



# LJ HUGHES & SONS, INC.

**DIAMOND CORE DRILLING**  
**Pressure Grouting, Foundation & Soil Borings**

320 Turnpike Road, Summersville, West Virginia 26651 (304) 872-1111

DRILL HOLE NO. EM-04-05 DRILLER: GEORGE RITCHIE

DRILLING FOR: RAG EMERALD RESOURCES  
WAYNESBURG PA

SURFACE ELEVATION: STARTED: APRIL 13 2004  
COMPLETED: APRIL 21 2004

LOCATION: PENNSYLVANIA GREENE COUNTY

FORMATION	STRATA THICKNESS	DEPTH FROM SURFACE
CASING	21.00	21.00
GRAY SHALE	32.00	53.00
GRAY SANDY SHALE	17.00	70.00
GRAY SHALE	3.60	73.60
GRAY SANDSTONE	4.30	77.90
GRAY SHALE	4.00	81.90
LIMESTONE	1.10	83.00
GRAY SHALE	8.00	91.00
GRAY SANDSTONE	5.80	96.80
GRAY SHALE	13.20	110.00
BLACK SHALE	1.90	111.90
COAL . . . . .	0.20	112.10
DARK GRAY SHALE	11.10	123.20
GRAY SHALE WITH SIDERITE	10.80	134.00
GRAY SHALE	14.60	148.60
GRAY SANDY SHALE	21.40	170.00
GRAY SHALE	14.00	184.00
COAL . . . . .	0.90	184.90
GRAY SHALE	9.10	194.00
GRAY SANDSTONE	15.60	209.60
GRAY SHALE	2.60	212.20
LIMESTONE	1.70	213.90
GRAY SHALE	20.10	234.00
GRAY SHALE WITH SIDERITE	21.00	255.00
GRAY SANDY SHALE	15.00	270.00
GRAY SANDSTONE	11.00	281.00
GRAY SHALE	13.00	294.00

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RAG EMERALD RESOURCES

CONTINUATION OF DRILL HOLE NO. EM-04-05

FORMATION	STRATA THICKNESS	DEPTH FROM SURFACE
COAL . . . . .	0.20	294.20
GRAY SHALE	29.80	324.00
GRAY SANDSTONE	11.20	335.20
GRAY SHALE	1.50	336.70
LIMESTONE WITH SHALE STREAKS	4.00	340.70
GRAY SHALE	11.60	352.30
LIMESTONE WITH SHALE STREAKS	5.00	357.30
GRAY SHALE	1.20	358.50
COAL . . . . .	0.50	359.00
GRAY SHALE	2.50	361.50
BLACK SHALE	5.00	366.50
COAL . . . . .	0.50	367.00
GRAY SHALE	0.80	367.80
COAL . . . . .	0.20	368.00
GRAY SHALE	2.00	370.00
GRAY SANDSTONE	1.00	371.00
DARK GRAY SHALE	3.20	374.20
BLACK SHALE	5.10	379.30
COAL . . . . .	0.50	379.80
DARK GRAY SHALE	1.70	381.50
DARK GRAY SANDY SHALE	18.50	400.00
GRAY SANDSTONE	10.00	410.00
COAL . . . . .	0.40	410.40
BLACK SHALE	0.30	410.70
COAL . . . . .	0.40	411.10
BLACK SHALE	3.00	414.10
GRAY SHALE WITH SIDERITE	13.00	427.10
GRAY SHALE	5.90	433.00
GRAY SHALE WITH SIDERITE	13.60	446.60
GRAY SANDY SHALE	3.40	450.00
GRAY SHALE	8.80	458.80
LIMESTONE	2.00	460.80
GRAY SHALE	6.20	467.00
BLACK SHALE WITH COAL STREAKS	2.30	469.30
GRAY SHALE	16.30	485.60
GRAY SANDSTONE	53.40	539.00
DARK GRAY SHALE	7.20	546.20
COAL . . . . .	0.90	547.10
GRAY SHALE	2.50	549.60
COAL . . . . .	3.30	552.90
GRAY SHALE	0.40	553.30
COAL . . . . .	0.40	553.70
DARK GRAY SHALE	7.80	561.50
COAL . . . . .	0.20	561.70
LIMESTONE WITH SHALE	2.60	564.30

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FORMATION	STRATA THICKNESS	DEPTH FROM SURFACE
GRAY SHALE	21.70	586.00
GRAY SANDY SHALE	8.50	594.50
GRAY SANDSTONE	7.20	601.70
GRAY SHALE	15.00	616.70
COAL . . . . .	0.30	617.00
GRAY SHALE	3.00	620.00
DARK GRAY SHALE	5.00	625.00
LIMESTONE	9.80	634.80
GRAY SANDY SHALE WITH SIDERITE	10.00	644.80
GRAY SANDSTONE	5.40	650.20
GRAY SHALE	6.00	656.20
LIMESTONE WITH SHALE PARTINGS	92.00	748.20
GRAY CALCAREOUS SHALE	18.80	767.00
DARK GRAY SHALE	5.80	772.80
COAL . . . . .	3.60	776.40
DARK GRAY SHALE	1.60	778.00
DARK GRAY SHALE WITH SANDSTONE STREAKS	8.30	786.30
GRAY SANDSTONE	2.10	788.40
DARK GRAY SHALE WITH SANDSTONE STREAKS	7.40	795.80
DARK GRAY SHALE	1.50	797.30
COAL . . . . .	0.50	797.80
BLACK SHALE	1.30	799.10
DARK GRAY CALCAREOUS SHALE	1.00	800.10
GRAY SHALE	1.60	801.70
LIMESTONE WITH SHALE PARTINGS	11.80	813.50
SOFT GRAY SHALE	0.80	814.30
BLACK SHALE	0.30	814.60
LIMESTONE WITH SHALE PARTINGS	23.00	837.60
SOFT GRAY SHALE	3.60	841.20
BLACK SHALE WITH COAL STREAKS	0.80	842.00
GRAY SHALE	1.10	843.10
LIMESTONE WITH SHALE PARTINGS	13.60	856.70
GRAY SHALE	9.30	866.00
DARK GRAY SHALE	6.00	872.00
COAL . . . . .	1.35	873.35
DARK GRAY SHALE	1.50	874.85
COAL . . . . .	0.20	875.05
DARK GRAY SHALE	1.50	876.55
COAL WITH SHALE STREAKS . . .	0.45	877.00
COAL . . . . .	0.77	877.77

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CONTINUATION OF DRILL HOLE NO. EM-04-05

FORMATION	STRATA THICKNESS	DEPTH FROM SURFACE
BLACK SHALE	0.30	878.07
COAL . . . . .	0.30	878.37
GRAY SHALE	0.90	879.27
COAL . . . . .	3.37	882.64
DARK GRAY SHALE	0.02	882.66
COAL . . . . .	0.10	882.76
DARK GRAY SHALE	0.02	882.78
COAL . . . . .	3.56	886.34
DARK GRAY SHALE	0.16	886.50
LIMESTONE	0.20	886.70
GRAY SHALE	1.10	887.80
LIMESTONE	2.10	889.90
GRAY SHALE	0.70	890.60
LIMESTONE	0.80	891.40
GRAY SHALE	9.10	900.50
BLACK SHALE	0.30	900.80
COAL . . . . .	0.40	901.20
GRAY CALCAREOUS SHALE	1.20	902.40
GRAY SHALE	6.00	908.40
GRAY SANDY SHALE	0.70	909.10
GRAY SANDSTONE	0.40	909.50
GRAY SHALE	0.50	910.00

TOTAL DEPTH OF HOLE = 910.00 FEET

30 BAGS CEMENT PLACED IN HOLE