# CRJ01-0206

**Natural Gamma (CPS)** 18 36 54 72 90 108 126 144 162

**Caliper (Inches)** 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5

**Lithological Description**

**Lithologic Symbol**

**Depth (ft)**

**Optical Televiewer** N E S W N

**Rock Quality Designation (RQD)** 20 40 60 80 100

**Near Spaced Density g/cc** 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9

**Far Spaced Density g/cc** 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9

**Deep Induction Resistivity (Ohm-m)** 1 2 3 4 5 6 7 8 9 10 11 12 13 14

**Neutron In Air (CPS)** 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000 3100 3200 3300 3400

**Neutron In Fluid (CPS)** 910 970 1030 1090 1150 1210 1270 1330 1390 1450 1510 1570 1630 1690

**ELEVATION (ft)**

4990 4980 4970 4960 4950 4940 4930 4920 4910 4900 4890 4880 4870 4860 4850 4840 4830 4820 4810 4800 4790 4780 4770 4760 4750 4740 4730 4720 4710 4700

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300

0-1.5 ft. SILT (ML); light brown (7.5YR 6/3), highly calcareous, abundant roots, wormhole porosity.

1.5-4.0 ft. SANDY SILT (ML); light brownish gray (10YR 6/2), ~2% small pebbles, some mottling, highly calcareous.

4.0-6.5 ft. SILTY SAND (SM); light brownish gray (10YR 6/2), slightly calcareous, ~2% small rock fragments and some coarse sand particles.

6.5-9.0 ft. SILT (ML); ~10% very fine grained sand, mottled, slightly calcareous, very pale brown (10YR 7/3).

9.0-11.0 ft. WEATHERED MANCOS SHALE BEDROCK: highly weathered, slightly calcareous, soft to moderately hard, yellowish gray (5Y 7/2), some white gypsum crystals and masses along fracture/bedding surfaces.

11.0-12.6 ft. No Recovery.

12.6-302.0 ft. MANCOS SHALE:
12.6-13.0 ft. moderately weathered, pale yellowish brown (10YR 8/2), mostly siltstone, wavy bedding with some fracturing along them.

13.0-13.5 ft. No Recovery.

13.5-18.0 ft. highly weathered down to 15.0 ft. (numerous bedding plane fractures) and moderate to slightly weathered down to 18.0 ft. with bedding plane fractures spaced 0.2-0.3 ft. apart. At 15.0-15.3 ft. is a 90 degree fracture. Thin coating of gypsum crystals along about half of the fractures. Yellowish gray (5Y 7/2) to light olive gray (5Y 6/1), highly calcareous, bedding is wavy and bioturbated in places. Trace fine (framboidal) pyrite along bedding surfaces.

18.0-18.8 ft. No Recovery.

18.8-23.0 ft. abundant bedding plane fractures down to ~20.0 ft. Bedding plane fractures about 0.2-0.3 ft. apart down to 23.0 ft. Moderate to slightly weathered. Gypsum crystal coatings along many fractures. Some wavy and bioturbated bedding, pale yellowish brown (10YR 8/2) to olive gray (5Y 4/1) on some bedding surfaces, highly calcareous, no vertical or high angle fractures.

23.0-23.3 ft. No Recovery.

23.3-26.0 ft. abundant bedding plane fractures with spacing 0.1 ft. or less. Gypsum crystals along bedding plane fractures ~25.5 to 25.7 ft. Abundant worm burrows and bioturbated bedding, moderately calcareous.

26.0-35.0 ft. moderately weathered, prevalent fractures for length of run, but decreasing @34.0 ft. Core loss obvious at beginning of run (@26.0 ft.). Moderately calcic with prominent gypsum crystallization on faces of most fractures. Bedding angle approximately 5 degrees; ~90% of fractures are on bedding, no high angle fractures, some fractures are fissile, wavy bioturbation throughout, no evidence of formation water.

35.0-45.0 ft. weathering decreases to unweathered "fresh" bedrock @39.5 ft. Moderately calcic. @36.0-37.7 ft., moderately fractured along bedding, moderately pyritized, with gypsum crystallization and minor iron staining on fractures to 39.4 ft.

45.0-55.0 ft. "fresh" appearance to shale, clean mechanical fractures along bedding planes in several locations, no gypsum crystallization or iron staining along fracture faces. No evidence of formation water, core interior dry. Nice claystone.

55.0-65.0 ft. fissile along fractures @56.0-58.0 ft. @57.0 ft. fractures occur @80 degree angle to core axis (~twice the bedding plane angle). No secondary mineralization on fractures faces.

65.0-75.0 ft. bedding angle and bioturbation crenulations @80% to core axis. Core is solid overall with no fractures from 66.0-70.0 ft. and only minor mechanical fractures from 70.0-75.0 ft.

75.0-85.0 ft. @79.8-80.0 ft. fossiliferous deposit, calcic, heavy encrustations on core, preceded by short splintery fractures along core axis for 0.5 ft.

85.0-95.0 ft. good competent core, mechanical fractures on bedding planes with bioturbation crenulations, no secondary mineralization observed, no indication of formation water, interior of core dry.

95.0-105.0 ft. @103.8 ft. approximately 0.2 ft. bioturbations and silt size cemented zone. Good claystone run with minor mechanical fractures and dry core interior, normal 5 degree angle of bedding, moderately calcic.

105.0-115.0 ft. excellent recovery with only 2 locations of mechanical fracturing on bedding, standard overall appearance.

115.0-125.0 ft. core generally hard and moderately calcic. @116.0-117.0 ft. core is splintered along axis (mechanically induced). No secondary mineral deposits noted.

125.0-135.0 ft. minor mechanical fracturing along bedding planes.

135.0-145.0 ft. penetration rate slows, shale harder @140.0 ft. @140.0-140.8 ft. core fissile, biocrenulations, no secondary minerals. @141.0-143.0 ft. core fractured along axis. Drill pipe screened with LEL meter at end of run(0.0 ppm).

145.0-155.0 ft. formation very hard. @151.0-153.0 ft. abundant fossils, large bivalves.

155.0-165.0 ft. core loss related to drilling, minor loss (~0.5 ft.). Continued hard core, causing mechanical fractures parallel with axis @ 157.0-158.0 ft. and 162.0-164.0 ft.

165.0-175.0 ft. fissile along bedding @167.0-168.0 ft. Bedding plane angle =90 degrees to core axis. Core continues to drill slow, but formation doesn't appear any different.

175.0-185.0 ft. fissile @184.0-185.0 ft. No gas detected.

185.0-195.0 ft. @185.0-186.0 ft. core is fissile. @189.5 ft. drilling compressor overheats; stopped drilling.

195.0-205.0 ft. @200.0-202.0 ft. heavy fracture zone, core is partly fissile and relatively weak, possible natural fracture zone, doesn't appear completely mechanically induced although the current compressor has minimal PSI to drill and clear cuttings. @200.0 ft. pyrite deposit.

205.0-215.0 ft. good run, bedding angle is <5 degrees and is almost perpendicular to core axis, minimal bioturbidity crenulations. @214.8-215.0 ft. fissile break.

215.0-225.0 ft. @217.8 ft. is a 0.2 ft. fissile break, very broken. @220.7 and 220.9 ft. mechanical breaks. @223.5, and 223.7 ft. fissile with mechanical breaks. @ 224.2 ft mechanical break.

225.0-235.0 ft. bedding +/- 5 degree angle, no formation water. @225.5, 225.8, 226.3, and 226.4 ft. mechanical breaks. @ 226.75 fractures on bedding. @227.35 mechanical breaks. @228.9, 229.6, 230.35, 230.55, and 230.75 ft. mechanical breaks, slightly fissile. @232.35, 232.95,233.2, 233.6, and 234.2 ft. fissile fractures on bedding.

235.0-245.0 ft. mechanical breaks @236.5, 238.2, 241.2, 242.0, 242.9, and 243.7 ft. Fissile fractures @ 238.65, 240.85-240.95, and 242.55 ft. Bedding angle +/- 5 degrees with bioturbidity crenulations, color, hardness, and general condition normal, no secondary mineralization, no indications of formation water.

245.0-255.0 ft. mechanical breaks @246.3, 248.9, 250.3, 251.2, 252.5, 253.0, 253.9, 254.2, 254.5, and 255.0 ft. Core is generally hard, with dry interior, no indication of formation water.

255.0-265.0 ft. mechanical breaks @256.0, 256.5, 257.2, 257.9, 259.4, 259.9, 260.1, 260.5, 261.1, 261.8, and 264.2 ft. Slightly fissile @260.0-260.5 ft. on breaks. 5 degree angle bedding with bioturbation crenulations, moderately calcic.

265.0-275.0 ft. no indication of formation water, no secondary mineralization identified on break faces. Mechanical breaks @ 266.3, 266.5, 269.9, 270.0, 270.4, 271.0, and 271.2 ft. @271.7 ft. on the face of bedding are several drops of resin (about 0.003 ft. diameter) or petroleum hydrocarbon deposits? Another is seen @ 268.3 on similar face of a break on bedding plane.

275.0-285.0 ft. mechanical breaks @275.5, 276.0-276.7, 277.7, 278.2, 278.4, 279.0, 279.5, 283.3, 283.6, and 284.0 ft. Wavy biocrenulations (0.2 ft. thick) @ 281.0 ft. Normal bedding angle is 0-5 degrees. Moderately calcic.

285.0-295.0 ft. mechanical breaks @ 285.7-286.0 ft. 286.0-287.0 ft., 291.6, and 291.8 ft. @ 292.3 ft. "large" storm turbidity? section is light gray. This 10.0 ft. run doesn't appear to be as hard as the penetration rate would indicate.

295.0-302.0 ft. mechanical breaks @ 296.0-296.6, 297.2, and 298.2 ft. Random bedding plane breaks, no fractures, core not extremely hard. Bedding angle normal, few scattered bioturbidity crenulations, no indication of formation water, core interior is dry.

**107.0 ft.** PRAIRIE CANYON MEMBER / LOWER BLUE GATE MEMBER

Stoller

**U.S. DEPARTMENT OF ENERGY**
GRAND JUNCTION, COLORADO

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