

**APPENDIX A-1**

Lithologic Logs and Overburden Data for Exploration Wells Drilled in Contrary Run Watershed  
in June 2004

Hole No. DH-1  
 Surface Elevation: 1610.00  
 Form of Coal Elevations: 1551.00 Brookville  
1575.00 Clarion

Operation Name: Growing Greener, Contrary Run  
 Method of Drilling: Air rotary  
 Date Drilled: 6/3/04  
 Drilled By: L.G.HetagerDrilling, Inc.  
 Logged By: Milena F. Bucek, Bucek & Associates, Inc.  
 Township: Snow Shoe  
 County: Centre  
 Quadrangle: Snow Shoe

Groundwater Elevations and Date Measured

Surveyed by: B&AI Method: GPS  
 Remarks:

UTM's: zone \_\_\_\_\_ Northing: \_\_\_\_\_ Easting: \_\_\_\_\_  
 Latitude: 41° 4' 34.2" Longitude: 77° 56' 43.5"

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Color or Munsell Code	OBA Sample No.	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
1.0	1.0			Road fill						
4.0	3.0			Moderate yellowish brown sandy 10YR5/4 loam with sandstone and siltstone fragments		1	1-4	0.04	none	-1.50
6.0	2.0			Dark yellowish brown 10YR 4/2 medium-grained sandstone, soft		2	4-6	0.04	none	-2.25
10.0	4.0			Greenish gray 56Y6/1 with moderate yellowish brown 10YR5/4 medium- to fine-grained sandstone, soft		3	6-8	0.04	none	-1.25
15.0	5.0	10		Grayish olive 10Y4/2 fine- to medium-grained sandstone with shale interbeds		4	8-10	0.04	none	-1.25
20.0	5.0			Light olive gray 5Y5/2 siltstone and shale, with sandstone interbeds, soft		5	10-12	0.04	none	-0.50
22.0	2.0			Grayish olive 10Y4/2 shale, siltstone and very fine-grained sandstone, soft		6	12-15	0.04	none	-1.00
24.0	2.0	20		Olive gray 5Y3/2 shale and siltstone		7	15-18	0.04	none	0.25
27.0	3.0			Dark gray N3 shale and siltstone		8	18-20	0.04	none	0.25
30.0	2.0			Dark yellowish brown 10YR4/2 shale, soft		9	20-22	0.08	none	-0.75
31.0	2.0	30		Dark gray N2 shale		10	22-24	0.12	none	-0.25
34.0	3.0			Black N1 shale		11	24-27	0.06	none	2.50
35.0	1.0			Clarion coal (12")		12	27-29	0.04	none	0.75
36.0	1.0			Brownish gray 5YR4/1 shale		13	29-31	0.26	none	21.75
				Light brownish gray 5YR6/1 medium-grained sandstone, hard, dry		14	31-33	0.42	none	19.75
48.0	12.0	40				15	33-34	0.70	none	-0.50
49.0				Grayish black N5 very-fine grained sandstone, moist		16	34-35	0.88	none	-0.75
50.0				Light brownish gray 5YR6/1 medium- to fine-grained sandstone with siltstone and shale interbeds		17	35-36	1.02	none	-1.50
				Light brownish gray 5YR6/1 medium-grained sandstone, hard, moist		18	36-38	0.32	none	-1.50
				Grayish black N5 very-fine grained sandstone, moist		19	38-42	0.20	none	-1.25
				Light brownish gray 5YR6/1 medium- to fine-grained sandstone with siltstone and shale interbeds		20	42-45	0.06	none	-0.75
				Light brownish gray 5YR6/1 medium-grained sandstone, hard, moist		21	45-49	0.08	none	0.00
				Grayish black N5 very-fine grained sandstone, moist		22	49-50	0.06	none	-1.50
				Light brownish gray 5YR6/1 medium- to fine-grained sandstone with siltstone and shale interbeds		23	50-53	0.04	none	1.00
				Light brownish gray 5YR6/1 medium-grained sandstone, hard, moist		24	53-55	0.04	none	4.75
				Black N1 shale and cannel coal		25	55-57	0.22	none	1.25
				Black N1 shale and cannel coal		26	57-59	0.82	none	3.25
				Brookville coal (12")		27	59-60	1.52	none	1.00
				Medium gray N6 shale, siltstone and fine-grained sandstone		28	60-62	0.06	none	-0.75

Hole No. DH-2  
 Surface Elevation: 1645.00  
 Bottom of Coal Elevations: 1633.00 Lower Kittanning  
1616.00 Clarion  
1613.00 Clarion

Operation Name: Growing Greener, Contrary Run  
 Method of Drilling: Air rotary  
 Date Drilled: 6/3/04  
 Drilled By: L.G.HetagerDrilling, Inc.  
 Logged By: Milena F. Bucek, Bucek & Associates, Inc.  
 Township: Snow Shoe  
 County: Centre  
 Quadrangle: Snow Shoe

Groundwater Elevations and Date Measured  
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 ▽ \_\_\_\_\_  
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Laboratory: \_\_\_\_\_  
 UTM's: zone \_\_\_\_\_ Northing: \_\_\_\_\_ Easting: \_\_\_\_\_  
 Latitude: 41° 4' 51" Longitude: 77° 56' 21.6"

Surveyed by: B&AI Method: GPS  
 Remarks: \_\_\_\_\_

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Color or Munsell Code	OBA Sample No.	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential	
2.0	2.0	10		Moderate brown 5YR4/4 sandy loam							
4.0	2.0			Dark gray N3 shale		1	1-4	0.06	none	-3.00	
5.0				Black N1 shale, soft		2	4-7	0.06	none	-2.50	
9.0				Black N1 shale with coal streaks (8")		3	7-9	0.12	none	-1.75	
11.0	2.0			Lower Kittanning coal (12")		4	9-10	0.26	none	-4.25	
12.0	1.0			Dark yellowish brown 10YR4/2 very fine-grained sandstone		5	10-11	0.10	none	-1.50	
14.0	2.0			Pale yellowish brown 10YR5/2 fine- to medium-grained sandstone, soft, with occasional beds of siltstone and shale		6	11-12	0.56	none	-2.25	
6.0				Grayish black N2 shale interbedded with siltstone and sandstone		7	12-14	0.14	none	-2.00	
20.0			20		Grayish black N2 shale interbedded with siltstone and sandstone		8	14-17	0.04	none	-3.00
5.0					Black N1 shale with some coal streaks		9	17-20	0.12	none	-3.50
25.0		30		Black N1 shale with some coal streaks		10	20-22	0.04	none	-2.25	
3.0				Clarion coal (12")		11	22-25	1.24	none	-1.50	
8.0				Black shale N1 with coal streaks		12	25-28	6.02	none	-2.00	
29.0	1.0			Clarion coal (12")		13	28-29	6.06	none	-2.00	
2.0				Olive gray 5Y4/1 shale		14	29-31	0.74	none	-1.75	
31.0	2.0			Clarion coal (10")		15	31-32	0.64	none	-3.25	
32.0	1.0			Medium light gray N6 shale interbedded with siltstone and sandstone		16	32-34	0.24	none	-2.75	
34.0	2.0			Medium light gray N6 medium-grained sandstone		17	34-36	0.32	none	-1.50	
36.0	2.0				18	36-38	0.16	none	-0.75		
38.0	2.0										
		40									
		50									
		60									
		70									
		80									

Hole No. DH-3  
 Surface Elevation: 1520.00  
 Bottom of Coal Elevations: 1493.00 Clarion  
1475.00 Brookville  
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 Groundwater Elevations ▽  
 and Date Measured ▽  
▽

Operation Name: Growing Greener, Contrary Run  
 Method of Drilling: Air rotary  
 Date Drilled: 6/3/04  
 Drilled By: L.G.HetagerDrilling, Inc.  
 Logged By: Milena F. Bucek, Bucek & Associates, Inc.  
 Township: Snow Shoe  
 County: Centre  
 Quadrangle: Snow Shoe  
 Laboratory: \_\_\_\_\_

Surveyed by: B&AI Method: GPS  
 Remarks: \_\_\_\_\_

UTM's: zone \_\_\_\_\_ Northing: \_\_\_\_\_ Easting: \_\_\_\_\_  
 Latitude: 41° 4' 11.6" Longitude: 77° 56' 16.4"

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Color or Munsell Code	OBA Sample No.	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
1.0	1.0			Fill						
	4.0			Moderate brown 5YR4/4 loam (mixture of loam and fill)		1	1-4	0.14	none	-3.50
5.0	5.0			Moderate yellowish brown 10YR5/4 weathered medium-grained sandstone and shale, soft		2	4-8	0.08	none	-1.00
10.0	4.0	10		Moderate yellowish brown 10YR5/4 weathered very fine-grained sandstone, shale and siltstone		3	8-10	0.04	none	-1.00
14.0	2.0			Moderate olive brown 5Y4/4 shale and siltstone, soft		5	14-16	0.06	none	-1.00
16.0	4.0			Olive gray 5Y3/2 shale, siltstone and very fine-grained sandstone		6	16-20	0.04	none	-1.00
20.0	4.0	20		Black N1 shale and siltstone		7	20-22	0.12	none	7.00
24.0	1.0			Black N1 shale		8	22-24	0.16	none	5.75
25.0	2.0			Clarion coal (24")		9	24-25	0.64	none	0.25
27.0	2.0			Medium dark gray N4 claystone		10	25-27	3.52	none	0.50
29.0	1.0			Medium gray N5 shale		11	27-29	1.28	none	-0.75
30.0	2.0	30		Medium light gray N6 very fine-grained sandstone and siltstone, hard		12	29-30	1.20	none	0.00
32.0	5.0			Medium light gray N6 fine- to medium-grained sandstone (hard) with shale and siltstone interbeds		13	30-32	0.20	none	-0.25
37.0	3.0			Grayish black N2 shale and siltstone (hard) and very fine-grained sandstone		14	32-34	0.16	none	-0.25
40.0	2.0	40		Brownish gray 5YR4/1 medium-grained sandstone, moist, hard		15	34-37	0.06	none	0.75
42.0	2.0			Black N1 shale with coal streaks		16	37-40	0.06	none	-0.25
44.0	1.0			Brookville coal (12")		17	40-42	0.16	none	-0.50
45.0	4.0			Brownish black 5YR2/1 claystone		18	42-44	6.02	none	0.00
49.0						19	44-45	6.82	none	0.75
						20	45-48	2.12	none	1.25
						21	48-49	0.06	none	0.00

Hole No. DH-4  
 Surface Elevation: 1510.00  
 Bottom of Coal Elevations: 1476.00 Clarion  
1444.00 Brookville

Operation Name: Growing Greener, Contrary Run  
 Method of Drilling: Air rotary  
 Date Drilled: 6/3/04  
 Drilled By: L.G.HetagerDrilling, Inc.  
 Logged By: Milena F. Bucek, Bucek & Associates, Inc.

Groundwater Elevations and Date Measured  
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Township: Snow Shoe  
 County: Centre  
 Quadrangle: Snow Shoe  
 Laboratory: \_\_\_\_\_

Surveyed by: B&A Method: GPS  
 Remarks: \_\_\_\_\_

UTM's: zone \_\_\_\_\_ Northing: \_\_\_\_\_ Easting: \_\_\_\_\_  
 Latitude: 41° 4' 6.7" Longitude: 77° 55' 55.3"

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Color or Munsell Code	OBA Sample No.	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
3.0	3.0			Moderate brown 5YR4/4 sandy loam		1	1-3	0.04	none	2.50
5.0	5.0			Dark yellowish orange 10YR6/6 very fine-grained sandstone interbedded with siltstone and shale, weathered, soft		2	3-6	0.04	none	-2.50
8.0	8.0			Moderate yellowish brown 10YR5/4 medium-grained sandstone, hard		3	6-8	0.04	none	2.50
11.0	11.0	10		Moderate yellowish brown 10YR5/4 medium-grained sandstone, hard		4	8-11	0.04	none	-2.50
19.0	19.0	20		Dark yellowish brown 10YR4/2 medium-grained sandstone, hard		5	11-14	0.04	none	-2.50
25.0	25.0	20		Dark yellowish brown 10YR4/2 medium-grained sandstone, hard		6	14-17	0.04	none	2.50
30.0	30.0	30		Light brownish gray 5YR6/1 medium- to coarse-grained sandstone with thin shale and siltstone interbeds, moist		7	17-19	0.04	none	-2.50
33.0	33.0	30		Light olive gray 5Y6/1 medium-grained sandstone		8	19-22	0.04	none	0.00
34.0	34.0	30		Light olive gray 5Y6/1 medium-grained sandstone		9	22-25	0.04	none	-2.50
34.0	34.0	30		Clarion coal (12")		10	25-28	0.04	none	0.00
36.0	36.0	30		Brownish gray 5YR4/1 claystone, soft		11	28-30	0.04	none	0.00
36.0	36.0	30		Brownish gray 5YR4/1 claystone, soft		12	30-32	0.04	none	0.00
36.0	36.0	30		Brownish gray 5YR4/1 claystone with shale		13	32-33	0.06	slight	55.00
40.0	40.0	40		Brownish gray 5YR4/1 claystone with shale		14	33-34	2.84	none	2.50
44.0	44.0	40		Medium gray N5 medium-grained sandstone with shale and siltstone interbeds, hard		15	34-36	0.52	none	0.00
44.0	44.0	40		Medium gray N5 medium-grained sandstone with shale and siltstone interbeds, hard		16	36-38	0.22	none	0.00
44.0	44.0	40		Medium gray N5 medium-grained sandstone with shale and siltstone interbeds, hard		17	38-40	0.50	none	0.00
44.0	44.0	40		Medium gray N5 medium-grained sandstone with shale and siltstone interbeds, hard		18	40-44	0.26	none	5.00
44.0	44.0	40		Medium gray N5 medium-grained sandstone with shale and siltstone interbeds, hard		19	44-47	0.06	none	5.00
44.0	44.0	40		Medium gray N5 medium-grained sandstone with shale and siltstone interbeds, hard		20	47-50	0.06	none	7.50
44.0	44.0	40		Medium gray N5 medium-grained sandstone with shale and siltstone interbeds, hard		21	50-52	0.06	none	8.00
44.0	44.0	40		Black N1 shale with siltstone, hard		22	52-55	0.14	none	22.50
44.0	44.0	40		Black N1 shale with siltstone, hard		23	55-58	0.14	none	22.50
44.0	44.0	40		Black N1 shale		24	58-60	0.12	none	22.50
44.0	44.0	40		Black N1 shale		25	60-62	0.24	none	25.00
44.0	44.0	40		Black N1 shale		26	62-64	1.06	none	22.50
44.0	44.0	40		Brookville coal and shale		27	64-65	0.20	none	17.50
44.0	44.0	40		Brookville coal and shale		28	65-66	0.52	none	17.00
44.0	44.0	40		Brookville coal (12")		29	66-68	0.40	none	16.50
44.0	44.0	40		Black N1 clayey shale, claystone						

Hole No. DH-5  
 Surface Elevation: 1590.00  
 Bottom of Coal Elevations: 1545.50 Clarion  
1518.00 Brookville

Operation Name: Growing Greener, Contrary Run  
 Method of Drilling: Air rotary  
 Date Drilled: 6/3/04  
 Drilled By: L.G.HetagerDrilling, Inc.  
 Logged By: Milena F. Bucek, Bucek & Associates, Inc.  
 Township: Snow Shoe  
 County: Centre  
 Quadrangle: Snow Shoe

Groundwater Elevations and Date Measured  
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UTM's zone \_\_\_\_\_ Northing: \_\_\_\_\_ Easting: \_\_\_\_\_  
 Latitude: 41° 4' 16.7" Longitude: 77° 55' 30.3"

Surveyed by: B&AI Method: GPS  
 Remarks: \_\_\_\_\_

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Color or Munsell Code	OBA Sample No.	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
2.0	2.0			Refuse		1	1-2	0.20	none	-2.50
				Spoil		2	2-8	0.04	none	-1.50
		10				3	8-13	0.04	none	-1.00
						4	13-18	0.04	none	-2.00
						5	18-20	0.04	none	-2.50
20.0	20.0	20		Light olive gray 5Y5/2 to moderate yellowish brown 10YR5/4 medium- to coarse-grained sandstone, weathered, soft		6	20-23	0.04	none	-0.50
	5.0					7	23-25	0.04	none	-0.50
25.0	25.0	30		Pale yellowish brown 10YR6/2 medium-grained sandstone		8	25-28	0.04	none	-1.00
28.0	28.0			Light olive gray 5Y5/2 medium- to coarse-grained sandstone, hard		9	28-32	0.04	none	-0.25
32.0	32.0			Olive gray 5Y4/1 coarse-grained sandstone; alternating beds of weathered (soft) and unweathered medium-grained sandstone with shale and siltstone interbeds		10	32-36	0.04	none	-4.25
	8.0					11	36-40	0.04	none	-2.25
40.0	40.0	40		Dark gray N2 shale		12	40-43	0.06	none	19
43.0	43.0			Clarion coal (16")		13	43-44	1.00	none	-1.00
44.5	44.5			Coal and shale		14	44-45	7.82	none	-3.25
45.0	45.0			Black N1 shale		15	45-46	2.46	none	-2.50
46.0	46.0			medium gray N5 clayey shale						
47.0	47.0			Olive gray 5Y4/1 shale		16	46-50	1.18	none	7.50
	6.0	50				17	50-53	0.30	none	5.75
53.0	53.0			Black N1 shale		18	53-55	0.10	none	7.50
55.0	55.0			Olive gray 5Y4/1 shale and siltstone		19	55-58	0.14	none	5.50
58.0	58.0			Olive gray 5Y4/1 medium-grained sandstone with shale and siltstone		20	58-60	0.16	none	16.25
60.0	60.0	60		Medium gray N5 to grayish black N2 shale and siltstone		21	60-64	0.14	none	12.00
	7.0					22	64-67	0.10	none	14.50
67.0	67.0			Black N1 shale		23	67-70	0.16	none	25.50
71.0	71.0	70		Brookville coal (12")		24	70-71	0.22	none	5.50
72.0	72.0			Dark gray N3 siltstone and fine-grained sandstone		25	71-72	1.70	none	6.25
	1.0					26	72-73	0.58	none	4.50
	4.0			Medium light gray N7 medium-grained sandstone, hard		27	73-74	0.76	none	-1.00
76.0	76.0	80								

Hole No. DH-5  
 Surface Elevation: 1590.00  
 Bottom of Coal Elevations: 1545.50 Clarion  
1518.00 Brookville

Operation Name: Growing Greener, Contrary Run  
 Method of Drilling: Air rotary  
 Date Drilled: 6/3/04  
 Drilled By: L.G.HetagerDrilling, Inc.  
 Logged By: Milena F. Bucek, Bucek & Associates, Inc.  
 Township: Snow Shoe  
 County: Centre  
 Quadrangle: Snow Shoe  
 Laboratory: \_\_\_\_\_  
 UTM's: zone \_\_\_\_\_ Northing: \_\_\_\_\_ Easting: \_\_\_\_\_  
 Latitude: 41° 4' 16.7" Longitude: 77° 55' 30.3"

Groundwater Elevations and Date Measured  
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Surveyed by: B&A Method: GPS  
 Remarks: \_\_\_\_\_

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Color or Munsell Code	OBA Sample No.	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
9.0			[Dotted Pattern]							
85.0										
		90								
		100								
		110								
		120								
		130								
		140								
		150								
		160								

Hole No. DH-6  
 Surface Elevation: 1610.00  
 Bottom of Coal Elevations: 1592.00 Clarion  
1548.00 Mercer

Operation Name: Growing Greener, Contrary Run  
 Method of Drilling: Air rotary  
 Date Drilled: 6/3/04  
 Drilled By: L.G.HetagerDrilling, Inc.  
 Logged By: Milena F. Bucek, Bucek & Associates, Inc.  
 Township: Snow Shoe  
 County: Centre  
 Quadrangle: Snow Shoe  
 Laboratory: \_\_\_\_\_

Groundwater Elevations and Date Measured  
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Surveyed by: B&AI Method: GPS  
 Remarks: \_\_\_\_\_

UTM's zone \_\_\_\_\_ Northing: \_\_\_\_\_ Easting: \_\_\_\_\_  
 Latitude: 41° 4' 44.9" Longitude: 77° 55' 23.3"

Depth	Thick-ness	Scale	Graphic Log	Lithologic Description and Water Conditions	Color or Munsell Code	OBA Sample No.	Log Interval	% Total Sulfur	Fizz Rating	Neutralization Potential
15.0	10			Moderate yellowish brown 10YR5/4 medium-grained sandstone, moderate to hard		1	3-5	0.04	none	-5.00
17.0	2.0			Grayish brown 5YR3/2 medium-grained sandstone		2	5-9	0.04	none	-3.25
18.0	1.0			Clarion coal (11")		3	9-12	0.04	none	-6.00
20.0	2.0			Black N1 shale		4	12-15	0.04	none	-2.00
20.0	20			Medium dark gray N3 shale with iron/manganese coating on fracture faces interbedded with siltstone		5	15-17	0.04	none	-2.00
30.0	30			Dark gray N3 shale, hard, with siltstone interbeds		6	17-18	0.28	none	-8.25
37.0	7.0			Black N1 shale		7	18-20	0.04	none	-3.75
40.0	40			Medium dark gray N3 very fine- to medium-grained sandstone, hard		8	20-22	0.04	none	-3.75
50.0	50			Medium gray N3 medium-grained sandstone, hard, dry; with occasional beds of siltstone and shale		9	22-25	0.04	none	-1.75
54.0	54			Light olive gray 5Y6/1 medium-grained sandstone, micaceous		10	25-28	0.08	none	-1.50
59.0	59			Sandstone/coal - mixed		11	28-30	0.10	none	2.50
60.0	60			Mercer coal (18")		12	30-34	0.08	none	26.25
61.5	61.5			Brownish gray 5YR4/1 clayey shale		13	34-37	0.08	none	19.00
64.0	64			Brownish gray 5YR4/1 clayey shale		14	37-40	0.04	none	-0.50
				Sandstone/coal - mixed		15	40-43	0.08	none	5.25
				Sandstone/coal - mixed		16	43-46	0.04	none	1.75
				Sandstone/coal - mixed		17	46-50	0.04	none	3.25
				Sandstone/coal - mixed		18	50-54	0.04	none	18.25
				Sandstone/coal - mixed		19	54-57	0.04	none	1.25
				Sandstone/coal - mixed		20	57-59	0.04	none	2.50
				Sandstone/coal - mixed		21	59-60	0.56	none	-2.75
				Sandstone/coal - mixed		22	60-61.5	3.52	none	-2.75
				Sandstone/coal - mixed		23	61-62	0.16	none	-2.75
				Sandstone/coal - mixed		24	62-63	0.10	none	-0.25