

November 1, 1961

FLOYD WAGNER HILL # 13

**U. S. BUREAU OF MINES'
RESERVOIR APPRAISAL WELL #5**

Operating

Company: Hazlen Oil Co.; Harrieville, West Virginia

**Farm Name: Floyd Wagner Permit No.: Pleasants County - 594
Well #13**

**Well Location: Lafayette District, Pleasants County, W. Va.
E. C. St. Marys Quadrangle - Scale 1/62,500
4.87 miles S. Lat. 39°25'
2.11 miles W. Long. 81°00'**

**Oil Field: Bonds Creek Oil Field
(near Hebron in Eastern Pleasants County)**

Well Head Elevation: 901.0' Total Depth of Well: 1975.19'

**Producing Horizons: "Kemper Sands" -- Oil, 1 1/2 bbls./daily
"Loyalhanna Limestone" -- Oil show**

Lower Portion of Well

Cored by: U. S. Bureau of Mines, Morgantown, W. Va.

**Interval Cored: (4" core)
1773.27 - 1975.19'**

Coring Completed: August 1961

Detailed Lithologic Description of

Cable Tool-Samples and Cores by: Wallace R. McCord

**Sedimentary Petrographer
W. Va. Geological Survey
Morgantown, W. Va.**

**DETAILED LITHOLOGIC DESCRIPTION
OF THE
FLOYD WASSER WELL #13**

U. S. BUREAU OF MINES'
Reservoir Appraisal Well #5

Top	Bottom	Thickness (in feet)	Character of Rocks
0.00	1630.00	1630.00	Interval drilled with cable tools. Samples not obtained.
1630.00	1773.27	123.27	Interval drilled with cable tools. Samples obtained.
			MAUCH CREEK SERIES - 69.00' +
			Norton Sand - 26.00'
1650.00	1676.00	26.00	Sandstone: Very light-gray, fine- to medium-grained, highly angular to subangular, glassy to moderately frosted, abundant light yellowish-gray silt sized fines that are very slightly calcareous, slightly micaceous (muscovite mica); contains many very fine to medium-grained silt fragments of carbonaceous and argillaceous material.
	1676.00		Base of "Norton Sand"
1676.00	1689.00	13.00	Siltstone: Medium dark-gray with streaks of brownish-gray, very highly argillaceous, micaceous; contains streaks of medium light-gray to medium-gray, slightly calcareous siltstone.
1689.00	1693.00	4.00	Limestone: Medium-gray to brownish-gray, very fine-crystalline with many fine sized crystals of calcite, moderately to highly argillaceous.
1693.00	1696.00	3.00	Siltstone: Medium- to medium dark-gray, very highly argillaceous, micaceous, very slightly to slightly calcareous.
1696.00	1700.00	4.00	Limestone: Medium-gray to olive-gray, microcrystalline to very fine-crystalline, moderately to very highly argillaceous.
1700.00	1705.00	5.00	Siltstone: Medium- to medium dark-gray, very highly argillaceous, shaly, slightly micaceous; contains several streaks of dark-gray, micaceous siltstone; interbedded with streaks and very thin beds of medium-gray to olive-gray, moderately to very highly argillaceous limestone.

APPRAISAL WELL #2

Top	Bottom	Thickness (in feet)	Character of Rocks
1705.00	1708.00	3.00	Limestone: Medium-gray to brownish-gray, micro-crystalline to very fine-crystalline, moderately to highly argillaceous.
1708.00	1711.00	3.00	Shale: Medium dark-gray to dark-gray, highly silty, slightly micaceous; contains streaks of medium dark-gray to olive-gray, highly to very highly argillaceous limestone.
1711.00	1713.50	2.50	Limestone: Medium-gray to olive-gray, microcrystalline, moderately to very highly argillaceous.
1713.50	1719.00	5.50	Siltstone: Medium- to medium dark-gray, highly to very highly argillaceous, shaly, slightly micaceous; interbedded with streaks and very thin beds of medium dark-gray to olive-gray, highly to very highly argillaceous limestone.
GREENBRIER SERIES - 100.60'			
1719.00	1727.00	8.00	Limestone: Light-gray to brownish-gray, micro-crystalline, some beds are slightly to moderately argillaceous and silty with silt sized particles of quartz; contains numerous very thin beds of very light-gray, very pure limestone (mostly soft calcite).
1727.00	1743.00	16.00	Limestone: Light-gray to light olive-gray, micro-crystalline to very fine-crystalline; contains very thin beds of very light-gray very pure limestone (mostly calcite).
1743.00	1762.00	17.00	Limestone: Light-gray to brownish-gray, micro-crystalline to very fine-crystalline, some beds slightly silty and slightly argillaceous; contains very thin beds of very light-gray, very pure limestone (mostly calcite).
1762.00	1763.00	3.00	Limestone: Light brownish-gray to olive-gray, micro-crystalline to very fine-crystalline, slightly argillaceous; some thin beds are slightly silty and contain very fine- to fine-grained sized clastic fragments of limestone.
1763.00	1770.00	3.00	Limestone: Light brownish-gray to brownish-gray, microcrystalline to very fine-crystalline; some thin beds are slightly argillaceous, very slightly silty, and contain very fine to fine-grained sized clastic fragments of limestone; contains very thin beds of very light-gray, very pure limestone (mostly calcite).

APPRAISAL WELL #5

Top	Bottom	Thickness (in feet)	Character of Rocks
1700.00	1773.27	3.27	Limestone: Light-gray to light brownish-gray, microcrystalline matrix; oolitic and fragmental with very fine to medium-grained sized oolites, pellets, and elastic fragments of limestone (make up approx. 35% of rock mass); some thin beds are slightly silty to slightly sandy.
1773.27	1973.19	201.92	Interval covered by U. S. Bureau of Mines. Core examined .
1773.27	1774.50	1.23	Limestone: Light-gray to light brownish-gray, microcrystalline matrix; oolitic and highly fragmental with very fine- to very coarse-grained sized oolites, pellets, and elastic fragments of limestone (make up approx. 50% of rock mass); highly sandy with very fine- to coarse sized, angular to subrounded, glassy grains of quartz (approx. 20% of rock mass); contains large crystals of secondary calcite and a few of the oolites have siliceous centers (center portion of the oolite filled with silica).
Interval Sand - 36.40'			
1774.50	1776.60	2.10	Sandstone: Very light-gray, very fine- to medium-grained, highly angular, glassy to slightly frosted, some silt sized fines, highly calcareous, tightly cemented; contains many silt sized to coarse-grained sized elastic fragments of light- to greenish-gray limestone (approx. 5% of rock mass).
1776.60	1777.60	1.00	Sandstone: White to very light-gray, mostly fine- and even-grained, highly angular, glassy to slightly frosted, slightly to moderately calcareous, slightly friable, fair porosity (many pin-point to pin-head sized vug openings); contains numerous specks of ilmenite and carbonate material.
1777.60	1778.17	0.57	Sandstone: Light- to medium-gray, very fine-grained, highly angular, glassy, highly silty, moderately calcareous, slightly dolomitic, tightly cemented.
1778.17	1779.30	1.13	Sandstone: Very light- to light-gray, very fine- to fine-grained, highly angular, glassy to slightly frosted, some silt sized fines, moderately calcareous, very slightly dolomitic, tightly cemented; contains a few specks of ilmenite and numerous specks to fine-grained sized fragments of carbonate material.

APPRAISAL HILLS #5

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Top	Bottom	Thickness (in feet)	Character of Rocks
1779.30	1784.20	4.90	Sandstone: White to very light-gray, mostly fine- and even-grained, highly angular, glassy to moderately frosted, non-calcareous to moderately calcareous in some thin beds, slightly friable, easily fractured, good porosity (abundant pin-point to pin-head sized vug openings), numerous specks of limonite.
1784.20	1785.70	1.50	Sandstone: White to very light-gray, very fine- to fine-grained, highly angular, glassy to slightly frosted, moderately to highly calcareous, fair porosity, less friable and more tightly cemented than the above interval and not as easily fractured.
1785.70	1798.50	12.80	Sandstone: White to very light-gray, very fine- to fine-grained, highly angular, glassy to moderately frosted; contains numerous thin beds of medium-grained, highly angular to angular sandstone; moderately calcareous, slightly to moderately friable, easily fractured, good porosity, few specks of limonite, many specks and tiny fragments of light-gray carbonate material.
1798.50	1799.55	1.05	Sandstone: White to very light-gray, very fine- to fine-grained, highly angular, glassy to moderately frosted, few silt sized fines, highly calcareous; less friable and more tightly cemented than the above interval; low porosity.
1799.55	1800.65	1.10	Sandstone: White to light-gray, very fine- to coarse-grained, highly angular to angular, glassy to moderately frosted, some silt sized fines, highly calcareous, tightly cemented, very low porosity; contains abundant (approx. 15% of rock mass) very fine- to very coarse-grained silt clastic fragments of light- to medium dark-gray limestone.
1800.65	1806.90	6.25	Sandstone: Very light- to light-gray, fine- to coarse-grained, highly angular to angular, glassy to moderately frosted, many silt sized fines, highly calcareous, tightly cemented, very low porosity; contains abundant (make up 15-20% of rock mass) very fine- to very coarse-grained silt clastic fragments of light- to medium dark-gray limestone; many specks of carbonaceous material; several streaks of shaly, argillaceous material.
	1806.90		Base of "Lower Sand"

Top	Bottom	Thickness (in feet)	Character of Rocks
1800.90	1801.00	0.90	Limestone: light brownish-gray to medium-gray, microcrystalline matrix, highly oolitic and pelleted with very fine- to coarse-grained sized calcite and pellets (make up approx. 50% of rock mass), argillaceous; contains a few tiny clastic fragments of limestone and very thin partings of shaly carbonaceous material.
1801.00	1804.00	2.20	Limestone: Medium light-gray to light olive-gray, microcrystalline matrix, highly oolitic and pelleted with very fine- to coarse-grained sized calcite and pellets (approx. 50% of rock mass), massive, slightly stylolitic; contains a few tiny clastic fragments of limestone.
1804.00	1808.37	4.37	Limestone: Medium light-gray to light olive-gray, microcrystalline matrix, highly oolitic and pelleted with very fine- to coarse-grained sized calcite and pellets (approx. 35% of rock mass); many tiny clastic fragments and few streaks of medium- to medium dark-gray, highly argillaceous limestone; highly sandy and conglomeratic with very fine-grained to pebble sized particles of quartz (approx. 20% of rock mass); quartz grains and pebbles are angular to well rounded and glossy to highly frosted.
1808.37	1810.15	1.78	Limestone: Greenish-gray to medium-gray, microcrystalline matrix, highly oolitic and pelleted with very fine- to medium-grained sized calcite and pellets (approx. 25% of rock mass); many tiny clastic fragments of limestone; contains several pyritic and argillaceous streaks; highly sandy with very fine- to coarse sized, angular to rounded, glossy to slightly frosted grains of quartz (approx. 20% of rock mass).
1810.15	1810.95	0.80	Sandstone: Light- to medium light-gray, very fine- to coarse-grained, highly angular to subrounded, glossy to moderately frosted, very highly calcareous (approx. 40% of rock mass composed of carbonate material), many specks and few streaks of pyrite; contains thin partings of medium light-gray, highly oolitic and pelleted limestone and several very small deposits of secondary calcite.
1810.95	1811.35	0.40	Siltstone: Medium-gray, highly argillaceous, very slightly dolomitic, micaceous, fairly soft.

APPRAISED WELL #3

Top	Bottom	Thickness (in feet)	Character of Rocks
1811.35	1812.00	0.65	Siltstone: Yellowish-gray, dolomitic; sandy with very fine sized, angular grains of glaucous quartz; contains a few specks of pyrite and muscovite mica. <u>Lorraine Limestone - 7.60'</u>
1812.00	1819.60	7.60	Limestone: Light yellowish-gray to yellowish-gray, microcrystalline, dolomitic, slight euhedral-like texture, abundant dolomitic silt sized fines; highly sandy with very fine- to coarse sized grains of quartz (approx. 25% of rock mass); sand grains are angular to rounded and glaucous to moderately frosted; lower most 0.40' of this interval is very silty and slightly argillaceous. POCONO SERIES - 155.59' +
1819.60	1820.94	1.34	Shale: Medium dark-gray, very silty, slightly calcareous, very slightly dolomitic, fairly hard. <u>(Transitional Interval)</u> . <u>Big Lake Sandstone - 115.30'</u>
1820.94	1836.25	15.31	Siltstone: Medium light-gray, argillaceous to highly argillaceous, micaceous with abundant very minute flakes of muscovite mica, few small patches of pyrite; interbedded with many thin beds of light- to medium-gray, argillaceous to highly siliceous sandstone.
1836.25	1836.63	0.38	Sandstone: Light-gray, very fine- to medium-grained, highly angular, glaucous to slightly frosted, slightly calcareous and very slightly dolomitic, slightly micaceous; contains some coarse sized, angular grains of glaucous quartz, and a few rounded, frosted quartz pebbles.
1836.63	1836.92	0.29	Sandstone: White to light-gray, fine- to coarse-grained, highly angular to angular, glaucous to moderately frosted; very highly conglomeratic with abundant small to fairly large sized, frosted to waxy, rounded quartz pebbles; slightly calcareous, slightly micaceous, many specks of argillaceous and carbonaceous material; contains streaks of greenish-gray, highly siliceous and argillaceous sandstone in the basal most 0.07' of this interval.

Top	Bottom	Thickness (in feet)	Character of Rocks
1836.92	1841.20	4.28	Sandstone: Very light-gray to light-gray, very fine- to medium-grained, highly angular, glassy to slightly frosted, abundant silt sized fines, slightly calcareous, tightly cemented, highly micaceous, many specks of carbonaceous material, few specks of pyrite; contains many streaks of medium-gray, very highly micaceous and carbonaceous sandstone.
1841.20	1843.20	2.00	Siltstone: Medium- to medium dark-gray, very highly argillaceous and shaly, highly micaceous (mostly muscovite mica), abundant carbonaceous material.
1843.20	1846.93	3.73	Siltstone: Medium light-gray to medium-gray, highly to very highly argillaceous, shaly, highly micaceous, abundant carbonaceous material; contains many streaks of light-gray, very fine-grained sandstone.
1846.93	1855.90	8.97	Sandstone: Light- to medium light-gray, very fine- to fine-grained, highly angular, glassy to slightly frosted, tightly cemented, very silty, highly argillaceous and shaly, highly micaceous, many specks of carbonaceous material; contains numerous streaks of medium-gray, very highly micaceous and carbonaceous shale.
1855.90	1877.50	21.60	Sandstone: Very light- to light-gray, very fine- to fine-grained, with a very small percentage of medium-grained, highly angular, glassy to slightly frosted, some silt sized fines, very slightly calcareous, tightly cemented (average 8% porosity), micaceous, abundant carbonaceous material (in specks, small patches, streaks, and lenses); contains many streaks of micaceous material and several thin partings of medium dark-gray, micaceous shale.
1877.50	1880.00	2.50	Shale: Medium dark-gray to grayish-black, carbonaceous, micaceous, highly silty with a few sandy streaks, few plant fossils (preservations are black carbonaceous material).
1880.00	1887.23	7.23	Sandstone: Light- to medium- light-gray, very fine- to fine-grained, glassy to moderately frosted, some silt sized fines, tightly cemented, micaceous, considerable amount of carbonaceous material; contains a six-inch break of black, micaceous, carbonaceous shale two feet above the base of this interval; top most 0.40' of this interval is highly argillaceous and very carbonaceous.

Top	Bottom	Thickness (in feet)	Character of Rocks
1887.23	1889.00	1.67	Shale: Medium dark-gray, very highly silty, highly micaceous and carbonaceous, few plant fossils (preservations are black carbonaceous material).
1889.00	1894.30	5.30	Siltstone: Medium light-gray to medium-gray, very highly argillaceous, highly micaceous and carbonaceous, few plant fossils (preservations are black carbonaceous material).
1894.30	1899.05	4.55	Sandstone: Very light- to light-gray, very fine- to fine-grained, highly angular, glassy to slightly frosted, slightly calcareous, very slightly friable, micaceous, many specks of carbonaceous material; contains numerous streaks and partings of micaceous and carbonaceous material.
1899.05	1910.80	11.75	Sandstone: Very light-gray, very fine- to fine-grained, highly angular, glassy to slightly frosted, some silt sized fines, very slightly calcareous, very slightly friable, micaceous, pyritic, many specks of carbonaceous material; contains a few streaks of highly micaceous and carbonaceous shale.
1910.80	1912.47	1.67	Shale: Medium- to medium dark-gray, silty, micaceous, slightly carbonaceous.
1912.47	1916.45	3.98	Sandstone: Very light- to light-gray, very fine- to coarse-grained, highly angular, glassy to moderately frosted, some silt sized fines, very slightly- to slightly calcareous, tightly cemented, micaceous, abundant carbonaceous material, few specks of pyrite; contains many fragments, streaks, and partings of medium dark-gray to dark-gray, micaceous and carbonaceous shale.
1916.45	1928.20	11.75	Sandstone: Very light- to light-gray, very fine- to fine-grained, highly angular, glassy to slightly frosted, abundant silt sized fines, very slightly friable, micaceous, many specks of carbonaceous material, slightly pyritic, oil stained; contains many streaks of micaceous material and several partings of medium dark-gray, micaceous and carbonaceous shale; lower most 2.30' of this interval is very highly micaceous and very carbonaceous.
1928.20	1930.12	1.92	Sandstone: Light-gray to medium light-gray, very fine- to medium-grained, highly angular to angular, glassy to moderately frosted, silty, tightly cemented, highly micaceous and carbonaceous, pyritic; contains numerous partings of medium-gray to black, highly micaceous and carbonaceous shale.

APPRAISAL WELL #5

Top	Bottom	Thickness (in feet)	Character of Well
1930.12	1934.22	4.10	Shale: Medium dark-gray, silty, micaceous, carbonaceous, few specks of pyrite; contains several thin partings of medium light-gray, fine- to medium-grained sandstone.
			<u>Sandy Sand</u> - 21.88'
1934.22	1949.20	14.98	Sandstone: Light-gray with several thin beds of light-olive-gray, very fine- to medium-grained, angular, glassy to slightly frosted, abundant silt sized fines, very slightly to moderately calcareous, tightly cemented, micaceous, many specks of carbonaceous material; sporadically oil stained; contains many streaks of micaceous siltstone and micaceous, carbonaceous shale.
1949.20	1950.92	1.72	Sandstone: Light- to medium light-gray, fine- to coarse-grained, angular, glassy to moderately frosted, abundant silt sized fines, slightly to moderately calcareous, tightly cemented, highly micaceous, abundant carbonaceous material; contains numerous streaks and very thin partings of highly micaceous and carbonaceous shale.
1950.92	1951.70	0.78	Shale: Medium-gray to medium dark-gray, silty, micaceous, slightly carbonaceous.
1951.70	1954.50	2.80	Sandstone: Light-gray to light olive-gray, very fine- to coarse-grained, angular, glassy to moderately frosted, abundant silt sized fines, very slightly to slightly calcareous, tightly cemented, micaceous, abundant carbonaceous material; contains numerous streaks and very thin partings of micaceous and carbonaceous shale.
1954.50	1956.10	1.60	Sandstone: White to very light-gray, fine- to coarse-grained, angular to subrounded, glassy to highly frosted, some silt sized fines, moderately to highly calcareous, tightly cemented, slightly micaceous, many specks of carbonaceous material; contains streaks and very thin partings of grayish-black, highly micaceous, carbonaceous, pyritic shale with a few plant fossils (preservations are black carbonaceous material).
	1956.10		Base of "Sandy Sand"
1956.10	1975.19	19.09	Shale: Medium- to medium dark-gray, moderately to highly silty, micaceous, slightly carbonaceous with many specks and few streaks of carbonaceous material.
	1975.19		Total Depth of Well.