0

Limestone (70%): grayish black (N2) when wet, medium dark gray (N4) when dry. Microcrystalline (30-100%); fossils (tr-70%): brachiopods, disarticulated crinoid columnals, calcareous algae; lime mudstones and bioclastic wackestones and packstones. Beds 0.2-2.4 ft thick. Contacts with interbedded mudstones sharp to gradational. Well indurated.

Mudstone (30%): grayish black (N2) when wet, medium dark gray (N4) when dry. Argillaceous; calcareous; intraclasts (tr): rounded to subangular, sand- to cobble-size limestone. Poorly indurated.

TABLE B-4--Core description, Amoco Production Co. No. 1 State GM (660' FNL, 660' FEL, sec. 16, T. 6 N., R. 29 E., Quay County, New Mexico). Elevation 4,845 ft (1,477 m), ground level. Total depth 6,400 ft (1,951 m). Plugged and abandoned 9/11/79.

Depth Interval (ft)	Description

Description starts in Abo Formation (Permian).
Abo top at 4,988 ft (1,520 m), by electric log;
Abo thickness 1,076 ft (328 m).
Upper unit of Abo Formation 632 ft (193 m) thick.

5135.0-5162.7

Sandstone (65%): moderate reddish brown (10R4/6) to dark reddish brown (10R3/4) when wet, grayish red (10R3/2) to pale reddish brown (10R5/4) when dry, contains 10% irregular greenish-gray (5GY6/1) to very light gray (N8) color bands as thick as 7 cm which cut across primary sedimentary structures. Fine to very fine grained, well sorted, anhydritic; arkosic arenite; contains sparse molds of chickenwire anhydrite. Beds 1.4-6.8 ft thick, generally conglomeratic near base and fine upward into fine to very fine sand and then grade upward into overlying mudstones; conglomerate composed of angular to subrounded, coarse-sand to granule-size clasts of very fine grained sandstone and red mudstone floating in a fine to very fine sand matrix. Beds thicker than 5 ft small- to medium-scale cross-laminated, and current rippled, contain some convoluted bedding, desiccation cracks, and root traces. Beds thinner than 5 ft generally have gradational contacts with interbedded mudstones, contain plane-parallel laminae, cross-laminae, and root traces. Well indurated.

Mudstone (35%): dark reddish brown (10R3/4) when wet, grayish red (5R4/2) when dry, contains a trace of spherical greenish-gray (5GY6/1) blebs as large as 1 cm in diameter. Silty. Beds 1.0-4.6 ft thick. Poorly indurated.

5162.7-5173.3

Sandstone (100%): dark reddish brown (10R3/4) when wet, pale reddish brown (10R5/4) when dry; lower 0.4 ft greenish gray (5G6/1) to yellowish gray (5Y8/1) when dry. Very fine grained, well sorted; arkosic arenite; lower 0.2 ft conglomeratic, composed of angular to subrounded, coarse-sand to pebble-size clasts of greenish-gray mudstone in a fine sand matrix. Trough cross-laminated throughout, desiccation cracks in upper 1 ft. Sharp base and gradational top. Well indurated.

5173.3-5226.6

Mudstone (55%): dark reddish brown (10R3/4) when wet, reddish brown (10R4/4) when dry, contains a trace of spherical to irregularly shaped greenish-gray zones as thick as 1 cm.

Depth Interval (ft)	Description

Silty. Beds 0.9-5.7 ft thick, contain closed chickenwire fractures, root traces and desiccation cracks. Basal contacts gradational and upper contacts sharp to gradational. Poorly indurated.

Sandstone (45%): dark reddish brown (10R3/4) when wet, grayish red (10R4/2) to pale reddish brown (10R5/4) when dry, beds contain 0-20% irregular, greenish-gray (5G6/1) to light-gray (N8) color bands and blebs 0.01-0.4 ft thick. Very fine grained, well sorted; arkosic arenite. Beds 0.2-4.7 ft thick. Most beds thicker than 2 ft have a sharp base, are medium-scale cross-laminated in the lower third of the bed, cross-laminated in the middle third, unbedded in the upper third, and grade into overlying mudstone; desiccation cracks and root traces present throughout but are most prevalent in the upper third of beds. Most beds thinner than 2 ft grade into overlying and underlying mudstones, are parallel laminated or small-scale cross-laminated, and contain desiccation cracks and root traces; some contained horizontal to vertical closed fractures. Moderately to well indurated.

5226.6-5278.6

Sandstone (95%): moderate reddish brown (10R4/6) to dark reddish brown (10R3/4) when wet, pale reddish brown (10R5/4) when dry; beds contain tr-10% irregular greenish-gray (5G6/1) to grayish-yellow (5Y8/4) color bands and blebs. Fine to very fine grained, well sorted, locally conglomeratic and poorly to moderately sorted; arkosic arenite. Conglomerate intraformational, composed of angular to subrounded clasts of red mudstone and fine-grained sandstone floating in a fine sand matrix. Beds 10.3-14.4 ft thick, grade upward from fine sand to very fine sand, grade into overlying mudstones, and have sharp basal contacts. The lower third of individual beds is medium-scale cross-laminated, the middle third is small-scale cross-laminated, and the upper third is structureless except for desiccation cracks and root traces; soft-sediment faults and convolute bedding occur throughout the sandstones. Cross-laminated sandstone contains anhydrite cement and a trace of visible porosity. Well indurated.

Mudstone (5%): dark reddish brown (10R3/4) when wet, reddish brown (10R4/4) when dry. Silty. Beds 0.8-2.0 ft thick. Upper contacts sharp and lower contacts gradational. Poorly to moderately indurated.

5278.6-5299.9

Sandstone (65%): dark reddish brown (10R3/4) when wet, pale reddish brown (10R5/4) when dry, beds contain 0-60% greenish-gray (5G6/1) to light-gray (N8) color bands that cut across primary sedimentary structures. Fine grained, well sorted; arkosic arenite. Beds 0.2-6.8 ft thick,

Depth Interval (ft)	Description

small- to medium-scale cross-laminated; some lamination convoluted; contains soft sediment faults, desiccation cracks, root traces, and closed fractures. Contacts with interbedded mudstones gradational. Well indurated.

Mudstone (35%): dark reddish brown (10R3/4) when wet, grayish red (10R4/2) to reddish brown (10R4/4) when dry. Silty. Beds 0.4-3.8 ft thick. Poorly to moderately indurated.

5299.9-5347.6

Sandstone (85%): dark reddish brown (10R3/4) when wet, pale reddish brown (10R5/4) to grayish pink (5R8/2) when dry. Very fine to medium grained, moderately to well sorted, locally conglomeratic, anhydritic; arkosic arenite; conglomerate intraformational, forms layers 0.3-0.5 ft thick, composed of angular to subrounded granule- to pebble-size clasts of red mudstone floating in a fine sand matrix. Beds 1.7-16.2 ft thick, form sequences medium-scale cross-laminated in the lower part and small-scale cross-laminated or planar laminated in the upper part; this sequence is repeated as many as three times in a single bed; some lamination is convoluted. Upper parts of some beds contain desiccation cracks and root traces. Lower medium-scale cross-laminated portions of beds have a trace of visible porosity. Lower contacts sharp and upper contacts gradational. Well to moderately indurated.

Mudstone (15%): dark reddish brown (10R3/4) when wet, grayish red (10R4/2) to reddish brown (10R4/4) when dry. Silty. Beds 0.6-2.6 ft thick, contain desiccation cracks and root traces. Poorly to moderately indurated.

5347.6-5351.6

Sandstone (100%): dark reddish brown (10R3/4) when wet, pale reddish brown (10R5/4) to grayish pink (5R8/2) when dry. Medium-sand to pebble sized, poorly sorted, arkosic conglomerate grades upward into a fine-grained, well sorted, planar to cross-laminated arkosic arenite; convolute lamination in upper 1 ft. Gradational top and sharp base. Well indurated.

5351.6-5410.3

Sandstone (65%): dark reddish brown (10R3/4) when wet, pale reddish brown (10R5/4) when dry; beds contain tr-10% irregular greenish-gray (5G6/1) color bands. Fine to very fine grained, well sorted, anhydritic; arkosic arenite. Beds 2.8-20.1 ft thick, small- to medium-scale cross-laminated and planar laminated; some beds have closed vertical fractures. Bases sharp and tops gradational. Porosity (tr): intergranular. Moderately to well indurated.

Mudstone (35%): dark reddish brown (10R3/4) when wet, grayish red (10R4/2) to reddish brown (10R4/4) when dry; beds

Depth Interval (ft)	Description

contain 0-20% greenish-gray (5G6/1) color bands 0.1-0.4 ft thick. Silty, contains thin laminae of very fine grained sandstone. Beds 1.9-15.3 ft thick. Poorly to moderately indurated.

5410.3-5455.0
No core

5455.0-5466.0
Sandstone (100%): dark reddish brown (10R3/4) when wet, pale reddish brown (10R5/4) when dry; bed contains 10% irregular greenish-gray (5G6/1) color bands. Very fine grained, well sorted; locally conglomeratic and poorly sorted; arkosic arenite. Conglomerate intraformational, composed of granule- to pebble-size grains of red mudstone and fine to very fine grained sandstone floating in a very fine sand matrix. Bed arranged into four fining-upward sequences that start at the base with an intraformational conglomerate which is overlain by an interval of convoluted, high-angle, large-scale cross-laminae which is overlain by small-scale cross-laminated sandstone w'ich is overlain by silty, sandy mudstone; base of each sequence sharp. Moderately to well indurated.

5466.0-5571.0
Mudstone (90%): dark reddish brown (10R3/4) when wet, grayish red (10R4/2) to reddish brown (10R4/4) when dry. Silty to argillaceous; calcareous (10%); swells in water (10%); calcareous mudstone contains recrystallized fossil fragments. Most beds thicker than 5 ft. Poorly indurated.
Sandstone (10%): dark reddish brown (10R3/4) when wet, grayish red (10R4/2) when dry. Very fine grained, well sorted; arkosic arenite. Beds less than 3 ft thick. Moderately indurated.

5571.0-5604.0
Mudstone (60%): grayish brown (5R3/2) when wet, dusky red (10R3/2) when dry. Silty. Sparse horizontal and vertical, branching tubular burrows 3-10 mm in diameter. Beds 0.5-1.0 ft thick. Contacts with interbedded sandstones gradational. Poorly to moderately indurated.
Sandstone (40%): dark reddish brown (10R3/4) when wet, dusky red (10R3/2) when dry. Very fine grained, well sorted, structureless; calcareous; arkosic arenite. Sparse horizontal and vertical, branching tubular burrows 3-10 mm in diameter. Beds 0.5-1.0 ft thick, contain closed vertical fractures. Moderately indurated.

5604.0-5607.2
Sandstone (100%): dark reddish brown (10R3/4) to pinkish gray

Depth Interval (ft)	Description

(5YR8/1) when wet, grayish pink (5R8/2) to pale purple (5P6/2) when dry. Fine to coarse grained, moderately sorted, calcareous; arkosic arenite; coarser grains are angular to rounded, medium to coarse sand-size clasts of red mudstone and very fine grained sandstone. Planar laminated to medium-scale cross-laminated. Well indurated.

5607.2-5632.0
No core

Middle unit of Abo Formation
Top at 5,620 ft (1,713 m) by electric log;
thickness 146 ft (45 m)

5632.0-5659.5
Mudstone (65%): dusky red (10R3/2) when wet, grayish red (10R4/2) when dry; beds mottled with 0-30% light-bluish-gray (5B7/1)to greenish-gray(5GY6/1)mudstone. Silty; calcareous; fossils (tr): fragments of calcareous algae. Beds 0.7-14.4 ft thick, contain calcite-filled fractures less than 1 cm long. Contacts with interbedded sandstones gradational. Poorly to well indurated.
Sandstone (35%): mottled dark reddish brown (10R3/4) and greenish gray (5GY6/1) when wet, dark reddish brown (10R3/4) and greenish gray (5GY6/1) to light bluish gray (5B7/1) when dry. Very fine grained, well sorted; calcareous; arkosic arenite. Beds 1.2-7.9 ft thick, bioturbated and wavy to ripple laminated. Well indurated.

5659.5-5813.0
No core

Lower unit of Abo Formation
Top at 5,766 ft (1,757 m) by electric log;
thickness 284 ft (87 m)

5813.0-5831.0
Mudstone (60%): dark reddish brown (10R3/4) when wet, grayish red (10R3/2) when dry. Silty; calcareous; dolomite nodules (10%): microcrystalline, 2-7 cm in diameter. Beds 2.0-8.4 ft thick. Contacts with interbedded sandstone gradational. Poorly indurated.
Sandstone (40%): dark reddish brown (10R3/4) when wet, grayish red (10R3/2) when dry. Fine to very coarse grained, moderately to poorly sorted; arkosic arenite. Beds 3.0-4.9 ft thick, crudely parallel laminated, contain closed vertical fractures. Well indurated.
Dolostone (tr): light gray (N7) when dry. Microcrystalline, nodular. One bed 0.1 ft thick.

Depth Interval (ft)	Description

5831.0-5849.0
No core

5849.0-5853.0
Sandstone (100%): dark reddish brown (10R3/4) when wet, grayish red (10R3/2) when dry. Very fine grained, conglomeratic, poorly sorted; composed of coarse-sand to pebble-size clasts of microcrystalline limestone floating in a sand matrix. Wavy laminated and small- to medium-scale cross-laminated.

5853.0-5857.0
No core

5857.0-5857.6
Mudstone (100%): dark reddish brown (10R3/4) when wet, grayish red (10R3/2) when dry. Silty; calcareous. Sharp base. Poorly indurated.

5857.6-5859.0
Sandstone (100%): dark reddish brown (10R3/4) when wet, grayish red (10R3/2) when dry. Fine to coarse grained, conglomeratic, poorly sorted; anhydritic; arkosic arenite. Sharp base.

5859.0-5862.0
Mudstone (100%): similar to 5857.0-5857.6 ft.

5862.0-5866.0
No core

5866.0-5867.0
Mudstone (100%): similar to 5857.0-5857.6 ft.

5867.0-5870.3
Conglomerate (100%): fine sand to pebble size, very poorly sorted; calcareous, arkosic. Sharp base. Moderately indurated.

5870.3-5888.4
Sandstone (100%): pale reddish brown (10R5/4) to very dusky red (10R2/2) when dry; mottled light greenish gray (5G8/1) and dark greenish gray (5G6/1) below 5885.7 ft. Fine to very fine grained, well sorted; calcareous; arkosic arenite. Planar laminated and cross-laminated throughout; medium-scale cross-laminae in upper 1 ft have superimposed climbing current ripples. Burrowed below 5885.7 ft. Well indurated.

5888.4-5895.0
No core

Depth Interval (ft)	Description
5895.0-5909.0	Sandstone (100%): pink to red. Fine-sand to pebble sized, conglomeratic, poorly sorted, angular to subrounded, anhydritic; arkosic arenite. Porosity (tr): intergranular. Low angle cross-laminae throughout. Well indurated.
5909.0-5934.0	No core
5934.0-5962.0	Sandstone (90%): similar to 5895.0-5909.0 ft but beds 0.3-8.8 ft thick, have sharp contacts with interbedded mudstone. Moderately to well indurated. Mudstone (10%): red. Silty. Beds 0.1-1.0 ft thick. Moderately indurated.
5962.0-5983.0	No core
5983.0-5988.6	Mudstone (100%): red. Silty; sand (40%): coarse to very coarse grained angular quartz and feldspar floating in mud matrix; poorly sorted; arkosic wacke. Sharp base. Poorly indurated.
5988.6-6016.6	Sandstone (100%): grayish red (10R4/2) when wet, moderate orange pink (10R7/4) when dry. Fine-sand to pebble-size, conglomeratic, poorly sorted, dolomitic, calcareous, anhydritic; arkosic arenite. Pebble-size clasts are granitic rock fragments and quartz and feldspar. Crude planar lamination to low-angle cross-lamination throughout. Moderately to well indurated.
6016.6-6050.0	No core
6050.0-6050.9	Mudstone (100%): olive gray (5Y4/1) when wet, medium gray (N5) when dry. Argillaceous; calcareous. Poorly indurated. Hueco Formation (Permian), top at 6,050.9 ft (1,844 m)
6050.9-6052.0	Limestone (100%): olive gray (5Y4/1) when wet, medium gray (N5) when dry. Intraclasts (60%): angular to subrounded, medium-sand to pebble-size clasts of microcrystalline limestone; microcrystalline (40%); intraclastic packstone. Gradational base. Well indurated.

Depth Interval (ft)	Description

6052.0-6056.0

Dolostone (100%): pale brown (5YR5/2) when wet, brownish gray (5YR4/1) when dry. Microcrystalline, some ghost fabric of intraclastic limestone. Porosity (tr): vuggy. Gradational base. Well indurated.

6056.0-6064.0

Limestone (100%): similar to 6050.9-6052.0 ft.

6064.0-6069.4

Dolostone (100%): similar to 6052.0-6056.0 ft.

6069.4-6140.4

Sandstone (90%): very dusky red (10R2/2) when wet, dusky red (10R3/2) when dry. Medium-sand to pebble size, conglomeratic, poorly sorted; calcareous; arkosic arenite. Beds 2.0-10.5 ft thick, planar laminated to medium-scale cross-laminated. Contacts with interbedded mudstones sharp to gradational. Well indurated.

Mudstone (10%): blackish red (5R2/2) when wet, very dusky red (10R2/2) when dry. Silty. Beds 1.4-2.1 ft thick. Poorly to well indurated.

TABLE C-1—Petrographic data. Compositional and textural data for thin sections of samples taken from 10 key wells. See text of Appendix C for further explanation.

Sample	Rock name	Quartz	Feldspar	Rock fragments	Clays	Mica	Carbonate	Anhydrite	Hematite	Porosity	Mean grain size, mm	Sorting	Grain-to-grain size
A1-5130A	mudstone	t	t	0	90	10	t	0	10	0			
A1-5130B	mudstone	t	0	0	100	0	0	0	t	0			
A1-5180	sandstone (quartz arenite)	70	t	0	t	0	20	t	10	0	0.07	good	L,P,S
A1-5360	dolostone	t	0	0	0	0	100	0	0	0			
A1-5690	dolostone	0	0	0	0	0	100	t	t	0			
A1-5710	dolostone	0	0	0	0	0	100	0	t	0			
A1-5810	limestone (foraminiferal packstone)	0	0	0	0	0	100	t	0	0			
A2-4410	limestone (lime mudstone)	0	0	0	0	0	100	0	0	0			
A2-4470A	sandstone (arkosic wacke)	80	10	0	10	t	t	0	t	0	0.06	moderate	P,L
A2-4470B	mudstone	20	0	0	40	10	t	20	10	0			
A2-4500	mudstone	0	0	0	70	0	0	30	t	0			
A2-4780	mudstone	40	t	0	40	t	20	0	t	0			
A2-4790A	sandstone (quartz arenite)	70	t	0	0	t	30	t	t	0	0.07	good	P,L
A2-4790B	sandstone (quartz arenite)	50	t	0	0	0	40	10	t	0	0.07	good	P,L
A2-5050	mudstone	t	0	0	80	t	0	0	20	0			
A2-5170	limestone (bioclastic wackestone)	t	0	0	0	0	100	t	t	0			
A2-5210	limestone (foraminiferal brachiopodal packstone)	t	0	0	0	0	90	10	0	0			
A3-3800	sandstone (arkosic arenite)	70	10	0	t	0	t	10	10	0	0.07	good	L,P
A3-4040	sandstone (arkosic arenite)	70	10	0	t	0	10	10	t	0	0.06	good	L,P
A3-4200	sandstone (arkosic arenite)	50	40	0	t	0	t	0	10	0	0.15	good	L,P
A3-4210	sandstone (arkosic arenite)	50	40	0	t	t	t	0	10	0	0.12	moderate	P,L
A3-4560	limestone (foraminiferal wackestone)	t	0	0	0	0	100	t	0	t			
A4-6100A	sandstone (arkosic wacke)	40	30	0	20	10	t	0	t	t	0.06	moderate	P,F,L
A4-6100B	mudstone	20	0	0	80	t	t	0	0	0			
A4-6150	mudstone	20	0	0	70	t	t	0	10	0			
A4-6350	mudstone	30	t	0	60	10	t	t	t	0			
A4-6390	sandstone (arkosic wacke)	50	30	0	t	10	10	0	t	t	0.08	moderate	F,P,l
A4-6430	mudstone	70	t	0	0	0	20	10	t	0			
A5-2050A	sandstone (arkosic arenite)	40	20	0	0	0	0	40	t	0	0.30	moderate	F,P
A5-2050B	anhydrite	t	0	0	0	t	0	100	t	0			
A5-2430	sandstone (arkosic wacke)	30	20	0	10	t	30	0	10	0	0.27	moderate	P,L,f
A5-2910A	sandstone (arkosic arenite)	50	20	10	0	t	20	0	t	0	0.39	good	P,L
A5-2910B	sandstone (arkosic wacke)	30	40	0	10	10	t	0	10	0	0.10	poor	P,l,f
A5-3060	mudstone	20	t	0	50	10	t	0	20	0			
A5-3070	sandstone (arkosic arenite)	50	30	10	t	t	10	0	t	0	0.46	poor	L,P
A5-3100	mudstone	10	0	0	80	t	t	0	10	0			
A5-3600	sandstone (arkosic arenite)	60	30	0	t	t	0	0	t	10	0.11	good	P,L
A6-3980	sandstone arkosic arenite)	80	10	0	t	0	10	t	t	0	0.09	moderate	L,P,cc

Sample	Rock name	Quartz	Feldspar	Rock fragments	Clays	Mica	Carbonate	Anhydrite	Hematite	Porosity	Mean grain size, mm	Sorting	Grain-to-grain size
A6-4160A	sandstone (arkosic arenite)	40	30	0	t	0	20	t	10	0	0.20	good	P,L
A6-4160B	sandstone (quartz arenite)	80	t	0	t	0	20	t	t	0	0.06	good	L,P
A8-3890	mudstone	80	t	0	10	t	10	0	t	t			
A8-4050	mudstone	20	0	0	70	10	t	0	t	0			
A8-4100	sandstone (arkosic arenite)	70	20	0	t	t	10	t	t	0	0.08	good	P,L
A8-4240	mudstone	30	t	0	40	10	10	0	10	0			
A8-4580	sandstone (arkosic arenite)	30	20	0	t	0	50	t	t	0	0.17	good	P,F,L
A8-4870	mudstone	50	t	0	20	0	20	0	10	0			
A8-5140	limestone (bioclastic wackestone)	0	0	0	0	0	100	0	0	0			
A8-5200	mudstone	20	0	0	70	0	t	0	10	0			
A8-5240	sandstone (arkosic arenite)	20	20	10	0	0	50	0	0	0	0.28	moderate	P,f,L
A8-5290	sandstone (arkosic wacke)	50	10	0	30	0	10	t	t	t	0.07	moderate	P,f,l
B1-3726.2	sandstone (arkosic arenite)	50	10	0	0	t	t	40	t	0	0.07	good	F,P
B1-3739.9	mudstone	50	t	0	50	t	t	0	t	0			
B2-3962.4	sandstone (arkosic wacke)	50	30	0	10	t	10	t	t	0	0.12	moderate	P,L
B2-3925.5	dolostone	30	t	0	0	t	70	t	t	0			
B3-3952.3	sandstone	90		0	0	t	0	0	10	0	0.06	good	P,L
B3-4497.6	limestone (intraclastic ostracodal packstone)	0	0	0	0	0	100	0	0	0			
B3-4501.7	mudstone	50	0	0	40	t	10	0	t	0			
B3-4501.8	limestone (foraminiferal packstone)	0	0	0	0	0	100	0	0	0			
B3-4521.6	limestone (bioclastic packstone)	0	0	0	0	0	100	0	0	0			