W.E. Well 11

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
REGION V

MORGANTOWN RESEARCH CENTER

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Memorandum

To: Robert L. Rough, Project Leader, Morgantown Petroleum Research Laboratory

From: William K. Overbey, Jr., Physical Science Technician (Geology)

Subject: Summary and preliminary examination and lithologic description of Reservoir Evaluation well 11, Pennzoil Company's Wm. Kaufman No. 7, Clover-Rush Run Field, Smithfield District, Roane County, West Virginia

Approximately 80.5 feet of core was examined which included portions of the driller's Big Lime, Keener sand and Big Injun sand.

The lower portion of the Big Lime from core examination is light gray to grayish brown, oolitic, slightly to moderately sandy and glauconitic. The basal portion is a light gray to light tan dolomite, sucrosic, glauconitic, and calcareous. The dolomite grades into a very calcareous coarse grained sandstone, with a conglomerate at the base (driller's Keener sand).

The Big Injun sand in this well is quartzitic, light grayish green in color, fine grained, argillaceous, glauconitic, very slightly calcareous, and slightly micaceous. The argillaceous material appears to be illite and kaolinite with traces of montmorillonite which coat the subangular quartz grains and fill many pore spaces. Small amounts of calcite fill some pore spaces. The quartz sand grains are poorly sorted and vary in size from 0.09 to 0.25 mm. The clay material coating the sand grains rather loosely bonds the sandstone.

Many small light brown stained areas of the core are assumed to have been caused by invasion of the drilling mud filtrate. The even distribution of these stains in the lower portion of the core are interpreted as an indication of the relatively homogeneous distribution of intergranular porosity.

The following lithologic description of the core is preliminary to a more detailed examination to be conducted.

Core interval examined: 2131.0 - 2212.9 feet

Depth, feet Top	Bottom	Thickness, feet	Lithologic description
2131 -	2133	2	Limestone, white to light gray, slightly sandy, glauconitic, pyritic, oolitic, stylolitic, fossiliferous. Traces of oil by florescence.
2133 -	2135	2	Limestone, light brown, sandy, oolitic, glauconitic.
2135 -	2137	2	Limestone, light-gray to grayish brown, very sandy in zones, oolitic, some very thin 0.1 mm clay partings.
2137 -	2138	1	Limestone, light gray, slightly sandy (very fine grains), with shale inclusions. Unconformable (eroded shale) surface (2137.9 - 2138.1)
2138 -	2139	1	Limestone, light brown, slightly sandy, oolitic very argillaceous, fossiliferous, shaly.
2139 -	2142	3	Limestone, light brown, oolitic fossil. Fractures filled with oil.
2142 -	2146	4	Limestone white to light gray, dolomitic, green clay partings, shear zone replaced by calcite-dolomite.
2146 -	2149	3	Limestone, light gray, oolitic, crystalline filling of pore space.
2149 -	2153	4	Dolomite, light gray, dense, traces of oolitic structures.
2153 -	2156	3	Dolomite, light gray to light tan, dense.
2156 -	2159	3	Dolomite, light tan to white, very fine rhombohedral crystals give sucrosic texture, calcareous.
2159 -	2161	2	Dolomite as above.
2161 -	2163	2	Dolomite as above, except glauconitic.

Depth, feet Top	Bottom	Thickness, feet	Lithologic description
2163 -	2164	1	Dolomite, becoming shaly, limey and conglomeritic.
2164 -	2165	1	Limestone, light gray, and conglomerate.
2165 -	2166	1	Conglomerate, composed of quartz pebbles, limestone rock fragments, and cemented with lime.
2166 -	2167	1	Sandstone, white, calcareous, coarse grained with scattered quartz pebbles.
2167 -	2169	2	Sandstone as above.
2169 -	2170	1	Sandstone, white, medium to coarse grained, slightly calcareous, some filling of pores by calcite, quite pyritic.
2170 -	2172	2	Sandstone as above.
2172 -	2174	2	Sandstone, white, medium to coarse grained, angular, slightly calcareous (fillings and detrital grains), illite clay material, traces of mica. Blue color with benzidine stain indicates montmorillonite(?).
2174 -	2176	2	Sandstone, medium-coarse, angular, slightly calcareous, argillaceous, spots of mud filtrate invasion, slightly micaceous, glauconitic.
2176 -	2178	2	Conglomerate, quartzitic, coarse, light green fragments of limestone, traces of montmorillonite by benzidine stain.
2178 -	2180	2	Sandstone, quartzitic, light greenish-gray, fine grained, (0.12 - 0.175 mm), argillaceous, glauconitic, slightly calcareous, porous zones have been cemented with calcite by percolating water. Cross bedded in zones of coarse grains and pebbles (2179-80). Coarse zones very calcareous.
2180 -	2182	2	Sandstone, quartzitic, light grayish-green, fine to coarse grained, conglomerate zones, calcareous, argillaceous; traces of montmorillonite by benzidine stain (color 5B 7/6 to 5B 4/8).

Depth, feet Top	Bottom	Thickness, feet	Lithologic description
2182	2183	1	Sandstone, quartzitic, light greenish-gray, fine grained, angular, slightly calcareous, argillaceous.
2183	2185	2	Sandstone, quartzitic, fine grained, light greenish-gray, very calcareous, slightly argillaceous. Reaction to benzidine stain 5B 6/6.
2185	2187	2	Sandstone, quartzitic, fine grained, angular, light greenish-gray, very calcareous, slightly argillaceous. Benzidine stain 5B 6/6 traces, cross bedded.
2187	2189	2	Sandstone as above.
2189	2191	2	Sandstone, light greenish-gray, quartzitic, fine grained (0.12 - 0.17 mm), slightly calcareous, argillaceous. Benzidine stain 5B 7/6 to 4/8, slightly micaceous. Clay material appears to be illite and kaolinite, clay completely coating sand grains.
2191	2194	3	Sandstone, as above.
2194	2195	1	Sandstone, light greenish-gray, quartzitic, subangular, fine grained (0.12 to 0.20 mm), slightly calcareous, argillaceous, glauconitic, slightly micaceous. Clay material which appears to be illite, coats most quartz grains and is apparently the bonding material.
2195	2197	2	Sandstone as above except grain size slightly larger (0.12 mm to 0.25 mm) and higher clay content. Clay filling many pore spaces as well as coating sand grains. More calcareous than interval above. Carbonate found mostly filling pore space.
2197	2199	2	Sandstone, quartzitic, light greenish-gray, fine grained (0.12 to 0.19 mm), argillaceous, slightly calcareous, micaceous, glauconitic, Subangular quartz grains are coated with clay. Some pores partially filled with clay and calcite.

Depth, feet Top	Bottom	Thickness, feet	Lithologic description
2199	2200	1	Sandstone, quartzitic, light greenish-gray, fine grained (0.10 to 0.25 mm), argillaceous, slightly calcareous, slightly micaceous, glauconitic. Quartz sand grains coated with clay (illite?). Occasional thin clay parting. Mica is detrital plates (0.2 to 0.5 mm) of muscovite.
2200	2201.8	1.8	Sandstone, quartzitic, light greenish-gray, fine grained (0.10 to 0.25 mm) slightly micaceous, slightly argillaceous, calcareous, glauconitic. Quartz sand grains are sub-rounded to subangular and not coated as heavily with clay as interval above.
2201.8	2202.5	.7	Shale, medium gray, very micaceous, soft.
2202.5	2202.7	.2	Dolomite, light tan, slightly sandy with shale parting.
2202.7	2204	1.3	Shale, medium gray, micaceous, with sand stringers 3 to 5 mm thick.
2204	2207.5	3.5	Shale, medium gray, micaceous.
2207.5	2208.2	.7	Shale as above.
2208.2	2208.4	.2	Sandstone, light green, very fine grained, quartzitic, argillaceous.
2208.4	2208.8	.4	Shale, light gray, micaceous
2208.8	2210.2	1.4	Sandstone, light green, quartzitic, very fine grained (0.07 to 0.10 mm), slightly micaceous, argillaceous. Clay material completely surrounds sand grains.
2210.2	2212.5	2.3	Sandstone, light green, quartzitic, fine grained (0.12 to 0.22 mm), slightly calcareous, micaceous, glauconitic, argillaceous, cross bedded. Clay material coating sand grains and partially filling pores.
2212.5	2212.9	.4	Mud stone, dark gray, waxy, soft.

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